Scientific Refereed Quarterly

Sosyoekonomi

Vol. 30(51) January 2022 ISSN 1305-5577

SOSYOEKONOMİ

Peer-Reviewed, Scientific, Quarterly Hakemli, Bilimsel, Süreli

Sosyoekonomi Society Sosyoekonomi Derneği

January 2022, Vol. 30(51) ISSN 1305-5577

www.sosyoekonomijournal.org

Publisher / Derginin Sahibi	:	On Behalf of Sosyoekonomi Society / Sosyoekonomi Derneği Adına
Editor-in-Chief / Yayın Kurulu Başkanı (Sorumlu Yazı İşleri Müdürü)		**Ahmet Burçin YERELİ** editor@sosyoekonomijournal.org
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Title of Journal / Yayının Adı	:	Sosyoekonomi Journal Sosyoekonomi Dergisi
Type of Journal / Yayının Türü	:	Periodical Yaygın, Süreli Yayın
Frequency and Language / Yayının Şekli ve Dili	:	Quarterly, English & Turkish 3 Aylık, İngilizce & Türkçe
Directorial Address / Yayının İdare Adresi	:	Sosyoekonomi Derneği, Cihan Sokak, 27/7 06430 Sıhhiye / ANKARA Tel: +90 312 229 49 11 Fax: +90 312 230 76 23
Printing House / Basım Yeri	:	Sonçağ Yayıncılık Matbaacılık Reklam San. Tic. Ltd. Şti. İstanbul Caddesi, İstanbul Çarşısı, 48/48, İskitler / ANKARA Tel: +90 312 341 36 67
Place and Date of Print / Basım Yeri ve Tarihi	:	Ankara, 31.01.2022
Abstracting-Ranking-Indexing / Dizin	:	*Emerging Sources Citation Index (ESCI), Tübitak - ULAKBİM TR Dizin, EconLit, EBSCO, SOBIAD, ProQuest, RePEc (Research Papers in Economics), IDEAS, EconPapers.*

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Content

Executive Summary

The objective of our journal is to publish up-to-date, high-quality, and original research papers. In our 30th volume, 51st issue, we present twenty-five studies, including socio-economic-based findings and reviews, broadly containing research papers. Research papers provide a clear contribution to knowledge in the field with solid theoretical and/or methodological support and provide a critical, concise yet comprehensive, and contemporary examination of economics in real life and its applications.

The opening article of this issue investigates the effect of technological innovations on the environmental quality in 1995-2017 for the selected OECD countries and determines Environmental Kuznets Curve. Quite surprisingly, Özpolat and Nakıpoğlu-Özsoy found that technological innovations reduce environmental degradation, yet energy use and urbanization have the opposite effect. When it comes to technology and innovations, it is necessary to mention the works of Acar and Sever. The study that analyses the impact of innovation on employment in Turkey pointed out the positive effects of high-tech goods exports and research and development activities on employment. In contrast, patent applications for the final product from innovation did not create the same result.

The third study is about monopoly cities, which has been frequently mentioned in the literature for decades. According to the evaluations made by Isabetli-Fidan and Şeker in terms of inequality between 2007 and 2018, it has been determined that Istanbul has the characteristics of being a monopoly city. After this study, which evaluates the concept of the city in the broadest possible sense, I would like to introduce another study that analyzes both at the urban and rural levels. Çebi-Karaaslan, Oktay wrote the article, and Alkan, the fourth study of our issue, aims to determine the demographic, economic factors, housing characteristics, and social-environmental indicators that affect household savings in Turkey. While Günay and Bayraktaroğlu's study titled "*Analysis of the Effects of the Central Bank's Interest Announcements on Tourism Index Returns* "is the fifth study; Çelik and Bayrak's paper on democracy, terrorism, and foreign direct investments for both developing and developed countries is the sixth study of this issue.

The subject of the seventh article, which is one of the remarkable studies in this issue and prepared by Öngel, Günsel, and Bozkurt, is the phenomenon of suicide. The study, which investigates whether suicide cases can be handled socially and economically, revealed that socio-economic evaluations could only be valid for Turkey's 15 to 24 age group. Karabacak and Mecik, on the other hand, evaluated a well-known issue in terms of causality with current data, but they encountered a somewhat surprising fact. They determined that the income per capita in Turkey did not change the tax structure and did not show any change in favour of direct taxes to ensure fairness in income distribution. This contribution is valuable to public finance researchers.

Küçükkambak and Süler's study that establishes a relationship between the fear of Covid and purchasing enters the issue as the ninth study; The study of Demirtaş and Ilıkkan-Özgür, which also draws attention with its emphasis on health, which analyses the effects of information communication technologies and air pollution on public health expenditures, is included as the tenth study in the issue. The eleventh study is related to the phenomenon of migration, which has been one of the hot topics for Turkey recently. The study prepared by Sancar and Akbaş tested whether there was a relationship between migration, unemployment, and urbanization based on the Harris-Todaro model in 12 regions of Turkey for the period of 2008-2019 or not. The result reveals that the model is valid in six regions of 12 regions and not valid in six regions. The following study, which investigates the direct effects of brand trust and environmental awareness on the intention to repurchase a brand, examines the subject of brand trust, brand sensitivity, and resistance to negative information. The study by Gültekin and Kılıç, which aims to investigate the direct effects of brand trust and environmental awareness on the intention to repurchase a brand, examines the subject within the framework of brand trust, brand sensitivity, and resistance to negative information. The thirteenth study, Aydoğdu-Bağcı, and Sever aim to investigate the effect of taxes on income, wealth, and expenditures, which are tax types according to their sources, on economic growth by Panel ARDL analysis since it allows the evaluation for both stationary and non-stationary data.

The fourteenth article, written by Polat and Eş-Polat, on the Covid 19 disease coincides with one of the financial crisis periods in which financial connectivity tends to rise. The relationship between cryptocurrencies and cryptocurrencies in this period is among the interesting and highly recommended studies. When injustices in income distribution have become one of the biggest threats to social peace, tourism is considered one of the sectors supporting social and economic welfare with significant positive effects on employment generation and economic growth. For this reason, the fifteenth study, Alılı, Özer, and Erkan, aimed to examine the validity of the Kuznets curve hypothesis between 1995 and 2018 in Turkey. While the sixteenth study prepared by Çirkin and Göksel is to determine the determinants of the foreign trade liberalization and unemployment within the framework of the

heterogeneous firm model, the following article, Tekin, and Demirel investigate the impact of scientific and technological performance on economic growth. Similarly, in the eighteenth study, Acar dealt with transparency, one of the performance criteria, in terms of audit revenues and tried to determine the factors affecting independent audit fees.

While performance is one of the important issues that public finance deals with, another paper in public finance is the nineteenth article dealing with tax flexibility and public sector size. In the analysis of Gürler-Hazman and Kaya for the period 1990-2019, only a one-way causality in the long term was determined. Foreign trade, which is the intersection of public finance and economics, is the subject of the following study. The relationship between E7 countries and Turkey was evaluated by Tekin and Merdivenci between 2000 and 2018, and a positive and significant relationship was found with GDP and population.

Our issue includes significant, remarkable, and luring academic studies. Another of these is the twenty-first study, which deals with the employment relationship between the adult and youth population. The job quality of young people, who are more disadvantaged than adults in working life, was evaluated according to the "*labour market segmentation theory*" in this study. Erdem-Karahanoğlu and Kumaş found that the socio-demographic characteristics of young people, the sector they work in, their profession, and the region they live in affect the probability of having a good job. Subsequently, the twenty-second article in our issue deals with the relationship between inflation and income inequality, another issue where the economy and public finances intersect, by Aktaş and Dokuzoğlu.

When the covid-19 epidemic is still going on, health-related issues are very typical to come to the fore. The third study on Covid19 in this issue deals with the effects of vaccine and corona disease news on Borsa İstanbul. Based on the findings obtained by Özdemir and Hiçyılmaz, it has been determined that the first event day and the second event day caused mostly abnormal losses on the sectors, and the third event day caused positive abnormal returns on the sectors.

While the first of the last two studies in this issue, Nacar and Karabacak determine the effective tax burden on labor, capital, and consumption in Turkey, in the second, the applicability of the "*brain drain tax"* proposed by Bhagwati was evaluated by Yavan. Both studies, which will be published as the twenty-fourth and the twenty-fifth study, are precious in their contributions to the literature.

We hope you will share our enjoyment and academic pleasure while reading this issue. We are truly grateful for your ongoing interest in our journal.

Sevilay Ece GÜMÜŞ-ÖZUYAR
Editorial Board Member

Editörün Notu

Dergimizin amacı, güncel, kaliteli ve özgün araştırma makaleleri yayınlamaktır. 30. cildimizin 51. sayısında sosyoekonomik temelli bulgu ve incelemeleri içeren yirmi beş çalışmayı sunuyoruz ki sayı genel olarak araştırma makalelerini içermektedir. Araştırma makaleleri, sağlam teorik ve/veya metodolojik destekle alandaki bilgiye açık bir katkı sağlar ve gerçek hayatta ve uygulamalarında ekonominin eleştirel, özlü ancak kapsamlı ve çağdaş bir incelemesini gerçekleştirir.

Bu sayının açılış makalesi, seçilmiş OECD ülkeleri için 1995-2017 yıllarında teknolojik yeniliklerin çevre kalitesi üzerindeki etkisini araştırmak ve Çevresel Kuznets Eğrisini belirlemeye çalışmaktadır. Oldukça şaşırtıcı bir şekilde Özpolat ve Nakıpoğlu-Özsoy teknolojik yeniliklerin çevresel bozulmayı azalttığı, ancak enerji kullanımı ve kentleşmenin tam tersi bir etkiye sahip olduğunu ortaya koymuştur. Teknoloji ve yenilikler denilince Acar ve Sever'in eserlerinden bahsetmek gerekmektedir. Türkiye'de inovasyonun istihdam üzerindeki etkilerini analiz eden çalışmada, yüksek teknolojili mal ihracatı ve araştırma geliştirme faaliyetlerinin istihdam üzerindeki olumlu etkilerine dikkat çekilirken, inovasyondan kaynaklanan nihai ürün için patent başvurularının aynı sonucu vermediği belirtilmiştir.

Üçüncü çalışma ise literatürde son birkaç on yıldır adından sıkça söz ettiren monopol şehirler üzerinedir. İsabetli-Fidan ve Şeker tarafından 2007-2018 yılları arasında eşitsizlik açısından yapılan değerlendirmelere göre İstanbul'un monopol şehir olma özelliklerini taşıdığı saptanmıştır. Kent kavramını en geniş anlamıyla değerlendiren bu çalışmadan sonra hem kentsel hem de kırsal düzeyde analiz eden bir başka çalışmayı tanıtmak isterim. Sayımızın dördüncü çalışması olan ve Çebi-Karaaslan, Oktay ve Alkan tarafından yazılan makalede, Türkiye'de hanehalkı tasarrufunu etkileyen demografik, ekonomik faktörler, konut özellikleri ve sosyal-çevresel göstergelerin belirlenmesi amaçlanmaktadır. Günay ve Bayraktaroğlu'nun "*Merkez Bankası Faiz Açıklamalarının Borsa İstanbul Turizm Endeksi Getirilerine Etkisi*" başlıklı çalışması beşinci çalışma olurken; Çelik ve Bayrak'ın hem gelişmekte olan hem de gelişmiş ülkeler için demokrasi, terör ve doğrudan yabancı yatırımlar konusundaki makalesi, sayımızın altıncı çalışmasıdır.

Bu sayıda dikkat çeken çalışmalardan biri olan ve Öngel, Günsel ve Bozkurt tarafından hazırlanan makalenin konusu ise intihar olgusudur. İntihar vakalarının sosyal ve ekonomik açıdan ele alınıp alınamayacağını araştıran çalışma, Türkiye için sosyoekonomik değerlendirmelerin ancak 15-24 yaş grubu için geçerli olabileceğini ortaya koymaktadır. Karabacak ve Mecik ise bilinen bir konuyu nedensellik açısından güncel verilerle değerlendirirken oldukça şaşırtıcı bir gerçekle karşılaşmışladır. Türkiye'de kişi başına düşen gelirin vergi yapısını değiştirmediğini ve gelir dağılımında adaleti sağlayacak şekilde doğrudan vergiler lehine bir değişiklik göstermediğini tespit etmişlerdir. Bu katkı, kamu maliyesi araştırmacıları için oldukça değerlidir.

Küçükkambak ve Süler'in Covid korkusu ile satın alma arasında ilişki kuran çalışması, sayıya dokuzuncu çalışma olarak girerken; Demirtaş ve Ilıkkan-Özgür'ün sağlık vurgusu ile de dikkat çeken, bilgi iletişim teknolojileri ve hava kirliliğinin kamu sağlık harcamaları üzerindeki etkilerini inceleyen çalışması ise onuncu çalışma olarak sayıda yer bulmuştur. On birinci çalışma, Türkiye'nin son dönemde en çok konuşulan konularından biri olan göç olgusuyla ilgilidir. Sancar ve Akbaş tarafından hazırlanan çalışma, 2008-2019 döneminde Türkiye'nin 12 bölgesinde Harris-Todaro modeline göre göç, işsizlik ve kentleşme arasında bir ilişki olup olmadığını test etmiştir. Sonuç, modelin 12 bölgenin altı bölgesinde geçerli olduğunu ve altı bölgede geçerli olmadığını ortaya koymaktadır. Gültekin ve Kılıç tarafından marka güveni ve çevre bilincinin bir markayı tekrar satın alma niyeti üzerindeki doğrudan etkilerini araştırmayı amaçlayan çalışma ise, marka güveni, marka duyarlılığı ve olumsuz bilgilere direnç çerçevesinde konuyu incelemektedir. On üçüncü çalışmada Aydoğdu-Bağcı ve Sever, kaynaklarına göre vergi türleri olan gelir, servet ve harcamalar üzerindeki vergilerin hem durağan hem de durağan olmayan verilerin değerlendirilmesine olanak sağlaması nedeniyle ekonomik büyüme üzerindeki etkisini Panel ARDL analizi ile araştırmayı amaçlamaktadır.

Polat ve Eş-Polat tarafından yazılan ve finansal bağlantının yükselme eğiliminde olduğu finansal kriz dönemlerinden birine denk gelen Covid-19 hastalığı ve bu dönemde kripto paralar ile kripto paralar arasındaki ilişkiyi konu alan on dördüncü makale, bu konuda ilgi çeken ve okunması şiddetle tavsiye edilen çalışmalar arasında yer almaktadır. On beşinci çalışmada ise Alılı, Özer ve Erkan, Kuznets eğrisi hipotezinin Türkiye'de 1995-2018 yılları arasındaki geçerliliğini incelemeyi amaçlamıştır. Gelir dağılımındaki adaletsizliklerin toplumsal barışa yönelik en büyük tehditlerden biri haline geldiği günümüzde, turizm hem istihdam yaratma hem de ekonomik büyüme üzerinde önemli olumlu etkileri olan sosyal ve ekonomik refahı destekleyen sektörlerden biri olarak kabul edilmektedir. Çirkin ve Göksel tarafından hazırlanan on altıncı çalışmanın amacı, heterojen firma modeli çerçevesinde dış ticaret liberalizasyonu ve işsizliğin belirleyicilerini belirlemek iken, takip eden makalede Tekin ve Demirel bilimsel ve teknolojik performansın ekonomik büyüme üzerindeki etkisini araştırmaktadır. Benzer

şekilde on sekizinci çalışmada da Acar, performans kriterlerinden biri olan şeffaflığı, denetim gelirleri açısından ele almış ve bağımsız denetim ücretlerini etkileyen faktörleri belirlenmeye çalışmıştır.

Performans, kamu maliyesinin ilgilendiği önemli konulardandır ve kamu maliyesi alanında bu sayıdaki bir diğer çalışma, vergi esnekliği ve kamu kesimi boyutunu ele alan on dokuzuncu makaledir. Gürler-Hazman ve Kaya'nın 1990-2019 dönemi için yaptığı analizde uzun vadede sadece tek yönlü bir nedensellik tespit edilmiştir. Hem kamu maliyesi hem de ekonominin kesişim noktası olan dış ticaret ise takip eden yirminci çalışmanın konusunu oluşturmaktadır. Tekin ve Merdivenci, 2000-2018 yılları arasında E7 ülkeleri ile Türkiye arasındaki ilişki değerlendirilmiş ve GSYİH ve nüfus ile pozitif ve anlamlı bir ilişki bulunmuştur.

Sayımız önemli, dikkat çekici ve cezbedici akademik çalışmaları içermektedir. Bu niteliği taşıyan çalışmalardan bir diğeri, yetişkin ve genç nüfus arasındaki istihdam ilişkisini ele alan yirmi birinci çalışmadır. Çalışma hayatında yetişkinlere göre daha dezavantajlı olan gençlerin iş kalitesi bu çalışmada "*tabakalı işgücü piyasası kuramı*"na göre değerlendirilmiştir. Erdem-Karahanoğlu ve Kumaş, gençlerin sosyo-demografik özellikleri, çalıştıkları sektör, meslekleri ve yaşadıkları bölgenin iyi bir işte çalışma olasılığını önemli ölçüde etkilediğini tespit etmişlerdir. Akabinde sayımızda yer alan yirmi ikinci makale ise ekonomi ve kamu maliyesinin kesiştiği bir başka konu olan enflasyon ve gelir eşitsizliği arasındaki ilişki Aktaş ve Dokuzoğlu tarafından ele alınmıştır.

Covid-19 salgınının hala devam ettiği günlerde sağlıkla ilgili konuların gündeme gelmesi de oldukça normaldir. Bu sayıdaki Covid-19 ile ilgili üçüncü çalışma, aşı ve korona hastalığı haberlerinin Borsa İstanbul'a etkilerini ele almaktadır. Özdemir ve Hiçyılmaz tarafından elde edilen bulgulara dayalı olarak, birinci olay günü ve ikinci olay gününün sektörlerde çoğunlukla anormal kayıplara neden olduğu, üçüncü olay gününün ise sektörlerde pozitif anormal getirilere neden olduğu tespit edilmiştir.

Sayımızda yer alan son iki çalışmadan ilkinde, Nacar ve Karabacak, Türkiye'de emek, sermaye ve tüketim üzerindeki efektif vergi yükü hakkında tespitler yaparken; ikincisinde ise Bhagwati tarafından önerilen "*beyin göçü vergisinin*" uygulanabilirliği Yavan tarafından değerlendirilmiştir. Yirmi dördüncü ve yirmi beşinci çalışma olarak yayımlanacak olan her iki çalışma da literatüre katkıları açısından oldukça değerlidir.

Bu sayımızı okurken aldığımız zevke ve akademik zevkimize ortak olacağınızı umuyoruz. Dergimize gösterdiğiniz ilgiye samimiyetle minnettarız.

Sevilay Ece GÜMÜŞ-ÖZUYAR

Yayın Kurulu Üyesi

Sosyoekonomi

2022, Vol. 30(51), 11-31

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.01
Date Submitted: 11.06.2020
Date Revised: 23.10.2021
Date Accepted: 02.01.2022

The Effect of Technological Innovations on Environmental Quality in Selected OECD Countries

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Seçili OECD Ülkelerinde Teknolojik Yeniliklerin Çevre Kalitesi Üzerine Etkisi

Abstract

This study aims to examine the effect of technological innovations on the environmental quality in 1995-2017 for the selected OECD countries and to determine Environmental Kuznets Curve. While carbon emission is the dependent variable, patent applications, GDP per capita, energy use, and urbanization are used as control variables in the model. Second-generation panel analysis has been estimated to examine the link between technological innovations and environmental quality. According to the results obtained, Environmental Kuznets Curve is not valid in selected OECD countries. Technological innovation decreases environmental degradation while energy use and urbanization increase degradations.

Keywords : Environmental Kuznets Curve, Technological Innovation, Environmental Degradation.

JEL Classification Codes : K32, O13, O44.

Öz

Bu çalışmada, seçili OECD ülkeleri için 1995-2017 yılları arasında teknolojik yeniliklerin çevre kalitesi üzerindeki etkisinin incelenmesi ve Çevresel Kuznets Eğrisinin belirlenmesi amaçlanmıştır. Karbon emisyonu bağımlı değişken iken, patent başvuruları, kişi başına düşen GSYİH, enerji kullanımı ve kentleşme modelde kontrol değişken olarak kullanılmıştır. Teknolojik yenilikler ve çevresel kalite arasındaki bağlantıyı incelemek için ikinci nesil panel analizi tahmin edilmiştir. Elde edilen sonuçlara göre, Çevresel Kuznets Eğrisi seçili OECD ülkelerinde geçerli değildir. Teknolojik yenilik, çevresel bozulmayı azaltırken, enerji kullanımı ve şehirleşme de bozulmaları artırmaktadır.

Anahtar Sözcükler : Çevresel Kuznets Eğrisi, Teknolojik Yenilik, Çevresel Bozulma.

1. Introduction

Due to the connection of the energy sector with other sectors of the economy, both energy supply and energy demand have an important place in the economy. Energy has an important place in raising the welfare levels of societies and determining the countries' international policies. Therefore, energy is the primary source of economic growth and industrialization (Paul & Bhattacharya, 2004). Moreover, the rapid change and transformation in the general structure of the economy required more energy use.

According to the United Nations Statistics, the world population, which is 7.78 billion today, is increasing rapidly. 55% of the population lives in urban areas, according to 2018 data, and it is expected to increase to 60% in 2030 and to 68% in 2050. This rapid increase in the population caused the necessary measures to protect the environmental quality (UN, 2018). As stated in some of the studies, it is seen that urban residents tend to consume more than those living in rural areas, and it is observed that approximately 71-76% of carbon emissions and 67-76% of global energy use occur in urban areas (Seto et al., 2014; UN, 2017). Rapid urbanization happening worldwide creates problems in meeting basic services such as education, health, transportation, infrastructure, housing, employment, and a clean environment. On the other hand, with the increasing economic activities, fast and incorrect urbanization causes several negative externalities and environmental quality deterioration, such as causing excessive use and unnecessary use of resources.

Technological innovations and R&D expenditures are also crucial for ensuring energy efficiency and environmental sustainability (Jones, 2002; Fisher-Vanden et al., 2004; Zhou et al., 2010). Although there are approaches to increase energy efficiencies, such as political precaution or controls, there is a direct relationship between energy efficiency and technological innovation. Advanced technological innovations reduce energy use in the economy, increase energy efficiency and lead to more output with less energy input (Zhou et al., 2010; Sohag et al., 2015). Thus, technological innovation increases efficiency in energy use and encourages renewable energy sources. However, there is a contradiction in reducing energy use. Thanks to technological innovations, reducing energy use lowers energy prices; on the other hand, it may cause economic agents who want to benefit from low energy prices to use more energy (Greening et al., 2000). The effectiveness of technological innovation has attracted the attention of governments. It has led policymakers to play an active role in ensuring sustainable economic growth, reducing polluting emissions, and promoting clean energy sources. Patent applications or numbers, one of the most important indicators of technological innovation, also play a crucial role in increasing environmental quality. Therefore, there are some superiorities of using the numbers of patent applications to mitigate environmental degradation: i) Firstly, to contribute to the improvement of environmental quality in the world, large amounts of incentives are given to R&D investments and patent applications every year. ii) Patent applications may have a determining feature for the technological innovations and carbon emission relationship. iii) On the other hand, patent rights protect technological development (Sandner & Block, 2011).

The article tries to find answers to the effects of technological developments on environmental degradation. Considering that OECD countries are industrialized countries, technological developments directly impact carbon emissions. In this case, the significance of the statistical results obtained is essential. In addition, patent applications were used as an indicator of technological development in the study. The main point that distinguishes this study from studies in this field is patent applications as an indicator. In addition, there are many studies on environmental degradation. When the data is used, country group and time dimension are taken into account, and the results differ. The econometric methods and data sets used in this study are also indicators of the difference. Based on this, our motivation depends on the deficiencies of previous studies.

From the point of this view, the study frame is generally prepared as the following: section 1 reviewed the studies and findings on environmental quality, energy use, urbanization, and technological innovations as two-sub sections. Section 3 describes data and methodology. The results are given in Section 4 and based on the results, conclusions and policy recommendations are in section 5.

2. Literature Review

In the literature about environmental degradation, empirical studies have extensively focused on the relationship between economic growth, energy consumption, and CO_2 emissions (see, for example, Marrero, 2010; Pao & Tsai, 2010; Sharma, 2011; Asongu, 2017). However, these studies ignored the role of R&D activities. For this purpose, studies on environmental economics are divided into two parts in the literature section. In the first part, the studies investigating the relationship between economic growth, energy consumption, and environmental pollution are given. In the second part, a literature review will be conducted on the relationship between R&D activities-economic growth and environmental degradation.

2.1. Economic Growth, Energy Consumption, and Environmental Pollution

In studies related to environmental pollution, it is seen that the effects of independent variables on carbon emissions are generally examined. In the literature, environmental degradation is often represented by CO_2 emissions. The relationship between energy consumption, total CO_2 emissions, and real output has been investigated frequently and is referred to as Environmental Kuznets Curve (EKC) in economic literature. The EKC hypothesis states that emissions will increase to the income threshold and decrease as income increases. Therefore, an inverted-U shape pattern between real output and CO_2 emissions addresses a one-way causality relationship from income to emissions (Apergis & Payne, 2009: 650). There are three effects on the formation of an inverted U shape curve. The first effect is the scale effect, which states that economic growth harms the environment. Accordingly, economic growth causes environmental damages, and greenhouse gas emissions increase. The second effect is the composition effect. Therefore, the composition effect refers that economic growth positively impacts the environment. The final effect is

the technological effect. Accordingly, economic growth with clean and new energy sources positively affects the environment. Therefore, while the scale effect is valid in the first stage of economic growth, the composition and technological effects are valid in the following periods (Saboori, 2012: 185). Looking at the studies showing the existence of a parabolic relationship between economic growth and carbon emissions, it is seen that Ang (2007) found the inverse U-shaped relationship between economic growth and carbon emissions in France in the 1960-2000 period. Jalil and Mahmud (2009) obtained a parabolic relationship between carbon emissions and economic growth from 1975 to 2005 in China.

In the study of Pao and Tsai (2010), which tested the validity of the EKC hypothesis in BRICS (Brazil, Russia, India, and China), the findings showed that the EKC hypothesis is valid in all three countries except Russia. Jalil and Feridun (2011) probed the association between China's economic growth, energy consumption, and pollution between 1953 and 2006. According to the results of the ARDL approach, CO_2 emissions are determined by income and energy consumption in the long run. In addition, it is concluded that the Environmental Kuznets Curve in China is valid. In addition, Sinha and Shahbaz (2018), in their study of the effect of economic growth on carbon emissions, concluded an inverse U-shaped relationship in India from 1971 to 2015. Dong et al. (2018) stated that the EKC hypothesis in China was valid for 1993-2016. Danish et al. (2019) examined the impact of economic growth on carbon emissions in BRICS countries and concluded that the EKC hypothesis is valid in other BRICS countries, except India, in 1990-2015.

On the other hand, Friedl and Getzner (2003) found a cubic relationship between economic growth and carbon emission in Austria in 1960-1999, while He and Richard (2010) concluded a monotonic relationship in Canada during 1948-2004. In addition, Al-Mulali et al. (2015a) concluded that the EKC hypothesis was not valid in Vietnam in 1981-2011, while Ahmad and Du (2017) reported a positive relationship between economic growth and carbon emissions in Iran during the period 1971-2011. Murthy and Gambhir (2018) tested the nonlinear relationship between economic growth and India's carbon emissions from 1991-2014. They found an N-shaped relationship between economic growth and carbon emissions, in which the EKC hypothesis was not valid.

Apergis and Payne (2010) examined the relationship between energy consumption, economic output, and CO_2 emissions for 11 countries between 1992 and 2004. According to the study results, a two-way causality relationship from energy consumption to economic output and a one-way causality relationship between CO_2, energy consumption, and economic output was obtained in the short term. Therefore, it was concluded that the feedback hypothesis was valid in the study. In addition, a two-way causality relationship between CO2 emissions and energy consumption in the long term was found in the study. Therefore, the results indicate that energy production and consumption efficiency should be increased. Acaravci and Ozturk (2010) obtained a two-way causality relationship between energy consumption and CO_2 emissions in 7 European countries by using ARDL bound test approach. Saidi and Hammami (2015) investigated the relationship between CO_2 emissions and energy use in their studies conducted in 58 countries for 1990-2012 and found a positive

and significant relationship between variables. Adams et al. (2018) indicated that non-renewable energy positively affected economic growth in their studies for 30 African countries during 1980-2012.

On the other hand, Cai et al. (2018) investigated the relationship between clean energy consumption, economic growth, and CO_2 emissions in G7 countries with the ARDL bounds test approach. There was no cointegration relationship between the variables for Canada, France, Italy, and the UK, while the cointegration relationship was obtained for Germany. Tuna and Tuna (2019), in their study for ASEAN-5 countries, have concluded that there is a positive and significant effect between economic growth and energy consumption. Similarly, Chen et al. (2019), in their studies investigating the relationship between carbon dioxide emissions, renewable and non-renewable energy sources, and economic growth, concluded that non-renewable energy use increased economic growth in the long run. In their study for India, Kang et al. (2019) examined the relationship between renewable and non-renewable energy sources and economic growth. According to the analysis results using the VAR approach, the decrease in carbon dioxide emissions in India leads to a decline in the economic growth rate.

Studies examining the relationship between economic growth and environmental quality with the urbanization dimension are included in the literature. For instance, Iwata et al. (2010), for France, examined whether the Environmental Kuznets Curve was valid and concluded that there was an inverted U-shaped relation between variables. In addition, the effects of energy consumption and urbanization on CO_2 emissions were investigated, and the results were statistically insignificant. However, Cole and Neumayer (2004) examined the nexus between urbanization and carbon emissions and reported a positive relationship between variables. Destek and Ozsoy (2015) analysed the impact of energy consumption and urbanization on environmental pollution for Turkey in 1970-2010. They found that energy consumption and urbanization positively related to carbon emissions.

2.2. R&D Activities-Economic Growth, and Environment Nexus

As a well-known that, especially technological development is more important in energy matters and environmental economics literature in terms of combating global warming and climate change; for this reason, when we look at the background of the technological development and environmental quality nexus, we can see three different effects between technological development and environmental quality. The p*ositive impact* expresses that technological development has a reducing impact on CO_2 emissions. The n*eutrality hypothesis* claims no significant relationship between technological development and environmental pollution (Kocak & Ulucak, 2019). The last *rebound effect* shows that energy efficiency increases and leads to less energy consumption thanks to technological developments. However, the decrease in energy consumption leads to a decline in energy prices. Decreasing energy prices increase energy consumption and environmental pollution (Sorrell et al., 2009; Zhang et al., 2015). In studies that examine the effect of technological development on economic growth, it is generally seen that technological development

affects economic growth positively. For example, Fang (2011) estimated the impact of R&D expenditures on economic welfare in China for the period from 1978 to 2008 and reported that technological progress contributes a positive influence on economic growth. Inglesi-Lotz (2016) examined the relationship between R&D expenditures and economic growth for 34 OECD countries during 1990-2010 and noted that R&D expenditures affect real GDP positively.

While some studies in the literature examine the relationship between R&D activities and economic growth, some also looked at their impact on the environment. Lantz and Feng (2006) searched the relationship between technological development, economic growth, population, and CO_2 emissions for Canada in 1970-2000 and found a significant quadratic nexus between carbon emissions and technology. Tang and Tan (2013) examined the nexus between economic growth, energy prices, electricity consumption, and technology innovation in Malaysia for 1970-2009. The empirical result of the study shows that electricity consumption is negatively affected by energy prices and technological innovation. Sohag et al. (2015) investigated the impact of technological innovation and economic growth on energy use for Malaysia in the years 1980-2012. It is concluded that technological innovation plays an active role in reducing energy use by increasing energy efficiency. In addition, Irandoust (2016) researched the effects of economic growth and technological innovation on renewable energy during 1975-2012 in Nordic countries. According to the result of the study, a unidirectional causality from technological innovation to renewable energy has been identified.

Moreover, Álvarez-Herránz et al. (2017) investigated the relationship between energy innovation and greenhouse gas emissions in 28 OECD countries from 1990 to 2014. They found that advances in energy technologies lead to improved environmental quality. Nikzad and Sedigh (2017) also found that environmental innovations played an important role in minimizing greenhouse gas growth in Canada during 1990-2008. Similarly, Zhang et al. (2017) examined the effect of environmental innovation on CO_2 emissions for China's 30 provinces for 2000-2013. They expressed that energy efficiency is most effective in minimizing emissions and improving environmental quality. Yi and Geetha (2017) tested technological innovation and the CO_2 emissions nexus in Malaysia from 1971-2013. They found a negative relationship between technology innovation and pollution-causing emissions in the short term. However, there has been no relationship between variables in a long time.

Similarly, Li and Wang (2017) also reported that technological innovation negatively impacts carbon emissions in 95 countries spanning 1996-2007. Moreover, Chen and Lei (2018) studied the nexus between economic growth, technological innovation, and CO_2 emissions for 30 global countries from 1980 to 2014. They concluded that technological innovation had more negative effects on pollution in countries with high carbon emissions. Kahouli (2018) investigated the impact of total R&D investments on CO_2 emissions during 1990-2016 in Mediterranean countries. The empirical results show that total R&D investments harm environmental pollution. Ganda (2019) examined the innovation,

technological investment, and carbon emissions nexus in selected OECD countries 2000-2014. The study results indicated that R&D expenditures negatively correlate with carbon emissions. Lin and Zhu (2019) searched the relation between renewable energy technology innovation and carbon emissions in China from 2000 to 2015. According to the linear regression model results, they reported that renewable energy technology innovation harms carbon emissions.

On the other hand, Garrone and Grilli (2010) investigated the impact of public energy R&D expenditures on carbon intensity in 13 developed countries in the years 1980-2004. They reported that there is not a significant effect between variables. Samargandi (2017) concluded that technological innovation did not effectively reduce carbon emissions in Saudi Arabia in 1970-2014. Similarly, Cheng et al. (2019) examined the effect of innovation on carbon emissions for OECD countries over the 1996-2015 periods. They reported that there is an insignificant relation between innovation and carbon emissions.

In addition, patent applications, which are an indicator of technological development within the scope of research and development activities, also play an important role in increasing environmental quality. Brunnermeier and Cohen (2003) tested the determinants of environmental innovations from 1983 to 1992 for the US and reported a positive relationship between pollution abatement expenditures and environmental patents. Chen and Lei (2018) have investigated technological innovation and carbon emissions in 30 global countries using patent data as a proxy for technological innovation. According to the study results, there is a negative relation between carbon emissions and patents. On the other hand, Ganda (2019) has examined the impact of innovation and technology investment on environmental pollution by using the number of patent families and concluded a positive relationship between carbon emissions and patents in OECD countries. These patents do not play an influential role in reducing carbon emissions.

3. Methodology

To study the impact of technological innovation on environmental degradation by using carbon emissions and compare the relative relationship between GDPs per capita, energy use, and urban population, the annual data has been collected from 1995 to 2017 for selected 12 countries (Canada, Denmark, Finland, France, Germany, Japan, South Korea, New Zealand, Sweden, Spain, UK, and the USA). The patent application number is used as an indicator of technological innovation. In line with this, the countries in the model have been selected according to patent application rank.

The panel model is formed as follows:

$$InCO2_{i,t} = \alpha_0 + \alpha_1 InY_{i,t} + \alpha_2 InY^2_{i,t} + \alpha_3 INY^3_{i,t} + \alpha_4 InPAT_{i,t} + \alpha_5 InENU_{i,t} + \alpha_6 InURB_{i,t} + \varepsilon_{i,t} \quad (1)$$

In the paper, the empirical model is constituted based on the study of Lin and Zhu (2019). Accordingly, in the model, t, i and $\varepsilon_{i,t}$ indicate that period, cross-section, and

residual term, respectively. Moreover, $InCO2_{i,t}$ is the natural log of carbon emissions, $InPAT_{i,t}$ is the natural log of patent applications, $InENU_{i,t}$ is the natural log of Energy use, $InY_{i,t}$ is the natural log of GDP per capita, $InY^2{}_{i,t}$ is the natural log of GDP per capita square, $InY^3{}_{i,t}$ is the natural log of GDP per capita cube, and $InURB_{i,t}$ is the natural log of financial development index. Carbon emissions is metric tons per capita. Patent applications are worldwide patent applications filed through the Patent Cooperation Treaty; energy use is measured in kg of oil equivalent per capita; GDP per capita is measured in constant 2010 US$; urbanization is urban population. All data were sourced from the World Development Indicators 2020 (World Bank). In general, when the literature is evaluated, the coefficients in the model, α_3, α_4, and α_5 are not certain. Because the validity of the EKC hypothesis can be changed according to sample and period. However, in the study, we expect that inverted-U shaped, therefore the validity of EKC. α_2 and α_6 coefficients are expected to be positive and significant. Finally, α_1 coefficient is expected to be negative and significant.

The analysis has been analysed the impact of technological innovations on ecological degradations. In line with this, the cross-sectional dependence has been investigated using the CD Test. in the panel data analysis, the breakdowns and changes occurring in the units are independent of each other, and the units do not affect each other. Accordingly, the dependency between the units should be investigated at the first stage of the model. To specify the existence of dependence, a cross-sectional dependent test has been estimated by developed by Breush Pagan (1980) and Pesaran (2004). The CD test developed by Pesaran (2004) is calculated as follows:

$$CD = \sqrt{\frac{2T}{N(N-1)}}\left(\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right) \tag{2}$$

In the model, T represents the time dimension of the panel; N is the cross-sectional dimension of the panel and $\hat{\rho}_{ij}$ is the binary OLS correlation sample estimate of the remains (Pesaran, 2004:1-7). After determining the cross-section dependency on the panel, the CIPS unit root analysis developed by Pesaran (2007) has been estimated. CIPS unit root analysis is derived from CADF statistic at equation 3.

$$\Delta y_{i,t} = a_i + \rho_i y_{it-1} + \beta_i \bar{y}_{t-1} + \sum_{j=0}^{k}\tau_{ij}\Delta \bar{y}_{it-1} + \sum_{j=0}^{k}\delta_{ij} y_{it-1} + \varepsilon_{i,t} \tag{3}$$

The deterministic term a_i in the equation refers to the number of lags k and $\bar{y}_t$ indicates the cross-sectional average of time. The CIPS unit root model created accordingly is as follows:

$$CIPS = (\frac{1}{N})\sum_{i=1}^{N} t_i(N,T) \tag{4}$$

In the study, Westerlund Error Correction Test (2007) and Westerlund Durbin-Hausman Test (2008) have been estimated to determine the long-term relationship between variables. Within the scope of Westerlund (2007) cointegration analysis, there is no cointegration hypothesis, and alternative hypotheses are formed as two different tests as the average group and panel test. At this stage, four cointegration test statistics $(G_\alpha, G_t, P_\alpha, P_t)$ were created according to the error correction model. According to the analysis, the variables must be stationary in I (1). In Westerlund Durbin-Hausman Cointegration (2008) analysis, variables do not need to be equally stable. In this method, two separate test statistics are calculated as groups and panels (DH_g, DH_p). While panel statistics(DH_p), it is expressed by group statistics(DH_g). The statistics are as follows:

$$DH_g = \sum_{i=1}^{n} \hat{S}_i(\tilde{\phi}_i - \hat{\phi}_i)^2 \sum_{t=2}^{T} \hat{e}_{it-1}^2 \quad DH_p = \hat{S}_n(\tilde{\phi} - \hat{\phi})^2 \sum_{i=1}^{n}\sum_{t=2}^{T} \hat{e}_{it-1}^2 \tag{5}$$

FMOLS (Fully Modified Ordinary Least Square) estimator developed by Pedroni (2000) has been used as a cointegration estimator to estimate coefficients of variables. FMOLS Panel estimator formulated as $\hat{\beta}_{GFM} = N^{-1}\sum_{i=1}^{N} \beta_{FMi}^{*}$. Finally, the study conducted the Bootstrap Granger Causality Test (Konya, 2016) panel causality test.

Bootstrap Granger Causality Test is a test that gives statistically more meaningful results in cross-section dependency and heterogeneity conditions. The test is estimated by considering the cross-section dependency and heterogeneity between the units that make up the panel. Estimation of the model is based on SUR (seemingly unrelated regression) method, and the Wald test is used to estimate the direction of causality. In addition, as stated in Bootstrap Granger Causality Test, it does not require a pre-test such as unit root and cointegration before causality analysis. Bootstrap Granger Causality Test panel causality test is formulated as follows:

$$CO2_{1,t} = \alpha_{1,1} + \sum_{i=1}^{ly_1} \beta_{1,1,i} CO2_{1,t-i} + \sum_{i=1}^{lx_1} \delta_{1,1,i} PAT_{k,1,t-i} + \varepsilon_{1,1,t}$$

$$CO2_{2,t} = \alpha_{1,2} + \sum_{i=1}^{ly_1} \beta_{1,2,i} CO2_{2,t-i} + \sum_{i=1}^{lx_1} \delta_{1,2,i} PAT_{k,2,t-i} + \varepsilon_{1,2,t} \tag{6}$$

and

$$PAT_{k,1,t} = \alpha_{2,1} + \sum_{i=1}^{ly_2} \beta_{2,1,i} CO2_{1,t-i} + \sum_{i=1}^{lx_2} \delta_{2,1,i} PAT_{k,1,t-i} + \varepsilon_{2,1,t}$$

$$PAT_{k,N,t} = \alpha_{2,N} + \sum_{i=1}^{ly_2} \beta_{2,N,i} CO2_{N,t-i} + \sum_{i=1}^{lx_2} \delta_{2,N,i} PAT_{k,N,t-i} + \varepsilon_{2,N,t} \quad (7)$$

While expressing CO_2, carbon emissions, PAT, technological innovation in equations; N refers to the number of units in the panel and the T time interval. Granger causality is expressed as follows:

- If any country in the panel $\gamma_{1,i}$ is not equal to zero but $\beta_{2,i}$ is equal to zero, there is one-way causality from PAT to CO2.
- If $\gamma_{1,i}$ is equal to zero but $\beta_{2,i}$ is not equal to zero, there is a one-way Causality from CO2 to PAT.
- If neither $\gamma_{1,i}$ nor $\beta_{2,i}$ is equal to zero, there is bidirectional Causality among variables.
- If both $\gamma_{1,i}$ and $\beta_{2,i}$ is equal to zero, there is no Causality among variables.

Before the results and discussion, the summary of descriptive statistics with the average of the variables of selected OECD countries has been given in Table 1. According to statistics, carbon emissions range from 0.705 in Sweden to 1.253 in the USA. The highest value belongs to the USA (5.307) for technological innovation, and the lowest value is in New Zealand (3.175). When variations are evaluated, South Korea has the highest variations for technological innovation.

Table: 1
Descriptive Statistics

Countries		INCO	INPAT	INENU	INY	INURB
Canada	Mean	1.203	3.623	3.903	4.640	7.417
	Maximum	1.232	3.742	3.927	4.708	7.473
	Minimum	1.175	3.385	3.882	4.539	7.357
	Std. Dev.	0.016	0.088	0.012	0.057	0.035
Denmark	Mean	0.938	3.189	3.533	4.756	6.672
	Maximum	1.133	3.273	3.620	4.797	6.704
	Minimum	0.734	3.091	3.449	4.691	6.648
	Std. Dev.	0.109	0.049	0.047	0.028	0.281
Finland	Mean	1.022	3.270	3.807	4.632	6.643
	Maximum	1.135	3.411	3.853	4.694	6.672
	Minimum	0.888	3.100	3.752	4.503	6.616
	Std. Dev.	0.071	0.090	0.027	0.054	0.017
France	Mean	0.733	4.146	3.603	4.595	7.690
	Maximum	0.791	4.168	3.633	4.633	7.729
	Minimum	0.645	4.094	3.563	4.530	4.649
	Std. Dev.	0.048	0.020	0.023	0.029	0.026
Germany	Mean	0.985	4.674	3.603	4.604	7.794
	Maximum	1.036	4.713	3.628	4.671	7.805
	Minimum	0.939	4.580	3.577	4.541	7.780
	Std. Dev.	0.027	0.026	0.016	0.039	0.006
Japan	Mean	0.955	5.506	3.582	4.642	8.036
	Maximum	0.986	5.584	3.611	4.685	8.066
	Minimum	0.922	5.413	3.535	4.606	7.990
	Std. Dev.	0.014	0.059	0.028	0.022	0.030
South Korea	Mean	0.991	5.020	3.645	4.269	7.592
	Maximum	1.066	5.223	3.733	4.417	7.622
	Minimum	0.870	4.704	3.506	4.081	7.547
	Std. Dev.	0.058	0.170	0.070	0.106	0.023
New Zealand	Mean	0.860	3.175	3.629	4.509	6.554
	Maximum	0.911	3.333	3.658	4.576	6.617
	Minimum	0.808	3.000	3.607	4.426	6.497
	Std. Dev.	0.033	0.084	0.016	0.046	0.034
Sweden	Mean	0.705	3.444	3.735	4.686	6.893
	Maximum	0.848	3.625	3.766	4.575	6.869
	Minimum	0.573	3.297	3.688	4.575	6.869
	Std. Dev.	0.089	0.124	0.024	0.056	0.023
Spain	Mean	0.789	3.448	3.449	4.465	7.530
	Maximum	0.883	3.560	3.512	4.509	7.571
	Minimum	0.696	3.311	3.391	4.375	7.479
	Std. Dev.	0.061	0.073	0.042	0.038	0.035
UK	Mean	0.894	4.239	3.528	4.581	7.692
	Maximum	0.962	4.343	3.588	4.633	7.739
	Minimum	0.734	4.123	3.441	4.486	7.657
	Std. Dev.	0.070	0.063	0.053	0.042	0.027
USA	Mean	1.253	5.307	3.872	4.670	8.375
	Maximum	1.307	5.470	3.906	4.727	8.426
	Minimum	1.164	5.028	3.832	4.583	8.313
	Std. Dev.	0.047	0.135	0.026	0.039	0.034
Panel	Mean	0.944	4.087	3.657	4.588	7.407
	Maximum	1.307	5.584	3.927	4.797	8.426
	Minimum	0.573	3.006	3.391	4.081	6.497
	Std. Dev.	0.170	0.827	0.141	0.313	0.565

4. Empirical Results

In this part, empirical findings have been discussed. At the first stage of the analysis, the Cross-Section Dependence (CD) and homogeneity tests were estimated. After determining Cross Section Dependence, CIPS unit root test, Westerlund cointegration test, and Konya causality test have been estimated. The results are shown in Table 2. No cross-sectional dependence is not accepted according to the all-test results. It means a shock that occurs in an individual of the panel can affect the other individuals. Moreover, the

homogeneity test results show that a country in the panel has a specific heterogeneity. Therefore, the existence of cross-sectional dependence and heterogeneity among countries is accepted.

Table: 2
Cross-sectional Dependency and Homogeneity

	Statistics	p-Values
CD	21.060	0.000
Homogeneity		
$\tilde{\Delta}$	7.252	0.000
$\tilde{\Delta}_{adj}$	7.777	0.000

For cointegration analysis to be performed after this stage, variables must be integrated at first degree. To evaluate the cointegration analysis results comparatively, two cointegration analyses have been used in the study. While Westerlund ECM analysis requires the variables to be integrated at I (1), for Westerlund's DH analysis, variables are not required to be equally stable. In this context, CIPS unit root analysis was performed. CIPS unit root test results are given in Table 3. According to the results obtained, all variables are first-degree difference stationary; all series are integrated at I (1).

Table: 3
CIPS Unit Root Test Results

Variables	**CIPS**			
	Level		**First**	
	Constant	**Constant &Trend**	**Constant**	**Constant &Trend**
INCO	-2.010	-2.730**	-3.761***	-3.536***
INY	-1.741	-1.858	-2.515**	-2.594*
INEU	-1.977	-2.076**	-4.133***	-4.286***
INUR	-1.425	-1.311	-1.657	-3.104***
INPAT	-1.469	-2.237**	-2.810***	-3.032***

*Note: critical values for constant: *10%; -2.11; **%5; -2.22, ***%1; -2.45, critical values for constant and trend: *10%; -2.65; **%5; -2.77, ***%1; -3.33.*

After this stage, the long-term relationship between CO_2 emissions, GDP per capita, energy use, patent applications, urbanization, and energy use has been investigated. The existence of a long-term relationship was estimated by Westerlund's ECM Cointegration and Westerlund DH Cointegration analysis. The results are given in Table 4.

Table: 4
Cointegration Test Results

Test	Value
Westerlund_ECM	
G_T	-13.255 (0.000)
G_α	-1.036 (0.000)
P_T	-13.480 (0.000)
P_α	-3.532 (0.000)
Westerlund_Dh	
dh_g	17.089 (0.000)
dh_p	15.507 (0.000)

Westerlund Cointegration Test is analysed according to 4 test statistics $(G_\alpha, G_t, P_\alpha, P_t)$ with normal distribution. Of these tests, Gα and Gt represent the group estimate, Pα and Pt represent the unit estimate. According to the results, all test results support a cointegration relationship. In addition, according to the results of Westerlund DH Cointegration analysis, the presence of a long-term relationship between the variables has been accepted. Finally, FMOLS cointegration estimator was used in the study.

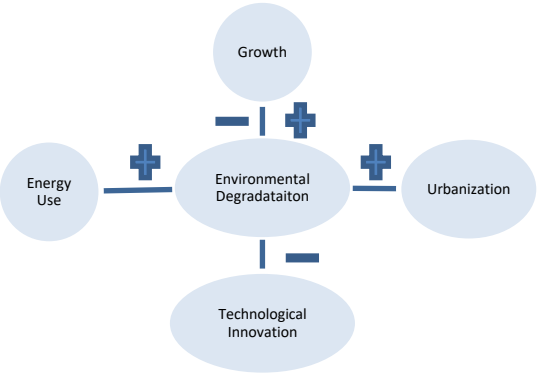
Table: 5
Cointegration Estimators Test Results

Variables	FMOLS
INY	-0.1328**
INY2	-0.1148**
INY3	0.0099*
INEU	0.7534***
INUR	0.1329**
INPAT	-0.0260***

*Prob. Value; *, 10%; **, %5; ***, %1.*

When the results in Table 5 are examined, Patent applications harm CO_2 emissions. Accordingly, patent applications used as an indicator of technological innovation create environmental improvement. Therefore, technological development has a reducing impact on CO_2 emissions in selected countries. The result obtained is similar to Li and Wang (2017), Chen and Lei (2018), and Kahouki (2018). It is seen that energy use is meaningful and positively affects CO_2 emissions. The main reason can be that economic growth requires high energy demand. A positive and significant relationship was obtained between urbanization and total CO_2 emissions. Urbanization is evaluated in increasing population density in cities because of labour migration from the village to the town. Therefore, the population density in the cities reveals the result of excess energy demand, and the results obtained in similar to Neumayer (2004) and Destek and Ozsoy (2015). Finally, the validity of the Environmental Kuznets Curve was examined. The existence of a U relationship between total CO_2 emissions and per capita income is obtained. Therefore, Environmental Kuznets Curve is invalid in these sectors. Figure 1 shows the graphical results of the study.

Figure: 1
Graphical Results



The causality relationship between CO_2 and patent applications was also investigated for each country in the study. The findings are included in Table 6.

Table: 6
Bootstrap Granger Causality Test

Country	H_0: Inpat does not cause Inco				H_0: Inco does not cause Inpat			
	Statistics	Critical Values			Statistics	Critical Values		
		%1	%5	%10		%1	%5	%10
Canada	2.777	15.194	7.048	4.203	17.240***	12.422	10.781	8.068
Denmark	0.573	10.578	5.555	3.171	4.783**	5.957	2.393	2.048
Finland	4.098	34.416	15.976	11.128	0.813	46.296	25.315	20.268
France	15.129*	21.914	14.521	12.601	0.007	9.288	6.534	6.017
Germany	1.700	47.874	31.283	27.157	2.631*	6.826	3.638	2.207
Japan	1.996	15.600	12.014	8.967	2.246	14.109	7.048	3.931
South Korea	5.121	92.104	75.209	56.475	0.457	101.060	67.483	57.266
New Zealand	1.681	102.438	80.967	52.615	16.469	34.589	25.470	19.110
Sweden	6.641	51.314	38.050	26.579	1.028	31.253	21.046	19.901
Spain	41.172***	26.314	15.576	13.783	14.695***	12.858	8.359	7.096
UK	2.880	33.741	25.064	18.979	1.122	34.228	21.206	16.458
United State	11.183	49.601	35.336	30.544	0.949	6.498	5.102	2.868

*Note: %1, %5 and %10 indicate that respectively ***, **, *.*

According to the results presented, while there is a unidirectional causality from CO_2 to a patent application in Canada and Denmark, a unidirectional causality from patent application capita to carbon emissions in France has been obtained. Finally, there is a unidirectional causality between carbon emissions and patent applications in Spain. According to these results, the increase in CO_2 in Canada and Denmark triggers technological research on pollution. But it is not sufficient. In France, however, the rise in pollution does not sufficiently affect the technical analysis in this field. While it is seen that technological research gives results in Spain, in other countries with meaningless results, it can be thought that technological research does not yield satisfactory results on pollution.

5. Conclusion

The current study aims to search the effect of technological innovations on environmental degradations and compare the relationship between energy use, growth, and urbanization from 1995 to 2017 in selected OECD countries. For this purpose, the relationship among variables is examined with second generations panel data methodologies: the Westerlund cointegration test and Bootstrap Granger Causality Test. According to FMOLS test panel results, technological innovations decrease carbon emissions. Increased patent applications indicate that technological innovations positively contribute to environmental quality. However, energy use, GDP per capita, and urbanization increase environmental degradation.

The following policies can be improved to minimize environmental degradation from the empirical results.

- The negative effect of technological innovation on environmental degradation expresses the importance of using technological innovations to increase energy efficiency.
- Establishing industrial policies related to technological innovation and directing these innovations to energy-intensive sectors can be effective.
- Providing incentives and financial supports for companies working on technological innovation can accelerate the development in this area.
- Increasing the environmental degradation of energy is due to the properties of the energy sources used. In this context, renewable energy sources that reduce carbon emissions will positively impact ecological quality.
- Innovative and R&D studies should reduce pollution without making any sectoral differences.
- Considering environmental degradation in creating industrial policies of countries will have a reducing effect on emissions.
- Sectoral policies can support technological developments.
- The policies can be improved by making cost-benefit analyses, increasing green technology investment, and disseminating practices such as carbon tax.
- Minimizing pollution also requires social and cultural transformation. Therefore, education policies should include activities that will ensure this transformation.
- Being included in International environmental agreements such as the Paris Agreement and fulfilling the necessary obligations may also reduce the global effects of environmental degradation.

References

Acaravcı, A. & I. Ozturk (2010), "On the Relationship Between Energy Consumption, CO2 Emissions and Economic Growth in Europe", *Energy*, 35(2010), 5412-5420.

Adams, S. et al. (2018), "Renewable and Non-renewable Energy, Regime Type and Economic Growth", *Renew. Energy*, 125, 755-767.

Ahmad, N. & L. Du (2017), "Effects of Energy Production and CO2 Emissions on Economic Growth in Iran: ARDL Approach", *Energy*, 123, 521-537.

Al-Mulali, U. et al. (2015a), "Investigating the Environmental Kuznets Curve Hypothesis in Vietnam", *Energy Policy*, 76, 123-131.

Al-Mulali, U. et al. (2015b), "Investigating the Environmental Kuznets Curve (EKC) Hypothesis by Utilizing the Ecological Footprint as an Indicator of Environmental Degradation", *Ecol Indic*, 48, 315-323.

Al-Mulali, U. et al. (2015c), "The Global Move Toward Internet Shopping and its Influence on Pollution: An Empirical Analysis", *Environ Sci Pollut Res*, 22(13), 9717-9727.

Álvarez-Herránz, A. et al. (2017), "Energy Innovations-GHG Emissions Nexus: Fresh Empirical Evidence from OECD Countries", *Energy Policy*, 101, 90-100.

Ang J.B. (2007), "CO2 Emissions, Energy Consumption, and Output in France", *Energy Policy*, 35, 4772-4778.

Apergis, N. & J.E. Payne (2009), "CO2 Emissions, Energy Usage, and Output in Central America", *Energy Policy*, 37(8), 3282-3286.

Apergis, N. & J.E. Payne (2010), "A Panel Study of Nuclear Energy Consumption and Economic Growth", *Energy Econ*., 32(3), 545-549.

Aşıcı, A.A. & S. Acar (2016), "Does Income Growth Relocate Ecological Footprint?", *Ecological Indicators*, 61, 707-714.

Asongu, S.A. et al. (2017), "Environmental degradation, ICT and Inclusive Development in Sub-Saharan Africa", *Energy Policy*, 111, 353-361.

Atil, A. et al. (2019), "Factors Influencing CO2 Emission in China: A Nonlinear Autoregressive Distributed Lags Investigation", *MPRA* Paper No: 91190.

Aydın, C. et al. (2019), "Is the Ecological Footprint Related to the Kuznets Curve a Real Process or Rationalizing the Ecological Consequences of the Affluence? Evidence from PSTR Approach", *Ecological Indicators*, 98, 543-555.

Bastida, L. et al. (2019), "Exploring the role of ICT on Household Behavioral Energy Efficiency to Mitigate Global Warming", *Renewable and Sustainable Energy Reviews*, 103, 455-462.

Bekaroo, G. et al. (2016), "Impacts of ICT on the Natural Ecosystem: A Grass Root Analysis for Promoting Socio-Environmental Sustainability", *Renewable and Sustainable Energy Reviews*, 57, 1580-1595.

Breusch, T.S. & A.R. Pagan (1980), "The Lagrange Multiplier Test and Its Applications to Model Specification in Econometrics", *The Review of Economic Studies*, 47(1), 239-253.

Brunnermeier, S.B. & M.A. Cohen (2003), "Determinants of Environmental Innovation in US Manufacturing Industries", *Journal of Environmental Economics and Management*, 45(2), 278-293.

Cai, Y. et al. (2018), "Nexus Between Clean Energy Consumption, Economic Growth and CO2 Emissions", *Journal of Cleaner Production*, 182, 1001-1011.

Chavanne, X. et al. (2015), "Electricity Consumption of Telecommunication Equipment to Achieve a Tele-meeting", *Apply Energy*, 137, 273-281.

Chen, W. & Y. Lei (2018), "The Impacts of Renewable Energy and Technological Innovation on Environment-Energy-Growth Nexus: New Evidence from a Panel Quantile Regression", *Renewable Energy*, 123, 1-14.

Chen, Y. et al. (2019), "CO2 Emissions, Economic Growth, Renewable and Non-renewable Energy Production and Foreign Trade in China", *Renew. Energy*, 131, 208-216.

Cheng, C. et al. (2019), "The Impact of Renewable Energy and Innovation on Carbon Emission: An Empirical Analysis for OECD Countries", *Energy Procedia*, 158, 3506-3512.

Cho, Y. et al. (2007), "The Impact of ICT Investment and Energy Price on Industrial Electricity Demand: Dynamic Growth Model Approach", *Energy Policy*, 35, 4730-4738.

Cole, M.A. & E. Neumayer (2004), "Examining the Impact of Demographic Factors on Air Pollution", *Population and Environment*, 26(1), 5-21.

Coroama V.C. et al. (2012), "Effects of Internet-Based Multiple-Site Conferences on Greenhouse Gas Emissions", *Telematics and Informatics*, 29, 362-74.

Danish-Baloch, M.A. et al. (2019), "Effect of Natural Resources, Renewable Energy and Economic Development on CO2 Emissions in BRICS Countries", *Science of The Total Environment*, 678, 632-638.

Destek, M.A. & F.N. Ozsoy (2015), "Relationships Between Economic Growth, Energy Consumption, Globalization, Urbanization, and Environmental Degradation in Turkey", *International Journal of Energy and Statistics*, 3(04), 1550017.

Destek, M.A. et al. (2018), "Analyzing the Environmental Kuznets Curve for the EU Countries: The Role of Ecological Footprint", *Environmental Science and Pollution Research*, 25(29), 29387-29396.

Dong, K. et al. (2018), "CO2 Emissions, Economic Growth, and the Environmental Kuznets Curve in China: what roles can nuclear energy and Renewable Energy Play?", *Journal of Cleaner Production*, 196, 51-63.

Dumitrescu, E.I. & C. Hurlin (2012), "Testing for Granger Non-Causality in Heterogeneous Panels", *Econ. Model*., 29, 1450-1460.

Elliot, S. (2011), "Transdisciplinary Perspectives on Environmental Sustainability: A Resource base and Framework for IT-Enabled Business Transformation", *MIS Quarterly*, 35(1), 197-236.

Erdmann, L. & L.M. Hilty (2010), "Scenario Analysis; Exploring the Macroeconomic Impacts of Information and Communication Technologies on Greenhouse Gas Emissions", *Journal Industrial Ecology*, 14, 826-43.

Fang, Y. (2011), "Economic Welfare Impacts from Renewable Energy Consumption: The China Experience", *Renewable and Sustainable Energy Reviews*, 15(9), 5120-5128.

Fettweis, G. & E. Zimmermann (2008), "ICT Energy Consumption-Trends and Challenges", *The11th International Symposium on Wireless Personal Multimedia Communications (WPMC2008)*, 2, 6.

Fisher-Vanden, K. et al. (2004), "What is Driving China's Decline in Energy Intensity?", *Resource and Energy Economics*, 26(1), 77-97.

Friedl, B. & M. Getzner (2003), "Determinants of CO2 Emissions in a Small Open Economy", *Ecological Economics*, 45(1), 133-148.

G7 ICT and Industry Ministers' Declaration (2017), *Making the Next Production Revolution Inclusive, Open and Secure, Italy*, <https://Teamdigitale.Governo.It/Upload/Docs/2017/10/Declaration_And_Annexes_Final_26_09_2017.Pdf>, 23.08.2019.

Ganda, F. (2019), "The Impact of Innovation and Technology Investments on Carbon Emissions in Selected Organisation for Economic Co-operation and Development Countries", *Journal of Cleaner Production*, 217, 469-483.

Garrone, P. & L. Grilli (2010), "Is There a Relationship Between Public Expenditures in Energy R&D and Carbon Emissions per GDP? An Empirical Investigation", *Energy Policy*, 38, 5600-5613.

Gesi (2012), *Smart 2020: Enabling the Low Carbon Economy in the Information Age*, <https://www.Theclimategroup.Org/Sites/Default/Files/Archive/Files/Smart2020Report.Pdf>, 23.08.2019.

Global Footprint Network (2019), *National Footprint Accounts, Ecological Footprint*, <http://data.footprintnetwork.org>, 23.08.2019.

Gombiner, J. (2011), "Carbon Foot Printing the Internet", *The Journal of Sustainable Development*, 5(1), 119-124.

Greening, L.A. et al. (2000), "Energy Efficiency and Consumption-the Rebound Effect-a Survey", *Energy Policy*, 28(6-7), 389-401.

Hassan, S.T. et al. (2018), "Economic Growth, Natural Resources, and Ecological Footprints: Evidence from Pakistan", *Environmental Science and Pollution Research*, 26(3), 2929-2938.

He, J. & P. Richard (2010), "Environmental Kuznets Curve for CO2 in Canada", *Ecological Economics*, 69(5), 1083-1093.

Higon, D. et al. (2017), "ICT and Environmental Sustainability: A Global Perspective", *Telematics and Informatics*, 34, 85-95.

Inglesi-Lotz, R. (2016), "The Impact of Renewable Energy Consumption to Economic Growth: A Panel Data Application", *Energy Economics*, 53, 58-63.

IPCC (2018), *Global Warming of 1.5°C Report*, <https://Www.Ipcc.Ch/Site/Assets/Uploads/Sites/2/2019/06/SR15_Full_Report_High_Res.Pdf>, 23.08.2019.

Irandoust, M. (2016), "The Renewable Energy-Growth Nexus with Carbon Emissions and Technological Innovation: Evidence from the Nordic Countries", *Ecological Indicators*, 69, 118-125.

Ishida, H. (2015), "The Effect of ICT Development on Economic Growth and Energy Consumption in Japan", *Telematics and Informatics*, 32, 79-88.

ITU (2019), *World Telecommunication/ICT Indicators Database*, <https://Www.Itu.Int/En/ITU-D/Statistics/Pages/Publications/Wtid.Aspx>, 23.08.2019.

Iwata, H. et al. (2010), "Empirical Study on the Environmental Kuznets Curve for CO2, in France: The Role of Nuclear Energy", *Energy Pol*., 38(8), 4057-4063.

Jalil, A. & M. Feridun (2011), "The Impact of Growth, Energy and Financial Development on the Environment in China: a cointegration analysis", *Energy Economics*, 33, 284-291.

Jalil, A. & S.F. Mahmud (2009), "Environmental Kuznets Curve for CO2 Emissions: a Cointegration Analysis for China", *Energy Policy*, 37, 5167-5172.

Jones, A. (2002), "An Environmental Assessment of Food Supply Chains: A Case Study on Dessert Apples", *Environmental Management*, 30(4), 560-576.

Kahouli, B. (2018), "The Causality Link Between Energy Electricity Consumption, CO2 Emissions, R&D Stocks and Economic Growth in Mediterranean Countries (MCs)", *Energy*, 145, 388-399.

Kang, H.S. et al. (2019), "The Dynamic Relationships among CO2 emissions, Renewable and Non-Renewable Energy Sources, and Economic Growth in India: Evidence from Time-Varying Bayesian VAR Model", *Structural Change and Economic Dynamics*, 50 (2019), 90-101.

Khan D.N. et al. (2018), "The Level of ICT on CO2 Emissions in Emerging Economies: Does the Level of Income Matters?", *Environmental Science and Pollution Research*, 25(23), 22850-22860.

Koçak, E. & Z.Ş. Ulucak (2019), "The Effect of Energy R&D Expenditures on CO2 Emission Reduction: Estimation of the STIRPAT Model for OECD Countries", *Environmental Science and Pollution Research*, 26(14), 14328-14338.

Kónya, L. (2006), "Exports and Growth: Granger Causality Analysis on OECD Countries with a Panel Data Approach", *Economic Modelling*, 23(6), 978-992.

Lee, J.W. & T. Brahmasrene (2014), "ICT, CO2 Emissions and Economic Growth: Evidence from a Panel of ASEAN", *Global Economic Review*, 43, 93-109.

Li, M. & Q. Wang (2017), "Will Technology Advances Alleviate Climate Change? Dual Effects of Technology Change on Aggregate Carbon Dioxide Emissions", *Energy Sustain. Dev.*, 41, 61-68.

Lin, B. & J. Zhu (2019), "The Role of Renewable Energy Technological Innovation on Climate Change: Empirical Evidence from China", *Science of the Total Environment*, 659, 1505-1512.

Lin, B. & J. Zhu (2019), "The Role of Renewable Energy Technological Innovation on Climate Change: Empirical Evidence from China", *Science of the Total Environment*, 659, 1505-1512.

Marrero, G.A. (2010), "Greenhouse Gases Emissions, Growth and the Energy Mix in Europe", *Energy Economics*, 32(6), 1356-1363.

Matthews, H.S. et al. (2002), "Energy Implications of Online Book Retailing in the United States and Japan", *Environ Impact Asses*, 22(5), 493-507.

Moyer, J.D. & B.B. Hughes (2012), "Icts: do They Contribute to Increased Carbon Emissions?", *Technological Forecasting and Social Change*, 79, 919-31.

Mrabet, Z. & M. Alsamara (2017), "Testing the Kuznets Curve Hypothesis for Qatar: a Comparison between Carbon Dioxide and Ecological Footprint", *Renew Sust Energ Rev*, 70, 1366-1375.

Murthy, K.V. et al. (2018), "Analyzing Environmental Kuznets Curve and Pollution Haven Hypothesis in India in the Context of Domestic and Global Policy Change", *Australasian Accounting, Business and Finance Journal*, 12(2), 134-156.

Nikzad, R. & G. Sedigh (2017), "Greenhouse Gas Emissions and Green Technologies in Canada", *Environmental Development*, 24, 99-108.

OECD (2010), *Greener and Smarter, ICTS, the Environmental and Climate Change Report*.

Ozturk, I. et al. (2016), "Investigating the Environmental Kuznets Curve Hypothesis: The Role of Tourism and Ecological Footprint", *Environ Sci Pollut Res*, 23(2), 1916-1928.

Pao, H. & C.M. Tsai (2010), "CO2 Emissions, Energy Consumption and Economic Growth in BRIC Countries", *Energy Policy*, 38, 7850-7860.

Paul, S. & R.N. Bhattacharya (2004), "CO2 Emission from Energy Use in India: A Decomposition Analysis", *Energy Policy*, 32(5), 585-593.

Pesaran, M.H. (2004), "General Diagnostic Tests for Cross Section Dependence in Panels", *Cambridge Working Papers in Economics* 0435, Faculty of Economics, University of Cambridge.

Raheem, I.D. et al. (2019), "The Role of ICT and Financial Development on CO2 Emissions and Economic Growth", *African Governance and Development Institute Working Paper*, WP/19/058.

Room, J. (2002), "The Internet and the New Energy Economy", *Resources, Conservation and Recycling*, 36, 197-210.

Saboori, B. et al. (2012), "Economic Growth and CO2, Emissions in Malaysia: a Cointegration Analysis of the Environmental Kuznets Curve", *Energy Pol*., 51(4), 184-191.

Sadorsky, P. (2012), "Information Communication Technology and Electricity Consumption in Emerging Economies", *Energy Policy*, 48, 130-136.

Saidi, K. & S. Hammami (2015), "The Impact of CO2 Emissions and Economic Growth on Energy Consumption in 58 Countries", *Energy Rep*, 1, 62-70.

Samargandi, N. (2017), "Sector Value Addition, Technology and CO2 Emissions in Saudi Arabia", *Renewable and Sustainable Energy Reviews*, 78, 868-877.

Sandner, P.G. & J. Block (2011), "The market value of R&D, patents, and trademarks", *Res Policy*, 40(7), 969-985.

Seto, K. et al. (2014), "Human Settlements, Infrastructure and Spatial Planning", in: O. Edenhofer et al. (eds.), *Climate Change 2014: Mitigation of Climate Change, Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, Geneva)*, (923-1000), Cambridge UK/New York: Cambridge University Press.

Shabani, Z. & R. Shahnazi (2019), "Energy Consumption, Carbon Dioxide Emissions, Information and Communications Technology, and Gross Domestic Product in Iranian Economic Sectors: A Panel Causality Analysis", *Energy*, 169, 1064-1078.

Sharma, S.S. (2011), "Determinants of Carbon Dioxide Emissions: Empirical Evidence from 69 Countries", *Applied Energy*, 88(1), 376-382.

Sinha, A. & M. Shahbaz (2018), "Estimation of Environmental Kuznets Curve for CO2 Emission: Role of Renewable Energy Generation in India", *Renewable Energy*, 119, 703-711.

Sohag, K. et al. (2015), "Dynamics of Energy Use, Technological Innovation, Economic Growth and Trade Openness in Malaysia", *Energy*, 90, 1497-1507.

Sorrell, S. et al. (2009), "Empirical Estimates of the Direct Rebound Effect: A Review", *Energy Policy*, 37, 1356-1371.

Takase, K. & Y. Murota (2004), "The Impact of IT Investment on Energy: Japan and US Comparison in 2010", *Energy Policy*, 32, 1291-1301.

Tang, C.F. & E.C. Tan (2013), "Exploring the Nexus of Electricity Consumption, Economic Growth, Energy Prices and Technology Innovation in Malaysia", *Applied Energy*, 104, 297-305.

Toffel, M.W. & A. Horvath (2004), "Environmental Implications of Wireless Technologies: News Delivery and Business Meetings", *Environmental Science and Technology*, 38, 2961-70.

Tuna, G. & V.E. Tuna (2019), "The Asymmetric Causal Relationship between Renewable and Non-Renewable Energy Consumption and Economic Growth in the ASEAN-5 Countries", *Resource Policy*, (62), 114-124.

United Nations (2017), "Urban Environment Related Mitigation Benefits and Co-Benefits of Policies, Practices and Actions for Enhancing Mitigation Ambition and Options for Supporting their Implementation", *Framework Convention on Climate Change*, United Nations publication, FCCC/TP/2017/2.

United Nations (2018), *World Urbanization Prospects: The 2018 Revision*, ST/ESA/SER.A/420.

Webb, M. et al. (2008), "SMART 2020: Enabling the Low Carbon Economy in the Information Age", *Climate Group*, 1(1), 1.

Westerlund, J. (2007), "Testing for Error Correction in Panel Data", *Oxford Bulletin of Economics and Statistics*, 69(6), 709-748.

Westerlund, J. (2008), "Panel Cointegration Tests of the Fisher Effect", *Journal of Applied Econometrics*, 23, 193-233.

Yii, K.J. & C. Geetha (2017), "The Nexus between Technology Innovation and CO2 Emissions in Malaysia: Evidence from Granger Causality Test", *Energy. Procedia.*, 105, 3118-3124.

Zhang, C. & C. Liu (2015), "The Impact of ICT Industry on CO2 Emissions: A Regional Analysis in China", *Renewable and Sustainable Energy Reviews*, 44, 12-19.

Zhang, Y.J. et al. (2015), "Direct Energy Rebound Effect for Road Passenger Transport in China: A Dynamic Panel Quantile Regression Approach", *Energy Policy*, 87, 303-313.

Zhang, Y.J. et al. (2017), "Can Environmental Innovation Facilitate Carbon Emissions Reduction? Evidence from China", *Energy Policy*, 100, 18-28.

Zhou, N. et al. (2010), "Overview of Current Energy-Efficiency Policies in China", *Energy Policy*, 38(11), 6439-6452.

Sosyoekonomi

2022, Vol. 30(51), 33-52

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.02
Date Submitted: 12.07.2020
Date Revised: 07.11.2021
Date Accepted: 03.01.2022

The Effect of Innovation on Employment: An ARDL Bounds Testing Approach for Turkey[1]

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İnovasyonun İstihdam Düzeyine Etkisi: Türkiye İçin Bir ARDL Sınır Testi Yaklaşımı[2]

Abstract

Since the acceleration of technological advancements, many studies have been done in the economics literature on the direction and extent of the relationship between innovation and employment. The findings of these studies indicate that there is no unanimity among the researchers on an innovation-employment relationship. Based on annual data for the 1990-2018 period, this paper investigates the effect of innovation on employment in the Turkish economy using the ARDL bounds testing approach. The results obtained from the analysis show that exports of high-tech products, R&D expenditures, and changes in the number of firms positively affect employment, whereas, contrary to expectations, the number of domestic patent applications seems to affect it negatively.

Keywords : Innovation, Employment, ARDL, Turkey.

JEL Classification Codes : E24, F16 J23, O31.

Öz

Teknolojik ilerlemelerin ivme kazanması ile birlikte iktisadi literatürde inovasyon ve istihdam ilişkisinin yönü ve boyutları konusunda birçok araştırma yapılmıştır. Yapılan araştırmalardan elde edilen sonuçlar, inovasyon ve istihdam ilişkisi bakımından araştırmacılar arasında tam bir fikir birliğine ulaşılmadığını göstermektedir. Bu çalışmada Türkiye ekonomisi ekseninde inovasyon faaliyetlerinin istihdam düzeyi üzerindeki etkileri ARDL Sınır Testi yöntemi kullanılarak araştırılmıştır. Değişkenlere ilişkin yıllık veriler 1990-2018 dönemini kapsamaktadır. Araştırma sonuçlarına göre, yüksek teknolojili ürün ihracatı, Ar-Ge harcamaları, işletme sayısındaki değişim parametreleri istihdam düzeyine pozitif katkı yapmaktadır. Buna karşılık, beklentilerin aksine, yurt içi patent başvuru miktarı istihdam düzeyini negatif etkiler görünmektedir.

Anahtar Sözcükler : İnovasyon, İstihdam, ARDL, Türkiye.

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[1] *This study is the updated version of the paper presented in Turkish at the 4th International Entrepreneurship, Employment and Career Congress.*

[2] *Bu çalışma, 4. Uluslararası Girişimcilik, İstihdam ve Kariyer Kongresi'nde Türkçe sunulan bildirinin güncellenmiş halidir.*

1. Introduction

Keeping employment at acceptable levels is among the main objectives of economic policy. The relationship between technological developments and employment are discussed extensively on economic platforms. Industrial progress in the last half-century, the emergence of machines, and the use of computers that increase the demand for skilled workers are known examples of the effects of technological change on the labour force. Today, while the life cycle of the products is shortening, production technologies are becoming more and more frequently changeable. Investing in innovation increases companies' capabilities by enabling them to compete in international markets while making it easier to adopt new technologies that increase labour productivity. In this respect, the innovation process defined by introducing new or significantly improved products, processes, and organizational structures is among the critical determinants of accelerating or sustaining economic growth (Cirera & Sabetti, 2016: 2). Although there is a consensus in the literature about the positive contributions of innovation to productivity and economic growth, there is no consensus regarding the effects of innovation on employment. While the findings of some studies show a positive relationship between employment and innovation, some other studies indicate the presence of a negative relationship between the two variables. Among the determining factors of these differences is the type of innovation, research sample size, economic development levels of the countries examined, degree of competitiveness, differences in labour skills, and the research methods implemented.

Since new approaches to product design are expected to impact demand for goods positively, the idea that labour demand would increase is plausible. In addition, one can say that there is no consensus on the idea that new production methods would decrease labour demand, hence reducing the employment level. This is because technological advancements would, on the one hand, increase the number of unemployed persons in some areas. Still, they would have expansionary effects on employment in some other areas through new investments due to decreasing costs and increasing demand for products.

In this regard, we observe that the bulk of the studies on innovation-employment relationships use relatively firm or sectoral data. In contrast, the number of those studies using macro variables is pretty limited. However, it is essential to note that the effects of innovation at the firm level might differ from sectoral level effects. It might be challenging to monitor firms' entry and exits, and new business environments might develop. At the same time, it might be impossible to differentiate market expansion from "business stealing" (Meriküll, 2008: 9).

On the other hand, more empirical studies use data from developed economies where technologically more advanced firms are located. On the contrary, those firms operating in the developing or emerging market economies produce mainly products with low value-added or operate simply as a subcontractor of foreign firms. Therefore, they differ from firms from developed countries (Meriküll, 2008: 5).

In light of this, our study investigates the effects of innovation indicators on employment levels in Turkey's economy based on annual data from 1990-2018. ARDL Bound Test approach has been adopted in the study as econometric analysis. The study is expected to contribute to the literature basically in three ways. First, we use data from an emerging market economy to see a difference between emerging and developed economies. Secondly, we utilize macroeconomic variables in the analysis, which is rare in the existing literature. The third contribution of the study has something to do with the method we implement to test the effect of employment on inflation.

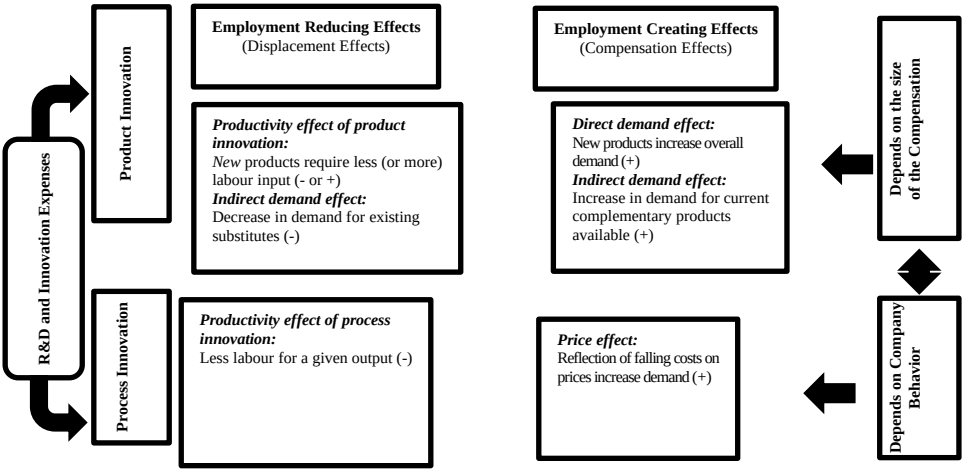
2. The Relation Between Innovation and Employment

Innovation comes out from investments of economic units in productive knowledge, management practices, and organizational decisions. The ultimate aim of these investments is to introduce innovations that positively affect the company's performance by increasing productivity, sales, earnings, or profitability. However, there is uncertainty regarding the extent to which companies can transform their productive investments into innovation and whether these innovation outcomes will affect the performance of companies. In other words, innovation is a risky phenomenon. This is because, in the beginning, it is impossible to know for sure whether or not a new product, process, or organizational change will lead to successful operations and profitable products that could be sold in the market. This is especially true for the countries where key complementary factors such as skills, managerial, and organizational or technological capabilities are too weak to support innovation (Cirera & Sabetti, 2016: 4).

There are four types of innovation within the framework of the Oslo Guide: product innovation, process innovation, organizational innovation, and marketing innovation (Fazlıoğlu et al., 2019: 441). However, when evaluated from an evolutionary point of view, one can talk about two main types of innovation: *process innovation* and *product innovation* (Massini, 2016: 7). Product innovation refers to newly developed or substantially improved goods or services. In this case, one can talk about differences in the main features of the firm's new products as opposed to its previous products (Fazlıoğlu et al., 2019: 441). Process innovation is characterized by the desire to increase productivity or reduce costs by either saving on labour, capital, or a combination of both. Process innovation comes out mostly with investments in capital goods containing a new technology. Generally, higher productivity and job losses are expected after a process innovation. On the other hand, introducing new products or replacing, adapting, or improving an existing product increases the variety and quality of the goods and creates new markets that result in higher production and employment (Massini, 2016: 7).

As shown in Figure 1 below, both types of innovation can be associated with employment reducing (*displacement effects*), labour-saving effects, and job-creating effects (*compensation effects*).

Figure: 1
Innovation - Employment Relationship



Source: Dachs & Peters, 2013: 3; Harrison et al., 2008: 37.

The effects of process innovation on employment for a given enterprise are closely related to productivity changes. Introducing new production processes causes productivity increases because the production process enables firms to get the same output level with less labour input and lower unit costs. The scope of productivity effect of the negative displacement effect depends on the existing production technology, the hence marginal rate of technical substitution between factors, and the direction of technological change (Dachs & Peters, 2013: 3).

However, if labour productivity (and other factors) is transferred to prices, then demand goods, followed by derived demand for labour, hence employment will increase (compensation effect), thereby reducing marginal cost. The outcome of these two balancing (compensation) results is generally expected to be positive. The magnitude of the impact will depend on the price elasticity of demand (Garcia *et al*., 2004: 2), price falls, and the extent of competition as well as the behaviour and relative strength of different representatives, including managers of the firms and the labour unions (Dachs & Peters, 2013: 3).

Product innovation promotes employment growth mainly through demand. When a new product successfully enters the market, innovation causes new demand for the enterprise's product. This direct demand effect may emerge from overall market expansion or may result in losses incurred by the firm's competitors. The magnitude of the compensation effect originating from increased demand depends on the substitutability of goods and the reaction by the competitors. Besides the direct demand effect, *indirect employment effects* may also come into question at the firm level due to product innovation. First of all, indirect demand effects on the existing products of the innovating firm should be considered. Suppose the new product partially or entirely substitutes the old product. In that case, labour demand for the production of the old product is reduced, and the overall effect becomes uncertain for the business enterprise which made the innovation.

On the other hand, in the case of complementary demand relationships, the new product will also cause an increase in demand for the existing products. Hence employment will increase further. Secondly, compared to the old product, the same amount of output of the new product may be produced at higher or lower productivity levels. In other words, the new product may imply a change in the production method and the input mixture; this may also either reduce or increase labour input (Dachs & Peters, 2013: 4; Harrison *et al*., 2008, 5). Product innovations may also have productivity effects, even if they are not associated with simultaneous process innovations. The new or improved product may imply a change in the production method and input mix, reducing or increasing labour requirements. Therefore, empirical investigation is needed to determine the extent and direction of these effects. However, they are likely to be smaller than the positive compensation effects from increased demand for a firm's products. The importance of such increases in demand will depend on the nature of competition and how long it will take the rivals to react to the new products. In addition, since the new products are likely to decrease the firm's sales to a certain degree, compensation effects may get smaller (Harrison et al., 2008, 5).

Since productivity increase result from the process, innovation means producing the same output level using less labour input, reducing employment. However, this also means a fall in unit costs. Based on the company's degree of competition, a cost reduction will likely lead to lower prices. This will positively affect demand and, therefore, production and employment. The demand elasticity of the products significantly determines the magnitude of the compensation effect. It also depends on the representatives within the firm and the nature of the competition. For instance, while labour unions try to turn any earning received from innovation into an increase in labour payments, the firm's managers may use its market power to increase their earnings. Both behaviours can reduce and override the compensation effect (Harrison et al., 2008: 5).

Additional employment effects of innovations can also occur at the sectoral or macro level. For instance, process innovations can affect employment in companies close to the first production stage. The innovative company is directly promoted to acquire new machines to upgrade the production process. Indirect effects occur if the innovating

company can increase its productivity. Benefiting from this production increase, supplier companies can also increase their labour demands.

On the other hand, competing firms that cannot keep up with technological enhancement may suffer from a fall in their market share and may even exit from the market. Innovations in production can also lead to externalities in both ways, positive or negative, for other companies operating in the same industries and some other industries. The intensity of indirect demand effects over the other companies depends mainly on demand relationships. Although the innovative company is, in principle, faced with unlimited demand, the overall demand, in general, is limited at the sectoral level. Product innovation creates negative externalities if the innovative company expands production at the expense of other companies' existing products. In this respect, indirect demand effects on the products called "stealing business" or "business thievery" should be considered at the sectoral and macro levels. On the contrary, in the presence of complementary demand, product innovation will increase the demand for existing products of other companies. It can even trigger the development of new complementary products (Dachs & Peters, 2013: 4).

On the other hand, in a competitive world, as stated in Say's law, within the framework of the classical approach, "each supply creates its demand,"[3] and technological change ultimately enters the process of self-regulation. In addition, the compensation mechanism "through the fall of prices" has been proposed many times by both Neoclassical economists and modern theorists in the history of economic thought. In addition, in a world where competitive convergence is not instant, innovative entrepreneurs can make extra profits in the process of the time-lag between decreases in costs due to technological progress and the fall in prices. Classical and Neoclassical economists assume that employment will improve after these profits are used in new products and business areas (Vivarelli, 2007: 2-3).

However, the functionality of this mechanism on which Say's law is based has been criticized for not considering the existence of demand contractions. According to Keynes, difficulties associated with some components of effective demand, such as lower marginal capital efficiency, may postpone spending decisions and further reduce demand elasticity. The compensation mechanism does not work in such cases, and technological unemployment is no longer a temporary problem. Moreover, the effectiveness of the

[3] *However, we should underline that, contrary to what is widely believed, the true form of the Say's law is not "every supply creates its own demand." In reality it simply says "supply of A creates demand for B" implying that you have to produce and offer something before you demand something else. It is, therefore, as far as its widely known -but not true- form is concerned, something of a "famous wrong but known as right." In fact, it was not J.B. Say himself who argued "supply creates its own demand," but it was reformulated in these words, not surprisingly, by John Maynard Keynes who had a mentality conflict with the Classical school. It is amazing to see how far someone's theory can be reformulated by someone else to mean something quite different from its original meaning yet become so widely accepted in its distorted form that no one questions anymore. This can only be explained by the fact that Keynesian approach became so dominant for decades following the Great Depression that no one dared to question its arguments. For a more detailed discussion, see Skousen (2016).*

compensation mechanism through price falls depends on the validity of the perfect competition hypothesis. If the dominant oligopolistic structure, the compensation effects are severely weakened since cost minimization is no longer compulsory and is not transformed to falling prices. In addition, the transformation of increased profitability of companies into new investments is not warranted. When pessimistic expectations prevail in companies, the transformation of accumulated profits created by innovation into investments can be postponed due to the "animal spirits" in Keynes' words (Vivarelli, 2014: 128).

In line with these evaluations, the following section reviews some of the studies contributing to the literature regarding the impact of innovation activities on employment.

3. Literature Review

Even though there are also macroeconomic studies, the primary studies examining the relationship between innovation and employment in the literature are firm-based or sector-based. The existing literature on the innovation-employment relationship is summarized in Table1 below.

Table: 1
Summary of the Literature

Author(s), Year	Country, Period (s), Analysis Level	Method	Results
Piva & Vivarelli (2005)	Italia 1993-1997 Firm	OLS GMM-SYS	Although it is weak, there is a positive relationship between innovation and employment.
Üçdoğruk (2006)	Turkey 1995-2000 Firm	OLS	The employment growth rates of product and process innovating companies, especially at low technology levels, are positive.
Merikül (2008)	Estonian 1998-2000; 2002-2004 Firm and sectoral	OLS GMM	Innovation activity positively affects employment at both the company and industry level, and product innovation has a more substantial positive employment effect.
Harrison et al. (2008)	France, Germany, Spain, UK 1998-2000 Firm	OLS	The displacement effects caused by the productivity increases in the production of old products are more significant. At the same time, those associated with process innovations likely to be compensated by price falls are small. However, the effects associated with product innovations appear strong enough to repay the displacement effects significantly.
Crespi & Tacsir (2011)	Argentina, Chile, Costa Rica, Uruguay Firm	OLS	Except for Chile, product and process innovations positively affect the employment level.
Gül (2014)	Turkey 2004-2008 NUTS-2 region Firm	LS	The quality of human resources education and entrepreneurship potential positively affect employment growth. It has been observed that increasing the innovation capacity of firms has a positive effect on employment.
Karabulut (2015)	İstanbul/Turkey Firm	OLS	Product, process, and corporate innovation positively affect financial performance, customer performance, internal business process performance, learning, and growth performance.
Cirera & Sabetti (2016)	Developing Countries 2013-2015 Firm	OLS IV	Product innovation positively affects employment in the short term when it is successful and brings additional sales to the company. Besides, process innovation containing production automation does not appear to impact employment changes.
Peluffo & Silva (2018)	Uruguay 2000-2012 Firm	OLS IV	Innovation has a positive effect on employment growth and skilled labour. Compared to other innovations, productivity-improving innovations contribute more to the skill composition, skilled labour, and total employment growth. Especially product innovation has a higher positive effect on the demand for the specialized labour force.
Dachs & Peters (2013)	16 European Countries 2002-2004 Firm	WIV	Due to the general productivity increases and process innovation, there are more job losses in the companies with foreign ownership than those with domestic ownership. At the same time, the employment-creating aspect of product innovation has been more remarkable for foreign companies.

Dalgıç & Fazlıoğlu (2021)	Turkey 2003-2015 Firm	OLS	Innovation strengthens the probability of a firm's high growth performance. Product innovation is beneficial for the manufacturing and services sector. Although process innovation is not in terms of sales, it negatively affects firm growth in terms of employment.
Jenkins (2008)	South Africa Firm	TSLS	Both trade and technology have a negative impact on employment.
Frey & Osborn (2013)	USA 2010 Firm	Logit	47% of total employment in the USA is at risk, and these professions tend to be automated over the next ten to twenty years. In addition, it has been determined that there is a susceptible structure against computerization in the service professions that have had an important share in employment in the past decades in the USA.
Berman, Bound & Griliches (1994)	USA 1959-1973; 1973-1979; 1979-1987 Sectoral	OLS	The labour-saving technological change in the US manufacturing industry in the 1980s led to a 15% drop in the employment of production workers for the period of 1979-1989. Later on, it was observed that the demand turned towards skilled workers, moving away from unskilled workers.
Jung et al. (2016)	South Korean 2010 Sectoral	CGE	Innovative activities increase total labour demand and have positive effects on economic growth. However, technological innovation improves the demand for highly skilled labour more than other labour categories.
Mehta (2016)	Indian 2000-2001; 2013-2014 Sectoral	GLS	"product innovation" on employment for different industries is positive.
Antonucci & Pianta (2002)	Eight European Countries 1994-96; 1994-99 Sectoral	OLS	Process innovations had a negative effect on employment, whereas product innovation had a weak positive impact. Total innovation expenditures contribute negatively to employment increase.
Mastrostefanoa & Pianta (2009)	10 European Countries 1994-2001 Sectoral	GLS OLS	While product innovation increases the level of employment, process innovation decreases employment. The overall effect for innovation is negative due to the dominance of process innovations.
Piva & Vivarelli (2017)	11 European Countries 1998-2011 Sectoral	GMM-SYS LSDVC	R&D expenditures contribute positively to product innovation-related employment. The positive employment effect originates from the medium and high technology sectors, while no effect has been detected in the low technology industry. Besides that, it was observed that capital formation was negatively related to employment.
Massini (2016)	Brazil 2000-2011 Sectoral	OLS	While product innovation has a negative effect on both total employment and employment share, process innovation has a positive effect, although it is not always significant.
Blien & Ludewig (2017)	Germany 1970-2004 NUTS-III Sectoral	OLS	The effect of technological change on employment may vary with the demand structure. The contribution of technological advancements to employment level is positive in the sectors with elastic demand. On the contrary, in the industries with inelastic demand, technological advances have harmful effects on employment
Evangelista & Savona (2003)	Italy 2003 Sectoral	Logit	The net effect is positive for small firms and under half of the service sectors. Innovation negatively affects large firms, capital-intensive industries, and all finance-related sectors. In general, the effect of innovation on employment was negative.
Sinclair (1981)	USA Macro	IS/LM	Positive employment compensation can occur if demand elasticity and factor substitution are sufficiently high.
Kang (2007)	South Korea 1980 -2004 Sectoral Macro	SVAR	For the 1980s, technological shocks reduced unemployment in the short run but increased it in the long run. In addition, it contributes positively to employment for both the short and long term in the 1990s.
Matuzeviciute (2017)	EU Countries 2000-2012 Macro	SGMM	Results do not indicate any significant relationship between technological innovations (the ratio of triple patent and the R&D expenditures to GDP) and the unemployment rate.

Firm-level studies (Piva & Vivarelli, 2005; Üçdoğruk, 2006; Harrison et al., 2008; Meriküll, 2008; Crespi & Tacsir, 2011; Gül, 2014; Karabulut, 2015; Cirera & Sabetti, 2016; Peluffo & Silva, 2018) found in general that endeavours toward product and process innovations positively affect employment (especially for skilled labour) though the magnitude of the layoff and compensation effects may vary. Results of some other studies (e.g., Dachs & Peters, 2013; Dalgıç & Fazlıoğlu, 2021) indicate, however, that product innovation supports employment whereas process innovation reduces it.

On the other hand, we should also note that few studies found that innovation negatively affects employment. For instance, in their research using the logit model for Italy,

Evangelista & Savona (2003) found that innovation negatively affects employment when skilled labour replaces unskilled labour.

Scale is an important factor when analysing the impact of innovation on employment. This is because firm-level findings may not be compatible with those at the industry or macro level. In this context, it cannot be known in the firm-level analyses whether innovating firm gets its benefits -hence employment increases- by shutting down its competitors ("business stealing") or if there is a net effect at the industry level. Similarly, one cannot observe the emergence of new business fields. In addition, firm-level studies are based on panel or survey data and do not represent the whole industry (Meriküll, 2008; 5; Mastrostefano & Pianta, 2009: 730). On the contrary, in addition to solving this sort of problem, industry-level analyses make it possible to determine the general effect of technological change by taking into consideration its direct effects on innovating firms as well as indirect impact on the industry, including 'business thievery', product substitution or differentiation, price-elastic market expansion and change (Mastrostefano & Pianta 2009: 731).

The findings of many studies looking into the innovation-employment relationship at the industry level (e.g., Berman et al., 1994; Merikull, 2008; Mehta, 2016, Jung et al., 2016) indicate that innovations have a positive effect on employment.

However, some studies reached different findings concerning the impact of product and process innovation on employment. Antonucci and Pianta (2002), Mastrostefanoa and Pianta (2009), and Piva and Vivarelli (2017) found that product innovations positively affect employment, whereas process innovations affect it negatively. Similarly, as an example of a developing economy, Massini (2016) investigated the effects of structural change on employment at the industry level in Brazil using panel data of 22 sectors. Results of the study showed that product innovations affect employment and labour force participation positively while process innovations affect it negatively. Jenkins (2008) examined the causes of high unemployment rates in South Africa, becoming a significant economic and social problem. After the decomposing change in unemployment according to Chenery type decomposition, he investigated the effect of trade and technological change on manufacturing employment's level and skill composition by using a two-stage least squares (TSLS) estimation method. The results showed that both trade and technology have a negative effect on employment.

On the other hand, there are only a few studies in the literature investigating this issue in the framework of a macroeconomic perspective. Sinclair (1981), in this realm, highlighted the macro IS/LM model and concluded that a positive employment compensation effect might arise when demand elasticity and the substitution possibility between factors are high enough. In his analysis based on the USA data, he found strong evidence supporting compensation with the mechanism of "falling wages," though not with the mechanism of "falling prices" (Vivarelli, 2014: 133). Kang (2007) investigated the effects of technological shocks on employment in the South Korean economy with the help of a structural VAR model. The results indicated that for the 1980s, technological shocks -while reducing it in

the short run- improved employment in the long run, hence neutralizing its short-run effects in general over time. Interestingly, this effect seems to be positive both in the short and the long run for the 1990s. Matuzeviciute's (2017) study on macroeconomic variables indicates no meaningful relationship between innovation and employment.

In summary, there is no consensus in the literature among the research results for the effects of innovations on employment. Some of them conclude that there is a positive correlation between product innovations and employment increases, whereas there is a negative correlation between process innovation and employment level. On the other hand, some conclude that innovations negatively affect employment, leaving room for further empirical research. Undoubtedly, one can think of many factors to determine these results, such as development levels of countries, the existence of a competitive structure, quality of the labour force, level of unionization, and finally, the structural status of the sector investigated.

4. Data, Model, and Method

The model we estimated in this study setting up a functional relationship between employment, patent applications, high-tech exports, changes in the number of firms, and R&D expenditures, is given below.

$$EMP_t = \beta_0 + \beta_1 PAT_t + \beta_2 HEXP_t + \beta_3 CNF_t + \beta_4 RAD_t + \varepsilon_t \quad (1)$$

The terms in Equation 1 denote the following:

EMP = The number of individuals employed,

PAT = Annual domestic patent applications,

HEXP = Exports of high-tech products in US dollars,

CNF = Annual change in the total number of firms on the national scale,

RAD = The ratio of research and development expenditures to GDP.

The data used in the analysis cover the period 1990-2018, where the raw data are compiled from the Turkish Statistical Institute (TUIK), OECD, and the World Bank data sources. The logarithmic values are used for the number of individuals employed, the number of patent applications, exports of high-tech products, and the change in the number of firms.

One of the most critical issues to be taken care of in the time series is investigating the stationary state of the series. The series must be stationary for the researcher to reach econometrically meaningful relationships between the parameters. The problem of fake regression can be encountered in a trend in the relevant variables of a time series. Therefore, the series' deterministic (definitive) and stochastic (probabilistic) aspects should be investigated and considered. Especially in empirical studies using macroeconomic time series, stationarity tests are standard practices (Tarı, 2006: 380-381).

Unit root tests provide information about the stationarity of the series and their integration levels. The series is called zero-order integrated I(0) if they are stationary at their level values and first-order integrated I(1) if they become stationary at their first differences. Determining the integration levels of the series is important for investigating the short and long-term relationship between parameters and for the analysis method to be used (İğdeli, 2019: 2526).

In the methods adopted by Engle and Granger (1987), Johansen-Juselius (1990), and Johansen (1992), which allow the determination of a long-term relationship between the variables, they must be integrated at the same level. If the level of integration between the variables is not the same, it is not possible to establish a long-term relationship between them (Fatukasi et al., 2015: 27). If the levels of integration of the variables are not the same, the investigation on whether there is a short and long-term relationship between the time series can be done by using the ARDL (autoregressive distributed lag) method. This method offers some econometric advantages over the other single co-integration methods.

Firstly, it eliminates endogeneity problems and the inadequacy of hypothesis tests for coefficients estimated for the long term for the Engle-Granger method. Secondly, long and short-term parameters of the model can be estimated simultaneously. Thirdly, all variables are assumed to be endogenous. Fourthly, this method does not require establishing the integration level between the variables and pre-testing for unit roots (Halicioglu, 2007: 66). In this context, the ARDL method can be used not only in the case where the regressors (i.e., independent variables) are cointegrated completely I(0) or completely I(1) but also when they are partly I(0) and partly I(1) (Pesaran et al., 2001: 290). Lastly, the ARDL boundary test approach gives better results than multivariable co-integration methods in the case of small sampling (Fatukasi et al., 2015: 27).

For the ARDL method to be used, first, it is necessary to do the stationarity test for the variables. Testing for stationarity can be performed by using various tests such as Enhanced Dickey-Fuller (ADF), Dickey-Fuller GLS (DF-GLS), Phillips-Perron (PP), Elliott-Rothenberg-Stock Point-Optimal (ERS), and Ng-Perron. In the stationarity tests, the main hypothesis is a unit root (i.e., the series is not stationary). The alternative hypothesis is that there is no unit root in the series (i.e., the series is stationary). To make estimations by the ARDL method, any series included in the analysis must reach the stationary state before reaching the I(2) level. The unrestricted ARDL model can be formulated as follows:

$$\Delta EMP_t = \alpha_0 + \sum_{i=1}^{n}\beta_{1i}\Delta EMP_{t-i} + \sum_{i=0}^{n}\beta_{2i}\Delta PAT_{t-i} + \sum_{i=0}^{n}\beta_{3i}\Delta HEXP_{t-i} + \sum_{i=0}^{n}\beta_{4i}\Delta CNF_{t-i} + \sum_{i=0}^{n}\beta_{5i}\Delta RAD_{t-i} + \delta_1 EMP_{t-1} + \delta_2 PAT_{t-1} + \delta_3 HEXP_{t-1} + \delta_4 CNF_{t-1} + \delta_5 RAD_{t-1} + e_t \quad (2)$$

In Equation 2, Δ is the first difference operator, α_0 is the constant coefficient, and e is the usual white noise residuals. The left-hand side term denotes the number of individuals employed. On the right side, "δ_1-δ_5" corresponds to the long-term relationship. The "β_1-β_5" parameters with sigma represent the short-term dynamics of the model (Dritsakis, 2011: 5).

To determine the presence of co-integration in the model, it is necessary to determine the appropriate length of the lag at the beginning, where Akaike and Schwarz information criteria are used in determining the ideal lag (Esen et al., 2012: 257). To investigate the existence of long-term relationships between variables, the Pesaran et al. (2001) procedure is used. The restricted test method is based on the F-test. The F-test is the test for co-integration or testing the hypothesis that there is no co-integration between the variables. The primary and alternative hypotheses can be expressed as follows (Dritsakis, 2011: 5):

Ho: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0 \rightarrow$ there is no co-integration between variables.

Ha: $\delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0, \rightarrow$ there is co-integration between variables.

This can also be illustrated as FEMP (EMP | PAT, HEXP, CNF, RAD).

In the ARDL boundary test, the determination of the long-term relationship is realized by the Wald test or F statistic. Calculated F statistic is compared with the levels of significance they created asymptotically in Pesaran et al. (2001). If the calculated F statistic is below the lower limit, it is decided that there is no co-integration between the variables. On the contrary, if the calculated F statistic is higher than the upper limit of the critical values, it is accepted that there exists a long-term relationship between the variables. On the other hand, if the calculated value for the relevant variables lies between the F statistic's lower and upper critical limits, no definitive judgment can be made regarding the co-integration relationship. In this case, it is recommended to call for other co-integration methods by considering the stationarity levels of the parameters (Akel & Gazel, 2014: 31).

After determining the existence of co-integration in the model, the long-run relationship can be written as follows:

$$EMP_t = \alpha_0 + \sum_{i=1}^{n} \beta_{1i} EMP_{t-i} + \sum_{i=0}^{n} \beta_{2i} PAT_{t-i} + \sum_{i=0}^{n} \beta_{3i} HEXP_{t-i} + \sum_{i=0}^{n} \beta_{4i} CNF_{t-i} + \sum_{i=0}^{n} \beta_{5i} RAD_{t-i} + e_t \quad (3)$$

In line with the unrestricted error model estimation, the long-term elasticities are obtained by dividing one-time lagged coefficients of explanatory variables (multiplied by negative) by once lagged values of the dependent variable (Onoja, 2017:33). The error correction model regarding the variables of the ARDL model is shown as the following:

$$\Delta EMP_t = \alpha_0 + \sum_{i=1}^{n} \beta_{1i} \Delta EMP_{t-i} + \sum_{i=0}^{n} \beta_{2i} \Delta PAT_{t-i} + \sum_{i=0}^{n} \beta_{3i} \Delta HEXP_{t-i} + \sum_{i=0}^{n} \beta_{4i} \Delta CNF_{t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta RAD_{t-i} + \delta ECT_{t-1} + e_t \quad (4)$$

In Equation 4, EC_{t-1}, the error correction coefficient denotes the one-time lagged value of the model's residuals in which the long-term relationship between the variables is established. The error correction coefficient indicates what level of correction, in the long run, will be achieved by the divergences from the equilibrium in the short run. It is desirable to have an error correction coefficient negative and significant (Akel & Gazel, 2014: 32).

5. Findings

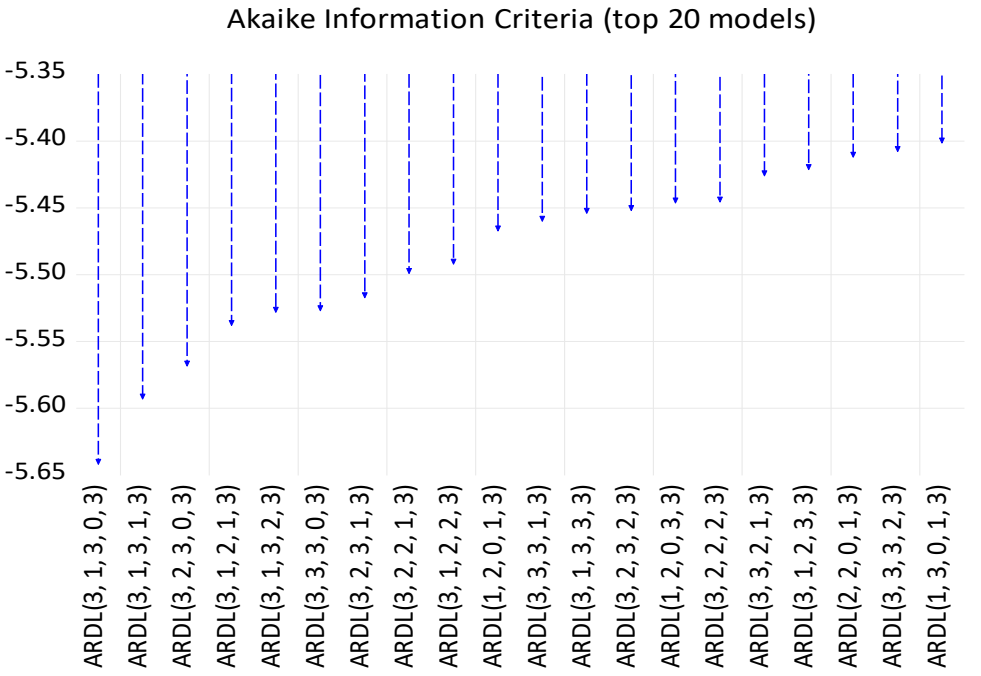
To perform the analysis, the stationarity test of the variables should be done in the first stage. In this study, the Phillips-Perron test method conducted the stationarity analysis as it represents a further improved version of the Augmented Dickey-Fuller (ADF) test (Asteriou & Hall, 2007: 299). The results for the unit root test are given in Table 2.

Table: 2
Unit Root Test Results

Variable	*Test Level*	*Equation Type*	*Test Statistic*		*Result*
			Constant (c)	*Const. and Trend (c&t)*	
EMP	Level	Phillips-Perron	0.7402	-1.0339	I(1)
	First Difference	Phillips-Perron	-4.8205	-5.1213	
PAT	Level	Phillips-Perron	0.1204	-1.9537	I(1)
	First Difference	Phillips-Perron	-4.1836	-4.0616	
HEXP	Level	Phillips-Perron	-2.2869	-1.7592	I(1)
	First Difference	Phillips-Perron	-5.6130	-8.6377	
CNF	Level	Phillips-Perron	-2.2932	-2.3456	I(1)
	First Difference	Phillips-Perron	-4.5747	-4.4909	
RAD	Level	Phillips-Perron	0.3843	-2.0798	I(1)
	First Difference	Phillips-Perron	-7.3425	-8.9504	
Mac Kinnon (1996) one-sided critical p values: $\tau_{0.05} = -1.954$, $\tau_{c\ 0.05} = -2.976$, $\tau_{c\ t.\ 0.05} = -3.587$					

Results of stationarity analysis show that all of the variables do not show stationarity in their level values. However, they become stationary after their first difference. The fact that the variables are stationary at the I(1) level means that we can examine whether or not there are short and long-term relationships between the relevant variables. Akaike Information Criteria were used to determine the most appropriate lag length for the ARDL boundary test; ARDL (3,1,3,0,3) model proposed by the relevant information criteria was used in the analysis. Chart 1 shows the best lag length indicated by the Akaike information criteria.

Chart: 1
The Determination of Lag Length



Estimation results for the ARDL(3,1,3,0,3) model are given in Table 3.

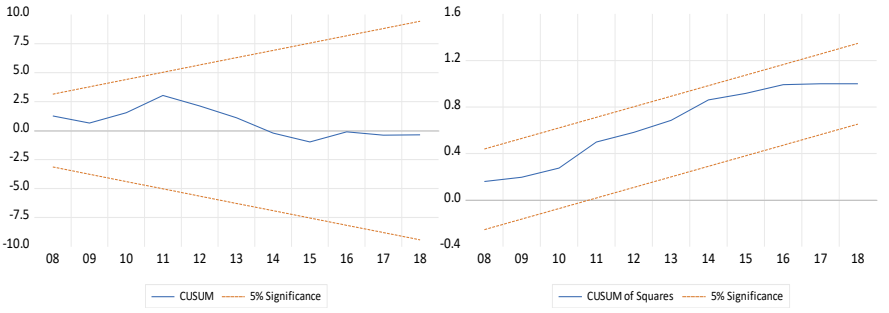
Table: 3
ARDL(3,1,3,0,3) Model Estimation Results

Dependent Variable = EMP				
Variables	**Coefficient**	**Standard Error**	**t-Statistic**	**Probability**
EMP(-1)	0.7012	0.1195	5.8676	0.0001
EMP(-2)	0.0207	0.1859	0.1115	0.9132
EMP(-3)	-0.3653	0.1717	-2.1276	0.0568
PAT	0.0373	0.0294	1.2697	0.2304
PAT(-1)	-0.1010	0.0338	-2.9808	0.0125
HEXP	0.0402	0.0146	2.7481	0.0190
HEXP(-1)	0.0130	0.0178	0.7299	0.4807
HEXP(-2)	0.0535	0.0148	3.6068	0.0041
HEXP(-3)	-0.0247	0.0119	-2.0802	0.0617
CNF	0.0804	0.0169	4.7469	0.0006
RAD	-0.0981	0.0715	-1.3729	0.1971
RAD(-1)	0.1079	0.0873	1.2357	0.2423
RAD(-2)	0.2659	0.0841	3.1618	0.0090
RAD(-3)	0.3356	0.0507	6.6132	0.0000
C	5.0626	0.9404	5.3831	0.0002

Diagnostic Tests			
	Value	**Probability**	
R^2	0.9969		
F-statistics	257.74	0.0000	
Breusch-Godfrey LM Test (*F-statistic*)	1.0359	0.3936	
Heteroskedasticity Test: Breusch-Pagan-Godfrey (*F-statistic*)	0.8258	0.6381	
Ramsey Reset Test *(F-statistic)*	0.4981	0.4964	

Accordingly, the diagnostic test results for the model setup show no autocorrelation, heteroscedasticity, and specification (model setting) error. In addition, CUSUM and CUSUMSQ graphics were used to investigate the presence of a structural break in the model. As it can be seen from Chart 2, the relevant values fall within the critical limits at a 5% significance level. Therefore, the model does not have a structural break and seems stable.

Chart: 2
CUSUM and CUSUMSQ Graphics



Boundary test values investigating the co-integration relationship among the parameters used in the model are given in Table 4.

Table: 4
ARDL Boundary Test Results

	Critical Value	**Lower Bound I(0)**	**Upper Bound I(1)**
F Statistic	10%	2.75	3.99
	5%	3.35	4.77
15.9207	1%	4.76	6.67
t Statistic	Critical Value	Lower Bound I(0)	Upper Bound I(1)
	10%	-2.57	-3.66
	5%	-2.86	-3.99
-5.6570	2,5%	-3.13	-4.26
	1%	-3.43	-4.6

As shown in Table 4, F and t statistics are higher than the upper limit values. Therefore, the coefficient of EMP_{t-1} is found to be significant, and there is a co-integration relationship between the variables. Estimated long-term values are shown in Table 5.

Table: 5
Long Term Estimation Results

Dependent Variable = EMP				
Variables	***Coefficient***	***Standard Error***	***t-Statistic***	***Probability***
PAT	-0.0989	0.0227	-4.3515	0.0012
HEXP	0.1275	0.0185	6.8597	0.0000
CNF	0.1250	0.0199	6.2622	0.0001
RAD	0.9503	0.1471	6.4590	0.0000

As shown in Table 5, all coefficients are statistically significant. All variables except for patent applications seem to contribute positively to the level of employment. A 1% increase in high technology product exports leads to a 0,127% improvement in employment. Likewise, as the number of domestic firms increases, employment goes up as well: a 1% increase in the number of firms leads to a 0,125% increase in employment level. Similarly, a positive relationship between R&D expenditures and employment: a 1% increase in R&D expenditures contributes to the employment level almost at the same rate (0,95%).

Based on the long-term estimation results, one can say that the innovation-oriented efforts in Turkey turn into productivity increases and that new investments lead to increases in demand, especially for skilled labour as high-tech products sales go up at both national and international levels in a strengthened economy in terms of competitiveness. However, contrary to the theoretical expectations, there seems to be a negative, though not very strong, relationship between patent applications and employment level. Indeed, according to the estimation results, a 1% increase in patent applications seems to reduce the employment level by 0,098%. In other words, the relationship is quite weak, and its sign is contrary to the expectations. How can we explain this surprising result? One can think of two arguments in this respect.

The first argument is that, as far as the period under investigation is concerned, on average, only 20% of total patent applications could receive registration certificates; that is, most of the applications could not be converted into accepted patents. Secondly, and more importantly, it has to do with a very small portion of the patents received could be commercialized. In other words, the products that come out after receiving the patent could not be transformed into a mass-commercial production.

The error correction model estimation results carried out to determine the short-term behaviours of the co-integrated variables are given in Table 6.

Error correction model estimation results indicate that the error correction coefficient has a negative sign and is statistically significant. Accordingly, 64,3% of the deviations from the equilibrium occurring in the short run disappear until the end of the first year, hence converging to the long-run equilibrium. Additionally, a 1% increase in the high-tech product exports, which is statistically significant at a 5% significance level in the short run, causes a 0,04% improvement in the employment level.

Table: 6
Error Correction Model Estimation Results

Dependent Variable = D(EMP)				
Variables	**Coefficient**	**Standard Error**	**t-Statistic**	**Probability**
C	5.0626	0.4844	10.450	0.0000
D(EMP(-1))	0.3446	0.0921	3.7414	0.0033
D(EMP(-2))	0.3653	0.1150	3.1748	0.0088
D(PAT)	0.0373	0.0200	1.8608	0.0897
D(HEXP)	0.0402	0.0111	3.6270	0.0040
D(HEXP(-1))	-0.0287	0.0088	-3.2572	0.0076
D(HEXP(-2))	0.0247	0.0088	2.7838	0.0178
D(RAD)	-0.0981	0.0491	-1.9966	0.0712
D(RAD(-1))	-0.6016	0.0710	-8.4700	0.0000
D(RAD(-2))	-0.3356	0.0394	-8.5074	0.0000
ECT(-1)	-0.6433	0.0617	-10.4187	0.0000
	Value	**Probability**		
R^2	0.9010			
F Statistic	13.6561	0.0000		

6. Conclusion

Increased competition among the economic units, firms, and economies in the development process gave way to the acceleration of innovative applications. Innovations contribute to economic development on both micro and macro levels. Nevertheless, the employment dimension of innovation as one of the main determinants of economic policy has been a subject of debate for a long time. While it is generally accepted that product innovations positively affect employment, process innovations are thought to affect them negatively. The impact of innovations on employment occurs in two different forms: displacement and compensation. In a sector where production technology is labour-intensive, increasing output with new and more productive machines through technological advancements leads to increased demand for machines at the expense of labour, reducing employment. This is called as *displacement effect* in the literature. On the contrary, the employment increasing practices of companies due to the market expansion following the release of new products are called the *compensation effects*.

It would not be an accurate assessment to assume that all technological developments have an employment-reducing effect because productivity increases and cost decreases caused by technological developments can also expand demand by pulling prices and/or wages down. Expanding output levels of the firms following increased demand paves the way for new investments, whereby employment increases may also be observed. However, introducing new products to the market may not always lead to employment growth. For instance, if the newly released products replace the old ones, an employment increase may not follow. Moreover, many other factors such as the expertise level of workers, degree of competitiveness in the market, power of the unions, demand conditions, and expectations also play an important role in the impact of product or process innovations on employment.

Classical and New Classical economists believe that technological innovations will expand employment through the spontaneous market equilibrating mechanism due to the flexibility of prices and wages. On the contrary, according to the Keynesian approach, the relationship between innovation and employment may turn negative due to various factors

such as unions, imperfect competition, and uncertainties in effective demand. Accordingly, opposite or mixed results have been obtained from the empirical studies investigating the effects of innovations on employment. Nevertheless, the more dominant view is that, compared to process innovation, product innovation generally provides more employment opportunities.

In this study, the effect of innovation indicators on employment has been investigated in the Turkish economy using annual data from 1990-2018 and the ARDL Bound Test method. The results indicate that R&D activities, changes in the number of firms, and high-tech product exports positively affect employment. Based on these results, one can say that in Turkey, innovative efforts have evolved into productivity gains. It has led to improvements, especially in demand for skilled labour, with rising high-tech products in the competitively strengthened economy. Lastly, there seems to be a weak negative interaction between patent applications and employment levels. The low registration rate of national patent applications and the failure to commercialize all the patents received could explain this negative relationship. In this context, it becomes important to implement policies aiming to create skilled labour accommodating to changing demand structure due to emerging new technologies. In addition, supporting innovations that can be commercialized would help establish or sustain a competitive structure in international markets. This, in turn, will improve the balance of payments and contribute to economic growth performance positively.

References

Akel, V. & S. Gazel (2014), "Döviz Kurları ile BIST Sanayi Endeksi Arasındaki Eşbütünleşme İlişkisi: Bir ARDL Sınır Testi Yaklaşımı", *Erciyes University Journal of Faculty of Economic and Administrative Sciences*, 44, 23-41.

Antonucci, T. & M. Pianta (2002), "Employment Effects of Product and Process Innovation in Europe", *International Review of Applied Economics*, 16(3), 295-307.

Asteriou, D. & S. Hall (2007), *Applied Econometrics: A Modern Approach*, Palgrave Macmillan Pub., New York.

Berman, E. et al. (1994), "Changes in The Demand for Skilled Labour within U.S. Manufacturing Industries: Evidence from Annual Survey of Manufacturing", *The Quarterly Journal of Economics*, 109(2), 367-397.

Blien, U. & O. Ludewig (2017), "Technological Progress and (Un) employment Development", *IZA Discussion Paper Series*, <http://ftp.iza.org/dp10472.pdf>, 16.07.2019.

Cirera, X. & L. Sabetti (2016), "The Effects of Innovation on Employment in Developing Countries: Evidence from Enterprise Surveys", *The World Bank Policy Research Working Paper Series*, <http://hdl.handle.net/10986/24857>, 16.07.2019.

Crespi. G. & E. Tacsir (2011), "Effects of Innovation on Employment in Latin America", *MPRA Paper No. 35429*, <https://mpra.ub.uni-muenchen.de/35429/1/MPRA_paper_35429.pdf>, 12.07.2019.

Dachs, B. & B. Peters (2013), "Innovation, Employment Growth, and Foreign Ownership of Firms: A European Perspective", *ZEW* Discussion Paper No. 13-019, <https://www.econstor.eu/bitstream/10419/72469/1/742561240.pdf>, 24.07.2019.

Dalgıç, B. & B. Fazlıoğlu (2021), "Innovation and Firm Growth: Turkish Manufacturing and Services SMEs, *Eurasian Business Review*, 11, 395-419.

Dritsakis, N. (2011), "Demand for Money in Hungary: An ARDL Approach", *Review of Economics & Finance*, 1, 01-16.

Esen, E. et al. (2012), "Feldstein-Horioka Hipotezinin Türkiye Ekonomisi için Sınanması: ARDL Modeli Uygulaması", *Eskişehir Osmangazi University Journal of Economics and Administrative Science*, 7(1), 251-267.

Evangelista, R. & M. Savona (2003), "Innovation, Employment and Skills in Services. Firm and Sectoral Evidence", *Structural Change and Economic Dynamics*, 14, 449-474.

Fatukasi, B. et al. (2015), "Bounds Testing Approaches to the Analysis of Macroeconomic Relationships in Nigeria", *European Journal of Business and Management*, 7(8), 26-34.

Fazlıoğlu, B. et al. (2019), "The Effect of Innovation on Productivity: Evidence from Turkish Manufacturing Firms", *Industry and Innovation*, 26 (4), 439-460.

Frey, C.B. & M.A. Osborne (2013), "The Future of Employment: How Susceptible Jobs Are to Computerization?", *University of Oxford*, <https://www.oxfordmartin.ox.ac.uk/ downloads/academic/The_Future_of_Employment.pdf>, 20.06.2019.

Garcia, A. et al. (2004), "Innovation and Jobs: Evidence from Manufacturing Firms", *MPRA Paper 1204*, <https://mpra.ub.uni-muenchen.de/1204/1/ MPRA_paper_1204.pdf>, 24.06.2019.

Gül-Gökdoğan, T. (2014), "Türkiye İçin İstihdamın Belirleyicileri: İBBS-2 Bölge Düzeyi, Mekânsal Analiz Uygulaması", *Dokuz Eylül University Journal of Faculty of Economic and Administrative Sciences*, 29(1), 105-135.

Halicioglu, F. (2007), "The Demand for New Housing in Turkey: An Application of ARDL Model", *Global Business and Economics Review*, 9(1), 62-74.

Harrison, R. et al. (2008), "Does Innovation Stimulate Employment? A Firm-Level Analysis Using Comparable Micro-Data from Four European Countries", *NBER Working Paper* No: 14216, <https://www.nber.org/papers/w14216.pdf>, 18.06.2019.

İğdeli, A. (2019), "Ar-Ge ve Eğitim Harcamalarının Ekonomik Büyüme Üzerindeki Etkisi: Türkiye Örneği", *Manas Social Studies Journal*, 8(3), 2517-2538.

Jenkins, R. (2008), "Trade, Technology and Employment in South Africa", *Journal of Development Studies*, 44(1), 60-79.

Jung, S. et al. (2016), "Study on The Effect of Innovation on Employment Structure and Economic Growth: A Computable General Equilibrium Approach", *EcoMod*, 9524, <http://ecomod.net/system/files/ Yeo.ecomod16_yeo_160430.pdf>, 20.06.2019.

Kang, K.-H. (2007), "Technological Innovation and Employment", *Bank of Korea Economic Papers*, No. 9(2), <https://www.bok.or.kr/viewer/skin/doc.html?fn=FILE_201803300852120061.pdf&rs=/ webview/result/E0000729/200701>, 22.10.2021.

Karabulut, A.T. (2015), "Effects of Innovation Types on Performance of Manufacturing Firms in Turkey", *Procedia - Social and Behavioral Sciences*, 195, 1355-1364.

Massini, A.M. (2016), "Innovation and Employment: The case of Brazil", Lund University, Department of Economic History, *Master Thesis*, <http://lup.lub.lu.se/student-papers/record/8883088>, 18.06.2019.

Mastrostefano, V. & M. Pianta (2009), "Technology and Jobs", *Economics of Innovation and New Technology*, 18(8), 729-741.

Matuzeviciute, K. et al. (2017), "Do Technological Innovations Affect Unemployment? Some Empirical Evidence from European Countries", *Economies*, 5(4), 1-19.

Mehta, S. (2016), "Innovation and Employment: A Study of Indian Manufacturing Sector", *Millennial Asia*, 7(2), 184-206.

Meriküll, J. (2008), "The Impact of Innovation on Employment: Firm- and Industry-level Evidence from Estonia", *Bank of Estonia Working Paper Series*, <http://www.eestipank.ee/sites/eestipank.ee/files/publication/en/WorkingPapers/2008/_wp_108.pdf>, 21.07.2019.

OECD (2020), *Database*, <https://stats.oecd.org/>, 02.07. 2020.

Onoja, A.O. et al. (2017), "Econometric Analysis of Short-Run and Long-Run Determinants of Agricultural Value Addition in Africa", *Agrosearch*, 17(1), 26-43.

Peluffo, A. & E. Silva (2018), "Innovation, Employment and Skills", *35th IARIW General Conference*, <http://www.iariw.org/copenhagen/peluffo.pdf>, 25.07.2019.

Pesaran, M.H. et al. (2001), "Bound Testing Approaches to The Analysis of Level Relationship", *Journal of Applied Econometrics*, 16, 289-326.

Piva, M. & M. Vivarelli (2005), "Innovation and Employment: Evidence from Italian Microdata", *Journal of Economics*, 86(1), 65-83.

Piva, M. & M. Vivarelli (2017), "Technological Change and Employment: Were Ricardo and Marx Right?", *IZA Discussion Paper*, No.10471, <http://ftp.iza.org/dp10471.pdf>, 25.07.2019.

Sinclair, P.J.N. (1981), "When will Technical Progress Destroy Jobs?", *Exford Economic Papers*, 31, 1-18.

Skousen, M. (2016), *İktisadi Düşünce Tarihi: Modern İktisadın İnşası*, [The Making of Modern Economics] 7th ed. (trans. M. Acar, E. Erdem & M. Toprak), Ankara: Adres Publications.

Tarı, R. (2006), *Ekonometri*, 4th ed., Kocaeli Univ, Publications, Kocaeli.

TUIK (2020), "*Konularına Göre İstatistikler*", <http://www.tuik.gov.tr>, 24.06.2020.

Üçdoğruk, Y. (2006), "Employment Impact of Product and Process Innovations in Turkey", *Ege Academic Review*, 6(1), 93-105.

Vivarelli, M, (2007), "Innovation and Employment: A Survey", *IZA Discussion Paper* No. 2621, <http://anon-ftp.iza.org/dp2621.pdf>, 20.06.2019.

Vivarelli, M. (2014), "Innovation, Employment and Skills in Advanced and Developing Countries: A Survey of the Literature," *Journal of Economic Issues*, 48(1). 123-154.

World Bank (2020), *Data*, <https://data.worldbank.org/>, 28.06.2020.

Sosyoekonomi

2022, Vol. 30(51), 53-70

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.03
Date Submitted: 17.12.2020
Date Revised: 21.11.2021
Date Accepted: 04.01.2022

A Research About One City Monopoly Phenomenon in Turkey[1]

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Türkiye'de Monopol Şehir Olgusu Üzerine Bir Araştırma[2]

Abstract

This paper discusses the one-city monopoly phenomenon in Turkey from 2007 to 2018 from inequality. For this purpose, Theil Inequality Index is calculated for the NUTS3 level, and a significant gap between İstanbul and other cities is obtained. Then, club convergence analysis and clustering procedure are applied. According to the finding, the overall country's convergence hypothesis is rejected, and 75 of 81 cities have converged into six clubs. In these heterogeneous convergence clubs, İstanbul has confirmed the one-city monopoly characteristics while diverging from others, both in its great strength and the risks the city confronts.

Keywords : One-City Monopoly Phenomenon, Inequality, Unbalanced Regional Development, Club Convergence Analysis, Theil Index.

JEL Classification Codes : R110, R150, O500.

Öz

Bu çalışmada, Türkiye için monopol şehir olgusu, 2007 ve 2018 dönemi için eşitsizlik perspektifinden analiz edilmiştir. Bu amaçla Theil indeksi 81 il için hesaplanmış ve İstanbul ile diğer şehirler arasında belirgin bir farklılık bulunmuştur. Devamında, kulüp yakınsaması ve kümeleme analizi uygulanmıştır. Elde edilen sonuçlara göre, tam yakınsamayı ifade eden temel hipotez reddedilmiş ve 81 şehrin 75'ini kapsayan 6 yakınsama kulübü elde edilmiştir. İstanbul, heterojen yapıdaki bu yakınsama kulüplerinde yer almamıştır. İstanbul diğer şehirlerden ıraksadığını pozitif anlamda sahip olduğu güçle, negatif anlamda da üstlendiği risklerle göstererek monopol şehir olma özelliğini kanıtlamıştır.

Anahtar Sözcükler : Monopol Şehir Olgusu, Eşitsizlik, Bölgesel Eşitsiz Kalkınma, Kulüp Yakınsama Analizi, Theil İndeksi.

[1] *This study was funded by Scientific Research Projects Coordination Unit of İstanbul University. Project number: SBG-2019-33390.*

[2] *Bu çalışma İstanbul Üniversitesi Bilimsel Araştırma Projeleri Birimi tarafından desteklenmiştir. Proje No: SBG-2019-33390.*

1. Introduction

Inequality, as a dilemma, is a prior condition of economic development in the short run and a structural problem in the long run for a country. For decades, policymakers have debated the importance of regional inequality in the development process in various forms. Regional inequality decreases from less developed to developed countries. In the early stages of the development process, it is acceptable to expect disparity among regions, cities, and rural and urban areas. Because of the heterogeneity of resource distribution, regional growth is not always balanced during the development process, and as a result, countries are defined by inequality in different aspects. These are primarily economic, social, and geographical. People seek to shift to regions where they can maximize their utility due to various regional inequality situations within countries. This mobility causes agglomeration to some cities, especially in urban areas, creating one of the main problems in countries. Agglomeration in specific cities damages the deployment of resources and economic efficiency. Quintana and Royuela (2014: 1-30) focused on inequality's negative and positive effects. As they stated, high inequality increases socio-political instability and related risks, damages redistribution pressure, decreases the investment capacity because of market imperfections, and affects purchasing power parity. Besides, they emphasized the strong connection between high inequality and high fertility rates.

On the other hand, inequality causes both negative and positive implications in the long run. High inequality creates investment incentives with high aggregate savings or capital for innovative areas. If a country achieves to spread economic development throughout all regions, the government can intervene in agglomerations in earlier periods and increase economic efficiency. Otherwise, inequality starts and continues as a structural problem among cities, mostly in urban or rural towns. Its advantages, such as rapid urbanization, turn into adverse effects in the short run.

Inevitably, city development requires an organized and inclusive perspective for urban and rural areas. Even though urbanization is one of the driving forces for a country's development, rural area development also plays a crucial role in the development process. Therefore, investigation of city-level inequality provides an effective deployment of resources among urban and rural cities and decreases the contribution of inequality from a comprehensive perspective. Chen et al. (2020: 1-12) described integrated development between urban and rural areas as a combined development of new industrialization, urbanization, agricultural and rural modernization. To achieve economic efficiency, these three points should not separate. However, countries generally support big urban cities rather than rural areas to increase their social, economic, and political importance globally and become domestic and international network centres with new integration opportunities. (Wang et al., 2020: 1- 11) Furthermore, countries tend to support urban cities because of the competitive market conditions.

A growing number of urban cities have introduced several urban definitions and classifications. In the literature, urban cities are described as global cities, metropolitan

cities, megacities, and monopoly cities classified according to several functions such as economic performance, urban quality, and population density. Trujillo and Parilla (2016: 1-64) redefined cities according to three main forces: urbanization, global integration, and technological change. These three trends reshape the international economy, and global cities have been classified into seven types. These are Global Giants such as London and New York, Asian Anchors such as Hong Kong and Moscow, Emerging Gateways such as İstanbul and Cape-Town, Factory China such as Shenyang and Suzhou, Knowledge Capitals such as Boston and Stockholm, American Middleweights such as Indianapolis and Kansas City, International Middleweights such as Brussels and Frankfurt.

Zhao et al. (2017: 257-289) defined mega-cities in two terms. The first term is Mega-global cities such as New York and Tokyo, which have significant global effects on the world economy with their financial and business services, technology and innovation capacities, and governance power. The second term is Mega-local cities, mostly in less developed countries such as Asia, Africa and have poor integration with the global economy.

Furthermore, in this study, empirical results showed solid logarithmic relationships between the population of the country and the number of megacities in the country. It is suggested that if the population of a country or territory is around 100 million, the country can potentially have one megacity with an average population of ten million people like Moskva in the Russian Federation. Brazil, China, and the U.S.A. have more than two megacities due to their high population. Mega-global and Mega-local cities diverge due to the external and internal driving forces of economic growth. Although they have a similar population, their effects on the global economy are quite different.

Yeung et al. (2020: 31-38) explained the problems of megacities with three indicators. The first problem is the cities' attractiveness to specific industries, such as banking, finance, and manufacturing, which perform nationally and internationally. Secondly, growing cities bring about challenges, and they are striving to achieve a polycentric structure by promoting subcentres. The third indicator pointed out that megacities lack basic urban services such as water supply, fresh air, housing, and other facilities. The researchers used these indicators to stress urban poverty and income gaps in densely populated cities, stirring social tensions with crime and informal economic activities. On the other hand, the study emphasized megacities as globalization pioneers while acknowledging their potential to influence global financial problems in 2008.

Potlogea (2018: 1-30) approached urbanization regarding a city's human capital and skill advantages. The author thought that the unprecedented rates of growth of world urbanization and the performances of some developing countries, such as China, India, Brazil, Indonesia, and Turkey, reduce world income inequality. In addition to this view, even if convergence occurred between countries, economic activity would not be distributed equally across the regions over time and cause spatial disparities. In this step, the strong effect of human capital on urban success is described with the term "skill polarization across space". The theoretical model was developed to define the world economy, and empirical

findings revealed that the skill-intensive cities would rearrange international economic integration.

In developing countries, the term "megacity" is formed by the pros and cons of urbanization. In the short run, due to intense and rapid migration, most resources agglomerate in one city, which has significant effects on the country. These effects could be positive and negative, such as accelerating economic development or increasing regional inequality. This concept is called "one-city monopoly", concentrating resources in one area, mainly in the best-urbanized city. The "one-city monopoly phenomenon" is a significant issue that must be considered during the growth process. Shi et al. (2020: 1-12) summarize the term with three categories. The first category includes industrialized and urbanized countries with approximately 15% and 20% of their population in their leading cities' such as Britain, France, and Australia. The second category country is Japan. Industrialized and urbanized cities have an ageing population; therefore, demand decreases. Also, Tokyo is a metropolis city whose population has grown steadily. The third category involves developing countries where leading cities' portions fluctuate, such as Chile. In this study, Theil Index was used to demonstrate China's monopoly cities and analyse the relationship between the Theil Index, urban competitiveness index, and unbalanced development. They found a strong connection between the one-city monopoly phenomenon and urban competitiveness.

To address the differences among cities and comprehend the regional requirements of world urbanization, it is necessary to understand the process of urbanization and its contribution to inequality. With its multicultural characteristics, Turkey will be an exciting country at this point. Originating from regional unbalanced development and urbanization discussions, this study aims to contribute to Turkey's literature with two different perspectives. The first perspective is about İstanbul, with its characteristics as a "one-city monopoly" and some pros and cons about the city's situation. They are having a city like İstanbul as a chance for Turkey. More importantly, from the standpoint of inequality, hazards, such as a significant earthquake risk, are becoming more apparent. The second perspective is about the unbalanced regional development trends of the remaining 80 cities contributing to inequality. Agglomeration to cities and divergence effects showed how cities differed even within the same region.

This study is structured into five parts. After the introduction, the second part continues with the literature review. Inspiring the efficiencies of regional inequality indexes from the literature, in the third part, the inequality trends among 81 cities of Turkey have been analysed with Theil Index for each city. Then, the Natural Breaks Optimization method has been applied to specify the ranges. We have conducted an empirical analysis using econometric methodology by implementing Philips and Sul's (2007: 1771-1855) method to find the converging inequality clubs for the 2007-2018 period in the fourth part. The "one-city monopoly phenomenon" has been discussed with significant findings in the fifth part regarding the city of İstanbul.

2. Literature Review

In Turkey, regional economic growth policies have been discussed concerning economic and social dimensions. Although Turkey has achieved rapid progress as a developing country, some problems directly damage balanced development, such as unemployment and low productivity. In the past, accelerating urbanization was one of the optimal solutions to overcome these problems and achieve economic growth. According to the Turkish Statistical Institute, the country has witnessed a rapid increase in urbanization for the last thirty years. While 51.3% of the total population lived in rural areas in 1990, this ratio decreased to 12.1% in 2018. The mobility towards urban cities took place from eastern to western regions, especially to İstanbul. İstanbul became a megacity with the highest urban population in the country, where only 1% of its population lived in rural areas in 2019 (TÜİK). The decomposition among areas caused the cities to go in different directions. Additionally, urbanization and inequality increased simultaneously.

Unbalanced regional development and rising inequality are issues all around the world. Each country has its characteristics that cause inequality, Turkey as well. Blanchet et al. (2020: 1-93) investigated inequality using the surveys data, taxes, and national accounts. From 1980 to 2017, inequality in Europe rose slower than in the United States. They discovered the income distribution characteristics of countries behind their calculations. For many years Europe has used a well-designed redistribution model and upheld equality. But U.S.A.'s redistribution model was less successful in controlling equality. Also, Partridge and Rickman (2008: 285-310) indicated that the U.S.A. and inequality increased when the distance grew between rural and metropolitan areas. Conversely, while inequality decreased overall and city levels in China, inequality did not change within the prefecture between 2012 and 2018 (Pan et al., 2020: 1-20). According to OECD (2020: 56), the disparity between urban and rural areas is particularly significant in Croatia, Finland, Hungary, and Luxembourg, where it exceeds almost 17 percentage after 2008.

Studies focused on regional development and unequal resource distribution among Turkey's east and west regions and cities. Gezici and Hewings (2007: 383-403) have classified regional inequalities in Turkey into three categories: geographical, functional, and coastal interior from 1980 to 1997. They used the Theil index to measure inequalities between regions, and the spatial autocorrelation method was used to analyse the relationship between spatial dependence and regional inequalities. Empirical results examined whether rich or developed regions have relatively higher inequalities than poor ones. In Turkey, developed regions are located in the western part of the country, and inequality is observed there. The Marmara region's dominant contributor to total inequality, which includes İstanbul. Filiztekin and Celik's (2010: 116-127) study focused on regional inequalities in Turkey using the Gini coefficient between 1994 and 2003. They stated that inequality should be taken under control in developing countries because it does not have the power to disappear by itself, even in developed countries. Turkey is a developing country with a higher rate of inequality than in OECD and European countries. İstanbul was found to have the highest inequality rate from 1994 to 2003. Even though the other regions, such as the

Black Sea Region, decreased the inequality rates in time, İstanbul remained the highest inequality rates for decades.

Aksoy et al. (2019: 1-33) claim no overall income convergence in Turkey between 1987-2001 and 2004-2017. They applied Philips and Sul's (2007) club convergence method for both periods. According to obtained convergence clubs, for the period between 2004 and 2017, six convergence clubs were identified in which the first and second clubs included more prosperous cities in western regions. İstanbul and Kocaeli were located in Club 1 as the highest income cities, and Ağrı, Şanlıurfa, and Van were located in Club 6 as the lowest income cities. The results showed a clear division between the East and West regions, and this division requires policymakers to be concerned primarily to eliminate disadvantages. Karahasan (2020: 603-644) has discussed the equity enhancing effect of rapid growth in Turkey by performing the Markov Chain method for 2004-2017. The study investigated spatial variability and focused on the convergence effect on both regional and local levels to detect disparities. Empirical results show that, during this period, overall convergence was not equally distributed between developed and underdeveloped regions. Moreover, in place of convergence, local winner and loser cities have appeared, and convergence patterns were not related to regional proximity of geography.

Hazar et al. (2018: 102-105) stated that despite quite sizable regional inequalities in Turkey, empirical results showed a diminishing tendency between 2004 and 2014. Using subcomponents at regional and provincial levels, this study demonstrated the differentiating effects of migration on income inequalities. The relationship between convergence and migration is related to the level of education. The migration of adults and middle level educated people has a positive effect on the convergence process. Tansever and Kent (2018: 117-136) focused on regional earning inequalities in Turkey, highlighting the determinants of contributors to earnings inequality. To investigate earning inequality trends, the Theil index for NUTS1 level was calculated using individual-level data that formed subgroups of labour like gender, education, occupation, and sector for 2006 and 2014. As a result, they investigated decreasing inequality trends among regions with different subgroups, but the education level of people in İstanbul significantly affects inequality.

3. One-City Monopoly Index

Inequality is often higher in developing countries, with a substantial divide between rural and urban areas, imbalanced regional growth, and unequal resource allocation. One-city monopoly describes agglomeration and polarization in one urban city, and it is an aggravating result of inequality. Polarization in urban areas can provide economic and social advantages and accelerate economic growth in the short run. Still, these advantages can transform into disadvantages in the long run and cause diversity by contributing to inequality. To point out the one-city monopoly phenomenon in Turkey, we calculated the Theil index, a widely used inequality measure, for 81 cities in Turkey throughout 2007 and 2018. With the help of the Theil index, it is possible to explain the contribution of regions or towns to total inequality as a rate. This ranking starts from 0, which means "perfect

equality", and goes to infinity, "inequality". The calculation formula of Theil Index (1) for provinces is used by Shi et al. (2020). The main idea behind this formula is based on replacing the country's population and GDP with the city's population and GDP values. As shown below, A represents GDP, and B represents the population of the relevant city (Shi et al., 2020: 1-12):

$$OMI = ALog\frac{A}{B} + (100 - A)log\frac{100-A}{100-B} \quad (1)$$

GDP and population data for the NUTS3 level, which consists of 81 cities in Turkey, were collected between 2007 and 2018 from the Turkish Statistical Institute. In the first step, we calculated the Theil index for the NUTS3 level between 2007 and 2018 using the formula above. Ordering the Theil index scores from highest to lowest shows us Turkey's framework of inequality trends. Theil Index starts from 0.0004 for Çanakkale city as the lowest contributor and ends at 1.88 for İstanbul as the highest contributor to inequality.

In the second step, we divided each city's arithmetic mean of Theil index data for the period into four ranges using the Jenks Natural Breaks Optimization method. We also split the Theil index into three or five ranges instead of four, but one city was last in all tests. Each range represents the characteristic monopoly level of cities, and from one to four classes, the one city monopoly effect is becoming more dominant. Table 1 represents classifications, and the fourth class only includes one city, İstanbul, with the highest Theil Index score in this range. From this perspective, İstanbul is a "one-city monopoly" for Turkey. In the third class, six cities (Ankara, Şanlıurfa, Adıyaman, Van, Diyarbakır and Kocaeli) are following İstanbul. But the gap is evident between the third and fourth ranges. The seven cities in the third and fourth classes are the pioneer contributors to overall inequality and illustrate the invisible borders of the country.

As the leading city in this ranking, İstanbul represents the power of economic activity. At the same time, it has the power of disruption on equality with its population and high GDP rates. Kocaeli, a neighbouring city of İstanbul, and Ankara, the country's capital city, are industrialized cities and directly affect economic activity, but not as much as İstanbul. We can say that these three cities have a positive effect on inequality. However, the remaining third-class cities in Turkey's east (Şanlıurfa, Adıyaman, Van and Diyarbakır) have low economic activity power, and GDP Therefore has a negative effect on inequality. The majority of cities in Turkey are in the first and second classes. At that point, if we could exclude İstanbul from this ranking, it would be understandable to explain the inequality in Turkey between the east and west regions according to 3rd class cities. However, this table shows that İstanbul is separated from the east and the cities in the west, even if they are close to İstanbul. As a result, this decomposition confirms İstanbul's one-city monopoly characteristics.

Table: 1
Natural Break Optimization Classification

class	*lower*	*upper*	*count*
1	0.000143	0.029981	56
2	0.033762	0.09764	18
3	0.15084	0.271602	6
4	1.899165	1.899165	1

From a broader perspective, we would like to illustrate inequality trends between regions and cities in Turkey. We used the NUTS1 classification, consisting of 12 regions: West Marmara, Aegean, Central Anatolia, East Black Sea, West Black Sea, East Marmara, Mediterranean, Northeast Anatolia, Central East Anatolia, West Anatolia, Southeast Anatolia, and İstanbul. Except for İstanbul, the remaining regions consist of different cities according to neighbourhood relations. With GDP and capacity, İstanbul is a NUTS1 level region and a NUTS3 level city.

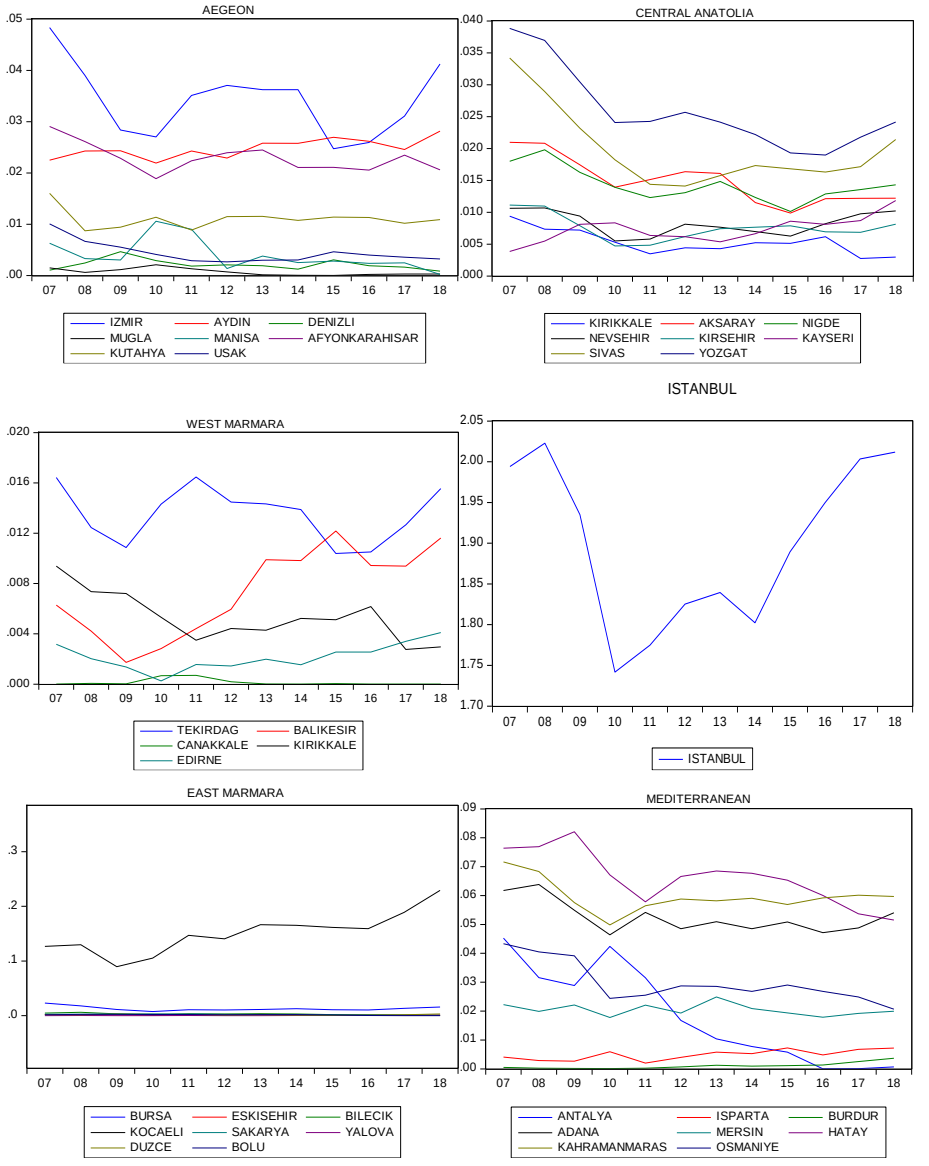
Table 2 shows the descriptive statistics of NUTS1. From 2007 to 2018, İstanbul's Theil index took values of approximately a minimum of 1.74 and a maximum of 2.011 with a mean of 1.8992 and a standard deviation of 0.1003. From İstanbul to West Marmara, the contribution to inequality decreases. According to Theil index results, compared to other cities, İstanbul is a prominent region and city. The big gap among regions is noticeable, and there is a more than tenfold difference between İstanbul as the significant contributor to inequality and West Marmara as the minor contributor.

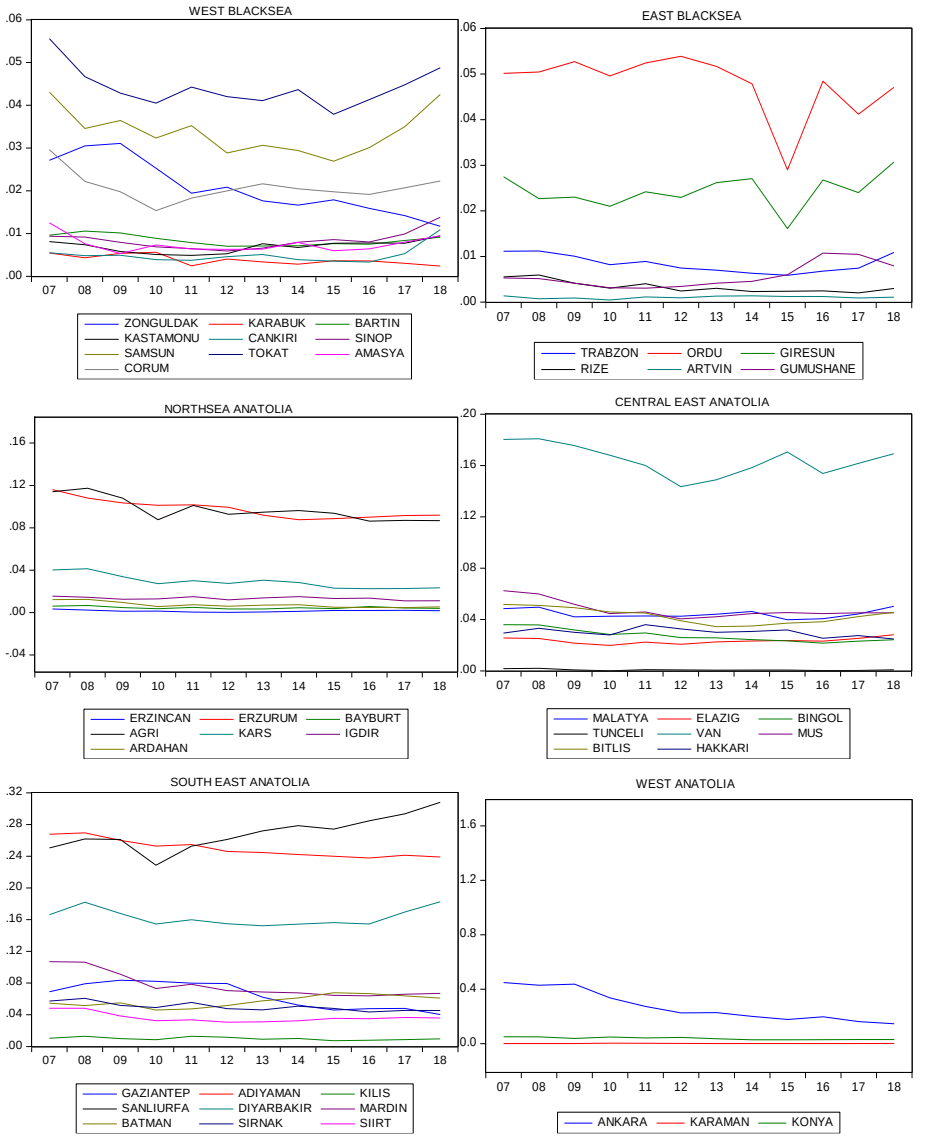
Table: 2
Descriptive Statistics of NUTS1

NUTS1	*Theil Index-Mean*	*Std. Dev.*	*GDP-Mean*	*Population-Mean*
İstanbul	1.8992	0.1003	578.4769	13.9180
Southeast Anatolia	0.1085	0.0008	10.4061	0.8898
West Anatolia	0.1036	0.0009	73.17204	2.4389
Central East Anatolia	0.0476	0.0045	5.6093	0.4681
Northeast Anatolia	0.0358	0.0401	3.6252	0.3152
Mediterranean	0.0316	0.0045	23.9419	1.2125
East Marmara	0.0217	0.0026	18.1531	0.7359
West Black Sea	0.0159	0.0021	7.6878	0.5072
East Black Sea	0.0151	0.0019	7.3435	0.4276
Central Anatolia	0.0129	0.0042	8.7529	0.48532
Aegean	0.0100	0.0039	29.8527	1.2125
West Marmara	0.0047	0.0049	18.1531	0.7359

The following twelve figures combine the NUTS1 level and NUTS3 level Theil index over 2007 and 2018. The values for İstanbul decreased during the global financial crisis between 2008 and 2010, but they increased. In 2018 İstanbul has reached the highest level of contribution to inequality. Inequality tendencies were observed in the third class of cities decomposed from others within the same region, such as Kocaeli in East Marmara and Van in Central Anatolia.

Figures: 1 to 12
NUTS1 and NUTS3 Level Theil Index Trends





4. Club Convergence Analysis

City-based Theil Index shows, most of the cities in the same regions have their unique paths, and neighbourliness among cities cannot help us while explaining the inequality structure of the NUTS1 level. Although the inequality problem between Turkey's east and west regions has been discussed for many years, we observed that inequality occurred

between İstanbul and other areas no matter where the cities are located. İstanbul is dominant as it has the characteristic of a one-city monopoly. Difference inequality trends of cities within the same NUTS1 regions have led us to employ convergence analysis to understand whether there is an overall convergence in the country and which cities converge to İstanbul.

The third step of the empirical part continues with club convergence analysis, developed by Philips and Sul (2007: 1771-1855). This method, termed the 'log t' regression test, is based on a data-driven algorithm and takes us to our goal. Philips and Sul (2007) suggest that, even if overall convergence is rejected, that does not mean rejection of subgroup convergence. The full panel can be separated from the convergence clubs and divergent members. Obtaining convergence clubs using this algorithm provides a chance to explore relations and characteristics of data during the period. We aimed to find out which inequality club İstanbul is in and which cities have converged to İstanbul and each other between 2007 and 2018.

Club convergence algorithm depends on panel data X_{it}, which points out the Theil index in this study, with time (t=2007,…,2018) and city (i=1,…,81). X_{it} can be explained with permanent components, g_{it}, and transitory components, α_{it}.

$$X_{it} = g_{it} + \alpha_{it} \tag{1}$$

The algorithm assumes these components (g_{it} and α_{it}) may contain μ_t, as common idiosyncratic components. The notation is specified to show time-varying idiosyncratic element δ_{it} and single common component, μ_t.

$$X_{it} = \left(\frac{g_{it}+\alpha_{it}}{\mu_t}\right)\mu_t = \delta_{it}\mu_t \quad \text{for all i and t.} \tag{2}$$

Then, h_{it} is defined as transition coefficient to estimate δ_{it} while eliminating μ_t.

$$h_{it} = \frac{X_{it}}{\frac{1}{N}\sum_{i=1}^{N} X_{it}} = \frac{\delta_{it}\mu_t}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}\mu_t} = \frac{\delta_{it}}{\frac{1}{N}\sum_{i=1}^{N} \delta_{it}} \tag{3}$$

The following equation explains the semi-parametric form of δ_{it} which provides an algorithm for to test club convergence; $\delta_{it} = \delta_i + \sigma_{it}\xi_{it}$ and $\sigma_{it} = \frac{\sigma_i}{L(t)t^{\alpha}}$, $t \geq 1$, $\sigma_i > 0$ for all i, where ξ_{it} is iid(0,1) in across i but weakly dependent over t. In this function, L(t) is equal to log(t), varying slowly, increasing, and divergent infinity. The size of α is determined to be a convergence of X_{it} toward δ_i. Philips and Sul imply the null hypothesis of convergence and alternative divergence hypothesis below.

H_0: $\delta_i = \delta \; and \; \alpha \geq 0$

H_1: $\delta_i \neq \delta \; or \; \alpha < 0$

To test log(t) regression, the following equation can be used:

$\log\left(\frac{H_1}{H_t}\right) - 2\log(log(t)) = \alpha + blog(t) + u_t \quad \text{for} \quad t = [rT], [rT]+1, \dots, T$ with $r > 0$ (r=0.3 is recommended) where, H_1/H_t is cross-sectional variance ratio, $H_t = \frac{1}{N}\sum_{i=1}^{N}(h_{it} - 1)^2$, h_{it} described as Eq(3) and $b = 2\alpha$. The null hypothesis is stated as a one-sided test for $b \geq 0$, which against $b < 0$ and the null hypothesis is rejected when $t_b < -1.65$ at the 5% level of significance.

In a nutshell, Philips and Sul's (2007) clustering algorithm can be explained step by step for our study as follows: (i) Starting to sort the data which is Theil index for 81 cities over the period 2008 and 2018 based on the last observation. (ii) Selecting the first k highest cities in the panel to form the subgroup G_k for $2 \leq k \leq N$ and run the log-t regression to compute the convergence test statistics $t_k = t(G_k)$ for this subgroup. Core group size k* should be chosen according to the criteria: $k^* = \arg\, max_k\{t_k\}\, subject\ to\ min\{t_k\} > -1.65$. If calculated test statistics are lower than -1.65, there are no convergence clubs. (iii) The procedure continues with sieving individuals for club membership. After identifying the core group G_k, G_k^c is added as the complementary set where c is critical value and $t > c$. In our study, a city was added and performed the log-*t* regression each time. The procedure is required to be repeated until making sure $t_b > -1.65$. (iv) Finally, the procedure should be stopped after repeating the (ii) and (iii) steps until clubs are no longer formed. Additionally, the log-t test is performed for all pairs of the subsequent initial clubs to merge them, fulfilling the convergence hypothesis jointly (Philips & Sul, 2007: 1771-1855; Ganioglu & Seven, 2019: 1-14).

The empirical results of the log(t) test are presented in Table 3. These results suggest that we reject the null hypothesis (t-stat = -76.82 < -1.65), which denotes full panel convergence of Turkey over the period 2007 and 2018.

Table: 3
Log (t) Test Results

Variable	*Coefficient*	*Standard Error*	*t-stats*
Theil Index	*-1.2185*	*0.0159*	*-76.8217*
The number of individuals is 81. The number of periods is 12. The first four periods are discarded before regression.			

Hence the overall club convergence hypothesis was rejected. We implemented a clustering algorithm to create potential convergence clubs among 81 cities. As the results showed in Table 4, we obtained six convergence clubs which include 75 cities from different NUTS3 level. Also, six cities are not included in any convergence clubs, diverging from others. In this method, contribution to inequality decreases from Club 1 to Club 6.

Obtained clubs indicated the heterogeneous structure of Turkey's convergence trends. As expected, cities with a high-rate Theil index, especially the first seven cities in the ranking (İstanbul, Ankara, Kocaeli, Adıyaman, Şanlıurfa, Van and Diyarbakır), fall into Club 1 and in "not converge" group. On the other hand, 52 cities from 11 NUTS regions are concentrated in Club 2, and 17 of them in this club are "metropolis cities". So, in Turkey,

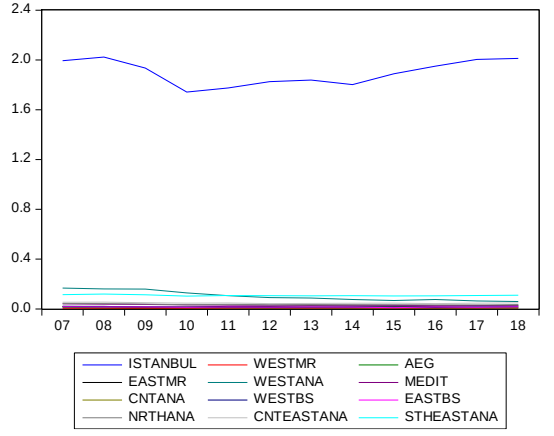
not only do metropolis cities contribute to inequality, but small cities have a significant effect over the period. Club 3, Club 4, and Club 5 are also heterogeneous, and Çanakkale, which is mentioned as the lowest contributor to inequality, falls into Club 6.

Furthermore, cities in the same NUTS region fall into different convergence clubs. For example, West Anatolia's part consists of 3 cities, Ankara is in Club 1, Konya is in Club 2, and Karaman is in Club 5. Therefore, divergence among cities occurred within the same NUTS regions. The distribution of cities towards high inequality and the density from Club 6 to Club 1 may predict further increasing inequality in the future. Rising inequality indicates degradation in resource distribution and causes several problems.

Table: 4
Final Convergence Clubs

Club	*Cities*					*t-stats*	*Coefficients*
Club 1	*Kocaeli*	*Ankara*	*Adıyaman*	*Diyarbakır*		*1.655*	*0.649*
	Bitlis	*Hakkari*	*Aydın*	*Isparta*	*Kahramanmaraş*		
	Elazığ	*Tekirdağ*	*Afyonkarahisar*	*Burdur*	*Osmaniye*		
	Bingöl	*Edirne*	*Kütahya*	*Adana*	*Gaziantep*		
	Muş	*Balıkesir*	*Bursa*	*Mersin*	*Kilis*		
	Malatya	*İzmir*	*Yalova*	*Hatay*	*Mardin*		
Club 2	*Kayseri*	*Çankırı*	*Konya*	*Ağrı*	*Batman*	*-0.787*	*-0.066*
	Sivas	*Sinop*	*Ordu*	*Kars*	*Zonguldak*		
	Yozgat	*Samsun*	*Giresun*	*Iğdır*	*Bartın*		
	Erzurum	*Gümüşhane*	*Kastamonu*	*Amasya*	*Çorum*		
	Şırnak	*Aksaray*	*Nevşehir*	*Tokat*	*Kırşehir*		
	Siirt	*Niğde*					
Club 3	*Kırıkkale*	*Artvin*	*Erzincan*	*Bayburt*	*Ardahan*	*-0.058*	*-0.006*
Club 4	*Denizli*	*Düzce*	*Rize*			*0.162*	*-0.019*
Club 5	*Tunceli*	*Manisa*	*Eskişehir*	*Bilecik*	*Sakarya Karaman*	*3.485*	*0.728*
Club 6	*Kırklareli*	*Çanakkale*	*Muğla*	*Bolu*	*Antalya*	*1.979*	*0.078*
Not Converge	*Van*	*İstanbul*	*Uşak*	*Şanlıurfa*	*Karabük Trabzon*	*-46.45*	*-1.049*

Figure: 13
Arithmetic Means of Theil Index for Each Convergence Club



The figure above shows the arithmetic means of each convergence club and İstanbul as well. From Club 1 to 6, convergence clubs are shown, Club 7 shows do not converge group. We separated İstanbul from the "not converge" group cities to show its divergence pattern.

5. One City Monopoly: İstanbul

İstanbul always plays a pivotal role in Turkey's primary economic transformation and has positive and negative effects on inequality as one city monopoly. The city is one of the most popular megacities in the world. It has strong connections to the world economy, a magnificent cultural heritage, and a strategic transcontinental location. İstanbul is the prominent driving force of Turkey in a variety of ways. According to the Turkish Statistical Institute, the city's population is over 15 million, nearly 18% of the total population in Turkey (Figure 14) (TÜİK). It is expected that a country with a population of an average of 100 million should have one megacity with a population average of 10 million, with a 0.10 ratio. (Zhao et al., 2017: 257-289). However, İstanbul's average ratio was 0.19 in 2018.

Furthermore, the city has produced approximately one-third of the total GDP for many years. As shown in Figure 15, since 2010, trends of the share of GDP have continued to increase with minor fluctuations. The services sector is the highest contribution to the city's economic growth, and it is more than one-third of total services. Undoubtedly, finance is the most significant player in this sector. In Figure 16, when we compare the services and industry sectors, it is apparent that the industry's share has fallen with time, while agriculture's contribution is minuscule. The city's density causes dispersion among other cities and disrupts effective resource distribution to a great extent. Figure 17 shows the per capita Turkish Lira GDP of Turkey and İstanbul. Although Turkey's per capita GDP has increased over time, it is clear that İstanbul's per capita GDP has remained stable and higher than its average ratio.

Figure: 14
Share of Population

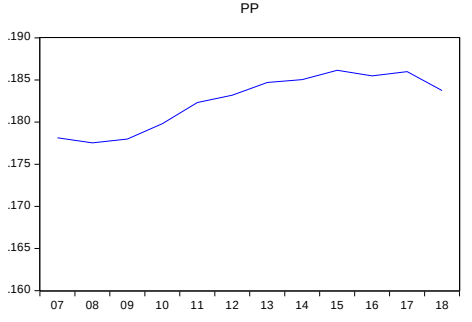


Figure: 15
Share of GDP

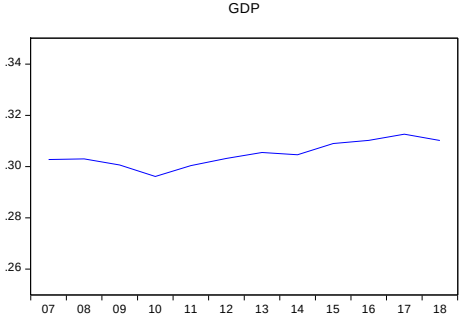


Figure: 16
Sectoral View of Agriculture, Services, and Industry

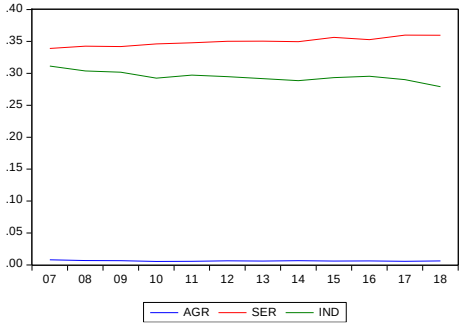
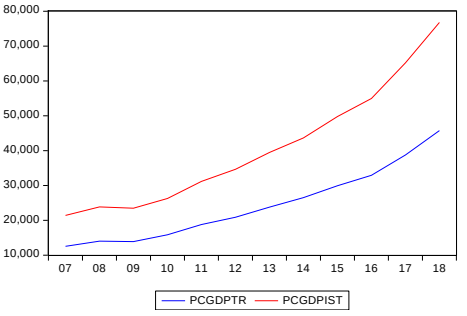


Figure: 17
Per Capita GDP of Turkey and İstanbul (TL)



For many years, İstanbul has been included in several city rankings for its competitiveness, quality of life, happiness, and other factors. These indices highlight the city's worth and reveal obvious facts regarding İstanbul's urban life. In 2018, İstanbul was placed 47th in the Quality-of-Life Index, 92nd in the Health Care Index, 50th in the Safety Index, 49th in the Cost-of-Living Index, 125th in the Pollution Index, and 157th in the Climate Index, out of 184 cities. Furthermore, in 2019, compared to prior years, the pollution index and climate index worsened, while İstanbul's density was measured at 2.892,34 per person/km^2 (Numbeo & Endeksa). In addition, according to the traffic commute time index, İstanbul residents spent at least 45 minutes commuting, which is longer than Europe's 25 minutes and OECD countries' less than 30 minutes (Statista). According to Subjective Well-Being Rankings in 2020, İstanbul was placed 115th out of 186 cities as an expected result (World Happiness Report, 2020: 47-67). Overall, even if this numerical knowledge is vital, it is insufficient to comprehend İstanbul's urbanization. Cities' uncontrolled growth, particularly in İstanbul, has resulted in regional development disparities and polarization. The consumption-oriented urban structure has had a negative impact on İstanbul's socioeconomic balance. Unfortunately, urban poverty and deprivation are now unavoidable realities (Başarmak & Öktem, 2020: 284-300).

6. Conclusion

This paper aimed to examine the one-city monopoly phenomenon in Turkey. Turkey has achieved considerable growth rates and has overcome many problems as a developing country. However, some structural problems persist. This study approached the city-based inequality and focused on the one-city monopoly phenomenon to better understand unbalanced regional development. Rising inequality within a country brings higher economic and social risks, and Turkey is facing these risks, such as regional disparities in the urbanization process. In the literature, the disparities mainly have been demonstrated between Turkey's east and west regions. But urban agglomeration trends indicate that

focusing inequality only between the eastern and western parts of Turkey is insufficient to understand the structures.

To point out the current situation of Turkey, we analysed inequality among cities in 3 steps, which enabled us to look from a broader perspective at the regional and city-level for the period 2007 and 2018. First, we calculated the Theil inequality index for all cities to find the highest and lowest contributors to inequality. According to the results, İstanbul has the highest score (1.88) and is the main contributor to inequality, while Çanakkale has the lowest (0.00014). The ordering Theil Index, from highest to lowest, also shows the counter inequality borders of Turkey. Defining inequality is quite difficult because it has more meaning than a ratio. In our study, the concept of inequality also represents the economic power of cities. In the second step of the empirical part, we continued with the Natural Break Optimization method to specify the Theil Index ranges among 81 cities and classified them into four to find monopoly cities. The fourth class only includes İstanbul (1.899), and the third class includes six cities: Ankara (0.27), Şanlıurfa (0.26), Adıyaman (0.24), Van (0.16), Diyarbakır (0.16), and Kocaeli (0.15). We are considering the gap between the third, and the fourth classes confirmed that İstanbul is the one city monopoly. After obtaining one city monopoly, İstanbul, as the third step, the club convergence method was adopted to Theil index to find which convergence club İstanbul is in. The results did not indicate overall convergence for the country, and the full panel was separated into six convergence clubs, including 75 out of 81 cities. Six cities out of 81 diverged from others.

Finding convergence clubs provides more comprehensive results about rising inequality trends among cities in Turkey. From Club 1 to Club 6, inequality decreases, and many cities fall within Club 1 and Club 2. In Club 1, cities represent the two edges of inequality's negative and positive effects. Club 2 includes 52 cities, where 35 of them are small. That shows increasing inequality in Turkey with both metropolises and small cities.

Furthermore, according to empirical results, İstanbul diverged from other cities as expected and confirmed that inequality occurred among İstanbul and other cities, even among İstanbul and İstanbul's border cities. That's why describing inequality trends between western and eastern regions would be neither clear nor conclusive. More specifically, the highest and lowest contributor cities to overall inequality occur in the east sides of the country and the same geographical region.

Being one city monopoly results in increasing İstanbul's responsibilities and risks day by day. Growing urbanization without capacity brings urban-specific problems to the city, such as urban poverty, land scarcity, housing, and some quality-based difficulties. Besides, exceeding capacity for a long year decreased the efficiency and productivity of İstanbul, and the socioeconomic structure has been damaged. The importance of government policies toward İstanbul has increased because of this predicament. The density of İstanbul is both the cause and result of uncontrolled rapid urbanization. İstanbul diverges from other cities in terms of both economic and social conditions. More importantly, prominent risks in İstanbul, such as an expectation of a great earthquake underlined for many years, increase

the country's economic vulnerability. While İstanbul is a one-city monopoly, the risks also threaten the country.

In the future, cities are expected to transform and grow more rapidly than today. Local cities will be strongly connected to global networks. New challenges will require more attention to resource distribution and urbanization expertise. Also, urbanization should not damage the harmony of cities, and it might be conclusive. But in Turkey, we experienced some adverse effects. As a result, the cities have diverged: İstanbul and others. İstanbul offers numerous advantages that will aid Turkey's future development, such as labour quality, research, development investments, technological adaptation level, worldwide prominence, etc. However, as the city grows, the gap between İstanbul and other cities will widen. Under these conditions, it will be unsustainable, potentially damaging harmony.

This picture shows, to cease rising inequality in Turkey depends on closing the gap between İstanbul and other cities. In Turkey, urbanization should be balanced and contribute more to economic growth than inequality. Providing a sustainable urbanization process, policymakers should make decisions to decrease risks. Cities require institutional reorganization to provide a sustainable urbanization process that grasps the development dynamics of cities and reveals their potential. On the other hand, İstanbul requires well-designed urban city planning to meet the challenges and distribute the city's resources equally while eliminating the difficulties and considering the city's capacity. In the future, rather than new investments, degrowth strategies may boost the city's benefits and quality while lowering the costs.

References

Aksoy, T. et al. (2019), "Revisiting income convergence in Turkey: Are there convergence clubs?", *Growth and Change*, 50, 1-33.

Azari, M. et al. (2016), "The effect of agglomeration on the productivity of urban manufacturing sectors in a leading emerging economy", *Economic Systems*, 40(3), 422-432.

Başarmak, H. & K. Öktem (2019), "Küreselleşme Sürecinde Kentselliğin Dönüşümü: Toplumsal, Teknolojik ve Mekânsal Süreçler Üzerine Bir İnceleme", *Uluslararası Yönetim Akademisi Dergisi*, 2(2), 284-300.

Blanchet, T. et al. (2020), "Why Is Europe More Equal Than the United States?", *PSE Working Papers*, halshs-03022133, HAL, 1-93.

Chen, K. et al. (2020), "Land use transition and urban-rural integrated development: Theoretical framework and China's evidence", *Land Use Policy*, 92, 1-12.

De Neve, J. & C. Krekel (2020), "Cities and Happiness: A Global Ranking and Analysis", *World Happiness Report*, Chapter 3, 47-67.

Endeksa (N/A), <https://www.endeksa.com/en/analiz/istanbul/demografi>, 9.11.2021.

Filiztekin, A. & M. Celik (2010), "Regional Income Inequality in Turkey", *Yildiz Technical University Faculty of Architecture E-Journal*, 5(3), 116-127.

Ganioglu, A. & U. Seven (2019), "Convergence in House Prices: Cross-Regional Evidence for Turkey", *Central Bank of the Republic of Turkey Working Paper*, No: 19/14, 1-14.

Gezici, F. & G. Hewings (2007), "Spatial Analysis of Regional Inequalities in Turkey", *European Planning Studies*, 15(3), 383-403.

Hazar, D. & E. Karakaya-Ayalp (2018), "Türkiye'de Bölgesel Yakınsama, Göç ve Faktör Hareketliliği", *Meltem İzmir Akdeniz Akademisi Dergisi*, 102-105.

Karahasan, B. (2020), "Winners and losers of rapid growth in Turkey: Analysis of the spatial variability of convergence", *Papers in Regional Science*, 99(3), 603-644.

Numbeo (N/A), *Quality of life index for country 2020*, <https://www.numbeo.com/quality-of-life/rankings_by_country.jsp>, 9.11.2021.

OECD (2020), *OECD Regions and Cities at a Glance 2020*, OECD Publishing, Paris, 1-166.

Pan, W. et al. (2020), "Regional Poverty and Inequality in the Xiamen-Zhangzhou-Quanzhou City Cluster in China Based on NPP/VIIRS Night-Time Light Imagery", *Sustainability*, 12(6), 2547.

Partridge, M.D. & D.S. Rickman (2008), "Distance from urban agglomeration economies and rural poverty", *Journal of Regional Science*, 48(2), 285-310.

Philips, P. & D. Sul (2007), "Transition Modeling and Econometric Convergence Tests", *Econometrica*, 75(6), 1771-1855.

Potlogea, A.V. (2018), "Globalization and the Skilled City", *Journal of Urban Economics*, 107, 1-30.

Quintana, D.C. & V. Royuela (2014), "Tracking positive and negative effects of inequality on long-run growth", *Universitat De Barcelona Research Institute of Applied Economics Working Paper*, 01, 1-30.

Shi, Y. et al. (2020), "The 'one-city monopoly index': Measurement and empirical analysis of China", *Cities*, 96, 1-12.

Statista (N/A), <https://www.statista.com/statistics/521886/travel-time-spent-work-study-countries/>, 9.11.2021.

Tansever, S. & O. Kent (2018), "Earnings Inequality in Turkey: A Regional Perspective", *Marmara Journal of Economics*, 2(1), 117-136.

Trujillo, J.L. & J. Parilla (2016), "Redefining Global Cities: Seven Types of Global Metro Economies", *A Joint Project of Brookings and JPMorgan Chase*.

Turkish Statistical Institute (N/A), <www.turkstat.gov.tr/>, 01.03.2020 & 22.06.2020.

Wang, H. et al. (2020), "Striving for global cities with governance approach in transitional China: Case study of Shanghai", *Land Use Policy*, 90, 1-11.

Yeung, Y.M. et al. (2020), "Megacities", *International Encyclopedia of Human Geography (Second Edition)*, 31-38.

Zhao, S. et al. (2017), "Megacities, the World's Largest Cities Unleashed: Major Trends and Dynamics in Contemporary Global Urban Development", *World Development*, 98, 257-289.

Sosyoekonomi

2022, Vol. 30(51), 71-90

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.04
Date Submitted: 15.03.2021
Date Revised: 27.11.2021
Date Accepted: 05.01.2022

Determinants of Household Saving Behaviour in Turkey[1]

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Türkiye'de Hanehalkı Tasarruf Davranışının Belirleyicileri[2]

Abstract

The study aims to detect demographics and economic factors and the factors related to residential properties and social-environmental indicators affecting household savings in Turkey. In the study, cross-sectional data was obtained from the Household Budget Survey conducted by the Turkish Statistical Institute between the years 2015-2017. Binary logistic regression and binary probit regression analyses determined household savings factors. According to the analysis results, the factors like the occupation of the household head, educational status, gender, age, marital status, household size, automobile ownership, and survey year were determined to affect the saving behaviour of households.

Keywords : Household Savings, Survey Data, Demographics and Economic Factors, Binary Logistic Regression, Binary Probit Regression, Turkey.

JEL Classification Codes : C25, C83, D14.

Öz

Bu çalışmanın amacı Türkiye'deki hanehalkı tasarruflarını etkileyen demografik, ekonomik faktörler ile konut özellikleri ve sosyal-çevresel göstergelere ilişkin faktörleri belirlemektir. Bu çalışmada, Türkiye İstatistik Kurumu tarafından 2015-2017 yılları arasında yapılan Hanehalkı Bütçe Araştırması anketinden elde edilen yatay- kesit verileri kullanılmıştır. Hanehalkı tasarruflarını etkileyen faktörleri belirlemek için binary lojistik regresyon ve binary probit regresyon analizleri uygulanmıştır. Analiz sonuçlarına göre, hane reisinin mesleği, eğitim durumu, cinsiyeti, yaşı, medeni durumu, hanehalkı büyüklüğü, otomobil sahipliği ve anket yılı gibi faktörlerin hanelerin tasarruf tutumları üzerinde etkili olduğu tespit edilmiştir.

Anahtar Sözcükler : Hanehalkı Tasarrufları, Anket Verisi, Demografik ve Ekonomik Faktörler, Binary Lojistik Regresyon, Binary Probit Regresyon, Türkiye.

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[1] *This article is mainly based on the doctoral dissertation of Kübranur Çebi-Karaaslan under the supervision of Prof.Dr. Erkan Oktay.*

[2] *Bu çalışma Prof.Dr. Erkan Oktay'ın danışmanlığında tamamlanan Kübranur Çebi-Karaaslan'ın "Hanehalkı Tasarruf Tercihlerinin Kesikli Tercih Modelleriyle İncelenmesi" isimli doktora tezinden üretilmiştir.*

1. Introduction

Households apply to save when it is necessary to satisfy their needs. The primary force driving an economy to save is household savings. Although households' saving behaviour is determined by a combination of economic, social, demographic, and cultural factors, it is mainly affected by changes in the disposable income of households (Rodriguez-Palenzuela & Dees, 2016: 41-44). People save due to a variety of reasons like creating savings to use in unexpected situations, establishing a relationship between the future and the needs of individuals, increasing expenditures, conducting business projects, having a sense of independence and power, having wealth, buying houses, cars, goods, and similar products (Browning & Lusardi, 1996: 1797).

Savings are the main force encouraging growth. Assuring adequate savings is a central policy to prevent imbalances in the balance of payments and to create sufficient investment. Savings are, in a sense, a macroeconomic status where the economist's perception towards the current condition and the influence of the policymaker is the most uncertain (Schmidt-Hebbel et al., 1994: 21). Improvements in savings and investments are closely linked with the interaction of an economy with the rest of the world (Rodriguez-Palenzuela & Dees, 2016: 12).

Private domestic savings are fundamental to the economy of a country. Personal savings create the basis for private savings. These savings are the part of personal income remaining after spending on taxes, consumption expenditures, interest payments, net current transfers to the state, and the rest of the world. Personal savings represent individuals' contribution to national savings, which is the total amount that can be employed to finance investments in fixed assets, stocks, or foreign assets (Reinsdorf & Perozek, 2004: 17). On the one hand, households give precious contributions to the country's economy, such as increasing welfare on behalf of their countries, the necessary funding for investments, decreased foreign financing dependency, and economic stability. On the other hand, they provide financial assurance, lifelong welfare, and a permanent lifestyle for their future (TCMB, 2015; WB, 2011).

National savings are the constant source of financial need to realize a steady growth trend in the national economies. According to the national savings rates estimated through the European accounts system obtained by the International Monetary Fund, while the national savings rate of Turkey in 2009 was 21.4%, the national savings rate in 2018 increased to 26.6%. While the national savings rate across the world in 2009 was 23%, this rate rose to about 26.7% in 2018. It was determined that the saving rate estimated by the International Monetary Fund was 25.3 in 2019 for Turkey, the national savings rate across the world increased to about 26.5%, and that in the survey conducted by Ing Bank for the second quarter of 2019 concerning Turkey's saving tendencies, the rate of account ownership decreased to 13.4% and the rate of those planning to save decreased to 26.4% (ING, 2019).

Various studies were performed to examine the saving behaviour of individuals and countries. In a study, personal saving behaviours in five major industrialized countries (Canada, Germany, Japan, the United Kingdom, and the United States) were analysed. The effect of inflation on personal savings was evaluated, and it was determined that inflation increased savings (Howard, 1978). Also, in a study carried out in the United States, the effect of nuclear war expectancy on saving behaviour was examined. It was determined that nuclear war expectancy had a negative or adverse impact on saving behaviour; in other words, people's expectations about nuclear war decreased their ambitions and activities to save (Russett et al., 1994). In the study that examined the relationship between savings and economic growth in Asian countries, the causal relationship between economic growth and savings was detected (Agrawal, 2001). In the study where the impact of gender factors on personal saving behaviours was investigated, it was determined that the short-term and regular savings behaviour determinants differ according to gender. It was determined that the probability of the short-term savings is low when women's health status to be weak, and the educational status increases the saving probability and regular savings made by men in the short term (Fisher, 2010). In the study where the relationship between people's health and saving behaviours was analysed, it was determined that the diagnosis of critical health problems negatively affected people's enthusiasm to save (Ricketts et al., 2013). Another study examined the relationship between financial literacy and retirement planning and behaviour towards retirement savings. It was determined that welfare in retirement depended on savings, and individuals who did not produce sufficient savings for retirement had a comparatively low level of financial literacy (Barbić et al., 2016). In the study where the impact of receiving professional financial advice on household savings was examined, it was determined that receiving professional financial advice had a definite effect on saving (Liu et al., 2019).

Households constitute the basic level of national savings, which is crucial for the growth and development of an economy. On this basis, analysing and examining the behaviour of household savings, which is a prior stage to increase the ratio of Turkey's national savings rate, would contribute to economic development. The purpose of this paper is to detect the factors affecting household saving, which is the most crucial determinant of the concept of saving and very significant for the sustainable growth of an economy, especially a developing economy. Saving behaviours exhibited by decision-makers have been a subject of research for a long time and have been researched in various aspects. This study aimed to fill this gap in the literature by analysing saving behaviours on cross-sectional data sets and demographic and economic variables, and more specific variables for household habits. For this purpose, the factors affecting the saving behaviour of households are modelled through a comprehensive data set representing Turkey. Savings are affected by various conditions, like demographic features, economic features, and social features. Determining the impacts of these features would contribute to defining the household savings and to the policy-making process that would encourage household savings.

2. Methodology

2.1. Data

In the study, cross-sectional data obtained from the Household Budget Survey conducted by the Turkish Statistical Institute between 2015-2017 were employed. The scope of the survey consisted of individuals residing in households located within the boundaries of the Republic of Turkey. Those within the institutional and nomadic populations were not included in the study. The primary sampling frame employed in selecting the blocks, which constituted the first stage sampling unit in the Household Budget Survey, was the National Address Database. Later, the created blocks from urban areas, and rural areas and villages, which belong to municipal organizations, were determined with probability proportional to the size of the settlement, and households were systematically chosen from each block. The household in the sample address was defined as the final sampling unit. A stratified two-stage cluster sampling method was employed to collect the data (TÜİK, 2018).

2.2. Measure and Variables

The dependent variable of the study was the saving status of the household. The category "household saves" was generated by combining the answers belonging to the question "What is your method of assessing the savings made in the household?" like real estate (house, shop, land, field), housing cooperative membership, gold, currency, bank account, stocks, bill, bonds, fund certificate, investments in work, lending at interest, with other options of the category. While performing binary logistic regression and binary probit regression analysis, code one was used for households that save and 0 for those that do not hold.

The socio-demographic and economic factors held by the household born affect household savings in Turkey and influence household savings. The factors related to residential properties and environmental indicators were considered independent variables. Gender of the household head (male; female), educational status (not finishing a school; primary school; secondary school; high school; the university), marital status (never married; married; deceased spouse/divorced), profession (not working; manager; learned profession groups; technician, operator, and assistant knew profession groups; office workers; service and sales staff; qualified agriculture, forestry, and aquaculture workers; artisans and associated workers; facility and machine operators and assemblers; workers who work in elementary occupations), age (15-24; 25-34; 35-44; 45-54; 55-64; 65+) and household size (1-person; 2-person; 3-person; 4-person; 5-person; 6+) were the demographic factors.

The variables like car ownership (yes; no), homeownership (homeowner; tenant; tied cottage; not a homeowner but not paying rent), second-home right (yes; no), the presence of someone with private life insurance in the home (yes; no), the credit card ownership (yes; no) and annual household disposable income level (1^{st} income level; 2^{nd} income level; 3^{rd} income level; 4^{th} income level; 5^{th} income level) were economic factors.

House type (detached house; apartment), the heating system of the house (central heating system; floor standing boiler (combi, etc.); stove; electric heater), type of fuel employed for heating (conventional fuel type; advanced fuel type), type of fuel used for hot water (conventional fuel type; advanced fuel type) and residential area (60 m^2 or less; 61 m^2-90 m^2; 91 m^2-120 m^2; 121 m^2-150 m^2; 151 m^2+) were factors related to residential properties.

The variables, such as the presence of an individual who has a habit of smoking cigarettes, tobacco, and cigars (yes; no), the presence of an individual having a habit of eating out in the house (yes; no), the presence of an individual with a pattern of going to the cinema in the house (yes; no), the presence of an individual with a habit of going to market (yes; no), and the survey year (2015; 2016; 2017) were the social and environmental indicators.

Ordinal and nominal variables were defined as dummy variables to observe the effects of the categories belonging to all variables to be taken to binary logistic and binary probit regression models (Alkan et al., 2015: 60).

2.3. Research Method

Survey statistics in Stata 14 (Stata Corporation) were used to account for the complex sampling design and weights. Weighted analysis was performed. Firstly, frequency analyses were performed according to the saving status of the households participating in the study. A Chi-square independence test was performed to examine the relationship between household savings and independent variables. Then, the factors affecting households' saving and impact dimensions were determined by employing the binary logistics and binary probit regression analysis. The binary logit and binary probit models are discrete choice models used when the outcome variable is binary or dichotomous and only takes 0 or 1 (Hosmer et al., 2013: 1).

3. Result

3.1. Descriptive Statistic and Chi-Square Test

Demographic and economic factors that can be effective in savings made by households in Turkey are presented in Table 1. According to Table 1, 32.9% of household heads did not work in a permanent job, while 3.3% worked in-office services. Almost half of the household heads (43.1%) participating in the study were primary school graduates. It was determined that 86.3% of household heads participating in the study were male. While 24.3% of household heads were between 35-44 years old, 1.2% of them were between 15-24 years old. 83.1% of household heads were married. 23.1% of the households were 2-person households. 62.3% of the households owned their houses. 41.7% of the households had at least one car, and 8.1% had a second home. 9.9% of the households had an individual with private life insurance, and 50% of them had a credit card.

Table: 1
Demographic and Economic Factors That Can Affect Saving Status of Households

Variables		Saving Status		n (%)	P
		No	Yes		
Demographic Indicators					
Profession	Not working	9690 (35.9)	1470 (21.3)	11160 (32.9)	0.000
	Manager	922 (3.49)	724 (10.5)	1646 (4.9)	
	Learned profession member	1093 (4)	854 (12.4)	1947 (5.7)	
	Technician, operator	904 (3.3)	366 (5.3)	1270 (3.7)	
	Office workers	875 (3.2)	232 (3.4)	1107 (3.3)	
	Service and sales staff	3011 (11.2)	774 (11.2)	3785 (11.2)	
	Qualified agriculture	3196 (11.8)	1318 (19.1)	4514 (13.3)	
	Artisans and associated workers	2930 (10.9)	478 (6.9)	3408 (10.1)	
	Facility and machine operators	2195 (8.1)	411 (6)	2606 (7.7)	
	Elementary occupations	2175 (8.1)	260 (3.8)	2435 (7.2)	
Educational Status	Not finishing a school	3707 (13.7)	394 (5.7)	4101 (12.1)	0.000
	Primary school	12062 (44.7)	2539 (36.9)	14601 (43.1)	
	Secondary school	3616 (13.4)	750 (10.9)	43.66 (12.9)	
	High school	4445 (16.5)	1255 (18.2)	5700 (16.8)	
	University	3161 (11.7)	1949 (28.3)	5110 (15.1)	
Gender	Male	22994 (85.2)	6229 (90.4)	29223 (86.3)	0.000
	Female	3997 (14.8)	658 (9.6)	4655 (13.7)	
Age	15-24	347 (1.3)	49 (0.7)	396 (1.2)	0.000
	25-34	3599 (13.3)	982 (14.3)	4581 (13.5)	
	35-44	6517 (24.1)	1706 (24.8)	8223 (24.3)	
	45-54	6303 (23.4)	1684 (24.5)	7987 (23.6)	
	55-64	5065 (18.8)	1379 (20)	6444 (19)	
	65+	5160 (19.1)	1087 (15.8)	6247 (18.4)	
Marital Status	Never married	891 (3.3)	310 (4.5)	1201 (3.5)	0.000
	Married	22211 (82.3)	5933 (86.1)	28144 (83.1)	
	Divorced/Deceased spouse	3889 (14.4)	644 (9.4)	4533 (13.4)	
Household Size	1-person	2450 (9.1)	522 (7.6)	2972 (8.8)	0.000
	2-person	6204 (23)	1631 (23.7)	7835 (23.1)	
	3-person	5773 (21.4)	1714 (24.9)	7487 (22.1)	
	4-person	5971 (22.1)	1654 (24)	7625 (22.5)	
	5-person	3252 (12)	742 (10.8)	3994 (11.8)	
	6+	3341 (12.4)	624 (9.1)	3965 (11.8)	
Economic Indicators					
Home- Ownership Status	Homeowner	16171 (59.9)	4930 (71.6)	21101 (62.3)	0.000
	Tenant	6370 (23.6)	1086 (15.8)	7456 (22)	
	Tied cottage	369 (1.4)	207 (3)	576 (1.7)	
	Not a homeowner but not paying rent	4081 (15.1)	664 (9.6)	4745 (14)	
Second-Home Ownership	No	25192 (93.3)	5945 (86.3)	31137 (91.9)	0.000
	Yes	1799 (6.7)	942 (13.7)	2741 (8.1)	
Private Insurance	No	25038 (92.8)	5482 (79.6)	30520 (90.1)	0.000
	Yes	1953 (7.2)	1405 (20.4)	3358 (9.9)	
Credit Card Use	No	14415 (53.4)	2512 (36.5)	16927 (50)	0.000
	Yes	12576 (46.6)	4375 (63.5)	16951 (50)	
Income Level	1st income level (lowest)	6419 (23.8)	356 (5.2)	6775 (20)	0.000
	2nd income level	6123 (22.7)	653 (9.5)	6776 (20)	
	3rd income level	5644 (20.9)	1132 (16.4)	6776 (20)	
	4th income level	5110 (18.9)	1666 (24.2)	6776 (20)	
	5th income level (highest)	3695 (13.7)	3080 (44.75)	6775 (20)	
Car Ownership	No	16996 (63)	2745 (39.9)	19741 (58.3)	0.000
	Yes	9995 (37)	4142 (60.1)	14137 (41.7)	

The properties of the residents where the household resides and social-environmental variables that can be effective in the saving status of households are presented in Table 2. According to Table 2, the house type was the apartment for 52.4% of the households. 51.3% of the households employed the stove as a residential heating system, and the house size was between $91m^2$-$120m^2$ for 37.3% of the household. 55.5% of the households employed conventional fuel types for heating, 91.7% employed advanced fuel types for hot water. 53% of the households had at least one person with the habit of smoking cigarettes, tobacco,

cigars, and 6.7% of them had at least one person going to the cinema, theatre, sports competitions. It was seen that 27.1% of the households had eating out, and 62.9% of them went to the market.

Table: 2
Residential Properties and Factors That Can Affect the Saving Status of Households

Variables		Saving status		n (%)	P
		No	Yes		
Indications Related to Residents					
House Type	Detached	13410 (49.7)	2722 (39.5)	16132 (47.6)	0.000
	Apartment	13574 (50.3)	4164 (60.5)	17738 (52.4)	
Heating System	Central heating system	2608 (9.7)	1212 (17.6)	3820 (11.3)	0.000
	Floor standing boiler	7975 (29.5)	2809 (40.8)	10784 (31.8)	
	Stove	14777 (54.7)	2588 (37.6)	17365 (51.3)	
	Electric heater	1631 (6)	278 (4)	1909 (5.6)	
Fuel Type (For Heating)	Conventional fuel type	15625 (57.9)	3176 (46.1)	18801 (55.5)	0.000
	Advanced fuel type	11341 (42.1)	3709 (53.9)	15050 (44.5)	
Fuel Type (For Hot Water)	Conventional fuel type	2407 (8.9)	404 (5.9)	2811 (8.3)	0.000
	Advanced fuel type	24584 (91.1)	6483 (94.1)	31067 (91.7)	
House Size	$60m^2$ or less	1897 (7)	211 (3.1)	2108 (6.2)	0.000
	$61m^2$-$90m^2$	9212 (34.1)	1794 (26)	11006 (32.5)	
	$91m^2$-$120m^2$	10013 (37.1)	2632 (38.2)	12645 (37.3)	
	$121m^2$-$150m^2$	4193 (15.5)	1427 (20.7)	5620 (16.6)	
	$150m^2$+	1676 (6.2)	823 (12)	2499 (7.4)	
Social and Environmental Indicators					
Habit of Smoking	No	12292 (45.5)	3620 (52.6)	15912 (47)	0.000
	Yes	14699 (54.5)	3267 (47.4)	17966 (53)	
Habit of Eating Out	No	20567 (76.2)	4124 (59.9)	24691 (72.9)	0.000
	Yes	6424 (23.8)	2763 (40.1)	9187 (27.1)	
The habit of Going to The Cinema	No	25619 (94.9)	6001 (87.1)	31620 (93.3)	0.000
	Yes	1372 (5.1)	886 (12.9)	2258 (6.7)	
The habit of Going to The Market	No	10212 (37.8)	2368 (34.4)	12580 (37.1)	0.000
	Yes	16779 (62.2)	4519 (65.6)	21298 (62.9)	
Year	2015	8987 (33.3)	1938 (32.2)	10925 (32.2)	0.000
	2016	9053 (33.5)	2575 (7)	11427 (33.7)	
	2017	8951 (33.2)	6887 (7.6)	11526 (34.1)	

According to the chi-square independence test results in Table 1 and Table 2, a significant relationship was detected between households' saving status and factors related to demographic issues, economic issues, residential properties, and social-environmental indicators.

3.2. Estimation of Models

Binary logistics and binary probit regression models were employed to determine the factors affecting the saving behaviours of the households in the study. The established models were defined as statistically significant (P <0.000).

3.2.1. Goodness of Fit Test

The goodness of fit test results is shown in Table 3. Pseudo R^2 values for binary logistics and binary probit models were calculated as 0.178 and 0.179, respectively. The classification success of the models was calculated as 81.17% and 81.22%, respectively. The area under the ROC curve of models was calculated as 0.7875 and 0.7878, respectively.

Table: 3
The goodness of Fit Test of Estimated Model Results

Criteria	LOGIT	PROBIT
Pseudo R^2	0.178	0.179
Cox-Snell/M	0.165	0.165
AIC	28209.64	28178.28
BIC	28664.83	28633.47
Log-likelihood	-14050.82	-14035.14
Classification Success	81.17	81.22
Area under ROC Curve	0.7875	0.7878
Hosmer-Lemeshow Chi-Square (P-value)	26.11 (0.001)	10.04 (0.2620)
P-value	0.000	0.000
N	33843	33843
LOGIT: Binary logistic regression; PROBIT: Binary probit regression		

In Table 4, estimated model results associated with demographic and economic factors that can affect households' savings were presented.

Table: 4
Estimated Model Results Associated with Demographic and Economic Factors

Variables	Binary Logistic Regression				Binary Probit Regression			
	β	Std. Error	95% CI		β	Std. Error	95% CI	
			Lower	Upper			Lower	Upper
Constant	-3.600[a]	0.150	-3.894	-3.306	-2.034[a]	0.079	-2.188	-1.880
Demographic indicators								
Profession (reference category: not working)								
Manager	0.701[a]	0.081	0.543	0.860	0.419[a]	0.048	0.325	0.512
Learned profession member	0.453[a]	0.086	0.285	0.621	0.269[a]	0.050	0.171	0.368
Technician, operator	0.210[b]	0.093	0.029	0.392	0.123[b]	0.053	0.018	0.227
Office workers	-0.054	0.103	-0.256	0.147	-0.035	0.058	-0.149	0.079
Service and sales staff	0.292[a]	0.069	0.157	0.428	0.167[a]	0.039	0.091	0.243
Qualified agriculture	1.050[a]	0.065	0.923	1.117	0.611[a]	0.036	0.539	0.682
Artisans and associated workers	0.182[b]	0.077	0.032	0.333	0.106[b]	0.042	0.023	0.189
Facility and machine operators	0.065	0.081	-0.095	0.225	0.044	0.045	-0.044	0.132
Elementary occupations	0.088	0.094	-0.096	0.272	0.053	0.050	-0.046	0.152
Educational status (reference category: not finishing a school)								
Primary school	0.315[a]	0.083	0.153	0.478	0.172[a]	0.044	0.086	0.258
Secondary school	0.385[a]	0.096	0.196	0.573	0.209[a]	0.052	0.109	0.311
High school	0.322[a]	0.095	0.135	0.508	0.178[a]	0.051	0.078	0.279
University	0.352[a]	0.102	0.151	0.553	0.197[a]	0.056	0.087	0.307
Gender (reference category: male)								
Female	-0.178[b]	0.084	-0.343	-0.013	-0.101[b]	0.046	-0.192	-0.010
Age (reference category: 65+)								
15-24	-0.161	0.223	-0.597	0.275	-0.075	0.121	-0.312	0.162
25-34	0.051	0.083	-0.113	0.214	0.043	0.047	-0.048	0.135
35-44	-0.167[b]	0.077	-0.317	-0.016	-0.085[b]	0.043	-0.169	0.000
45-54	-0.315[a]	0.069	-0.450	-0.180	-0.176[a]	0.039	-0.252	-0.100
55-64	-0.235[a]	0.062	0.357	-0.112	-0.129[a]	0.035	-0.198	-0.060
Marital status (reference category: married)								
Never married	0.245[b]	0.112	0.024	0.466	0.134[b]	0.064	0.009	0.259
Divorced/Deceased spouse	0.086	0.091	-0.091	0.264	0.050	0.050	-0.048	0.149
Household size (reference category: 4-person)								
1-person	0.773[a]	0.096	0.584	0.962	0.444[a]	0.053	0.339	0.549
2-person	0.288[a]	0.055	0.179	0.395	0.166[a]	0.031	0.105	0.227
3-person	0.068	0.049	-0.282	0.165	0.044	0.028	-0.011	0.099
5-person	-0.094	0.062	-0.215	0.026	-0.540	0.035	-0.122	0.014
6+	-0.452[a]	0.069	-0.589	-0.316	-0.257[a]	0.039	-0.333	-0.181
Economic indicators								
Homeownership status (reference category: homeowner)								
Tenant	-0.416[a]	0.051	-0.515	-0.316	-0.240[a]	0.028	-0.296	-0.185
Tied cottage	0.117	0.123	-0.125	0.358	0.066	0.072	-0.075	0.208
Not a homeowner but not paying rent	-0.437[a]	0.059	-0.553	-0.321	-0.249[a]	0.032	-0.313	-0.187
Second-home ownership (reference category: no)								
Yes	0.268[a]	0.057	0.156	0.379	0.163[a]	0.033	0.098	0.229

Private insurance (reference category: no)									
	Yes	0.454[a]	0.052	0.352	0.556	0.276[a]	0.031	0.216	0.337
Credit card use (reference category: no)									
	Yes	-0.188[a]	0.044	-0.275	-0.102	-0.101[a]	0.025	0.008	0.094
Income level (reference category: 1st income level)									
	2nd income level	0.726[a]	0.091	0.547	0.904	0.369[a]	0.045	0.281	0.457
	3rd income level	1.369[a]	0.089	1.194	1.544	0.713[a]	0.044	0.625	0.799
	4th income level	1.836[a]	0.091	1.657	2.015	0.978[a]	0.046	0.886	1.067
	5th income level (highest)	2.577[a]	0.097	2.387	2.768	1.419[a]	0.049	1.321	1.517
Car ownership (reference category: no)									
	Yes	0.285[a]	0.039	0.207	0.363	0.161[a]	0.022	0.117	0.205

[a]p<.01; [b]p<.05

According to the binary logistic and binary probit model results given in Table 4, the variables like the profession of the household head (manager, learned profession member, technician/operator, and assistant knew professional jobs, service and sales staff, qualified agriculture/forestry and aquaculture workers, artisans, and associated workers), the educational status of the household head (primary school, secondary school, high school, college, undergraduate-graduate), the gender of the household head, the age of the household head (35-44 age group, 45-54 age group, 55-64 age group), the marital status of household head (never married) and household size (1-person, 2-person, 6- person or more) were determined as significant. Homeownership status of the household (tenant, not a homeowner but not paying rent), automobile ownership in the household, second-home ownership, private life insurance and the presence of an individual having a credit card, and annual household income level (2nd income level; 5th income level) were also determined as significant.

In Table 5, estimated model results associated with residential properties and social-environmental factors that may affect households' savings were presented.

Table: 5
Estimated Model Results Associated with Residential Properties and Social-Environmental Factors

Variables	Binary Logistic Regression				Binary Probit Regression			
	β	Std. Error	95% CI		β	Std. Error	95% CI	
			Lower	Upper			Lower	Upper
Indications related to residents								
House type (reference category: detached)								
Apartment	-0.985[c]	0.056	-0.208	0.011	-0.051	0.031	-0.112	0.01
Heating system (reference category: stove)								
Central heating system	0.226[a]	0.074	0.080	0.371	0.127[a]	0.042	0.044	0.209
Floor standing boiler	0.410[a]	0.074	0.265	0.556	0.231[a]	0.042	0.148	0.313
Electric heater	-0.075	0.108	-0.287	0.137	-0.030	0.059	-0.148	0.087
Fuel type (for heating) (reference category: conventional fuel type)								
Advanced fuel type	-0.281[a]	0.0681	-4.415	-0.147	-0.164[a]	0.038	-0.241	0.088
Fuel type (for hot water) (reference category: conventional fuel type)								
Advanced fuel type	-0.249[a]	0.082	-0.409	-0.088	-0.131[a]	0.044	-0.218	-0.045
House size (reference category: 60 m^2 or less)								
$61m^2$-$90m^2$	0.185[c]	0.104	-0.020	0.389	0.098[c]	0.055	-0.009	0.206
$91m^2$-$120m^2$	0.286[a]	0.104	0.082	0.491	0.159[a]	0.055	0.051	0.066
$121m^2$-$150m^2$	0.242[b]	0.108	0.029	0.455	0.128[b]	0.057	0.014	0.241
$150m^2$+	0.320[a]	0.117	0.090	0.549	0.176[a]	0.063	0.051	0.301
Social and environmental indicators								
The habit of smoking (reference category: no)								
Yes	-0.352[a]	0.037	-0.424	-0.280	-0.205[a]	0.021	-0.246	-0.164
The habit of eating out (reference category: no)								
Yes	0.172[a]	0.040	0.093	0.251	0.097[a]	0.023	0.051	0.142
The habit of going to the cinema (reference category: no)								
Yes	0.182[a]	0.061	0.062	0.302	0.112[a]	0.036	0.041	0.183
The habit of going to the market (reference category: no)								
Yes	0.085[b]	0.039	0.008	0.161	0.051[b]	0.022	0.008	0.094
Year (reference category: 2015)								
2016	0.208[a]	0.044	0.120	0.293	0.113[a]	0.025	0.065	0.162
2017	0.335[a]	0.044	0.249	0.421	0.189[a]	0.024	0.141	0.237

[a]p<.01; [b]p<.05; [c]p<.10

According to the model results given in Table 5, the variables like the type of house where the household resides, the heating system of the house (central heating system, floor standing boiler), the type of fuel employed for heating, the type of fuel used for hot water, and house size ($61m^2$-$90m^2$, $91m^2$-$120m^2$, $121m^2$-$150m^2$, $151m^2$ and more) were determined as statistically significant. The presence of an individual having the habit of smoking cigarettes/ tobacco/cigars, the presence of an individual having the habit of going to the places like cinema/theatre/sports competition, and the habit of the household to eat out and the habit of the household to go to the market and the survey year (2016, 2017) were also determined as statistically significant.

3.3. Average Direct Elasticity

In Table 6 and Table 7, the elasticity estimates of the factors that affect the saving status of the households and the variance inflation factor (VIF) values of the independent variables included in the model were presented. While the variance inflation factor between 5 and 10 indicates an average multicollinearity problem, a value greater than 10 shows a

high-level multicollinearity problem (Alkan & Abar 2020: 33). When the VIF values of the independent variables employed in the study were analysed, it was observed that no independent variables created the multicollinearity problem.

In Table 6, the average direct elasticity estimates of socio-demographic and essential economic factors in the saving status of households were presented.

Table: 6
Elasticity Estimates for Socio-Demographic and Economic Factors

Variables	Binary Logistic Regression		Binary Logistic Regression		VIF
	Elasticity	Std. Error	Elasticity	Std. Error	
Demographic indicators					
Profession (reference category: not working)					
Manager	0.549[a]	0.062	0.627[a]	0.068	1.39
Learned profession member	0.363[a]	0.067	0.420[a]	0.076	1.88
Technician, operator	0.172[b]	0.075	0.198[b]	0.084	1.31
Office workers	-0.045	0.085	-0.059	0.098	1.25
Service and sales staff	0.237[a]	0.056	0.267[a]	0.061	1.54
Qualified agriculture	0.795[a]	0.047	0.871[a]	0.05	1.54
Artisans and associated workers	0.149[b]	0.063	0.172[b]	0.068	1.57
Facility and machine operators	0.054	0.067	0.072	0.073	1.46
Elementary occupations	0.072	0.077	0.087	0.082	1.37
Educational status (reference category: not finishing a school)					
Primary school	0.257[a]	0.069	0.279[a]	0.073	3.36
Secondary school	0.311[a]	0.079	0.337[a]	0.084	2.40
High school	0.262[a]	0.078	0.288[a]	0.084	3.02
University	0.286[a]	0.084	0.316[a]	0.091	3.84
Gender (reference category: male)					
Female	-0.143[b]	0.068	-0.160[b]	0.075	2.33
Age (reference category: 65+)					
15-24	-0.127	0.176	-0.115	0.188	1.31
25-34	0.039	0.064	0.064	0.069	2.69
35-44	-0.131[b]	0.059	-0.130[b]	0.066	3.44
45-54	-0.250[a]	0.054	-0.276[a]	0.06	2.72
55-64	-0.185[a]	0.049	-0.200[a]	0.054	1.93
Marital status (reference category: married)					
Never married	0.192[b]	0.86	0.204[b]	0.094	1.55
Divorced/Deceased spouse	0.068	0.071	0.078	0.078	2.83
Household size (reference category: 4-person)					
1-person	0.582[a]	0.069	0.640[a]	0.073	2.40
2-person	0.227[a]	0.043	0.257[a]	0.048	1.98
3-person	0.549	0.039	0.070	0.045	1.61
5-person	-0.077	0.502	-0.088	0.057	1.37
6+	-0.377[a]	0.059	-0.441[a]	0.068	1.48
Economic indicators					
Homeownership status (reference category: homeowner)					
Tenant	-0.334[a]	0.041	-0.378[a]	0.045	1.38
Tied cottage	0.089	0.093	0.960	0.103	1.11
Not a homeowner but not paying rent	-0.351[a]	0.048	-0.394[a]	0.053	1.15
Second-home ownership (reference category: no)					
Yes	0.209[a]	0.0434	0.246[a]	0.048	1.08
Private insurance (reference category: no)					
Yes	0.351[a]	0.039	0.407[a]	0.043	1.17
Credit card use (reference category: no)					
Yes	-0.149[a]	0.035	-0.156[a]	0.038	1.54
Income level (reference category: 1st income level)					
2nd income level	0.671[a]	0.085	0.737[a]	0.092	1.82
3rd income level	1.229[a]	0.082	1.321[a]	0.09	2.07
4th income level	1.601[a]	0.083	1.705[a]	0.091	2.41
5th income level (highest)	2.114[a]	0.084	2.231[a]	0.092	3.16
Car ownership (reference category: no)					
Yes	0.226[a]	0.031	0.248[a]	0.034	1.33

[a]p<.01; [b]p<.05; VIF: Variance Inflation Factor

According to the binary logistics and binary probit regression models presented in Table 6, the expected saving probability of the household with a female head was 14.3% and 16% less than that of a household with a male lead, while the other variables were fixed. According to the binary logistic regression model, the fact that the household head was primary school graduate, secondary school graduate, high school graduate, or university graduate increased the expected saving probability by 25.7%, 31.1%, 26.2%, and 28.6%, respectively, compared to the reference group. The household head who has never married increased the expected saving probability by 19.2% and 20.4% compared to the reference group. The household head's age was between 35-44, 45-54, or 55-64, reduced by 13.1%, 25%, 18.5% in the logit model, and reduced by 13%, 27.6%, 20% in the probit model, respectively. The household size consisted of 1-person, or 2-people increased the expected saving probability by 58.2% and 22.7% in the logit model, and 64% and 25.7% in the probit model, respectively, compared to the reference group. On the other hand, the household size consisted of 6-person or more reduced the expected saving probability by 37.7% and 44.1%, respectively, compared to the reference group.

According to the binary logistic regression model, the fact that household head was a manager, a learned professional member, technician/operator and assistant learned professional member, a service and sales staff, a qualified agricultural/forestry and aquaculture worker, or an artisan and associated worker increased the expected saving probability by 54.9%, 36.3%, 17.2%, 23.7%, 79.5%, 14.9% respectively, compared to the reference group. According to the binary probit regression model, the fact that household head was a manager, a learned professional member, technician/operator and assistant learned professional member, a service and sales staff, a qualified agricultural/forestry and aquaculture worker, or an artisan and associated worker increased the expected saving probability by 62.7%, 42%, 19.8%, 26.7%, 87.1%, 17.2%, respectively, compared to the reference group.

According to the binary logistic regression model, the household was tenant, or not a homeowner but not paying rent reduced the expected saving probability by 33.4% and 35.1%, respectively, compared to the reference group. According to the binary probit regression model, the household was tenant, or not a homeowner but not paying rent reduced the expected savings probability by 37.8% and 39.4%, respectively, compared to the reference group. The predicted saving probability of second homeowners was 22.6% and 24.6% more. The expected saving probability of the household having private insurance was 35.1% and 40% more than that of those who did not have. The predicted saving probability of the household employing credit cards was 14.9% and 15.6% less than those who did not engage. The saving probability of the household that owned cars was 22.6% and 24.8% more than those who did not own. As the household's income level increased, the saving probability increased in binary logistics and binary probit regression models.

In Table 7, the average direct elasticity of the factors related to residential properties and social-environmental characteristics that are effective in household saving.

Table: 7
Elasticity Estimates for Residential Properties and Social-Environmental Factors

Variables	Binary Logistic Regression		Binary Probit Regression		VIF
	Elasticity	Std. Error	Elasticity	Std. Error	
Indications related to residents					
House type (reference category: detached)					
Apartment	-0.078[a]	0.0441	-0.079	0.048	2.35
Heating system (reference category: stove)					
Central heating system	0.182[a]	0.06	0.201[a]	0.067	1.99
Floor standing boiler	0.326[a]	0.059	0.357[a]	0.065	4.30
Electric heater	-0.062[a]	0.089	-0.501	0.099	1.84
Fuel type (for heating) (reference category: conventional fuel type)					
Advanced fuel type	-0.222[a]	0.023	-0.255[a]	0.060	4.22
Fuel type (for hot water) (reference category: conventional fuel type)					
Advanced fuel type	-0.194[a]	0.062	-0.199[a]	0.065	1.17
House size (reference category: 60 m^2 or less)					
61m^2-90m^2	0.150[c]	0.086	0.159[c]	0.090	4.43
91m^2-120m^2	0.231[a]	0.085	0.253[a]	0.090	4.83
121m^2-150m^2	0.196[b]	0.089	0.205[b]	0.095	3.47
150m^2+	0.257[a]	0.095	0.279[a]	0.102	2.32
Social and environmental indicators					
The habit of smoking (reference category: no)					
Yes	-0.279[a]	0.029	-0.318[a]	0.032	1.14
The habit of eating out (reference category: no)					
Yes	0.136[a]	0.032	0.149[a]	0.035	1.25
The habit of going to the cinema (reference category: no)					
Yes	0.143[a]	0.047	0.170[a]	0.054	1.19
The habit of going to the market (reference category: no)					
Yes	0.067[a]	0.031	0.079 [b]	0.034	1.11
Year (reference category: 2015)					
2016	0.167[a]	0.035	0.181[a]	0.039	1.37
2017	0.267[a]	0.035	0.296[a]	0.039	1.38

[a]p<.01; [b]p<.05; [c]p<.10; VIF: Variance Inflation Factor.

According to the binary logistics model presented in Table 7, the expected saving probability of the households living in apartments was 7.8% less than that of the households living in a detached house. The predicted saving probability of the households employing an electric heater as the heating system was 6.2% less than households using a stove for heating. According to the binary logistics and binary probit models, the central heating system employed for heating in the house where the household resides increased the expected saving probability to 18.2% and 20.01%, respectively, compared to the reference group. Likewise, the house's heating system where the household resides was based on the floor standing boiler increased the expected saving probability compared to the reference group by 32.6% and 35.7%, respectively. The predicted saving probability of the households employing advanced fuel type for heating in their houses was 22.2% and 25.5% less than that of the households using conventional fuel type for heating, respectively.

Similarly, the expected saving probability of the households employing advanced fuel types for hot water in their houses was 19.4% and 19.9% less than households using conventional fuel types, respectively. According to the binary logistic regression model, the expected saving probability of the households living in the houses with 61 m^2 -90 m^2, 91 m^2 -120 m^2, 121 m^2 -150 m^2, 150 m^2, and more sizes was 15%, 23.1%, 19.6% and 25.7% more than the reference group, respectively. According to the binary probit regression model, the expected saving probability of the households living in the houses with 61 m^2-90 m^2, 91 m^2-120 m^2, 121 m^2-150 m^2, 150 m^2, and more sizes was 15.9%, 25.3%, 20.5%, and 27.9% more

than the reference group, respectively. According to the binary logistics and binary probit regression models, the expected saving probability of a household that participated in the survey in 2016 and 2017 was 16.7% and 26.7% more than a household that participated in 2015.

4. Discussion

In the study, the demographics and economic factors of the household head and the factors related to residential properties and social-environmental indicators affecting household savings in Turkey were determined. The household savings trends survey was essential in increasing national savings rates and guiding economic development in policies and activities performed by decision-makers.

According to the study results, the household head's profession affected the household's saving status. Among the professional groups, household heads working as qualified agricultural, forestry, and aquaculture workers were determined to have the highest saving probability. Similar results were obtained in the studies on this issue (Beckmann et al., 2013; Şengür & Taban, 2016).

In the study, it was determined that the education level of the household head affected the tendency to save. Also, various studies determined that education affected saving status (Beckmann et al., 2013; Ceritoğlu & Eren, 2014; Denizer et al., 2002; Fisher, 2010; Khan et al., 2013; Zengin et al., 2018). The study determined that the secondary school graduates' household heads had the highest saving probability. The relation between educational status and the possibility of saving was also associated with financial literacy. Another study detected a relationship between financial literacy and saving status. Financial literacy increased as the educational status improved (Barbić et al., 2016).

It was determined that households with a female household head were less likely to make savings. Similar results were determined in some studies (Fisher, 2010; Ricketts et al., 2013). Unlike this paper, another study determined that women in other categories saved more than men, apart from the women with the highest income (Abdelkhalek et al., 2010). In a study where households' savings decisions in Bulgaria, Hungary, and Poland were investigated, it was determined that households with a female household head made more savings (Denizer et al., 2002).

When the age of the household head was examined, it was determined that the saving probability in the 35-64 age group decreased and that the group over 65 years held the highest saving tendency. Other studies presented similar results (Denizer et al., 2002; Kulikov et al., 2007). This situation may be linked with the fact that the group above 65 years increases the part of income to be saved due to the decrease in their expenses and that our culture is concerned with endowing the relatives. In other studies on saving, the life cycle hypothesis was discussed. The life cycle hypothesis, based on the fact that the expenditures of individuals in old age can be accomplished without deteriorating their living

standards, states that the relationship between age and savings is humpbacked and that middle-aged people make positive savings and retired people make negative savings (Modigliani, 2005). The results obtained from the study did not support the life cycle hypothesis. Still, studies support the literature's life cycle (Beckmann et al., 2013; Burney & Khan, 1992; Hurd & Lee, 1995; Liberda, 1999; Şenol, 2018).

The marital status variable influenced the saving status of the households. It was determined that single household heads were more inclined to save than married ones. Similar results were in the studies on this issue (Şengür & Taban, 2016; Temel-Nalın, 2013).

When the size of the households was analysed, it was determined that one-person households were more inclined to save, but the possibility of saving in the households composed of 6-person or more was low. Some studies accomplished similar results (Abdelkhalek et al., 2010; Denizer et al., 2002; Hurd & Lee, 1995; Liberda, 1999; Ricketts et al., 2013; Şengür & Taban, 2016). Besides, in the literature, there is a study determining that two-person households hold a higher saving probability compared to those who are composed of one-person, three-person, or more and that this situation is related to the fact that two-person households may have more earnings because two-person households are formed of two adults (Beckmann et al., 2013). The number of children in households can cause both a decrease and an increase in savings. On the one hand, having children can encourage parents to make more savings to finance their children's needs like education and comfortable life in the future. On the other hand, excessive household size can drive parents to decrease their savings.

One of the economic factors, the property ownership variable, influenced the household's savings. Households that were not tenants or were homeowners but did not pay rent were less inclined to make savings than homeowners. Other studies also confirmed these findings (Erdem, 2017; Şengür & Taban, 2016; Temel-Nalın, 2013).

Those who owned a second home were more inclined to save than those who did not. This situation may be related to the fact that the second-home owners belong to a higher income group. Some studies obtained similar results in the literature (Bozkuş & Üçdoğruk, 2007; Şengür & Taban, 2016; Temel-Nalın, 2013). Contrarily, in the literature, some studies determined that households with assets like a second home were less inclined to save (Erdem, 2017).

It was determined that households with private insurance were more inclined to save than those without insurance. When the study results were analysed, individuals with private insurance constituted a small proportion, approximately 10% of the sample. This situation can be defined by the fact that private insurance premiums are high, or the sector employees who present this opportunity are very few. From this point of view, we can deduce that individuals with private insurance had sufficient income and thus had a chance to save more. There are studies in the literature complying with this situation. The families with public health insurance household heads were more inclined to save less than other households

(Erdem, 2017). It was asserted that the household head had no health insurance and social security had low-level savings. This was because the health expenditures paid from the disposable income constituted a heavy burden on the household budget (Ceritoğlu, 2009).

Households using credit cards were less inclined to save than those who did not use credit cards. Let's analyse the data of the interbank bank centre. It is seen that the total number of domestic and foreign credit cards in domestic transactions and the transaction sum have risen continuously since 2011, and the transaction sum with credit cards in 2019 reached 955,342.47 million (BKM, 2020). The increase in a credit card may also decrease the share of revenue allocated to save. Some studies obtain similar results in the literature (Bozkuş & Üçdoğruk, 2007; Zengin et al., 2018). This situation may be related to increasing credit card ownership can cause unconscious shopping today.

The study determined that all income level variables affected the tendency to save. The increase in income level raised the possibility of households saving. In the literature, studies performed in developed countries and developing countries and primarily in Turkey presented similar results (Abdelkhalek et al., 2010; Agrawal, 2001; Çelik, 2009; Çolak & Öztürkler, 2012; Horioka & Terada-Hagiwara, 2012; Hüfner & Koske, 2010).

It was determined that the car owner households were more inclined to save than those who were not. Considering that the income levels of the car owner households were not too low, it would be reasonable for them to save more than those who did not own the car. Some studies obtained similar results in the literature (Temel-Nalın, 2013). Still, studies are determining that car owner households saved less (Denizer et al., 2002; Kulikov et al., 2007; Şengür & Taban, 2016) compared to those who did not own cars, and there was no relationship between car ownership and saving tendency (Zengin et al., 2018).

In the study, the fact that the indicators related to residential properties such as the heating system of the house and type of fuel (for heating or hot water), and the social and environmental indicators such as the habit of smoking and going to the market were included in the models contributes to the literature in determining savings preferences in Turkey.

Households with central heating or floor-standing boilers were more inclined to save than those with stoves. This situation may be related to the fact that the households living in houses with stoves belong to lower-income groups than other households. Households employing advanced fuel types for heating and hot water were less inclined to save than households using conventional fuel types. This situation may be related to the fact that advanced fuel types had a higher share of disposable income allocated to save. The house size affected the saving probability of households, and as the house size increased, the saving probability raised.

Factors related to social and environmental indicators affect the saving behaviour of households. It was determined that households with individuals having the habit of smoking were less likely to save than those who did not have. It has been determined that households

with individuals having the habit of going to the cinema were more inclined to keep than those who did not have. It was determined that households with individuals having the habit of eating out were more likely to hold than those who did not have. In the literature, a study determined that individuals with a high-level habit of eating out had a low tendency to save, contrary to the survey (Zengin et al., 2018). It was determined that households with individuals having the habit of going to the market were more inclined to save than those who did not have. The fact that the products in the market are more affordable than the shopping places like stores, shops, groceries may be associated with the efforts of the household to reduce the income allocated for consumption. Also, according to the results obtained from the study, it was determined that a household participating in the survey in 2016 and 2017 was more inclined to save than a household participating in 2015.

In the paper, factors affecting household saving, which is the most crucial determinant of the concept of saving and essential for the sustainable growth of an economy, especially a developing economy, were determined. The demographic and economic factors of household heads and the factors like residential properties and social-environmental indicators influenced household savings in Turkey. Choosing the effects of these features would contribute to the policy-making process that would encourage households to save and the description of household savings.

In the study, economic indicators, primarily the education, age, household size, and income of household head, were determined to be highly efficient in household saving behaviour. The results were essential for producing incentive policies such as individual retirement plans to enhance households' saving tendency. Sustainable economic development for each country, especially for developing countries, mainly like Turkey, can be supplied with sufficient savings because the savings assessed within the financial system are essential financial resources. Savings finance investments, investments finance economic growth. Insufficient savings would transform the country into a more foreign-dependent country with low financial accumulation. As a result of the study, it is advised to policymakers to improve financial literacy to raise awareness about what the savings of individuals contribute to the future and about evaluating the savings in the financial system rather than saving under the mattress.

The study had several limitations. First, the data in the study were secondary. The variables necessary for statistical analysis consisted of the variables in the dataset. Variables such as the place of residence of the household (rural/urban), the number of unemployed in the household, the financial literacy level of the household head could not be involved in the model. Second, since the data were cross-sectional, it was not probable to describe a definitive causal relation related to the factors affecting household savings. Third, the data obtained from the study were the household heads' answers. Hence, the data obtained from this data collection method may be biased.

References

Abdelkhalek, T. et al. (2010), "A microeconometric analysis of household savings determinants in Morocco", *African Review of Money Finance and Banking*, 7-27.

Agrawal, P. (2001), "The relation between savings and growth: cointegration and causality evidence from Asia", *Applied Economics*, 33(4), 499-513.

Alkan, Ö. & H. Abar (2020), "Determination of factors influencing tobacco consumption in Turkey using categorical data analyses1", *Archives of Environmental & Occupational Health*, 75(1), 27-35.

Alkan, Ö. Et al. (2015), "Determination of Factors Affecting the Children's Internet Use", *American International Journal of Contemporary Research*, 5(6), 57-67.

Barbić, D. et al. (2016), "Logistic regression analysis of financial literacy implications for retirement planning in Croatia", *Croatian Operational Research Review*, 7(2), 319-331.

Beckmann, E. et al. (2013), "Determinants of households' savings in Central, Eastern and Southeastern Europe", *Focus on European Economic Integration Q*, 3(13), 8-29.

BKM (2020), *Yerli ve yabancı kredi kartlarının yurt içi kullanımı*, <https://bkm.com.tr/yerli-ve-yabanci-kredi-kartlarinin-yurt-ici-kullanimi/>, 26.03.2020.

Bozkuş, S. & Ş. Üçdoğruk (2007), "Hanehalkı tasarruf tercihleri-Türkiye örneği", Paper presented at the *8. Türkiye Ekonometri ve İstatistik Kongresi*, Malatya.

Browning, M. & A. Lusardi (1996), "Household saving: Micro theories and micro facts", *Journal of Economic Literature*, 34(4), 1797-1855.

Burney, N.A. & A.H. Khan (1992), "Socio-economic characteristics and household savings: an analysis of the households' saving behaviour in Pakistan", *The Pakistan Development Review*, 31(1), 31-48.

Çelik, Z. (2009), "Adana ilinde hanehalkı gelir ve tasarruf eğilimlerinin incelenmesi", *Yüksek Lisans Tezi*, Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.

Ceritoğlu, E. & O. Eren (2014), "The effects of demographic and social changes on household savings in Turkey", *Central Bank Review*, 14(3), 15-33.

Ceritoğlu, E. (2009), *The empirical importance of precautionary saving in Turkey*, University of Nottingham, Nottingham, United Kingdom.

Çolak, Ö.F. & H. Öztürkler (2012), "Tasarrufun belirleyicileri: Küresel tasarruf eğiliminde değişim ve Türkiye'de hanehalkı tasarruf eğiliminin analizi", *Bankacılar Dergisi*, 82, 3-44.

Denizer, C. et al. (2002), "Household savings in the transition", *Journal of Comparative Economics*, 30(3), 463-475.

Erdem, B.P. (2017), "Türkiye'de hanehalkı tasarruflarını etkileyen faktörler", *Uzmanlık Tezi*, Ekonomik Modeller ve Stratejik Araştırmalar Genel Müdürlüğü, TC Kalkınma Bakanlığı, Ankara.

Fisher, P. (2010), "Gender differences in personal saving behaviors", *Journal of Financial Counseling and Planning*, 21(1), 14-24.

Horioka, C.Y. & A. Terada-Hagiwara (2012), "The determinants and long-term projections of saving rates in Developing Asia", *Japan and the World Economy*, 24(2), 128-137.

Hosmer Jr, D.W. et al. (2013), *Applied logistic regression* (Vol. 398), John Wiley & Sons.

Howard, D.H. (1978), "Personal saving behavior and the rate of inflation", *The Review of Economics and Statistics*, 547-554.

Hüfner, F. & I. Koske (2010), *Explaining household saving rates in G7 countries: Implications for Germany*: OECD Publishing.

Hurd, M.D. & H.K. Lee (1995), "Household saving rates in Korea: Evidence on life-cycle consumption behavior", *Journal of the Japanese and International Economies*, 9(2), 174-199.

ING (2019), *Türkiye'nin Tasarruf Eğilimleri Araştırması 2019 İkinci Çeyrek Raporu*, ING Bank.

Khan, T. et al. (2013), "Determinants of private saving: A case of Pakistan", *Asian Journal of Economic Modelling*, 1(1), 1-7.

Kulikov, D. et al. (2007), *A microeconometric analysis of household saving in Estonia: income, wealth and financial exposure*: Eesti Pank/Bank of Estonia.

Liberda, B. (1999), "Household saving in Poland", *CASE-Center for Social and Economic Research Paper* No. 187.

Liu, F. et al. (2019), "Professional financial advice, self-control and saving behavior", *International Journal of Consumer Studies*, 43(1), 23-34.

Modigliani, F. (2005), *The Collected Papers of Franco Modigliani, Volume 6*: MIT Press Books, The MIT Press, edition 1, volume 6, number 0262134543, August.

Reinsdorf, M.B. & M. Perozek (2004), "Alternative measures of personal saving", *Survey of Current Business*, 84(9), 17-27.

Ricketts, C.F. et al. (2013), "The influence of individual health outcomes on individual savings behavior", *The Social Science Journal*, 50(4), 471-481.

Rodriguez-Palenzuela, D. & S. Dees (2016), "Savings and investment behaviour in the euro area", *ECB Occasional Paper* (No.167), Frankfurt: European Central Bank (ECB).

Russett, B. et al. (1994), "Did Americans' expectations of nuclear war reduce their savings?", *International Studies Quarterly*, 38(4), 587-603.

Schmidt-Hebbel, K. et al. (1994), *saving, investment, and growth in developing countries: an overview* (Vol. 1382): World Bank Publications.

Şengür, M. & S. Taban (2016), "Türkiye'de hanehalkı tasarruflarının gelir dışındaki belirleyicileri", *Optimum: Journal of Economics & Management Sciences/Ekonomi ve Yönetim Bilimleri Dergisi*, 3(1), 29-53.

Şenol, S. (2018), "The impact of borrowing on household saving behavior the case of Turkey 2003-2012", *Doktora* Tezi, Kadir Has Ünivessitesi Sosyal Bilimler Enstitüsü, İstanbul.

TCMB (2015), *Tasarruf-yatırım dinamikleri ve cari İşlemler dengesi gelişmeleri*, Ankara: Türkiye Cumhuriyeti Merkez Bankası.

Temel-Nalın, H. (2013), "Determinants of household saving and portfolio choice behaviour in Turkey", *Acta Oeconomica*, 63(3), 309-331.

TÜİK (2018), *Household Budget Statistics Micro Data Set*, <http://www.tuik.gov.tr/MicroVeri/HBA_2018/english/index.html>, 10.02.2020.

WB (2011), "Turkey - Sustaining high growth: The role of domestic savings - synthesis report", *Report No. 66301-TR* Washington D.C.: The Worldbank.

Zengin, S. et al. (2018), "Türkiye'deki düşük hanehalkı tasarrufuna neden olan faktörlerin belirlenmesine yönelik bir araştırma", *Journal of Yaşar University*, 13(49), 86-100.

Sosyoekonomi

2022, Vol. 30(51), 91-118

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.05
Date Submitted: 27.04.2021
Date Revised: 28.10.2021
Date Accepted: 06.01.2022

Analysis of the Effects of the Central Bank's Interest Announcements on Tourism Index Returns[1]

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Merkez Bankası Faiz Duyurularının Borsa İstanbul Turizm Endeksi Getirilerine Etkisinin Analizi[2]

Abstract

This paper examines the impact of interest rate announcements by the Central Bank of the Republic of Turkey (CBRT) on Borsa İstanbul tourism index returns. During the period covering 2010-2020, the effects of the CBRT's 20 decrease announcements and eight increase announcements on tourism index daily returns were examined separately using the event study method. Moreover, the BIST100 index was analysed for comparison purposes. According to the study results in which ARs were calculated with the mean adjusted return model, out of 20 announcements of decreases in the interest rate, only 3 showed statistically significant ARs on the event date. This result indicates that tourism investors' reactions to policy rate announcements are weak and suggests the policy rate does not affect tourism investors' reactions. The findings for the BIST100 support this idea.

Keywords : Index Returns, BIST Tourism, Interest Rates Announcements, CBRT, Event Study.

JEL Classification Codes : F65, L83, G14.

Öz

Bu makale, TCMB'nin açıkladığı faiz kararlarının Borsa İstanbul turizm endeks getirileri üzerindeki etkisini incelemeyi amaçlamaktadır. Çalışmada olay çalışması yöntemiyle 2010-2020 döneminde TCMB'nin açıkladığı 20 faiz indirim ve 8 faiz artırım kararının turizm endeksi günlük getirilerine etkisi ayrı ayrı incelenmiştir. Ayrıca, karşılaştırma amacıyla BIST100 endeksi incelenmiştir. Ortalama getiri modeliyle anormal getirilerin hesaplandığı çalışma bulgularına göre faiz oranı duyurularındaki 20 düşüşten sadece 3'ünde olay gününde turizm endeksi anlamlı anormal getiri gözlenmiştir. Bu sonuçlar, turizm yatırımcılarının politika faiz duyurularına tepkilerinin zayıf olduğunu ve politika faizinin turizm yatırımcılarını doğrudan etkilemediğini göstermektedir. BIST100 endeksinde elde edilen bulgular, faiz kararlarının pay getirilerine doğrudan etkilerinin zayıf olduğu sonucunu desteklemektedir.

[1] *This article was prepared based on the project entitled "Reactions of Tourism Investors to Policy Rate Announcements", supported by Anadolu University Scientific Research Projects Commission (Project Number: 2107E063).*

[2] *Bu makale Anadolu Üniversitesi Bilimsel Araştırma Projeleri Komisyonu tarafından desteklenen "Turizm Yatırımcılarının Politika Faiz Açıklamalarına Tepkileri" başlıklı proje kapsamında hazırlanmıştır (Proje Numarası: 2107E063).*

Anahtar Sözcükler : Endeks Getirisi, BİST Turizm, Faiz Oranı Duyuruları, TCMB, Olay Çalışması.

1. Introduction

The central bank's primary objective is to achieve and maintain price stability. Mainly, this means supporting the economy's strength and the financial system's resilience. Achieving central banks' targets will improve the economy and contribute to employment, and the purchasing power of money will be preserved with sustaining price stability. Within this framework, central banks use different tools to achieve their goals to support the economy.

As the traditional monetary policy instrument (Homer & Sylla, 2005: 184), central banks adjust their policy via the benchmark interest rates (in other words, policy rates) downwards when their economies weaken and upward when facing inflationary pressures (Assefa et al., 2017: 20). These policy rate adjustments have direct and indirect effects on many areas of an economy. However, although the policy rate is not the only instrument to steer the economy, it is prominent in its impact on the financial markets and the real economy. Generally, it is seen that an expansionary monetary policy increases asset prices (Kanalıcı-Akay & Nargeleçekenler, 2009; Bordo & Lane, 2013).

As one of the monetary transmission channels besides credit and exchange rate channels, interest rates are used to steer the economy and impact asset prices (Ganev et al., 2002; Bordo & Lane, 2013). Expansionary monetary policy decreases interest rates and increases investments and consumption (Cengiz, 2009). It also affects the investor reactions according to risk premium (Ganev et al., 2002: 52). Bernanke and Kuttner (2005: 1253) showed that an unexpected monetary policy of a decrease in interest rates of 25 basis-point rates leads to a 1 per cent increase in stock prices. This is also evidence for a more significant market response to perceived permanent policy changes than the unexpected inactions. Thus, investors react to the expansionary monetary policy by substituting cash for financial and real assets (Bordo & Lane, 2013: 3). As a result, expansionary and contractionary monetary policies in downward or upward interest rate adjustments impact asset prices and returns.

Money and capital market investors follow the macroeconomic developments to decide how to invest their savings. Various studies investigating the effects of macroeconomic variables on stock returns and prices showed that variables such as economic growth, exchange rate, inflation, and money supply have influenced (Bilson et al., 2001; Chen et al., 2005; Kyereboah-Coleman & Agyire-Tettey, 2008; Pilinkus, 2010; Gupta & Reid, 2013; Paramati & Gupta, 2013; Özmen et al., 2017). However, it should be noted that the mentioned indicators' effects vary depending on the macroeconomic environment of the country and stock markets. Especially in developing countries, accompanied by the central banks' instrument diversification in monetary policy, the policy rate has been one of the primary tools since the 2008 financial crisis.

Turkey is an emerging and fragile economy due to the current account deficit, inflation pressure, heavy reliance on foreign investments for growth, and other factors (Morgan Stanley, 2013). It is essential to steer the economy using monetary policy in this context. Central banks use several direct and indirect instruments to achieve their objectives and the interest rate among the direct tools. By the law on the Central Bank of the Republic of Turkey (CBRT), taking precautions to enhance the financial system's stability in conjunction with price stability was assigned. The CBRT put into practice the policy decisions it needed after the 2008 financial crisis. To control macro-financial risks resulting from global imbalances, the CBRT adopted an inflation targeting regime in 2010 and formulated a new monetary policy strategy (Çetin, 2016: 85). Moreover, since 2010, the CBRT has started to diversify in monetary policy instruments by considering global negativities in financial systems. The interest rate corridor is one of the interest rate policy instruments applied after 2010 (Bayır & Abdioğlu, 2020: 3260).

Debt financing at an optimal level is among the factors used to maximize firm value. This means that the capital structure producing the highest firm value is the one that maximizes shareholder wealth (Ross et al., 2002: 426). Thus, the shareholders' return will increase with the optimal debt structure. As a corporate finance matter, as Welch (2004: 126) showed, there is also the opposite effect that stock returns are the dominant determinant of debt ratios. On the other hand, Chen et al. (2005: 252) determined that the M2 money supply affected positively, as an expansionary monetary policy indicator, hotel stock returns, and the unemployment rate. Other than these results, they determined that the term structure of the interest rate (the yield spread - SPD) has no significant impact on Taiwan's hotel stock returns.

Macroeconomic indicators, natural disasters, sports events, policy, and security-based events affect tourism companies' operations and direct tourism stock investors' expectations and reactions. Besides cost stickiness, international tourism demand affected the stock returns of tourism companies, especially hotels, motels, cruise lines, and restaurants and bars (Günay & Koşan, 2020: 700). According to the evidence provided in the literature, stock indices and stock markets react in different degrees and aspects to the direction of policy rates (see also Domian et al., 1996; Kyereboah-Coleman & Agyire-Tettey, 2008; Pilinkus, 2010).

Examining the effects of interest rate announcements on the tourism index based on the issues above will provide necessary guidance for policymakers and investors. The requirements of the real economy and the interest rate decisions taken contrary to the market expectations are expected to adversely affect the market value and return performances of tourism enterprises, which have high operational and financial risks. This case will affect the interest of investors in the industry shares in the medium and long term. It may cause the owner to change hands easily by revealing results that will minimize the firm value of the businesses in the short term. For this reason, examining the effects of CBRT interest rate decisions on tourism index returns will be helpful to the relevant parties. The event study method is proper when the results of any event on share prices are expected to be

immediately reflected. It is also a widely used method for measuring market efficiency (Ross et al., 2002; Elbir & Kandır, 2017). The global financial crisis in 2008-2009, which severely shook the economies of both developed and developing countries, brought about changes in the monetary policy of the CBRT. Since the end of 2010, the CBRT has designed a new monetary policy that can respond to shocks, in addition to traditional practices, to limit the adverse effects of the crisis (CBRT, 2021a). Since the central bank policy rate is accepted as the rate-determining the monetary policy stance, 1-week repo rate announcements are used in the present study. A significant amount of literature exists concerning the determinants of asset returns (e.g., Chen et al., 2005). Examining tourism stocks' reactions to central banks' downward and upward adjustment of interest rates will contribute to the literature.

Our paper aims to examine the impact of the downward and upward interest rates decisions announced by the CBRT on tourism-related stocks in Borsa İstanbul. In line with this purpose, the study is designed in six sections. The second section briefly explains the theoretical background, following a comprehensive introduction. The third section involves a literature review entitled related research. After the methodology is described in section four, the fifth section reports the findings. Lastly, section six provides a summary and conclusions.

2. Theoretical Framework

Finance theory has argued that many factors, including macro, micro, or unexpected events, directly or indirectly affect financial markets and asset prices. There are many alternative instruments that investors can invest in. For this reason, investors try to obtain information about the risk and return of investment alternatives when considering investment decisions (Van Horne, 2002: 49). Individuals invest in an asset that precisely delivers the greater return of two assets (Burton & Shah, 2013: 85). Investors are affected by various indicators regarding businesses and economic conditions when making a share buying or selling decision. The realized return on an investment or financial asset represents the total return during a specific period (Berk et al., 2012: 321). What matters in an investment decision is the expected return to meet the risk borne. Therefore, the expected return on an investment is defined as the return required to cover the risk the investment carries (Berk et al., 2012: 367).

The return obtained in a year the economy performed well may result from the conditions of the economic environment (Madanoglu et al., 2011: 408). The effects of macroeconomic factors on the share values and returns of tourism sub-sectors are similar. In addition to share returns, the tourism index is affected by macroeconomic factors. While the bond interest rate explains a significant portion of the tourism index, inflation, money supply, and industrial production also affect the tourism index, albeit lesser (Wong & Song, 2006: 31). Economic policy uncertainty is among the factors that affect the share returns of the tourism industry (Demir & Ersan, 2018: 853).

The economic conditions are influential in share performance. The reaction of the share market and returns of the tourism industry to the general economic conditions differs according to the market returns. An economic recession causes the returns of traditional hotel businesses and casino hotels to vary. During the recession, the share performance of casino hotels is lower than that of conventional hotels (Wei, 2013: 44-46). While the share performance and returns of the traditional hotel businesses, which have a high operational risk, are negative during recessions, the return performance is observed to be positive in the gaming and casino services and food and beverage services sectors, which have a relatively low operational risk (Gu, 1994: 24). The increase in the level of leverage and the decrease in liquidity, which increase the financial stake in the tourism industry, is a situation that occurs especially during crisis periods. Another macroeconomic factor affecting the share returns of tourism industry businesses is the exchange rate (Chan & Lim, 2011: 1601; Demir, Alıcı & Lau, 2017: 376), which is related to operational and financial risk. Along with the economic situation and conditions of the country, the relationship between the share values and the exchange rate in pre-financial crisis periods is evident. In addition, the relationship between oil prices and imports and the share values of the tourism industry becomes more prominent in times of crisis (Demir et al., 2017: 376).

The expected inflation affects the consumption and savings decisions of investors. Inflation also affects sales and costs for businesses. Therefore, considering the effects on both investors and companies, the expected inflation rate negatively affects the tourism industry's share returns (Barrows & Naka, 1994: 125; Gu, 1994: 24). However, it is observed that expected inflation does not have a significant effect on share returns in developing countries (Chen et al., 2005: 252). On the other hand, due to the pressure on consumer demand, actual inflation negatively affects the share returns (Al-Najjar, 2014: 347). Consumer sentiment in an economy has an impact on demand and spending. The effect of consumer sensitivity on-demand and expenditures is also valid for the tourism industry. Therefore, consumer sentiment changes also affect share returns (Singal, 2012: 518-520). In addition to consumer sentiment, the consumer confidence index affects hotel sales positively and business risk negatively due to its positive effect on demand, thus increasing business share returns (Chen, 2015: 63; Demir & Ersan, 2018: 852).

On the other hand, the country's monetary policy influences the share returns of tourism businesses. The discount rate, which is among the monetary policy instruments, negatively affects the nominal and real index returns of the travel services and leisure and recreation services sectors. Although the findings significantly impact the tourism industry index returns, especially during periods of contraction, the results are more limited in periods of expansion (Chen, 2012: 84, 97). Again, the money supply, one of the monetary policy instruments, influences returns (Singal, 2012: 518). It is stated (e.g., Barrows & Naka, 1994; Chen et al., 2005) that the effect of the money supply on share returns is positive regardless of the level of development of the countries. As Bernanke and Kuttner (2005) pointed out, the significant movements in excess returns associated with monetary policy changes reflect extra sensitivity or overreaction of stock prices to policy actions.

In addition to the effects of monetary policy, capital market characteristics are influential in the share returns of the tourism industry (Kim & Jang, 2012: 609; Chen, 2013: 137-138). Share returns, as well as the country's macroeconomic conditions, fund flows to the capital market. However, the capital market returns differ independently of the tourism development level of the countries. The most important effect is the high effect of investment funds' orientation to capital markets on enterprise share returns (Cave et al., 2009: 665). Market trends have different effects on tourism sub-sectors.

Along with market trends, the effects of monetary policy decisions on returns also differ (Chen, 2013: 138). Capital market efficiency has various impacts on the share returns of the tourism sub-sectors, such as food and beverage services, accommodation services, leisure and entertainment services, and airline passenger transportation (Leung & Lee, 2006: 370). Again, market efficiency and anomalies affect the share returns of restaurant businesses (Sheel & Wattanasuttiwong, 1998: 29). Achieving market efficiency and eliminating the aberration depends on the depth and breadth of the capital market. In this context, the increase in the shares of institutional investors, especially to create market depth, positively affects the tourism industry returns and contributes to market efficiency (Leung & Lee, 2006: 370). While the increase in the shares of institutional investors affects share returns, it contributes to the rise in the depth of the capital market and market efficiency (Chen et al., 2009: 157).

Besides the macroeconomic factors, various business-specific factors affect the return on shares in the tourism industry. Mergers and acquisitions, one of the steps taken towards growth in businesses, affect the stock performance of the acquiring companies. Mergers and acquisitions in the hospitality services sector cause abnormal share returns (Kwansa, 1994: 19; Yang et al., 2009: 583). While the size of a merger has a more significant effect on excessive returns in the short term, the effect disappears in the medium term (Yang et al., 2009: 583-584). Abnormal transaction volumes are observed before and after manager change announcements in the tourism industry. The returns before and after the change announcement are negative. In this respect, managerial change is perceived as bad news by the market and causes uncertainty (Bloom & Jackson, 2016: 157).

In addition to macroeconomic conditions, various natural, social, and terrorist events observed in countries influence the share returns of the tourism industry. Events such as sporting events, war and terrorism, epidemics, and natural disasters affect share returns. Mainly, terrorist incidents are expected to negatively affect the share returns of tourism businesses. However, the perception of terrorist incidents as a threat to the country and its effect on investor sentiment causes positive abnormal returns (Chang & Zeng, 2011: 172-173). While the low share performance observed after the earthquake and terrorist attacks is due to the loss of hotel sales revenues, the negative impact of the epidemic on hotel share returns is caused by the contraction in sales revenues and monetary policy (Chen, 2011: 211). The elections held in countries are another factor that affects tourism industry returns. Although it is an indicator of political risk, political developments such as presidential elections in developing countries positively affect share returns (Chen et al., 2005: 255).

Any legal regulation related to the tourism industry affects share returns. In particular, the legal regulations that affect companies' sales and activity performance positively impact the industry share returns. However, if the law does not cover the business and the geographical region in which the business operates, it does not affect returns (Johnson et al., 2015: 38-39). Therefore, the impact of such events and developments, which affect tourism demand, on returns varies according to the type and characteristics of the event (Zopiatis et al., 2018: 17).

Based on the findings obtained in the tourism industry under this heading, theories related to the subject can be explained in detail and the factors affecting the share value and return. Abnormal Returns (ARs) are also described in the sections below, directly related to the subject.

3. Literature Review

While it is known that central banks' monetary policy and actions are a considerable component used to steer the economy, asset prices are also one of the primary elements influenced by money market decisions. Several studies have investigated the effects of monetary policy actions on stock prices, as they cause stock market booms or investors' reactions. When we examined the studies on monetary policy, we did not find any investigation related to the tourism industry. Some studies investigating tourism are related to other factors such as terror risk, global event announcements, new entries into the industry, innovation investments, or political events. Within the scope of the study, the related literature is summarized under two headings: monetary policy and the stock market, and the tourism stock market.

3.1. Studies Related to Monetary Policy and the Stock Market

Investigation of the effects and relations of macroeconomic indicators on the stock market and returns is one of the main topics in capital market research. Since the development level of capital markets is related to economic conditions, studies focus on the macroeconomic variables besides micro-level firm and behavioural factors. Gökalp (2016: 1394), who focused on the effects of the interest rate corridor as an agent of policy rate decisions of the CBRT, showed that rises in the upper bound of the corridor decrease stock prices differing in industrial level and vice versa. These results can be attributed to two reasons: the first is the differences in the sectors' interest rate sensitivity, and the second is the differences in the sectors' stock market depths. Thus, the study demonstrated that the interest rate corridor boundary changes during monetary policy transmission can be transferred to the financial and capital markets and felt intensely. Uyar et al. (2016) investigated the relationship between the 5Y government bond interest rate and XU100 (BIST100), XU030 (BIST30), XUTUM (BIST All Shares), XUMAL (BIST Financials), and XBANK (BIST Banks). They showed that the reactions of indices differ from shocks in the interest rate. Tüzün et al. (2016) investigated the effect of the weighted average funding cost of the CBRT on the BIST100 index, and the results showed that the changes in the market

funding interest rates made by the CBRT do not have an effect of reducing volatility in the stock market. This can be interpreted as showing a divergence between the money market and the credit market in Turkey.

Özmen et al. (2017) examined the effects of the exchange rate, deposit interest rate, and inflation on stock returns in a sample from Turkey with Johansen cointegration, vector autoregression (VAR), and Granger causality. The study sample in which BIST100 index return was used covers the period from 1997M1 to 2017M3 monthly. It was found that there is a long-term relationship between variables. The results showed one-way causality from exchange rate to BIST100, bidirectional causality from BIST100 to interest rate, one-way reason from BIST100 to inflation, bidirectional causality from interest to exchange rate, and one-way causality from inflation to the interest rate in the study period. Based on the study findings, the authors asserted that an increase in interest rate would provide capital inflows to the country and decrease the exchange rate. Bayır and Abdioğlu (2020) examined the effects of the CBRT interest rate corridor policy tool, the asymmetric interest rate corridor, on different financial market indicators, such as BIST100, BIST overnight repo rate, and USD exchange rate. The study, in which VAR analysis was used, covers monthly data from 2010M5 to 2018M5, when the CBRT used the interest rate corridor instrument. According to the results, BIST100 was affected negatively by the lower bound of the corridor while affected positively by the upper bound. In addition to these and other various results, they showed that the dollar and BIST100 variables affect each other negatively. After the dramatic decline in tourist mobility with the COVID-19 pandemic (Günay et al., 2020), Ertuğrul et al. (2020) tested the effects of the negative, accurate interest rates during the pandemic. They showed that the interest rate and BIST100 differ dynamically and statically. The study also demonstrated the impulse-response analysis results in the adverse real interest rate shocks. The BIST100 responded negatively in the first period, and the response diminished in the second period. Although various studies examine the stock returns determinants in BIST, the one conducted by Poyraz et al. (2020) investigated the BIST100 stock returns reactions to increase and decrease interest rate decisions made by the CBRT. In the sample of 25 interest rate adjustment announcements between 2010 and 2020, BIST100 investors' reactions were examined using the event study method. According to the results, a decrease in policy rate has a significant negative effect on BIST100; thus, the interest rate decreases cause ARs.

In an international market sampling study, Domian et al. (1996) investigated the long-lived asymmetrical relationship between expected inflation, as proxied by Treasury bill (T-bill) interest rates, and stock returns. Their study analysed monthly time series by OLS over 1953M1 to 1992M12 in the US example. T-bill rates were modelled as positive and negative changes to consider asymmetries, and then time series regression was applied. The study showed that declines in interest rates are followed by increases in stock prices as much as a year later, resulting in excess returns. In contrast, increases in interest rates brought about small changes in stock returns.

Bilson et al. (2001) aimed to determine the macroeconomic variables of the emerging markets' stock market returns to test that local factors are the primary source of returns. For this purpose, the study incorporated 20 countries as emerging markets in Latin America, Asia, the Middle East, and Africa. The study's sample period was from January 1985 to December 1997, and the return data were calculated monthly. The study included the M1 money supply, consumer price index, industrial production index, exchange rate macroeconomic variables, and the MSCI World Index, which proxies global factors. The Newey-West LS procedure indicated that emerging stock market returns show minor sensitivity to the world market index. The exchange rate is the most influential variable commonly negative in twelve of the twenty markets. The money supply is positively significant in six markets, and the other two variables are critical in only one need. Furthermore, the results show that emerging market returns have similar sensitivities to most of these macroeconomic variables. According to principal component analysis, the commonality is particularly evident when regions are considered.

Several macroeconomic indicators' effects on Ghana Stock Exchange all-share index (GSI) performance was examined by Kyereboah-Coleman and Agyire-Tettey (2008) with the case study technique. The 62-quarterly data from 1991Q1 to 2005Q4 were analysed by time-series regression analysis. Inflation, real exchange rate, lending rate of deposit money banks, and the three-month T-bill interest rate were added to the model. The study's findings showed that the T-bill interest rate had a weak-significant positive effect on the stock market. It was seen that the rest of the analysed variables affected GSI performance at a level of 1%. The lending rate negatively affected GSI performance. This result showed that a rise in the lending rate increases the firm's costs, resulting in less attractiveness for investors. Another reason for this highly negative effect was that high lending rates and excessive government borrowing crowded out the private sector.

Another study investigated the relationships between inflation, credit growth, and stock market booms in the US and Japan (Christiano et al., 2010). It was observed that inflation is low during stock market booms and high credit growth. They claimed that the interest rate targeting rule destabilizes asset markets and perhaps the economy. It was proposed that the interest rate targeting rule should contain credit growth; thus, the modified rule would moderate volatility in the real economy and asset prices.

In the case of the Baltic states, Pilinkus (2010) investigated the impacts of various macroeconomic indicators on stock market performance in terms of the short and long run. The author investigated macroeconomic indicators' effects on stock performance via a four-stage research model. In the first stage, the meaningful macroeconomic indicators were selected; the second step included checking conformity and preparing the data for variables. The third step determined multidimensional relations in the short and long run and two-dimensional causality between macroeconomic indicators and the stock market index for the Baltic states. Lastly, in the fourth stage, relations between variables were interpreted from the viewpoint of investors. The study's findings revealed that the only statistically significant indicator was lagged values of the index for the Lithuanian, Latvian, and Estonian stock

market indices. In the short run, three of the ten macroeconomic indicators, i.e., GDP, imports, and state debt, do not influence the stock market index. The impact of the remaining macroeconomic indicators on the stock market index varies depending on the country. For example, Granger causality for the Latvian stock index (OMXR) shows that the short-term interest rate is a leading macroeconomic indicator. According to the VAR results, it is only significant with one- and two-legged periods for the OMXR in the short-term run. On the other hand, in terms of long-term relationships, the Johansen cointegration analysis results showed that all macroeconomic indicators have connections with the stock market indices in at least one country. The significant implication of the study is that the impact of macroeconomic indicators on the stock market index during the short and long run is different even in countries with similar economic development levels.

Assefa et al. (2017) examined the effects of interest rates on stock returns quarterly from 1999 to 2013 in 21 developed and 19 developing economies. In the study period, the mean of quarterly stock returns was 1.18% in the developed countries and 4.22% in the developing countries. Furthermore, economic growth was substantially lower, and interest rates fell in the developed economies; in contrast, interest rates rose in the developing economies. The dynamic panel data analysis reported the adverse effects of interest rates on stock returns in developed countries. In contrast, the world market portfolio (MSCI returns) was the sole determinant of the developing economies' returns. They partially attributed this effect of an interest rate change on stock returns to different monetary policies and the more mature capital markets inherent in developed economies.

Chadwick (2018) measured the dependence between emerging countries' financial markets to US monetary policy and monetary policy uncertainty using Patton's (2006) time-varying copula models. The study focused on the dependence of level differences in emerging countries on US monetary policy. The study sample consisted of 5535 daily data items between January 1, 1995, and the end of February 2017 in thirteen countries. The results showed significant differences between the emerging markets, especially in the Latin American region, which is more dependent on US monetary policy and uncertainty.

3.2. Studies Related to the Tourism Stock Market

Although there are many studies on tourism stock markets, various studies related to events affecting tourism stocks and returns are summarized below. In their research, Madanoglu et al. (2007) aimed to examine the effects of terrorist bomb attacks in Indonesia, Turkey, and Spain on the market values of hospitality and tourism businesses. As expected, it was found that the markets reacted negatively to terrorist acts, and the market reaction in Turkey was weaker than that in Spain. In the study conducted by Chang and Zeng (2011), it was determined that although terrorist incidents were expected to affect the share returns of tourism businesses negatively, terrorism was perceived as a threat to the country, and these incidents caused positive ARs due to their effect on the nation's spirit and investor sensitivities in the USA.

Demir and Ersan (2018) examined the effects of economic policy uncertainty on the share prices of tourism businesses whose shares are traded on the stock exchange in Turkey during the period 2002-2013. They found that the European and Turkish economic confidence indices had significant adverse effects on tourism index returns. The findings show that the returns of Turkish tourism businesses depend on national and international economic uncertainties. Günay (2020) investigated investor reactions to terrorist, political, and military events in the tourism industry. The July 15 coup attempt, three elections, and the Euphrates Shield (2016), Olive Branch (2018), and Peace Spring (2019) cross-border operations are the events examined that occurred in 2016 and after. By the event study method, returns were calculated with the mean-adjusted return model using the daily data of ten companies. The study's findings indicate that the July 15 coup attempt caused significant negative and the Olive Branch operation important positive average ARs on the event day. In the 21-day event window, it was determined that the coup attempt caused negative and the Presidential and Deputy General Election, the Istanbul Metropolitan Municipality Interim Election, and the Peace Spring operation caused the highest positive cumulative average ARs, in that order. According to the findings, as expected, it can be concluded that the investor sensitivity to terrorism and security risks in the tourism industry is higher than the political events.

Using the case study method, Sheel and Zhong (2005) examined the effects of cash dividend announcements on ARs in hospitality businesses from 1994-2002 in the USA. The findings they obtained show that cash dividends are perceived positively by investors in both the accommodation and food and beverage services sectors. The results reveal that ARs differ between the two industries, and a more conservative dividend policy is needed for accommodation businesses. Using the case study method, Chen, Jang, and Kim (2007) determined the effects of the 2003 SARS epidemic on Taiwan's hotel stock price movements. They determined that the epidemic caused significant negative cumulative average ARs in Taiwan's hotel shares.

Kim et al. (2009) examined the effect of information technology investment announcements on share prices in hospitality businesses using the case study method. The essential findings were that information technology investments and financial performance are positively related. However, it was observed that the abnormal return and the cumulative abnormal return trend showed a steady increase in the three-day event window. Szutowski and Bednarska (2014) aimed to determine the investor reaction to innovation announcements using the example of tourism companies listed on the Warsaw stock exchange using the case study method. Their study shows that innovation positively affects investors' valuation of tourism businesses. In addition, it was determined that the investors reacted most to the innovation for marketing, distribution, and external cooperation, and the highest reaction occurred within five days of the innovation announcement. Qin et al. (2017) examined the effects of mobile applications on share returns in accommodation and airline businesses with the case study method. The findings reveal that mobile applications positively affect stock returns, and the speed of adaptation to mobile applications does not significantly affect share value.

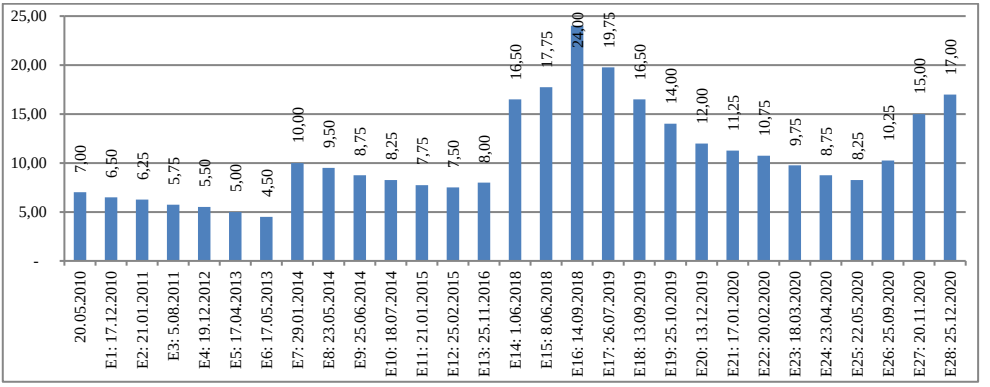
Şahin et al. (2017) aimed to determine the reactions of the stocks of companies included in the Borsa Istanbul Food, Beverage, and Tourism Indices to the crisis between Turkey and Russia resulting from the shooting down of a Russian fighter jet on November 24, 2015. According to the findings obtained from the research conducted with the event study method, the reactions of the businesses listed on the BIST Food and Beverage Index to the event were adverse, and the companies listed in the BIST Tourism Index had positive abnormal return values in the post-event period. It was also found that most of the Cumulative Average Abnormal Return values were negative. Çelik and Koç (2019) aimed to examine the effects of the same crisis using a case study involving the Tourism and Energy companies listed on Borsa Istanbul. In their research, in which the changes in the stock returns of 7 tourism and seven energy enterprises were examined, no statistically significant results were determined in the intervals discussed in the energy industry. According to the findings, BIST Tourism industry businesses exhibited positive cumulative abnormal returns (CARs) in the -5, +5 day interval. Still, there was no abnormal return in the other intervals before or after the event.

4. Methodology

The present study aimed to investigate the reactions of tourism-related companies' investors to the CBRT's interest rate announcements. For this purpose, the event study method was applied to the Borsa İstanbul (BIST) Tourism Index and BIST100 Market Index. We expect that tourism companies are sensitive to monetary policy actions due to high operating and financial risks. Although the effects of many macroeconomic factors and other events (Madanoglu et al., 2007; Demir et al., 2017; Günay, 2020) on stock returns have been investigated in the Turkish tourism industry, we encountered no study investigating monetary policy announcements. Thus, we aimed to examine the effect of policy rates announced by the CBRT on Borsa İstanbul (BIST) tourism stock returns. In addition, to compare the tourism index with the market and to see general market investor reactions to interest decisions, the BIST100 index was also examined in the study. The interest rate announcements were obtained from the CBRT (CBRT, 2021b) and indices data from the investing.com platform.

The CBRT changed the 1-week repo lending rate twenty-nine times between 2010M5 and 2020M12. In the years covering the research period, Turkey faced a series of unexpected events, such as the aircraft crisis with the primary tourism market Russia, the July 15 coup attempt, and cross-border operations, but none of the interest rate announcements overlapped with the event or estimation period and they are not expected to affect the study result by themselves. The first interest rate announcement in May 2010 is excluded due to investigating the increase and decrease effects. Those dates of changes in the repo rate are shown in Graph 1. In this date range, the CBRT decreased the lending rate twenty times and increased it eight times.

Graph: 1
The CBRT Lending Rate (1-Week Repo) Interest Rate Announcements



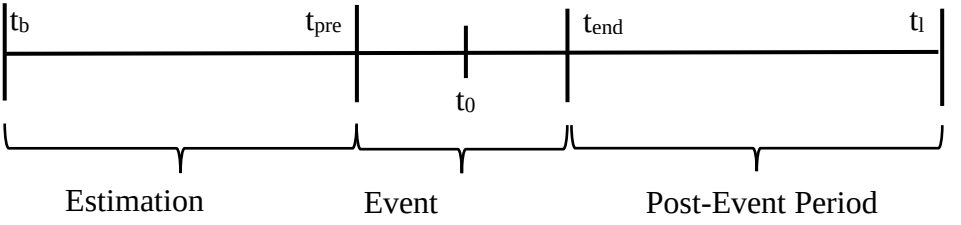
As seen in Graph 1, the CBRT funded the market mainly with a 10% interest rate. However, in June 2018 lending rate was raised to more than double. In 2018, a contractionary monetary policy was applied intensively, and the 1-week repo rate was decreased gradually until the third quarter of 2020. Interest rates on lending and deposits and market interest rates move in the same direction as policy rates. A downward adjustment to the policy rate will increase consumption and investments as the expansionary monetary policy action. Therefore, it is expected that tourism companies' returns will move in the opposite direction to policy rates on the announcement date. In the present study, the 1-week repo rate increase and decrease announcements were investigated in the context of investor reactions to monetary policy actions in Turkey. The event study method investigated investor reactions to policy rate announcements. The event study method and ARs are explained below.

4.1. Event Study

For many years, the event study technique has been used to examine the impact of a specific event or announcements on stock prices (Dolley, 1933; Bellemore & Blucher, 1959; Fama et al., 1969; MacKinlay, 1997). The mentioned events were generally related to stock split and dividend decisions. Fama (1970: 383) describes market efficiency as follows: "a market in which prices always 'fully reflect' available information is called 'efficient". Moreover, in that study, Fama (1970: 414) classified the efficient market into three forms: weak, semi-strong, and strong, with the adjustment of security prices depending on the nature of the information subset. One of the semi-strong form tests, in which costs are assumed to fully reflect all publicly available information (Fama, 1970: 415), is the event study. In other words, event studies provide a direct test of semi-strong form market efficiency. Systematically, nonzero ARs that persist after a particular type of event are inconsistent with the hypothesis that security prices adjust quickly to fully reflect new information (Brown & Warner, 1980: 205).

The events examined in the method are related to the information released to the market (Peterson, 1989: 36; MacKinlay, 1997: 36) through corporate releases such as financial reports, and corporate actions such as dividends, stock splits, acquisitions, and mergers (Fama et al., 1969; Borde et al., 1999; Sheel & Zhong, 2005; Elbir & Kandır, 2017). On the other hand, events may be related through governmental actions, finance- and economy-related news, and unanticipated events such as earthquakes and terrorist attacks (Chang & Zeng, 2011; Asteriou et al., 2013; Kaya et al., 2017; Çelik & Koç, 2019; Singh & Padmakumari, 2020).

Graph: 2
The Timeline for the Event Study



In the event study method, the timeline is divided into three periods, considered the "estimation period", "event window", and "post-event period" (Dyckman et al., 1984: 8; MacKinlay, 1997: 20; Beninga, 2008: 372). In the estimation period method, the term estimates expected returns of a stock or estimates parameters in a model (Peterson, 1989; 38; Armitage, 1995: 27; MacKinlay, 1997: 20). The event window is the period in which ARs are examined due to an event or announcement (Nezerwe, 2013: 66; Şahin et al., 2017: 478). Even if the event or report being considered is on a specific date, it is typical to set the event window length to be larger than one day (MacKinlay, 1997: 19). In many event studies, the post-event period is limited to the end of the event window. Occasionally, some studies use post-event window data to estimate the standard return model like the estimation period, aiming to increase the robustness of the normal market return (Dyckman et al., 1984: 7; MacKinlay, 1997: 20). Within this context, in Graph 2, t_b is the beginning date of the estimation period, t_{pre} is the first date examined for ARs, t_0 is the event date, t_{end} is the end date calculated for ARs, and, lastly, t_l is the last date of the post-event period. In addition, the post-event period is used to investigate recovery time (Mutan & Topcu, 2009: 17) or investigate longer-term company performance following the event (Beninga, 2008: 372).

In the present study, we selected t0 as the policy rate announcement date and t_{pre}^{end} is the three days before and after the t0 date, so the event window is seven days around the announcement, tb: is the date -103, and tpre-1 is the date -4, which means the estimation window covers 100 days between -103 and -4.

4.2. Abnormal Returns

As the efficient market hypothesis (Fama, 1970: 415) indicated, it is impossible to generate trading profits, and prices in efficient markets reflect all available information. From this point of view, abnormal return is the return when the trader can generate excess profits or losses compared to the normal return from a traded security. In other words, abnormal or excess return is the difference between observed return and appropriate given a particular return generating model (Peterson, 1989: 36). The models most commonly used to generate the expected return are listed in Table 1 (Brown & Warner, 1985: 7; Strong, 1992: 536-538; Armitage, 1995: 31).

Table: 1
Summary of Most Commonly Used Models to Calculate the Expected Return of Stock at Period t

Name of Model	$E(R_i)$	
Mean Adjusted (Average Return) Returns	$= \bar{R}_i$	Average returns for security i in a period
Market Adjusted (Index Model)	$= R_m$	Return on the market index
Market Model	$= (\alpha_i + \beta_i R_m)$	OLS based returns
Capital Asset Pricing Model (CAPM)	$= (R_f + \beta_i[E(R_m) - R_f])$	Risk-adjusted return
Fama-MacBeth Model	$= (\alpha_1 + \alpha_2 \beta_i)$	Two factors (mean & market) risk-adjusted return

As noted earlier, abnormal return is the difference between the observed and expected returns. Appraisal of the event's effect requires a measure of the abnormal return. In the event study logic, the abnormal return is the actual ex-post return of the security over the event window minus the normal return of the firm over the event window (MacKinlay, 1997: 15). Hence the abnormal return of a stock or index is calculated as shown in Eq. 1:

$$AR_{it} = R_{it} - E(R_{it}) \quad (1)$$

where

$$R_{it} = \frac{P_{it} - P_{it-1}}{P_{it-1}} = \frac{P_{it}}{P_{it-1}} - 1 \quad (2)$$

$$R_{it} = \ln\left[\frac{P_{it}}{P_{it-1}}\right] \quad (3)$$

P_{it} and P_{it-1} are the prices of security *i* at the end of the time *t*, and *t*-1, respectively. Any dividend gained from stock should be added to P_{it} in calculating observed return if there is any dividend. Eq. 2 is the calculation of arithmetic return (discrete returns), and in Eq. 3, the calculated returns are logarithmic, in which returns are calculated by natural logarithm and can be called log returns (Strong, 1992; Çıtak & Ersoy, 2016: 50). In return calculations, log returns are preferred for theoretical and empirical reasons. Log returns are analytically more tractable and more likely to be normally distributed (Strong, 1992: 535).

To test the hypothesis that an event has no impact on returns, the t-test is used. Where σ is the standard deviation of the estimation period returns, the test statistic for any event day t can be calculated as follows (Brown & Warner, 1985: 7; Evrim-Mandacı, 2003: 6;

Hendricks & Singhal, 2008: Ada et al., 2013; Elbir & Kandır, 2017: 23-24; Yıldırım et al., 2019: 416):

$$t = \frac{AR_t}{\sigma} \tag{4}$$

Reactions of the investor can be investigated by abnormal returns, whereas to determine the perception and absorption of shocks of the market and to see the progress of uncertainty that initially caused volatility, cumulative abnormal returns (CARs) should be calculated in the event window (MacKinlay, 1997: 21; Mutan & Topcu, 2009: 6; Elbir & Kandır, 2017: 23; Yıldırım et al., 2019: 416). CARs are calculated as shown in Eq. 5 (Brown & Warner, 1980: 228; Sakarya, 2011: 155; Elbir & Kandır, 2017: 23; Singh & Padmakumari, 2020: 15).

$$CAR_t = \sum_{t=1}^{t=n} AR_t \tag{5}$$

where CARt is the sum of the ARs from a beginning day "t" towards day n. Within the event window at different intervals (e.g., -3, +3; -5, +5; 0, +5), CARs are calculated to see the market reaction to the events.

The mean adjusted BIST Tourism and BIST100 indices' ARs were calculated separately for an interest rate increase and decrease announcements in line with this information. Pre- and post-announcement three days and the 100-day estimation period (days -103 through -4) were selected as the event window. CARs are calculated within the pre-and post-announcement and ±1 and ±3 days intervals. The findings of the ARs and CARs are reported. Lastly, to test for significance of the policy rate (1-week repo rate) increase and decrease announcements' effects on tourism and market indices, a one-sample t-test and Wilcoxon signed-rank test statistics were used. The results are reported in the subsequent section.

5. Findings

The effect of policy rate decrease announcements on the BIST Tourism index is reported in Table 2. Out of 20 interest rate decrease announcements in the tourism industry, only 3 showed statistically significant ARs on the event date. Events 3 and 22 ARs are important at the 5% level and event 20 at the 10% level. Those significant ARs are negative. This result shows that tourism investors' reactions to policy rate announcements are weak and indicate that the policy rate does not affect tourism index investors.

There are significant ARs in the event window only in 12 events at least in a day (-3, +3), while in 8 announcements, ARs are not substantial. At the same time, five events showed significant ARs on day +3 after the announcement, while four showed significant ARs on day -2. Those findings for interest rate decrease announcements' effect on the tourism index are random, indicating that the 1-week repo rate is not an underlying factor in ARs.

Table: 2
BIST Tourism Index ARs and CARs for 1-week Repo Decrease Announcements

t	E1	E2	E3	E4	E5	E6	E8	E9	E10	E11
AR Values of Events										
-3	.003	-.006	.000	**-.029***	-.008	.010	.007	-.006	.012	-.012
-2	-.005	-.007	-.017	**.031***	-.007	.016	.012	-.002	-.013	.003
-1	.012	**-.024***	**-.029****	-.012	-.010	-.011	.001	**-.027****	.000	.007
0	-.003	.009	**-.071***	.012	-.006	.000	.012	.000	-.014	.007
+1	**.015****	.002	**-.125***	.002	-.004	-.006	-.004	-.014	-.009	**.026****
+2	.011	-.013	-.021	-.004	.012	**.040***	.014	-.001	-.002	.002
+3	.006	**.035***	**-.049***	.001	.000	**.028***	**.031***	-.003	-.006	-.014
σ	*.009*	*.012*	*.017*	*.011*	*.013*	*.011*	*.015*	*.015*	*.016*	*.014*
CAR Values of Events										
-3, -1	.010	-.037	-.046	-.010	-.025	.015	.020	-.035	-.001	-.001
+1, +3	.031	.024	-.195	-.001	.008	.062	.041	-.018	-.018	.013
-1, +1	.023	-.013	-.225	.002	-.020	-.017	.009	-.040	-.024	.040
-3, +3	.038	-.004	-.312	.001	-.023	.077	.073	-.052	-.033	.019
t	**E12**	**E17**	**E18**	**E19**	**E20**	**E21**	**E22**	**E23**	**E24**	**E25**
AR Values of Events										
-3	-.001	.005	.012	.010	.001	-.015	.009	.040	.023	.042
-2	.005	-.001	.019	.022	.017	.015	-.028	**-.102***	-.023	.021
-1	.003	-.005	-.015	.010	-.013	-.029	-.007	**-.065****	.011	-.001
0	-.013	-.001	.015	-.005	**-.028****	-.013	**-.088***	-.028	.022	.012
+1	-.017	.012	-.006	.002	-.001	-.003	.034	-.028	.064	-.012
+2	-.014	-.007	-.001	.006	.009	**.043***	-.009	.030	.014	-.036
+3	.008	-.005	-.001	.014	-.009	-.013	-.005	**-.060****	-.009	.005
σ	*.015*	*.015*	*.014*	*.014*	*.015*	*.019*	*.021*	*.034*	*.040*	*.041*
CAR Values of Events										
-3, -1	.006	-.001	.016	.041	.005	-.029	-.026	-.127	.010	.062
+1, +3	-.023	.000	-.007	.023	-.001	.027	.020	-.058	.068	-.043
-1, +1	-.027	.006	-.005	.007	-.042	-.046	-.060	-.122	.096	-.001
-3, +3	-.029	-.002	.024	.059	-.024	-.016	-.093	-.213	.101	.030

** and ** are significant respectively at 5% and 10% level.*

The effect of policy rate increase announcements on BIST Tourism Index results is reported in Table 3. In the policy rate increase decisions of the CBRT, none of the ARs of the tourism index on the day of the announcement (t: 0) are statistically significant. Moreover, just one significant AR increases announcements (Event 27, t: -3). In the other findings, all event window and increase decisions ARs are insignificant even though the interest increase is considerably high. As seen in Tables 2 and 3, the standard deviations of the estimation window return in increase events are slightly higher than those of the decrease announcements except for some events (E23, E24, and E25). That suggests that tourism investors react to factors other than interest rates.

Table: 3
BIST Tourism Index ARs and CARs in 1-week Repo Increase Announcements

					AR Values of Event Windows			
t	**E7**	**E13**	**E14**	**E15**	**E16**	**E26**	**E27**	**E28**
-3	-.007	.021	.010	-.002	-.023	.004	**-.064***	-.003
-2	.010	-.008	.023	-.021	-.008	.027	-.008	-.016
-1	-.007	-.018	-.023	.010	.016	.015	-.015	-.025
0	-.026	.005	-.005	-.008	.004	-.023	.004	.016
+1	.002	.001	.002	.010	.013	-.016	.005	-.004
+2	-.003	.000	-.003	.012	-.001	-.028	.012	-.023
+3	.004	.004	-.022	.000	.002	.009	-.012	.010
σ	*.017*	*.024*	*.023*	*.022*	*.024*	*.026*	*.028*	*.027*
				CAR Values of Events				
-3, -1	.015	.006	-.004	.010	-.013	.046	-.087	-.043
+1, +3	.062	-.023	.004	-.023	.022	-.035	.005	-.017
-1, +1	-.017	-.027	-.013	-.027	.011	-.024	-.006	-.012
-3, +3	.077	-.029	.005	-.018	.000	-.012	-.078	-.043

** and ** are significant respectively at 5% and 10% level.*

A one-sample independent t-test and Wilcoxon signed-rank test are performed to examine the significance of the interest rate increase and decrease announcements' effects on BIST Tourism index ARs and CARs. The results obtained from the tests are given in Table 4. The null hypothesis in the t-test is that ARs and CARs means are equal to zero, and the alternative is not equal to zero, statistically. The Wilcoxon signed-rank tests show the median is statistically equal to zero and vice versa the alternative is not equal to zero.

Table: 4
Significance Tests for BIST Tourism ARs and CARs to Policy Rates Announcements

XTRZM		***Decrease in 1-Week Repo Rate***			***Increase in 1-Week Repo Rate***		
		T-Test (df: 19)		***Wilcoxon***	***T-Test (df: 7)***		***Wilcoxon***
	t	*t (p)*	*Mean Difference (Test Value = 0)*	*p*	*t (p)*	*Mean Difference (Test Value = 0)*	*p*
AR	-3	1.287 (.214)	.00485	.218	-.870 (.413)	-.00805	.575
	-2	-.346 (.733)	-.00220	.765	-.026 (.980)	-.00016	.889
	-1	***-2.505*** *(.022)*	-.01025	***.023***	-.962 (.368)	-.00580	.327
	0	-1.471 (.158)	-.00910	.313	-.829 (.435)	-.00428	.401
	+1	-.457 (.653)	-.00357	.526	.471 (.652)	.00149	.401
	+2	.826 (.419)	.00358	.526	-.827 (.435)	-.00421	.327
	+3	-.460 (.651)	-.00233	.601	-.144 (.890)	-.00055	.674
CAR	-3, -1	-.876 (.392)	-.00760	.550	-1.020 (.342)	-.01401	.263
	+1, +3	-.188 (.853)	-.00232	.526	-.473 (.651)	-.00326	.779
	-1, +1	-1.603 (.126)	-.02292	***.086***	-1.129 (.296)	-.00859	.263
	-3, +3	-.878 (.391)	-.01902	.823	***-2.161*** (.068)	-.02156	***.093***

According to the results of the t-test, the mean ARs only on the day before the interest rate decrease announcements are significantly different from zero. Except for this result, no ARs are substantially different from zero in decrease and increase announcements; thus, according to the t-test, the null hypothesis is confirmed. On the other hand, CARs' mean for

interest rate increase announcements is only significant in the ±3 days interval at the 10% level. Furthermore, the Wilcoxon test results are compatible with the t-test for ARs, while only CARs for ±1 days for decrease announcements and ±3 days for increase announcements are significant at the 10% level.

Table: 5
BIST100 Index ARs and CARSs for 1-week Repo Decrease Announcements

t	E1	E2	E3	E4	E5	E6	E8	E9	E10	E11
AR Values of Event Windows										
-3	.001	-.007	-.002	-.011	.004	.015	-.015	.002	-.010	.005
-2	-.017	-.001	-.007	.013	-.007	.007	.002	.015	.010	.010
-1	-.018	-.019	**-.033***	-.004	-.006	-.003	-.016	.020	-.006	-.008
0	-.015	.009	**-.053***	-.008	-.018	-.002	-.023	-.001	-.002	.004
+1	-.002	-.012	**-.073***	-.002	.001	**-.021****	.010	.006	-.013	-.003
+2	.019	-.002	.013	-.004	.007	.010	-.014	-.015	.003	.001
+3	.008	.011	**-.051***	.006	.007	**.020****	-.003	.005	-.002	.002
σ	*.012*	*.012*	*.012*	*.009*	*.011*	*.012*	*.016*	*.014*	*.013*	*.012*
CAR Values of Events										
-3, -1	-.034	-.027	-.042	-.002	-.008	.019	.037	-.007	.007	.013
+1, +3	.026	-.003	-.111	.000	.015	.009	-.003	-.013	-.001	.009
-1, +1	-.035	-.023	-.158	-.015	-.023	-.026	.025	-.022	-.007	.029
-3, +3	-.023	-.021	-.206	-.010	-.011	.026	.033	-.021	.010	.034
t	**E12**	**E17**	**E18**	**E19**	**E20**	**E21**	**E22**	**E23**	**E24**	**E25**
AR Values of Event Windows										
-3	-.012	.015	.006	.004	-.008	.007	.004	.021	.009	.023
-2	.008	.009	.007	.018	-.002	-.006	-.012	**-.084***	-.013	.003
-1	.003	-.014	.005	.004	.019	-.002	-.005	-.012	.007	.006
0	-.001	.008	.006	-.003	.002	.002	**-.032***	-.013	.007	.005
+1	-.011	.005	-.005	-.005	.005	.007	.009	-.004	.026	.020
+2	**-.022****	-.006	-.012	-.013	-.002	.005	-.019	.007	-.005	.005
+3	-.004	-.006	.004	-.004	-.006	-.009	-.005	-.018	.010	.003
σ	*.012*	*.015*	*.013*	*.014*	*.012*	*.012*	*.012*	*.016*	*.020*	*.020*
CAR Values of Events										
-3, -1	-.001	.010	.017	.026	.009	-.001	-.013	-.075	.003	.032
+1, +3	-.037	-.007	-.012	-.022	-.003	.004	-.016	-.014	.031	.028
-1, +1	-.009	.000	.005	-.004	.026	.007	-.028	-.030	.039	.031
-3, +3	-.039	.011	.011	.001	.008	.004	-.060	-.103	.040	.065

** and ** are significant respectively at 5% and 10% levels.*

The analysis results performed to compare tourism with the market (BIST100) and to see general market investor reactions to interest decisions are presented below. Tables 5 and 6 show that event date ARs for BIST100 are significant only for two decreased announcement events and one increased announcement event.

Table: 6
BIST100 Index ARs and CARSs for 1-week Repo Increase Announcements

	AR Values of Event Windows							
t	**E7**	**E13**	**E14**	**E15**	**E16**	**E26**	**E27**	**E28**
-3	-.015	.004	-.013	-.013	.009	.007	**-.027****	.011
-2	.002	-.010	-.011	-.011	.000	.005	**.026****	.003
-1	-.016	-.011	**-.031***	**.022****	.025	.014	.013	-.004
0	-.023	.003	-.014	**-.027***	.005	.003	.007	.003
+1	.010	.009	.002	.010	-.003	-.004	-.008	.005
+2	-.014	-.010	-.014	-.013	.007	.001	.004	-.019
+3	-.003	-.003	-.011	-.018	.020	.018	.002	.013
σ	*.019*	*.015*	*.012*	*.012*	*.016*	*.013*	*.015*	*.015*
	CAR Values of Events							
-3, -1	-.029	-.017	-.054	-.002	.034	.026	.012	.011
+1, +3	-.007	-.004	-.023	-.021	.025	.016	-.002	.000
-1, +1	-.029	.000	-.043	.004	.028	.014	.012	.005
-3, +3	-.059	-.019	-.092	-.049	.064	.045	.017	.014

** and ** are significant respectively at 5% and 10% levels.*

According to the t-test and Wilcoxon test results, decreased and increased policy rate announcements do not affect BIST100 index logarithmic returns. This result is valid for any event window date ARs and any tested interval CARs for increasing or decreasing announcements. These findings do not agree with those reported by Poyraz et al. (2020), particularly concerning the interest rate decrease announcement findings. Although their study calculated ARs with the exact estimation and event periods mean-adjusted model as ours, logarithmic returns were used in our study rather than arithmetic returns. Secondly, although not expected to impact, the number of events significantly was expanded, and the samples changed in our study.

Table: 7
Significance Tests for BIST100 ARs and CARs for Policy Rates Announcements

XU100		***Decrease in 1-Week Repo Rate***			***Increase in 1-Week Repo Rate***		
		T-Test (df: 19)		***Wilcoxon***	***T-Test (df: 7)***		***Wilcoxon***
	t	*t (p)*	*Mean Difference (Test Value = 0)*	*p*	*t (sig.)*	*Mean Difference (Test Value = 0)*	*p*
AR	-3	.626 (.539)	.00150	.681	-.134 (.897)	-.00071	.889
	-2	-.491 (.629)	-.00236	.654	.291 (.779)	.00129	.889
	-1	-1.124 (.275)	-.00333	.313	.474 (.650)	.00315	.575
	0	-1.624 (.121)	-.00581	.351	-.632 (.547)	-.00263	.779
	+1	-.421 (.679)	-.00183	.765	-.386 (.711)	-.00137	.999
	+2	-1.135 (.270)	-.00274	.332	-1.080 (.316)	-.00415	.263
	+3	-.731 (.474)	-.00222	.911	1.009 (.347)	.00527	.263
CAR	-3, -1	-.295 (.771)	-.00176	.823	-.222 (.831)	-.00234	.889
	+1, +3	-.897 (.381)	-.00602	.526	-.384 (.713)	-.00220	.484
	-1, +1	-1.162 (.260)	-.01081	.370	-.152 (.883)	-.00126	.674
	-3, +3	-.952 (.353)	-.01253	.794	-.513 (.623)	-.00984	.575

6. Conclusion

Most unexpected events such as financial crises, terrorist attacks, political events, outbreaks, or Olympic Games; international events; and positive news affect tourism stock returns and other macroeconomic factors (Chen et al., 2005: 254). Those events and reports give direction to investors' expectations and reactions; thereby, ARs can be observed in the market.

Central banks use monetary policy instruments to achieve their goals and steer the economy (Koç & Gürsoy, 2020: 443). The right monetary policies implemented by the central banks ensure that the country's economy is minimally affected by the adverse conditions that may occur and the current negative conditions (Çelik et al., 2015: 77). Investors monitor developments related to money and capital markets to earn on their investments; thus, they invest in less risk and more return securities. Monitoring changes in money and capital markets requires watching different macro- and micro-events that directly or indirectly affect assets. The policy rate as a monetary policy tool is a powerful instrument to achieve the target for central banks. Market interest rates are related to the policy rate; thus, it affects the investment and consumption decisions of individuals and the inflation and production levels in the country (Tanınmış-Yücememiş et al., 2015: 465).

On the other hand, macroeconomic developments guide the monetary policy decisions of central banks. Investors' expectations regarding the policy rate decision of the central bank arise before the meeting, and investment decisions are taken based on these expectations. From this point of view, the effect of policy rate increase and decrease announcements on BIST Tourism and BIST100 indices returns was examined. Thus, investor reactions to the CBRT monetary policy actions were aimed to be measured.

As noted, the tourism investors' reactions to policy rate adjustments are limited. The present study's findings showed that policy rate announcements had little effect on BIST Tourism and BIST100 returns. These findings support the study conducted by Kyereboah-Coleman and Agyire-Tettey (2008), indicating that the T-bill interest rate has a weak-significant positive effect on the stock market. Secondly, our study demonstrated that tourism investors reacted only to three decrease announcements, and none of the interest rate increase announcements caused ARs at day zero. It is known that an increase in the interest rate will provide capital inflows to the country (Özmen et al., 2017). However, our study does not support this case. This may have been because the proportional increase in interest rate was weak and did not meet the investors' expectations. Failure to meet the return expectations due to the investors' perceptions regarding the country and tourism industry risk will weaken the capital inflow despite the interest rate adjustment. On the other hand, Aktaş et al. (2018) pointed out that the BIST100 index has a significant relationship with the interest rate decisions implemented by various central banks (CBRT, the Federal Reserve, the European Central Bank, the Central Bank of India, the Central Bank of the Netherlands, the Central Bank of the Russian Federation, and the Central Bank of Brazil). While investor-specific factors explain the findings of their study, it is stated that this relationship

determined may indicate that BIST100 has a very diverse investor portfolio following monetary policy changes in various countries.

The one-sample t-test and Wilcoxon signed-rank test results for the tourism sample also indicated that decreases and increases in interest rates do not generate ARs on the event date. However, ARs at day t-1 are statistically significant for interest rate decreases. This result is meaningful as investors react according to their expectations in the capital markets. Another finding was that ARs on the market index differ much from tourism, significantly decreased announcements. However, the market index compared to tourism reacts more to interest rate increases. This is an expected result because financial sector shares in banks and financial institutions are included in the market index, affecting monetary policy decisions.

On the other hand, none of the ARs in the event window or CARs in different intervals are significant for the market index. This result is in contrast to what was reported by Poyraz et al. (2020), who stated that arithmetic returns were used, and events differed. Another study, conducted by Assefa et al. (2017), demonstrated that interest rates negatively affect stock returns in developed economies, whereas there is no significant effect in developing economies. The authors explain this result by the more mature capital markets in developed countries. In addition, because of the disinflation period and the efforts of the central banks of developed economies to counter the severe recession in the years 2008-2009, low-interest rates support consumer expenditures and corporate profits, thus leading to investors having positive expectations. The results of our study support the findings of the mentioned study, i.e., investors in Turkey, a developing country, do not react to the interest rate announcements on day zero. It can be concluded that the interest expectations of investors are shaped and priced before the announcement. As a result of Turkey's being a developing economy, its capital market does not have sufficient depth or width. The savings of the economic units (households, firms, and government) are not enough compared to the economy's borrowing needs. This causes investors to invest in money market instruments or speculative ones instead of capital market instruments.

Unanticipated news affects stock market investors' decisions. The present study investigated the effect of the CBRT policy rate, as one of the monetary policy instruments, on BIST Tourism and BIST100 indices between 2010 and 2020 with the event study method. For future studies, it can be suggested to explore different monetary policy tools or use other methods to analyse the effects of monetary policy on tourism stock returns. Another critical issue that needs to be investigated concerns the impact of the size of the policy rate adjustment rate in different countries and sectors. Alternatively, it can be examined with other relevant variables to identify direct or indirect effects, such as exchange rate, stock market depth, and investor attention. Lastly, the findings of the study should be evaluated within its limitations. The main rules were that logarithmic returns were used, and expected returns were determined using the mean-adjusted model. Moreover, the estimation period was selected as 100 days; different intervals could be chosen, like 20 or 250 days. However, examining the tourism stocks' reactions to central banks' interest rates' downward and upward adjustments is valuable to the restricted literature in this area.

References

Ada, S.S. et al. (2013), "Politik seçimler, referandumlar ve hisse senedi getirileri: İMKB örneği", *Finans Politik & Ekonomik Yorumlar*, 50(579), 23-40.

Aktaş, H. et al. (2018), "The effects of foreign central bank monetary policies on BIST100 index volatility", *Yönetim ve Ekonomi Dergisi*, 25(3), 749-756.

Al-Najjar, B. (2014), "Corporate governance, tourism growth and firm performance: Evidence from publicly listed tourism firms in five Middle Eastern countries", *Tourism Management*, (42), 342-351.

Armitage, S. (1995), "Event Study Methods and Evidence on Their Performance", *Journal of Economic Surveys*, 8(4), 25-52.

Assefa, T.A. et al. (2017), "Stock returns and interest rates around the World: A panel data approach", *Journal of Economics and Business*, 89, 20-35.

Asteriou, D. et al. (2013), "The London 2012 Olympic Games announcement and its effect on the London Stock Exchange", *Journal of Economic Studies*, 40(2), 203-221.

Barrows, C.W. & A. Naka (1994), "Use of macroeconomic variables to evaluate selected hospitality stock returns in the US", *International Journal of Hospitality Management*, 13(2), 119-128.

Bayır, M. & N. Abdioğlu (2020), "The effect of interest rate corridor on Turkish financial markets", *Journal of the Human & Social Science Researches*, 9(5), 3244-3263.

Bellemore, D.H. & L.H. Blucher (1959), "A study of stock splits in the post war years", *Financial Analysts Journal*, 15(5), 19-26.

Beninga, S. (2008), *Financial Modeling*, (3. edt.), London: The MIT Press.

Berk, J. et al. (2012), *Fundamentals of Corporate Finance*, (6. edt.), USA: Prentice Hall.

Bernanke, B.S. & K.N. Kuttner (2005), "What explains the stock market's reaction to Federal Reserve policy?", *The Journal of Finance*, 60(3), 1221-1257.

Bilson, C.M. et al. (2001), "Selecting macroeconomic variables as explanatory factors of emerging stock market returns", *Pacific-Basin Finance Journal*, 9(4), 401-426.

Bloom, B.A.N. & L.A. Jackson (2016), "Abnormal stock returns and volume activity surrounding lodging firms' CEO transition announcements", *Tourism Economics*, 22(1), 141-161.

Borde, S.F. et al. (1999), "Stock price reaction to dividend increases in the hotel and restaurant sector", *Journal of Hospitality & Tourism Research*, 23(1), 40-52.

Brown, S.J. & J.B. Warner (1980), "Measuring security price performance", *Journal of Financial Economics*, 8, 205-258.

Brown, S.J. & J.B. Warner (1985), "Using daily stock returns, The case of event studies", *Journal of Financial Economics*, 14, 3-31.

Burton, E.T. & S.N. Shah (2013), *Behavioral Finance, Understanding The Social, Cognitive, and Economic Debates*, New Jersey: John Wiley.

Cave, J. et al. (2009), "Supply-side investments: an international analysis of the return and risk relationship in the travel & leisure sector", *Tourism Management*, 30(5), 665-673.

CBRT (2021a), *Central Bank Monetary Policy Framework*, <https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Core+Functions/Monetary+Policy/Central+Bank+Monetary+Policy+Framework>, 30.11.2020.

CBRT (2021b), *1 Week Repo Rate*, <https://www.tcmb.gov.tr/wps/wcm/connect/EN/TCMB+EN/Main+Menu/Core+Functions/Monetary+Policy/Central+Bank+Interest+Rates/1+Week+Repo>, 30.11.2020.

Çelik, M.S. & R. Koç (2019), "Türkiye ve Rusya arasındaki uçak krizinin Borsa İstanbul (BİST) turizm ve enerji şirket hisselerine etkisi üzerine bir event study analizi", *Niğde Ömer Halisdemir Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 1(1), 1-15.

Çelik, Ş. et al. (2015), "TCMB para politikası kararlarındaki değişimlerin ve TCMB, FED ve ECB sözlü yönlendirmelerin BIST100 oynaklığı üzerindeki etkisinin analizi (2002-2014)", *Maliye ve Finans Yazıları*, (103), 51-83.

Cengiz, V. (2009), "Parasal aktarım mekanizması işleyişi ve ampirik bulgular", *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergi*si, (33), 225-247.

Çetin, M. (2016), "Türkiye Cumhuriyet Merkez Bankası (TCMB) para politikası uygulamalarının gelişimi", *Finansal Araştırmalar ve Çalışmalar Dergisi*, 8(14), 67-101.

Chadwick, M.G. (2018), "Dependence of the 'Fragile Five' and 'Troubled Ten' emerging market financial systems on US monetary policy and monetary policy uncertainty", *Research in International Business and Finance*, 49, 251-268.

Chan, F. & C. Lim (2011), "Tourism stock performance and macro factors", *19th International Congress on Modelling and Simulation*, Perth, Australia, 12-16 December 2011.

Chang, C. & Y.Y. Zeng (2011), "Impact of terrorism on hospitality stocks and the role of investor sentiment", *Cornell Hospitality Quarterly*, 52(2), 165-175.

Chen, M.-H. (2011), "The response of hotel performance to international tourism development and crisis events", *International Journal of Hospitality Management*, (30), 200-212.

Chen, M.-H. (2013), "Asymmetric response of hospitality stock prices to FED policy actions", *International Journal of Hospitality Management*, (33), 129-139.

Chen, M.H. et al. (2005), "The impact of macroeconomic and non-macroeconomic forces on hotel stock returns", *International Journal of Hospitality Management*, 24(2), 243-258.

Chen, M.-H. et al. (2007), "The impact of the SARS outbreak on Taiwanese hotel stock performance: An event-study approach", *Hospitality Management*, 26, 200-212.

Chen, M.-H. et al. (2009), "The impact of government weekend policy changes and foreign institutional holdings on weekly effect of tourism stock performance", *Journal of Hospitality & Tourism Research*, 33(2), 139-160.

Christiano, L. et al. (2010), "Monetary policy and stock market booms", *National Bureau of Economic Research Working Paper* 16402.

Çıtak, L. & E. Ersoy (2016), "Firmaların BIST sürdürülebilirlik endeksine alınmasına yatırımcı tepkisi: Olay çalışması ve ortalama testleri ile bir analiz", *Uluslararası Alanya İşletme Fakültesi Dergisi*, 8(1), 43-57.

Demir, E. & O. Ersan (2018), "The impact of economic policy uncertainty on stock returns of Turkish tourism companies", *Current Issues in Tourism*, 21(8), 847-855.

Demir, E. et al. (2017), "Macro explanatory factors of Turkish tourism companies' stock returns", *Asia Pacific Journal of Tourism Research*, 22(4), 370-380.

Dolley, J.C. (1933), "Characteristics and procedure of common stock split-ups", *Harvard Business Review*, 11(3), 316-326.

Domian, D.L. et al. (1996), "Expected inflation, interest rates, and stock returns", *Financial Review*, 31(4), 809-830.

Dyckman, T. et al. (1984), "A comparison of event study methodologies using daily stock returns: A simulation approach", *Journal of Accounting Research*, 22, 1-30.

Elbir, G. & S.Y. Kandır (2017), "Yatırım duyurularının pay getirileri üzerindeki etkisinin incelenmesi: Demir-çelik sektörü örneği", *Ekonomi Bilimleri Dergisi*, 9(1), 16-32.

Ertuğrul, H.M. et al. (2020), "Türkiye'de negatif reel faiz uygulamasının etkileri: seçilmiş temel göstergeler üzerine bir inceleme", *Proceeding of III. International Conference on Empirical Economics and Social Sciences (e-ICEESS'20)*, 309-323, 12-13 December, Balıkesir, Turkey.

Evrim-Mandacı, P. (2003), "İMKB'de genel seçimler öncesi ve sonrasında anormal fiyat hareketleri", *İMKB Dergisi*, 7(27), 1-16.

Fama, E. et al. (1969), "The adjustment of stock prices to new information", *International Economic Review*, 10(1), 1-21.

Fama, E.F. (1970), "Efficient capital markets: A review of theory and empirical work", *The Journal of Finance*, 25(2), Papers and Proceedings of the Twenty-Eighth Annual Meeting of the American Finance Association New York, N.Y. December, 28-30, 1969 (May, 1970), 383-417.

Ganev, G. et al. (2002), "Transmission mechanism of monetary policy in Central and Eastern Europe", *CASE Report No. 52*, Center for Social and Economic Research, Warsaw.

Gökalp, B.T. (2016), "Para politikası kararlarının hisse senetlerinin fiyatları üzerindeki etkileri", *S.D.Ü. İ.İ.B.F. Dergisi*, 21(4), 1379-1396.

Gu, Z. (1994), "Hospitality investment return, risk, and performance indexes: a ten-year examination", *Hospitality Research Journal*, 17(3), 17-26.

Günay, F. & L. Koşan (2020), "Maliyet yapışkanlığının pay getirisine etkisi: turizm alt sektörlerinde bir uygulama", *Muhasebe ve Vergi Uygulamaları Dergisi*, 13(3), 667-707.

Günay, F. (2020), "Terör, politik ve askeri olaylara Borsa İstanbul turizm sektörü yatırımcı tepkisi", *İzmir İktisat Dergisi*, 35(4), 839-856.

Günay, F. et al. (2020), "Assessing the short-term impacts of COVID-19 pandemic on foreign visitor's demand for Turkey: A scenario analysis", *Journal of Ekonomi*, 2(2), 80-85.

Gupta, R. & M. Reid (2020), "Macroeconomic surprises and stock returns in South Africa", *Studies in Economics and Finance*, 30(3), 266-282.

Hendricks, K.B. & V.R. Singhal (2008), "The effect of supply chain disruptions on shareholder value", *Total Quality Management & Business Excellence*, 19(7-8), 777-791.

Homer, S. & R.E. Sylla (2005), *A History of Interest Rates*, 4. Edt. New Jersey: John Wiley & Sons.

Johnson, M. et al. (2015), "The impact of authorization of the travel promotion act on hotel firm stock returns", *Cornell Hospitality Quarterly*, 56(1), 29-40.

Kanalıcı-Akay, H. & M. Nargeleçekenler (2009), "Para politikası şokları hisse senedi fiyatını etkiler mi? Türkiye örneği", *Marmara Üniversitesi İİBF Dergisi*, 27(2), 129-152.

Kaya, İ. et al. (2017), "15 Temmuz darbe girişiminin BİST 30/100 endeksleri üzerine etkisinin olay çalışması (Event Study) yöntemi ile analizi", *Uluslararası İktisadi ve İdari Bilimler Dergisi*, 3(2), 54-67.

Kim, J. & S.S. Jang (2012), "Comparative analyses of hotel REITs: examining risk-return and performance characteristics", *International Journal of Contemporary Hospitality Management*, 24(4), 594-613.

Kim, S.H. et al. (2009), "Effect of IT investment announcements on the market value of hospitality firms using event study methodology", *Tourism Economics*, 15(2), 397-411.

Koç, A. & S. Gürsoy (2020), "Amerikan merkez bankası FED'in para politikası araçları ve bağımsızlığı", *Econder Uluslararası Akademik Dergi*, 4(2), 421-447.

Kwansa, F.A. (1994), "Acquisitions, shareholder wealth and the lodging sector: 1980-1990", *International Journal of Contemporary Hospitality Management*, 6(6), 16-20.

Kyereboah-Coleman, A. & K.F. Agyire-Tettey (2008), "Impact of macroeconomic indicators on stock market performance: The case of the Ghana Stock Exchange", *Journal of Risk Finance*, 9(4), 365-378.

Leung, W.K. & T.S. Lee (2006), "Institutional investors and the Monday effect on tourism stocks", *International Journal of Hospitality Management*, 25(3), 348-372.

MacKinlay, A.C. (1997), "Event studies in economics and finance", *Journal of Economic Literature*, 35(March), 13-39.

Madanoglu, M. et al. (2007), "The impact of terrorist bombings on the market values of hospitality and tourism enterprises: Global evidence from Turkey, Spain, and Indonesia", *The Journal of Hospitality Financial Management*, 15(2), 49-60.

Madanoglu, M. et al. (2011), "Franchising and firm financial performance among US restaurants", *Journal of Retailing*, 87(3), 406-417.

Morgan, S. (2013), "Global EM Investor The Fragile Five", <http://graphics8.nytimes.com/packages/pdf/business/MorganStanleyFragileFive.pdf>, 28.01.2021.

Mutan, O. & A. Topcu (2009), "Türkiye hisse senedi piyasasının 1990-2009 tarihleri arasında yaşanan beklenmedik olaylara tepkisi", *Sermaye Piyasası Kurulu Araştırma Raporu*, Araştırma Dairesi: 22.06.2009 OCM 2009/01.

Nezerwe, Y. (2013), "Presidential elections and stock returns in Egypt", *Review of Business & Finance Studies*, 4(2), 63-68.

Özmen, M. et al. (2012), "Türkiye için döviz kuru, faiz ve enflasyonun hisse senedi getirileri üzerine etkileri", *Ç.Ü. İ.İ.B.F. Dergisi*, 21(1), 107-120.

Paramati, S.R. & R. Gupta (2013), "An empirical relationship between exchange rates, Interest rates and stock returns", *European Journal of Economics, Finance and Administrative Sciences*, (56), 168-181.

Peterson, P.P. (1989), "Event studies: A review of issues and methodology", *Quarterly Journal of Business and Economics*, 28(3), 36-66.

Pilinkus, D. (2010), "Macroeconomic indicators and their impact on stock market performance in the short and long run: The case of the baltic states", *Technological and Economic Development of Economy*, 16(2), 291-304.

Poyraz, E. et al. (2020), "Politika faizindeki değişimlerin Borsa İstanbul 100 endeksi üzerindeki etkisinin olay analizi ile incelenmesi", *International Review of Economics and Management*, 8(2), 201-220.

Qin, M. et al. (2017), "Mobile app introduction and shareholder returns", *Journal of Hospitality and Tourism Management*, 31, 173-180.

Ross, S.A. et al. (2002), *Corporate Finance* (6th edt.), USA: The McGraw-Hill Companies, Inc.

Şahin, E. et al. (2017), "Türkiye ve Rusya arasındaki "Uçak Krizinin" Borsa İstanbul gıda, içecek ve turizm endeksleri üzerine etkisi", *Business and Economics Research Journal*, 8(3), 473-485.

Sakarya, Ş. (2011), "İMKB kurumsal yönetim endeksi kapmasındaki şirketlerin kurumsal yönetim derecelendirme notu ve hisse senedi getirileri arasındaki ilişkinin olay çalışması (Event Study) yöntemi ile analizi", *ZKÜ Sosyal Bilimler Dergisi*, 7(13), 147-162.

Sheel, A. & N. Wattanasuttiwong (1998), "The relevance of financial leverage for equity returns of restaurant firms-an empirical examination", *The Journal of Hospitality Financial Management*, 6(1), 21-31.

Sheel, A. & Y. Zhong (2005), "Cash dividend announcements and abnormal returns in the lodging and restaurant sectors: An empirical examination", *The Journal of Hospitality Financial Management*, 13(1), 49-58.

Singal, M. (2012), "Effect of consumer sentiment on hospitality expenditures and stock returns", *International Journal of Hospitality Management*, (31), 511-521.

Singh, G. & L. Padmakumari (2020), "Stock market reaction to inflation announcement in the Indian stock market: A sectoral analysis", *Cogent Economics & Finance*, 8(1723827).

Strong, N. (1992), "Modelling abnormal returns: A review article", *Journal of Business Finance & Accounting*, 19(4), 533-553.

Szutowski, D. & M.A. Bednarska (2014), "Short-Term Effects of Innovations on Tourism Enterprise Market Value: Event Study Approach", in: F. Dias, S. Oliveira, J. Kosmaczewska & Â. Pereira (eds.), *New Trends in Tourism Research: A Polish Perspective*, (205-217), Portugal: GITUR.

Tanınmış-Yücememiş, B. et al. (2015), "Yeni bir para politikası aracı olarak faiz koridoru: Türkiye'de para politikası kurulu faiz kararlarının enflasyon üzerindeki etkisi", *Finansal Araştırmalar ve Çalışmalar Dergisi*, 7(13), 449-478.

Tüzün, O. et al. (2016), "TCMB ağırlıklı ortalama fonlama maliyeti'nin BIST100 üzerindeki etkisi", *Journal of Yaşar University*, 11(44), 263-277.

Uyar, U. et al. (2016), "Gösterge faiz oranı dalgalanmaları ve BIST endeksleri arasındaki ilişkinin eşanlı kantil regresyon ile analizi", *Ege Academic Review*, 16(4), 587-598.

Van Horne, J.C. (2002), *Financial Management and Policy* (12. edt.), New Jersey: Prentice Hall.

Wei, Y. (2013), "A comparative analysis of investment returns on hotels and casino hotels through the recession", *Unpublished Master Thesis*, Iowa State University.

Welch, I. (2004), "Capital structure and stock returns", *Journal of Political Economy*, 112(1), 106-131.

Wong, K.K.F. & H. Song (2006), "Do macroeconomic variables contain any useful information for predicting changes in hospitality stock indices?", *Journal of Hospitality & Tourism Research*, 30(1), 16-33.

Yang, J. et al. (2009), "Merger abnormal returns and payment methods of hospitality firms", *International Journal of Hospitality Management*, 28(4), 579-585.

Yıldırım, H.H. et al. (2019), "Vergi oranlarındaki indirimin sektör endeksleri üzerindeki etkisi: BİST'de bir araştırma", *Yeni Ekonomik Trendler ve İş Fırsatları*, 408-420.

Zopiatis, A. et al. (2018), "Tourism stocks in times of crisis: an econometric investigation of unexpected nonmacroeconomic factors", *Journal of Travel Research*, 1-21.

Sosyoekonomi

2022, Vol. 30(51), 119-136

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.06
Date Submitted: 20.01.2021
Date Revised: 01.01.2022
Date Accepted: 07.01.2022

The Linkages Between Democracy, Terrorism and Foreign Direct Investments in Developed and Developing Countries

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Gelişmiş ve Gelişmekte Olan Ülkelerde Demokrasi, Terörizm ve Doğrudan Yabancı Yatırımlar Arasındaki İlişkiler

Abstract

In this study, the linkages between political dynamics and foreign direct investment inwards to 118 developed and developing countries over the 2002-2017 period were analysed by the System GMM Panel Model to avoid the potential endogeneity problem. Findings indicate that the most vital positive determinant of FDI inwards is trade liberalization or trade openness. Also, there is no statistically significant relationship between countries' democratization and freedom level and FDI inwards. However, terrorism hinders FDI directly, especially in developed countries. Therefore, the decision of foreign investors might mainly depend on economic dynamics, which are related to them and host countries rather than politics.

Keywords : Democracy, Political Rights, Civil Liberties, Terrorism, Foreign Direct Investments, System GMM Panel Model.

JEL Classification Codes : C33, D74, F21.

Öz

Bu çalışmada, 2002-2017 döneminde 118 gelişmiş ve gelişmekte olan ülkeye yönelik yabancı doğrudan yatırımlarla politik dinamikler arasındaki ilişki, olası bir içsellik sorunundan kaçınmak adına, Sistem GMM Panel Modeli tahmicisine dayalı olarak analiz edilmiştir. Bulgular, bir ülkeye yönelik FDI girişlerinin en güçlü pozitif yönlü belirleyicisinin dış ticaret liberilizasyonu ya da dışa açıklık düzeyi olduğunu göstermektedir. Bununla birlikte, bir ülkenin demokratik gelişmişlik ve özgürlük seviyesiyle o ülkeye yönelik FDI girişleri arasında istatistiksel olarak anlamlı bir ilişkiye rastlanılmamıştır. Ancak, terör olaylarının FDI girişleri üzerinde, özellikle gelişmiş ülkelerde, saptırıcı etkiler yarattığı görülmektedir. Bu açıdan bakıldığında, yabancı yatırımcıların yatırım yeri kararlarında politik belirleyicilerden ziyade kendileri ve yatırım yapacakları ülkelere ilişkin iktisadi belirleyicilerin etkili olduğu anlaşılmaktadır.

Anahtar Sözcükler : Demokrasi, Politik Haklar, Sivil Özgürlükler, Terörizm, Doğrudan Yabancı Yatırımlar, Sistem GMM Panel Modeli.

1. Introduction

The lack of domestic savings makes it difficult to finance the physical capital accumulation, which is an important determinant of growth, especially in developing countries according to several studies (Shioji, 2001; Wang, 2002; Pereira & Roca-Sagales, 2003; Bronzini & Piselli, 2009; Adams, 2009; Önder et al., 2010; Kottaridi & Stengos, 2010; Su & Liu, 2016). Thus, foreign direct investments (FDI), which are expected to contribute to economic growth directly (Papanek, 1973; Balasubramanyam et al., 1996; Choe, 2003; Mello, 1999; Berthelemy & Demurge, 2000; Makki & Somwaru, 2004; Cuadros et al., 2006; Alguacil et al., 2011; Iamsiraroj & Ulubaşoğlu, 2015; Bandyopadhyay et al., 2014; Bezic et al., 2016) or indirectly by several channels such as domestic capital accumulation (De Mello, 1999), innovation and technology transfer (Su & Liu, 2016; Liu, 2008; Fedderke & Room, 2006; Baldwin et al., 2005; De Mello, 1999; Borensztein et al., 1998; Javorcik, 2004) and foreign trade (Sunde, 2017; Makki & Somwaru, 2004; Cuadros et al., 2004; Alguacil et al., 2002) are recognized as an alternative economic growth resource in FDI-led Growth Theory.

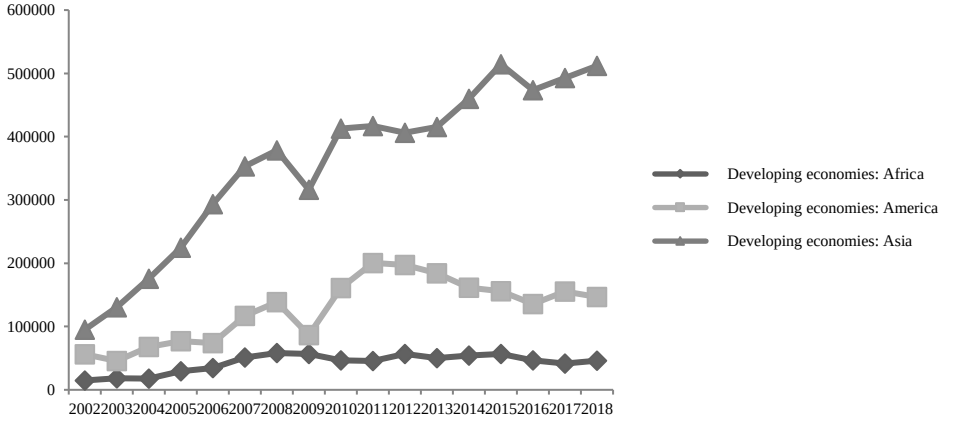
In other words, FDI inwards contributes to economic growth, especially in host countries, through technology transfer, promotion of domestic investments, and increase in human capital and capital accumulation (Goh et al., 2017). It is seen that many developing countries, which became liberal towards the late 1970s, turned out to be more open to FDI inputs (Mistura & Roulet, 2019: 6).

FDI inwards, concentrated in developed countries and reached a volume of $ 1.3 Trillion worldwide as of 2018[1], head towards developing countries with the 2008 Financial Crisis. According to UNCTAD data, only 28,1% of foreign direct investment inwards was directed to developing countries in the early 2000s (in 2002), while 70,1% were referred to developed countries. As of 2018, the share of foreign investments directed to developed countries decreased to 42,9%, whereas investments directed to developing economies increased to 54,4%. This shows that foreign investments tend to turn to develop countries significantly. Indeed, foreign investment inflow to developing economies seems to rise more than six times from 2002 to 2018.

Considering this situation from a geographical point of view, Asian economies are among the developing economies preferred by FDI with an average share of 68%; the American and African economies follow this with 24% and 8%, respectively. Besides, in Figure 1, from 2002 to 2018, the most significant change is observed in Asian economies, with increases observed more than five times.

[1] *According to the data of UNCTADSTAT, foreign direct investment inwards, which were around $ 590 Billion in 2002, reached around $ 1.3 Trillion by 2018.*

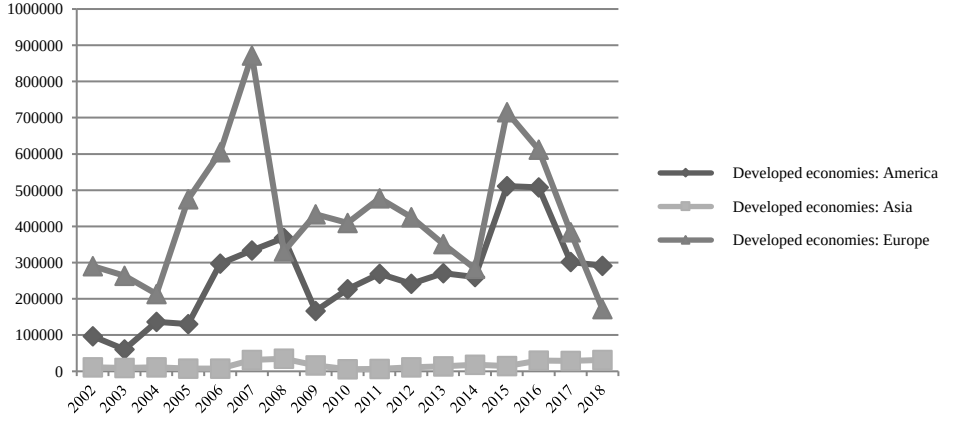
Figure: 1
Foreign Direct Investment Inwards in Developing Economies (Million $)



Source: United Nations Conference on Trade and Development (UNCTADSTAT).

Also, in Figure 2, there is a decrease in the capital towards developed European, American, and Asian economies during the crisis years.

Figure: 2
Foreign Direct Investment Inwards in Developed Economies (Million $)



Source: United Nations Conference on Trade and Development (UNCTADSTAT).

Considering the importance of FDI inwards on the economy (UNCTAD, 2004), it is necessary to identify the factors affecting the geographical and local distribution of FDI and

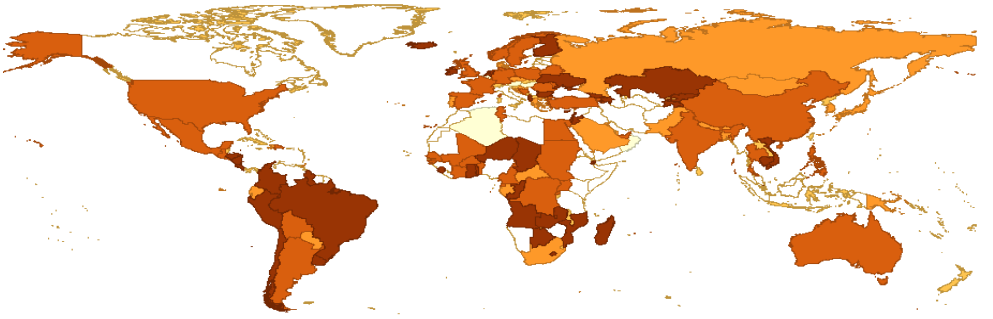
design policy patterns to provide more FDI entry to especially developing and poor countries.

The theoretical and empirical literature mainly examines the economic determinants of FDI inwards rather than political determinants. Because the perception that FDI inwards acts according to economic factors rather than socio-political factors is widespread in location preferences, in other words, it is evaluated that FDIs do not take into account the socio-political dynamics of countries. In contrast, they act only according to economic dynamics (Busse, 2003: 1).

However, when the spatial distribution of FDI inwards is analysed, it is understood that political dynamics such as democratic development level, political rights, and civil liberties can be the determining factors. Indeed, Figure 3 and Figure 4 show that there is a positive relationship between democracy and FDI, while Figure 5 shows that there is a negative relationship between terrorism and FDI[2].

Accordingly, in this study, FDI inwards to 118 developed and developing countries from 2002-2017 were analysed based on the System GMM Panel Estimator. Policy recommendations have been developed according to the findings obtained, especially for developing countries. In this respect, the contribution of this study to the inadequate literature is high.

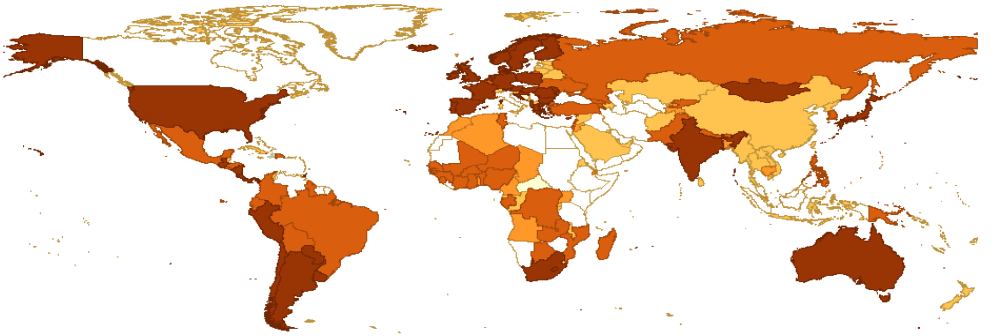
Figure: 3
The Regional Patterns of FDI Inwards (2015 - Million $)



Source: It is compiled from UNCTADSTAT statistics by the Authors.

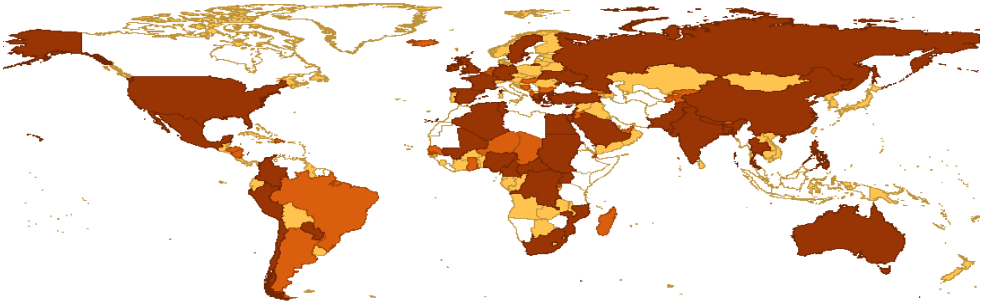
[2] *The color darkness degree indicates the higher statistic values.*

Figure: 4
The Regional Patterns of Democratization Values (2015)



Source: It is compiled from PolityIV statistics by Authors.

Figure: 5
The Regional Patterns of Terrorist Incidents (2015)



Source: It is compiled from GTD statistics by the Authors.

2. The Socio-Political Determinants of FDI Inwards

In literature, democratic development level, political rights, civil liberties, property rights, security and political stability are the main political determinants of FDI inwards.

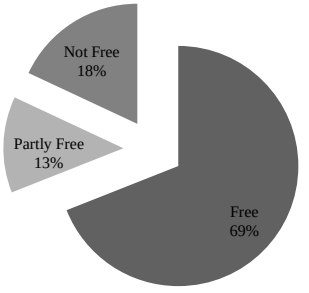
2.1. Democracy, Freedom and FDI Inwards

Democratic development level, political rights, and civil liberties are among the political factors that can effectively affect the geographical distribution of FDI inwards. In an economy, it is emphasized that as civil liberties and democratic values expand, especially economic freedoms which are the basis of intellectual property rights, markets will become more competitive, and economic growth will increase through investments (Feng, 1997; Çelik, 2018). The findings of many studies (Scully, 1988; Grier & Tullock, 1989; Özler & Rodrick, 1992; Helliwell, 1994; Alesina & Perotti, 1994; De Haan & Siermen, 1996;

Leblang, 1996; Mbaku & Kimenyi, 1997; Gupta et al., 1998; Kurzman et al., 2002; Busse 2003; Jensen, 2003; Blume & Voigt, 2008; Papaioannou & Siourounis, 2008; Narayan et al., 2011; Cervellatti & Sunde, 2011; Knutsen, 2013; Qureshi et al., 2015; Çelik & Karaçuka, 2018) in the literature also show that the direct and/or indirect effects of democracy on growth, through investment patterns, are favourable.

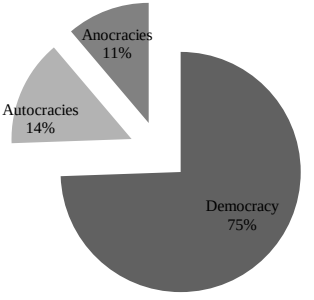
On the other hand, in Figure 6, between 2002-2017[3], it is seen that 69% of FDI inwards preferred to lead to free countries, while 31% of them preferred countries that are partially free and not free. On the other hand, in Figure 7, 75% of FDI inwards seemed to be directed to democratic governments, while 14% led to anocracy; and only 11% of them preferred to head to countries with autocratic status[4]. This situation gives a strong impression and supports that foreign investors prefer to lead to free and democratic countries.

Figure: 6
Distribution of 2002-2017 FDI Entries by Countries' Freedom Statutes



Source: Freedom House

Figure: 7
Distribution of 2002-2017 FDI Entries According to the Democracy Status of Countries



Source: Polity IV Project

2.2. Political Instability, Uncertainty and FDI's

Other policy determinants that can be effective in the geographical distribution of FDI inwards are security and political stability. The risk level of investments increases due to the loss of trust when the terrorist attacks reach dramatic levels in a country (Nitsch & Schumacher, 2004; Enders et al., 2006). Because, besides the direct effects of terrorism, such as loss of life and property, it also can cause negative indirect effects on macro sizes through channels such as investment, tourism, and migration in the medium and long term by damaging the environment of trust and stability. This situation shows that the region's political stability and risk level to be invested are important factors affecting investor decisions (Dunning, 1993; Moosa, 2002). From this point of view, terrorism is one of the

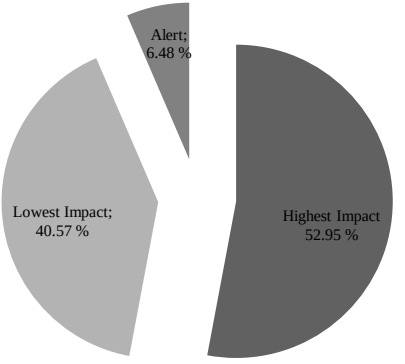
[3] *As of 2002-2017, FDI entries for 118 selected countries include 78,24% of entries worldwide. It can be said that the dimension of the sample chosen with this aspect is quite strong.*

[4] *The 2017 values of freedom and democracy indices are considered as the base.*

important factors that negatively affect FDI inwards (Global Business Policy Council, 2004) by causing a loss of investor confidence (Shahbaz et al., 2013; Bezic et al.). This is based on the Keynesian view that investment decisions can be influenced by psychological factors such as instability and uncertainty and economic and technical factors (Çelik & Karaçuka, 2018). Indeed, instability and uncertainties may sometimes become more important than market-based indicators such as tax incentives and interest rates (Pindyck, 1991), which may diverge investment decisions (Caballero & Pindyck, 1992).

The empirical literature suggests a negative relationship between political instability, uncertainty processes, and foreign direct investments. Some studies (such as Schneider & Frey, 1985; Ender & Sandler, 1996; Ramcharran, 1999; Blomberg & Mody, 2005; Enders et al., 2006; Lutz & Lutz, 2006; Kang & Lee, 2007; Abadie & Gardeazabal, 2008; Daniele & Marani, 2011; Bandyopadhyay et al., 2011; Omay et al., 2013; Filer & Stanisic, 2016; Rasheed & Tahir, 2012; Shahbazet al., 201; Kinyanjui, 2014; Ullah & Rahman, 2014; Akıncı et al., 2015; Bezic et al., 2016; Ali et al., 2017; Saeed et al., 2018; Efobi et al., 2018; Zakaria et al., 2019) support this situation. Besides, Powers and Choi (2012) stated that terrorist attacks targeting multinational companies adversely affect foreign direct investments. In contrast, the attacks that do not target the business world have no significant suppressive effect on FDIs. On the other hand, Bandyopadhyay et al. (2014) found that national terrorist incidents, rather than international terrorist incidents, had a greater divergent impact on FDI inwards.

Figure: 8
Distribution of FDIs According to the Levels of Countries Affected by Terrorism (2002-2017)



Source: It is compiled from the Global Terrorism Database and UNCTAD Statistics.

When Figure 8, which shows the FDI distribution in 2002-2017, is analysed, it is seen that the share of FDI to the countries where terrorism is at the alert stage is only 6,4%. This provides impressions that investments tend not to prefer problematic locations with high terrorism risks. On the other hand, only 41% preferred countries with no terrorism or low effects. However, considering that 53% of FDI entries are concentrated in countries highly affected by terrorism, it is difficult to maintain the general argument about the FDI's preference for the safe zone[5].

3. Methodology and Analysis

3.1. Data and Variables

In this study, the political determinants of foreign direct investment inwards to the 118 countries were analysed over the 2002-2017 period[6]. Table 1 includes detailed information about them. The percentage of net inwards of foreign direct investments in GDP was considered a dependent variable. On the other hand, democracy, civil liberties, political rights, and terrorism were deemed political determinants and control variables, such as GDP per capita, exchange rate, credit amount, and trade openness. Besides, dummy variables estimated by development level were used in alternative econometric models.

Table: 1
The Features of Variables

	Abbreviation	Explanation	Expected Sign	Source
Dependent Variable	FDI/GDP	Foreign direct investment, net inwards (% of GDP)		World Bank
Independent Variables	*CREDITGDP*	Domestic credit to the private sector by banks (% of GDP)	+	
	GDPPERCAPITA	GDP per capita (current Million US$)	+	
	EXCHANGERATE	Official exchange rate (LCU per US$, period average)	+	
	OPENNESS	Merchandise trade (% of GDP)	+	
	DEMOC	Democratization values of the countries	+	Polity IV
	CL	Civil Liberties values of the countries	-	Freedom House
	PR	Political Rights values of the countries	-	
	$TERROR_{INCIDENTS}$	The total number of terrorist attacks	-	GTD
	$TERROR_{CASUALTIES}$	The total number of fatalities and injuries due to terrorist attacks	-	
	$TERROR_{PROPERTY}$	The property damage due to terrorist attacks (Million $)	-	
	DEV_TERROR	It only includes terrorism indicators of developed countries, respectively, incidents, casualties, and property; others are equal to 0.	-	Authors
	UNDERDEV_TERROR	It only includes terrorism indicators of underdeveloped countries, respectively, incidents, casualties, and property; others are equal to 0.	-	
GDT: Global Terrorism Database				

The democracy variable, taken from the Polity IV Database, includes specific weighted forms of the competitiveness of political participation, the openness and

[5] *As in the GTD classification, countries with GTI values between 8-10 are classified as "alert", those between 4-8 are classified as "highest impact" and those between 0-4 are classified as "lowest impact" (IEP, 2017: 10).*

[6] *The 118 countries that make up the sample represent all countries at a high level in terms of dynamics such as FDI, democracy status, freedom status and terrorism. For example, as of 2017, 78,3% of FDI entries worldwide are directed towards these countries. In addition, it is seen that the distribution of the sample reflects all countries of the world at a high rate in terms of democracy status, freedom status and terrorism dimension.*

competitiveness of executive recruitment, and constraints on the chief executive. Indeed, it is an eleven-point scale from 0 to 10 representing the most democratic values (Marshall et al., 2013). Countries' civil liberties and political rights values, estimated by 25 indicators such as the electoral process, political pluralism, freedom of expression, and the rule of law, were used as an alternative proxy variable to the democracy variable. They are measured on a one-to-seven scale with one rating representing the freest and seven, the least free conditions (Freedom House, 2018: 3). Therefore, the expected signs of this variable are negative compared to the democracy variable sign.

The total number of terrorist incidents, the total casualties, and property damage due to terrorist attacks was taken into consideration as proxies to estimate frequency degree, human costs, and material costs of terrorism, respectively. These variables could be negative signs since terrorism represents an instability environment for new investments.

On the other side, considering the demand-side and supply-side determinants of foreign direct investments in the empirical literature; GDP per capita; official exchange rate; the percentage of merchandise trade on GDP as trade openness or liberation; and the percentage of domestic credit to the private sector by banks on GDP were used as control variables.

Firstly, the interest rates are the primary determinant of investments as a cost factor. Lower interest rates stand for broader credit advantages and higher profitability. However, host countries' credit amount capacity was considered an alternative financial proxy due to all countries' lack of interest rates data. Indeed, when increasing the credit amount in a country, interest rates, and of course, the costs of investments will decrease thanks to the abundance of money in financial markets. It can also be considered valid for the exchange rate. For instance, by the depreciation of the national currency or appreciation of the foreign currency, investments will decrease. An increase follows this in investments.

Secondly, GDP per capita refers to host countries' purchasing power and demand sustainability. Foreign investors might prefer countries with high purchasing power to establish demand sustainability towards their products. Indeed, economies with larger domestic markets tend to receive more FDI thanks to higher demand (Mistura & Roulet, 2019).

Finally, trade openness shows the integration degree between the host country and the others; it could positively encourage foreign investors. As the degree of trade openness of a country rises, the exchange of goods between signatory countries will increase. Therefore, trade policies are expected to affect FDI (Mistura & Roulet, 2019). Consequently, all economic control variables likely get positive coefficients.

3.2. Econometric Model and Analysis

System GMM Estimator was used in econometric analysis due to the potential endogeneity problem between foreign direct investment inwards, GDP per capita and

Exchange rate variables. It covers the 118 countries over the 2002-2017 period. Before the estimation, all variables must be stationarity to avoid spurious regression. Otherwise, R^2 and t statistics could be misleading in this situation, even if the sample is large (Gujarati & Porter, 2012).

Table: 2
The Results of Panel Unit Root Test (Levin, Lin & Chu)

Variables	***C***	***C+T***
CREDITGDP	-8.0301***	-12.1941***
GDPPERCAPITA	-6.2332***	-7.5439***
EXCHANGERATE	10.1258	-1.7549**
OPENNESS	-6.7757***	-12.8119***
DEMOC	4.2225	1.1523
D.DEMOC	3.8236	-18.9615***
PR	3.5012	2.5574
D.PR	-2.7093***	-1.5261*
CL	4.9058	2.0647
D.CL	0.1712	-21.3125***
$TERROR_{INCIDENTS}$	-3.5313***	-6.3387***
$TERROR_{CASUALTIES}$	2.9094	0.6482
$D.TERROR_{CASUALTIES}$	3.3589	-2.2544**
$TERROR_{PROPERTY}$	-1.9942**	-1.9236**

*Note: *, **, *** symbols stand for %10, %5, and %1 significance level, and C and C+T stands for values with constant and constant + trend, respectively.*

According to the results of Levin, Lin, and Chu Panel Unit Root Test presented in Table 2, DEMOC, PR, CL, and $TERROR_{CASUALTIES}$ variables are stationary at the first difference; while others are at level. Therefore, the econometric model could be represented as follows:

$$\ln \mathrm{FDI}_{it} = \beta_1(E_{it}) + \beta_2(P_{it}) + \beta_3(D_{it}) + u_{it} \quad (1)$$

$i = 1, 2, \ldots, 118$

$t = 2002, 2003, \ldots, 2017$

where FDI_{it} stands for the percentage of net inwards of foreign direct investments in GDP of country i at period t, E_{it} for a vector of economic determinants of FDI that are CREDITGDP, GDPPERCAPITA, EXCHANGE RATE, and OPENNESS variables; P_{it} for a vector of political determinants of FDI that are $TERROR_{INCEDENTS}$, $D.TERROR_{CASUALTIES}$, $TERROR_{PROPERTY}$, D.DEMOC, and alternatively, D.PR and D.CL variables. Finally, D_{it} for a vector of dummy variables that are related development level of countries with terrorism indicators.

3.3. Findings

The empirical analysis estimated twelve alternative econometric models using the System GMM Panel Model. Diagnostic results of all models, such as AR (1), AR (2), the number of instruments, Sargan and Hansen Test statistics, are suitable to evaluate the findings as scientifically confidential. According to the results of control variables in all models represented in Table 3 and Table 4, the strongest and positive determinant of foreign

direct investments is trade liberalization or trade openness. As the trade openness rises 10%, the foreign direct investment inwards to that country increases by 0,4%. On the other hand, GDP per capita and exchange rate are other statistically significant determinants of FDI inwards, although they have nominal size. Finally, findings indicate that there is not any meaningful relationship between domestic credit to the private sector by banks and FDI inwards.

Table: 3
Regression Results (System GMM Twostep)

118 Countries *2002-2017*		**Model** *(1)*	**Model** *(2)*	**Model** *(3)*	**Model** *(4)*	**Model** *(5)*	**Model** *(6)*
CREDİTGDP		0.005	0.005	0.007	0.006	0.005	0.006
GDPPERCAPITA		0.00009***	0.0009***	0.0008***	0.00009***	0.00009***	0.00009***
EXCHANGERATE		*0.0005***	0.0005**	0.005**	*0.0005***	0.0005**	0.0005**
OPENNESS		0.04***	0.05***	0.04***	0.04***	0.05***	0.04***
D.DEMOC		**0.03**	**0.003**	**0.002**	**0.003**	**0.03**	**0.003**
$TERROR_{INCIDENTS}$		**-0.001***					
$D.TERROR_{CASUALTIES}$			**0.00002**				
$TERROR_{PROPERTY}$				**-0.01****			
$DEV\_TERROR_{INCIDENTS}$					**-0.02****		
$UNDERDEV\_TERROR_{INCIDENTS}$					**0.004**		
$DEV\_TERROR_{CASUALTIES}$						**-0.001***	
$UNDERDEV\_TERROR_{CASUALTIES}$						**0.001**	
$DEV\_TERROR_{PROPERTY}$							**-0.04*****
$UNDERDEV\_TERROR_{PROPERTY}$							**0.14**
cons. (c)		-0.15	-0.22	-0.15	-0.17	-0.24	-0.19
AR (1)		**-1.18** **[0.238]**	**-1.18** **[0.238]**	**-1.18** **[0.238]**	**-1.18** **[0.238]**	**-1.18** **[0.238]**	**-1.18** **[0.238]**
AR (2)		**0.93** **[0.354]**	**0.93** **[0.354]**	**0.93** **[0.354]**	**0.93** **[0.353]**	**0.93** **[0.353]**	**0.93** **[0.354]**
N. of Instruments		**13**	**13**	**13**	**14**	**14**	**14**
Nobs		**1770**	**1770**	**1770**	**1770**	**1770**	**1770**
Sargan Test **(Overid. Restrictions Test)**		**4.02** **[0.674]**	**4.07** **[0.667]**	**3.83** **[0.699]**	**3.82** **[0.701]**	**4.02** **[0.674]**	**3.64** **[0.726]**
Hansen Test **(Overid. Restrictions Test)**		**4.73** **[0.354]**	**4.76** **[0.575]**	**4.57** **[0.599]**	**4.46** **[0.614]**	**4.75** **[0.576]**	**4.44** **[0.617]**
GMM Instruments for levels	Hansen	4.62 [0.328]	4.68 [0.321]	4.45 [0.348]	4.41 [0.353]	4.69 [0.321]	4.38 [0.357]
	Difference	0.10 [0.949]	4.76 [0.575]	0.12 [0.941]	0.05 [0.975]	0.06 [0.970]	0.06 [0.969]
gmmgdppercapita, collapse lag (2 4)	Hansen	2.62 [0.270]	2.62 [0.270]	2.56 [0.278]	2.61 [0.271]	2.58 [0.275]	2.62 [0.269]
	Difference	2.11 [0.715]	2.14 [0.711]	2.01 [0.733]	1.85 [0.763]	2.17 [0.705]	1.82 [0.769]
gmmexchangerate, collapse lag (2 4)	Hansen	1.17 [0.557]	1.17 [0.557]	1.09 [0.580]	0.99 [0.610]	1.30 [0.523]	1.00 [0.607]
	Difference	3.56 [0.470]	3.56 [0.470]	3.48 [0.480]	3.47 [0.482]	3.45 [0.485]	3.44 [0.487]
iv other variables	Hansen	2.28 [0.321]	2.28 [0.321]	1.01 [0.604]	0.12 [0.731]	0.45 [0.503]	0.02 [0.898]
	Difference	2.45 [0.654]	2.45 [0.654]	3.57 [0.468]	4.35 [0.501]	4.30 [0.507]	4.43 [0.490]

*Note: *, **, *** symbols stands for %10, %5 and %1 significance level respectively, statistics in square parentheses [ ] stands for p-values.*

On the other side, base model findings indicate that foreign investors do not mainly consider the political environment of host countries in their investment decision process. There is no statistically significant relationship between the democratization level and FDI. It is also the same for political rights and civil liberties. Therefore, the decision of foreign investors might mainly depend on economic dynamics related to them and host countries

rather than politics. However, terrorism is a determinative factor in this process due to its economic impacts on profitability and the economic environment. According to the findings, terrorism hinders FDI. However, it is only valid for the economic costs of terrorist attacks rather than the human cost dimension. Results indicate that rises in property damage levels of terrorist attacks affect the FDI ten times more than the total number of terrorist incidents. With a 10% rise in property damage due to terrorist attacks, foreign direct investment inwards decrease by 1%. Also, foreign direct investment decisions are not related to the human cost of terrorist attacks. Finally, at the development level, these restriction effects of terrorism on FDI only occur in developed countries rather than underdeveloped countries.

Table: 4
Regression Results - Alternative Base Models (System GMM Twostep)

118 Countries *2002-2017*		**Model** *(7)*	**Model** *(8)*	**Model** *(9)*	**Model** *(10)*	**Model** *(11)*	**Model** *(12)*
CREDİTGDP		0.005	0.005	0.005	0.005	0.006	0.006
GDPPERCAPITA		0.00009***	0.00009***	0.0009***	0.0009***	0.0008***	0.0008***
EXCHANGERATE		*0.0005***	*0.0005***	0.0005**	0.0005**	0.005**	0.005**
OPENNESS		0.04***	0.04***	0.05***	0.05***	0.04***	0.04***
D.PR		**0.27**		**0.27**		**0.28**	
D.CL			**0.05**		**0.04**		**0.06**
$TERROR_{INCIDENTS}$		**-0.001***	**-0.001***				
$D.TERROR_{CASUALTIES}$				**0.00002**	**0.00002**		
$TERROR_{PROPERTY}$						**-0.01****	**-0.01****
cons. (c)		-0.14	-0.14	-0.21	-0.21	-0.14	-0.14
AR (1)		-1.18 [0.238]	-1.18 [0.238]	-1.18 [0.238]	-1.18 [0.238]	-1.18 [0.238]	-1.18 [0.238]
AR (2)		0.93 [0.354]	0.93 [0.354]	0.93 [0.354]	0.93 [0.354]	0.93 [0.354]	0.93 [0.354]
N. of Instruments		13	13	13	13	13	13
Nobs		1770	1770	1770	1770	1770	1770
Sargan Test (Overid. Restrictions Test)		4.08 [0.666]	4.02 [0.674]	4.13 [0.659]	4.08 [0.666]	3.89 [0.691]	3.84 [0.698]
Hansen Test (Overid. Restrictions Test)		4.86 [0.562]	4.88 [0.559]	4.89 [0.558]	4.91 [0.555]	4.70 [0.582]	4.74 [0.577]
GMM Instruments for levels	Hansen	4.75 [0.314]	4.78 [0.311]	4.81 [0.307]	4.83 [0.305]	4.58 [0.333]	4.62 [0.329]
	Difference	0.11 [0.948]	0.11 [0.948]	0.08 [0.961]	0.08 [0.962]	0.12 [0.940]	0.13 [0.938]
gmmgdppercapita, collapse lag (2 4)	Hansen	2.74 [0.255]	2.81 [0.246]	2.74 [0.254]	2.81 [0.245]	2.68 [0.262]	2.77 [0.251]
	Difference	2.12 [0.714]	2.07 [0.722]	2.15 [0.709]	2.10 [0.717]	2.02 [0.732]	1.98 [0.740]
gmmexchangerate, collapse lag (2 4)	Hansen	1.17 [0.556]	1.29 [0.525]	1.20 [.0549]	1.32 [0.517]	1.09 [0.579]	1.19 [0.552]
	Difference	3.68 [0.451]	3.60 [0.463]	3.69 [0.450]	3.59 [0.464]	3.61 [0.461]	3.55 [0.470]
iv other variables	Hansen	1.34 [0.511]	2.01 [0.366]	1.58 [0.453]	1.24 [0.538]	1.02 [0.601]	0.44 [0.804]
	Difference	3.51 [0.476]	2.87 [0.580]	3.31 [0.508]	3.67 [0.452]	3.69 [0.450]	4.31 [0.366]

*Note: *, **, *** symbols stands for %10, %5 and %1 significance level respectively, statistics in square parentheses [ ] stands for p-values.*

3.4. Robustness Check

The findings do not change when considering political and civil liberties as an alternative to democracy. The alternative model findings in Table 4 also show no statistically significant relationship between political rights, civil liberties, and FDI inwards. There is no change in other economic and political variables; therefore, the findings appear to be robust.

4. Conclusion

In addition to direct contributions to physical capital accumulation, FDIs are seen as an important source of growth, especially for underdeveloped and developing countries, through channels such as technology transfer, innovation spread, and increased exports. It is seen that FDI currents, which started to grow in the 1980's worldwide, have reached serious volume since the 2000s. For this reason, underdeveloped and developing countries experiencing resource scarcity problems want to increase their FDI inwards. This situation requires determining the factors affecting the local and geographical distributions of FDI inwards.

When the local and geographical distributions of FDI inwards are analysed, it is seen that they started to prefer developing countries rather than developed economies, especially since the 2000s. It is widely accepted that economic factors such as cheap labour, tax advantage, and market size are behind these preferences. However, recently, political dynamics, such as democratic development level, civil liberties, political rights, and political stability, constitute a basis for intellectual property rights, can also impact FDI inwards. Indeed, foreign investors' significant and long-term investments in a country are closely related to their cost-effectiveness analysis as well as their perception of investment safety. From this point of view, it is foreseen that foreign investors will tend to prefer democratic and free countries with intellectual property rights and countries with low levels of political uncertainty and instability. Approximately 75% of the FDI inwards, realized during the 2002-2017 period, were seen to lead democratic countries; and similarly, it was seen that 70% was concentrated on countries with free status.

In this study, the effects of political factors on the geographical distribution of FDI inwards, under the sample of 118 developed and developing countries in 2002-2017, were investigated. In the wake of this study, it was found that foreign investors act only according to economic factors, and they tend to neglect political factors that are democratic development and freedom levels (civil liberties and political rights) of the countries they invest in. Furthermore, it has been found that terrorist incidents with high material damage rather than human dimension have a diverging effect on FDI inwards. It is seen that these diverting effects appear to be mostly in developed countries compared to developing ones.

From this point of view, it can be put forward that developing countries need to prioritize economic policies towards increasing international integration and liberalization, especially to attract foreign resources. Moreover, FDI inwards to any country will increase when the fight against terrorism is succeeded. In this regard, countries experiencing high-level terrorism must establish common policies in the battle against terrorism by establishing pacts, etc. In this direction, they should handle the economic, political, social, and psychological causes of terrorism to overcome problems effectively.

References

Abadie, A. & J. Gardeazabal (2008), "Terrorism and the World Economy", *European Economic Review*, 52, 1-27.

Adams, S. (2009), "Foreign Direct Investment, Domestic Investment, and Economic Growth in Sub-Saharan Africa", *Journal of Policy Modelling*, 31, 939-949.

Akıncı, M. et al. (2015), "The Impact of Terrorism on Direct and Indirect Investments: How Much Are Foreign Aids Compensative?", *AU SBF Journal*, 70(1), 1-33.

Alesina, A. & R. Perotti (1994), "The Political Economy of Growth: A Critical Survey of the Recent Literature", *The World Bank Economic Review*, 8(3), 351-371.

Alguacil, M. et al. (2002), "Foreign Direct Investment, Exports, and Domestic Performance in Mexico: A Causality Analysis", *Economics Letters*, 77(3), 371-376.

Alguacil, M. et al. (2011), "Inward FDI and Growth: The Role of Macroeconomic and Institutional Environment", *Journal of Policy Modelling*, 33(2011), 581-496.

Ali, H. et al. (2017), "How Terrorism Affects Foreign Direct Investment in Pakistan?", *International Journal of Economics and Financial Issues*, 7(3), 625-631.

Balasubramanyam, V.N. et al. (1996), "Foreign Direct Investment and Growth in EP and is Countries", *The Economic Journal*, 106(434), 92-105.

Baldwin, R. et al. (2005), "Multinationals, Endogenous Growth, and Technological Spillovers: Theory and Evidence", *Review of International Economics*, 13(5), 945-963.

Bandyopadhyay, S. et al. (2011), "Foreign Direct Investment, Aid, and Terrorism: An Analysis of Developing Countries", *Federal Reserve Bank of St. Louis Working Paper* No. 2011.

Bandyopadhyay, S. et al. (2014), "Foreign Direct Investment, Aid, and Terrorism", *Oxford Economic Papers*, 66(1), 25-50.

Berthelemy, J-C & S. Demurge (2000), "Foreign Direct Investment and Economic Growth: Theory and Application to China", *Review of Development Economics*, 4(2), 140-155.

Bezic, H. et al. (2016), "The Impact of Terrorism on the FDI of the EU and EEA Countries", *Zbornik radova Ekonomskog fakulteta u Rijeci: časopis za ekonomsku teoriju i praksu*, 34(2), 333-362.

Blomberg, S.B. & A. Mody (2005), "How Severely Does Violence Deter International Investment?", *Claremont Colleges Working Papers* No.2005-01.

Blume, L. & S. Voigt (2007), "The Economic Effects of Human Rights", *Kyklos*, 60(4), 509-538.

Borensztein, E. et al. (1998), "How Does Foreign Direct Investment Affect Economic Growth?", *Journal of International Economics*, 45(1), 115-135.

Bronzini, R. & P. Piselli (2009), "Determinants of Long-Run Regional Productivity with Geographical Spillovers: The Role of R&D, Human Capital and Public Infrastructure", *Regional Science and Urban Economics*, 39(2009), 187-199.

Busse, M. (2003), "Democracy and FDI", *HWWA Discussion Paper* No.220.

Caballero, R.J. & R. Pindyck (1992), "Uncertainty, Investment, and Industry Evolution", *National Bureau of Economic Research* WPNo.4380.

Çelik, N. & M. Karaçuka (2018), "Bölgesel Kalkınmanın İktisadi Politiği: Siyasal Çoğulculuk ve Yatırım İlişkisi", *Sosyoekonomi*, 26(37), 243-255.

Cervellati, M. & U. Sunde (2011), "Democratization, Violent Social Conflicts, and Growth", *IZA DP* No. 5643.

Choe, J.I. (2003), "Do Foreign Direct Investment and Gross Domestic Investment Promote Economic Growth?", *Review of Development Economics*,7(1), 44-57.

Cuadros, A. et al. (2004), "Openness and Growth: Re-Examining Foreign Direct Investment, Trade and Output Linkages in Latin America", *The Journal of Development Studies*, 40(4), 167-192.

Daniele, V. & U. Marani (2011), "Organized Crime, the Quality of Local Institutions and FDI in Italy: A Panel Data Analysis", *European Journal of Political Economy*, 27, 132-142.

De Haan, J. & C.L.J. Siermann (1996), "New Evidence on the Relationship between Democracy and Economic Growth", *Public Choice*, 86(1-2), 175-198.

De Mello, L.R. (1999), "Foreign Direct Investment-led Growth: Evidence from Time Series and Panel Data", *Oxford Economic Papers*, 51, 133-151.

Dunning, J.H. (1993), *Multinational Enterprises and the Global Economy*, UK: Edward Elgar Publishing Company.

Efobi, U. et al. (2018), "Aid, Terrorism, and Foreign Direct Investment: Empirical Insight Conditioned on Corruption Control", *International Economic Journal*, 32(4), 610-630.

Enders, W. & T. Sandler (1996), "Terrorism and Foreign Direct Investment in Spain and Greece", *Kyklos*, 49(3), 331-352.

Enders, W. et al. (2006), "The Impact of Transnational Terrorism on US Foreign Direct Investment", *Political Research Quarterly*, 59(4), 517-531.

Fedderke, J.W. & A.T. Romm (2006), "Growth Impact and Determinants of Foreign Direct Investment into South Africa, 1956-2003", *Economic Modelling*, 23, 738-760.

Feng, Y. (1997), "Democracy, Political Stability, and Economic Growth", *British Journal of Political Science*, 27(3), 391-418.

Filer, R.K. & D. Stanisic (2016), "The Effect of Terrorist Incidents on Capital Flows", *Review of Development Economics*, 20(2), 502-513.

Freedom House (2018), "Democracy in Crisis", Freedom in the World *2018 Report*.

Global Business Policy Council (2004), *FDI Confidence Index*, A.T. Kearney, Alexandria, Virginia.

Goh, S.K. et al. (2017), "Re-Examining Foreign Direct Investment, Exports, and Economic Growth in Asian Economies Using a Bootstrap ARDL Test for Cointegration", *Journal of Asian Economics*, 51, 12-22.

Grier, K.B. & G. Tullock (1989), "An Empirical Analysis of Cross-National Economic Growth 1951-80", *Journal of Monetary Economics*, 24(2), 259-276.

Gujarati, D.N. & D.C. Porter (2012), *Basic Econometrics*, İstanbul: Literatür Publication.

Gupta, D.K. et al. (1998), "Democracy, Economic Growth, and Political Instability: An Integrated Perspective", *The Journal of Socio-Economics*, 27(5), 587-589.

Helliwell, J.F. (1994), "Empirical Linkages between Democracy and Economic Growth", *British Journal of Political Science*, 24(2), 225-248.

Iamsiraroj, S. & M.A. Ulubaşoğlu (2015), "Foreign Direct Investment and Economic Growth: A Real Relationship or Wishful Thinking?", *Economic Modelling*, 51, 200-213.

IEP (2017), *Global Terrorism Index 2017 Measuring and Understanding the Impact of Terrorism*, Institute for Economics & Peace.

Javorcik, B.S. (2004), "Does Foreign Direct Investment Increase the Productivity of Domestic Firms? In Search of Spillovers through Backward Linkages", *American Economic Association*, 94(3), 605-627.

Jensen, N.M. (2003), "Democratic Governance and Multinational Corporations: Political Regimes and Inflows of Foreign Direct Investment", *International Organization*, 57(3), 587-616.

Kang, S.J. & H.S. Lee (2007), "Terrorism and FDI Flows Cross-country Dynamic Panel Estimation", *Journal of Economic Theory and Econometrics*, 18(1), 57-77.

Kinyanjui, S. (2014), "The Impact of Terrorism on Foreign Direct Investment in Kenya", *International Journal of Business Administration*, 5(3), 148-157.

Knutsen, C.H. (2013), "Democracy, State Capacity, and Economic Growth", *World Development*, 43, 1-18.

Kottaridi, C. & T. Stengos (2010), "Foreign Direct Investment, Human Capital, and Non-Linearities in Economic Growth", *Journal of Macroeconomics*, 32, 858-871.

Kunimitsu, Y. (2005), *Direct and Indirect Effects of Public Infrastructure on Regional Economic Growth in Japan: An Application of the Covariance Structure Model by Geographical Classification Area*, (No. 1365-2016-108126).

Kurzman, C.R. et al. (2002), "Democracy's Effect on Economic Growth: A Pooled Time-Series Analysis 1951-1980", *Studies in Comparative International Development*, 37(1), 3-33.

Leblang, D.A. (1996), "Property Rights, Democracy and Economic Growth", *Political Research Quarterly*, 49(1), 5-26.

Liu, Z. (2008), "Foreign Direct Investment and Technology Spillovers: Theory and Evidence", *Journal of Development Economics*, 85(1-2), 176-193.

Lutz, J.M. & B.J. Lutz (2006), "International Terrorism in Latin America: Effects on Foreign Investment and Tourism", *Journal of Economic, Social and Political Studies*, 31, 321-338.

Makki, S. & A. Somwaru (2004), "Impact of Foreign Direct Investment and Trade on Economic Growth: Evidence from Developing Countries", *American Journal of Agricultural Economics*, 86(3), 795-801.

Marshall, M.G. et al. (2013), *Polity IV Project Political Regime Characteristics and Transitions, 1880-2012*, Center for Systemic Peace, April 2013.

Mbaku, J.M. & M.S. Kimenyi (1997), "Macroeconomic Determinants of Growth: Further Evidence on the Role of Political Freedom", *Journal of Economic Development*, 22(2), 119-132.

Mistura, F. & C. Roulet (2019), "The Determinants of Foreign Direct Investment: Do Statutory Restrictions Matter?", *OECD Working Papers* on International Investment 2019/01.

Moosa, I.A. (2002), *FDI: Theory, Evidence, and Practice*, New York: Palgrave.

Narayan, P.K. et al. (2011), "Does Democracy Facilitate Economic Growth or Does Economic Growth Facilitate Democracy? An Empirical Study of Sub-Saharan Africa", *Economic Modelling*, 28(3), 900-910.

Nitsch, V. & D. Schumacher (2004), "Terrorism and International Trade: An Empirical Investigation", *European Journal of Political Economy*, 20(2), 423-433.

OECD (2019), "The determinants of Foreign Direct Investment: Do statutory restrictions matter?", *OECD Working Papers* on International Investment 2019/01.

Önder, A.Ö. et al. (2010), "The Impact of Public Capital Stock on Regional Convergence in Turkey", *European Planning Studies*, 18(7), 1041-1055.

Özler, S. & D. Rodrick (1992), "External Shocks, Politics and Private Investment: Some Theory and Empirical Evidence", *NBER Working Paper* 3960, 1-25.

Papaioannou, E. & G. Siourounis (2008), "Democratization and Growth", *The Economic Journal*, 118(532), 1520-1551.

Papanek, G.V. (1973), "Aid, Foreign Private Investment, Savings and Growth in Less Developed Countries", *The Journal of Political Economy*, 81(1), 120-130.

Pereira, A.M. & O. Roca-Sagalés (2003), "Spillover Effects of Public Capital Formation: Evidence from the Spanish Regions", *Journal of Urban Economics*, 53(2), 238-256.

Pindyck, R.S. (1991), "Irreversibility, Uncertainty, and Investment", *Journal of Economic Literature*, 29, 1110-1148.

Powers, M. & S.W. Choi (2012), "Does Transnational Terrorism Reduce Foreign Direct Investment? Business-Related versus Non-Business-Related Terrorism", *Journal of Peace Research*, 49(3), 407-422.

Qureshi, A. et al. (2015), "Democracy, Regime Stability, and Economic Growth: A Cross Country Dynamic Panel Data Analysis", *Journal of Economics and Sustainable Development*, 6(12), 23-44.

Roodman, D. (2009), "How to Do xtabond2: An Introduction to 'Difference' and 'System' GMM in Stata", *Stata Journal*, 9(1), 86-136.

Saeed, A. et al. (2018), "Taxing Impact of Terrorism on Global Economic Openness of Developed and Developing Countries", *Acta Oeconomica*, 68(3), 311-335.

Schneider, F. & B. Frey (1985), "Economic and Political Determinants of Foreign Direct Investment", *World Development*, 13, 161-175.

Scully, G.W. (1988), "The Institutional Framework and Economic Development", *Journal of Political Economy*, 96(3), 652-662.

Shahbaz, M.A. et al. (2013), "Impact of Terrorism on Foreign Direct Investment in Pakistan", *Archives of Business Research*, 1(1), 1-7.

Shioji, E. (2001), "Public Capital and Economic Growth: A Convergence Approach", *Journal of Economic Growth*, 6, 205-227.

Sunde T. (2017), "Foreign Direct Investment, Exports, and Economic Growth: ADRL and Causality Analysis for South Africa", *Research in International Business and Finance*, 41, 434-44.

Ullah, I. & M. Rehman (2014), "Terrorism and Foreign Direct Investments in Pakistan: A Cointegration Analysis", *Journal of Economics and Sustainable Development*, 5(15), 233-242.

UNCTAD (2004), *World Investment Report*, United Nations Conference for Trade and Development, Geneva.

Wang, E.C. (2002), "Public Infrastructure and Economic Growth: A New Approach Applied to East Asian Economies", *Journal of Policy Modelling*, 24, 411-435.

Zakaria, M. et al. (2019), "Effect of Terrorism on Economic Growth in Pakistan: An Empirical Analysis", *Economic Research-EkonomskaIstraživanja*, 32(1), 1794-1812.

Sosyoekonomi

2022, Vol. 30(51), 137-148

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.07
Date Submitted: 14.05.2021
Date Revised: 10.12.2021
Date Accepted: 08.01.2022

Is It Possible to Examine the Suicide Phenomenon from A Social and Economic Perspective?

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İntihar Olgusunu Sosyal ve Ekonomik Açıdan İncelemek Mümkün Mü?

Abstract

Suicidal behaviour, like other human behaviours, is a result of socioeconomic and psychological conditions. The research, it is aimed to examine the relationship between socioeconomic factors such as economic income levels, social status and quality of life, and suicidal behaviour in comparison with classical and Bayesian negative binomial regression models. The findings showed that suicidal behaviour increased due to the decrease in economic status and inequality of income distribution among young people. At the same time, it has been determined that employment and divorce rates reduce suicidal behaviour. As a result, it was determined that social and economic factors affected suicidal behaviour in the 15-24 age group, and solutions were suggested.

Keywords : Suicide Case, Bayesian Analysis, Social and Economic Factors.

JEL Classification Codes : C11, O12, J13.

Öz

İntihar davranışı tıpkı diğer insan davranışları gibi psikolojik olduğu kadar sosyoekonomik koşulların da bir sonucudur. Araştırmada, ekonomik gelir düzeyleri, sosyal statü ve yaşam kalitesi gibi sosyoekonomik faktörler ile intihar davranışı arasındaki ilişkinin klasik ve bayes tipi negatif binom regresyon modelleriyle karşılaştırmalı olarak incelenmesi hedeflenmektedir. Bulgular, gençlerdeki ekonomik durum düşüşüne ve gelir dağılımı adaletsizliğine bağlı olarak intihar davranışını arttığını göstermiştir. Aynı zamanda istihdam ve boşanma oranının da intihar davranışını azalttığı tespit edilmiştir. Sonucunda, 15-24 yaş grubundaki intihar davranışının sosyal ve ekonomik faktörlerden etkilendiği belirlenerek çözüm önerilerinde bulunulmuştur.

Anahtar Sözcükler : İntihar Vakası, Bayesyen Analiz, Sosyal ve Ekonomik Faktörler.

1. Introduction

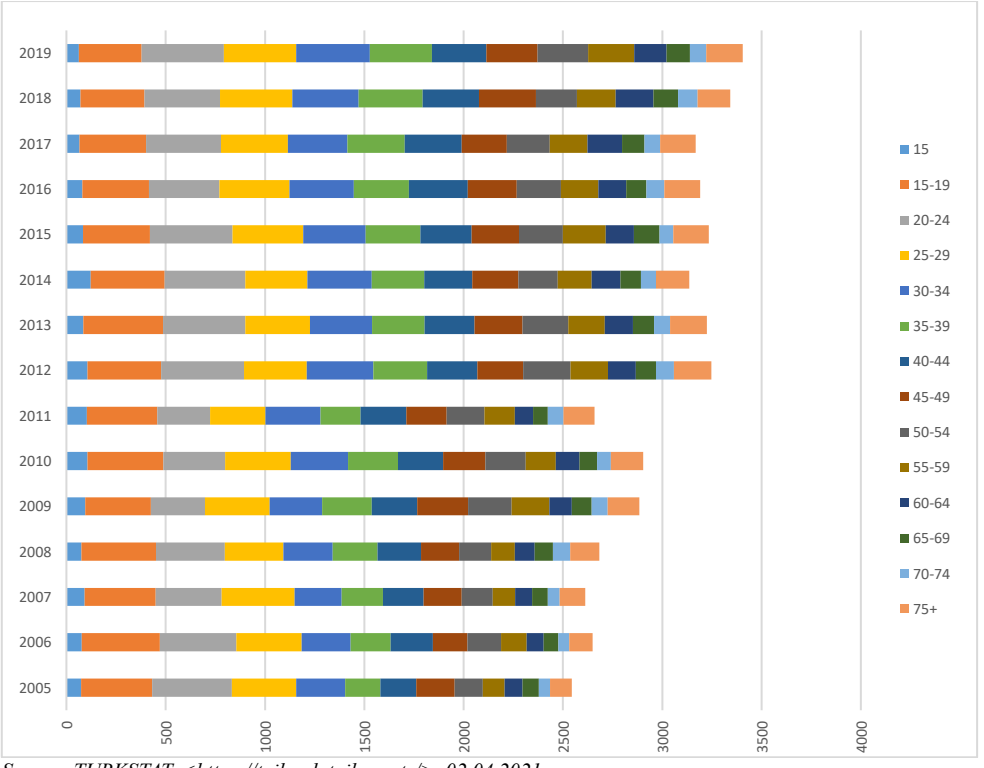
The suicide phenomenon, as a cause of death, is described as a health problem both individually and socially, this phenomenon, sociology, psychology, psychiatry, etc. Many disciplines handle it. Suicide, which is among the preventable causes of death, is behaviour individuals perform to end their lives for many reasons. According to Durkheim, who argued suicide as a social phenomenon and carried out the first comprehensive research on suicide in this field, expressed that "every death event that is a direct or indirect result of a positive or negative action by the deceased will result in death" (Durkheim, 2002: 25). Explaining and addressing the cause of suicide with just psychological factors is an unscientific understanding (Tatlılıoğlu, 2012: 141) since suicide is a complex phenomenon due to its complex nature, resulting from many factors, such as religious, cultural, socioeconomic, sociological, biological, etc. (Taşdelen, 2006: 34). Indeed, in the last century, the suicidal behaviour itself and its antecedents have been examined within many disciplines, for instance, psychiatry, psychology, medicine, and sociology (Şevik et al., 2012: 219). However, due to this complex nature, interdisciplinary studies are required.

According to Durkheim, suicide statistics tend to increase in economic crisis and economic prosperity. He explained this increase as an individual response to uncertainty and change. This uncertainty and rapid economic change lead individuals to irregularity (Durkheim, 2002: 25). Therefore, Durkheim stated that social antecedents of suicidal behaviour could be found. He tried to prove the argument that social factors should be examined, instead of mental illnesses, as reasons for suicide (İnce, 2007: 34). Based on that argument, it is possible to say that social and economic factors are important determinants of suicidal behaviours. Based on official statistics, characteristics such as a low level of education and suffering from unfavourable economic conditions may cause individuals to commit suicide-Turkey from those conditions. The increasing trend in suicide rates over the years makes it necessary to examine the antecedents of suicidal behaviour essential from a sociological perspective. The young population is among the essential dynamics of a country's economic and social development. In the formation of human capital, the population and the gender structure, and age status are considered. Human capital is more dynamic and broader in a country with a younger population. However, losses occur due to not properly using the young population's potential. Since young people cannot take part in both education and employment in a productive manner, there is a possibility that this potential of young people, who play a role in the development of the country, will not be fully used in Turkey, which is among the developing countries (Kılıç, 2014: 121). Both educators and pedagogues claim that one of the biggest problems in Turkey is the youth (Baş, 2017: 150).

Suicidal behaviour, which occurs in all age groups, is more common, especially among young people (O'conner & Sheehy, 1997: 242). Suicide cases, which are considered an exception in the past, have an increasing trend in recent years in Turkey. Considering the findings of the survey conducted in Turkey, Sahin and Batıgün (2003: 29) argue that the

suicide rates steadily increase in the 15-24 age group. According to the Turkey Statistical Institute, it is possible to analyse the data by age groups through suicide statistics.

Table: 1
Suicide Statistics by Age Group in Turkey (2005-2019 Period)



Source: TURKSTAT, <https://tuikweb.tuik.gov.tr/>, 02.04.2021.

As seen in Table 1, between 2005 to 2019, suicide cases most frequently occurred in the 15-24 age group in Turkey. In the world and Turkey, young people between the ages of 15-24 are considered risky in terms of suicide (Atay et al., 2012: 2). At this point, feeling safe, which occurs in societies where economic stability is achieved, gains importance in determining the limits of individual behaviour (Bozkurt, 2012: 25-26). Socioeconomic disadvantages have been considered critical determinants of suicide in time and social classes. The suicide rates tend to increase in low socioeconomic situations. This situation can be expressed as a perception of gain at the personal level. The suicide rate increases, especially in socioeconomic fluctuations and economic crises (Kübalı, 2007: 35-36). Depending on social cohesion and social structure, suicide rates vary between countries. According to the egoistic suicide phenomenon, the possibility of suicide increases in cases where social interaction is minor and family ties are weak.

On the other hand, the anomic suicide phenomenon argues that the possibility of suicide increases in economic and social crises in society. Europe in both world wars can be given as an example of this situation. Suicide rates increased more in those periods in Europe than in other times of history. In Turkey, social events such as child marriages, domestic violence, and cheating increase the likelihood of suicide. Moreover, the extant literature shows that the suicide rates of women are lower than men in societies in which divorce is not prohibited. At the same time, it is higher than men in other societies where divorce is not permitted (Tatlılıoğlu, 2012: 143). In this study, the antecedents of suicide, which have been investigated from many different angles in the extant literature, were examined from a socioeconomic perspective. The expected relationships between suicidal behaviour and socioeconomic variables are given in Table 2.

Table: 2
Expected Relationships Between Suicidal Behaviour and Socioeconomic Variables

Variables	Expected Relationship
Gini Coefficient	+
Rough Divorce Rate	+,-
Poverty Rate	+
Employment Number	-

Source: Compiled by the author.

Accordingly, this study examines Turkey's socioeconomic factors (Table 2) associated with suicidal behaviour via classical and Bayesian Poisson regression approaches. Indeed, the phenomenon of suicide has been the subject of sociology and philosophy throughout human history. For this reason, it is essential to predict the risk of suicide, develop appropriate methods, and take precautions. This study, in which statistical evaluations are carried out, tries to fill the interdisciplinary gap by contributing to social sciences on suicide.

2. Literature Review

According to Durkheim, who conducted the first comprehensive study investigating suicidal behaviour, suicides are "preventable as long as the individuals integrate with the society" (Durkheim, 1992: 34). Durkheim examined and systematized 26,000 suicide files in his study. Based on those data, he stated that there is a tendency to commit suicide. Even though Durkheim argued that psychological illnesses might also be related to suicide behaviour, he could provide empirical evidence regarding the relationship between suicide cases and mental illnesses. Drawing attention to his social reformer identity, Durkheim stated that the primary causes of suicide are sociological instead of psychological. According to social theory, the functioning of society should be examined, such as social welfare, economy, religion, and family, which are defined as social phenomena. For this reason, studies that include poverty suicide are examined.

Tel and Uzun (2003) examined the social support levels of patients who came to the emergency department to commit suicide between January 01 and March 31, 2002. As a result, they found out that those mainly were having difficulty coping with stress and having

a moderate level of social support. Also, it was stated that they concluded that the age group in which suicide cases occur frequently is 15-19 (Tel & Uzun, 2003: 158). Acar (2009), in his study examining the suicide cases within emergency services, stated that those, who applied to the emergency department with a suicide case, were single primarily (Acar, 2009: 58). Gür (2012), in another study on emergency departments, found that most of those who attempted suicide were women and under 30 years old. Rodriguez-Andres et al. (2011) investigated the socioeconomic factors affecting suicidal behaviour in Japan for men, women and total suicide cases between 1957-2009 separately. As a result, they discovered that the most crucial reason for suicide in males was divorce, while fertility problems came forward in females. They also stated that unemployment and economic difficulties had a similar effect on both genders. As a result, they concluded that sociological factors were more significant than the economic ones on committing suicide in Japan (Rodriguez-Andres et al., 2011: 730). Ayla et al. (2018) investigated the interrelationships between suicide, divorce, and marriage between 1980 and 2016, within the framework of the economic crisis. They found that the problem of the near past (3 and 4 years ago) increased suicidal rates of today. For this reason, they stated that all the steps to be taken against the crisis should be expanded before and after the crisis (Ayla et al., 2018: 432).

Gerdtham and Johannesson (2003) studied approximately 30,000 people between 24 and 65 years old in Sweden. Their findings revealed that unemployment was a significant antecedent of suicidal behaviour, and it increased the risk of death ratio due to suicide by approximately 50% (Gerdtham & Johannesson, 2003: 506). In another study examining the relationship between suicide and unemployment, Blakely et al. (2003) investigated 2.04 million people between 18-64 in New Zealand. They found a strong relationship between suicide rates and unemployment (Blakely et al., 2003: 594). In addition, Tunalı and Özkaya (2016) examined the relationship between unemployment ratios and suicidal behaviour during 1980-2014. As a result of the study, a bilateral causality between unemployment and suicide has been exposed. According to them, 26% of the suicide cases occurred due to commercial failures in the crisis periods (Tunalı & Özkaya, 2016: 68). Varol and Karagoz (2020) investigated the relationship between suicide ratios and socioeconomic factors. Unemployment, divorce, per capita income, alcohol consumption, labour force participation, urbanization, and inflation were the most important antecedents of suicidal behaviour, although they vary by gender (Varol & Karagöz, 2020: 278).

3. Data and Methodology

The socioeconomic variables to be analysed were obtained from the TURKSTAT database for the study. The variables were determined according to the relevant literature on the suicide case. They thought to affect are the number of suicides in the 15-24 age group, the poverty rate, the employment rate, the gross divorce rate, and the Gini coefficient. Data related to completed suicides in Turkey were collected systematically by TURKSTAT after 2005. For this reason, the relevant variables were examined in the period between 2006-2019.

Data analysis was carried out using the Poisson regression model since the dependent variable was count data. Counting data consists of positive values and generally does not reveal a standard distribution feature. In a study where counting data is used, biased parameter estimators can be encountered if the linear regression method is used. For this reason, methods that take into account the original distribution of the data should be preferred. Stata 15 computer program was used in data analysis.

4. Results

The classical Poisson regression propagation parameter established with variables was calculated as 2.61. It was determined that the data showed excessive spread due to being more significant than 1. Statistically, as a result of the goodness-of-fit test used as a goodness of fit test, it was seen that the model was not suitable for poisons (p-value: 0.000 <0.05). Therefore, negative binomial and generalized Poisson models were also estimated, in which excessive propagation was taken into account. Since the spread parameter of the generalized negative binomial regression model was obtained almost zero, it was concluded that the use of the model was not appropriate. In the negative binomial model, since the propagation parameter is a value other than zero, it was seen that the data fit the model. Three iterations estimated the model, and the Akaike information criterion was 163.31, Bayes information criterion was 167.14, and log-likelihood value was -77.03. The tests performed to examine the assumption of normality in the negative binomial model are given in Table 3.

Table: 3
Normality Tests Results

H_0: There is conformity to Normal Distribution. H_a: There is no compliance with Normal Distribution.				
Tests / Variables	Skewness and Kurtosis Test	Shapiro-Wilk Test	Doornik-Hansen Test	Classic Mahalanobis Criterion (X^2)
Suicide Count	0.7790	0.69505	0.8217	.053585
Poverty Rate	0.1444	0.33299		.125631
Gini Coefficient	0.2511	0.24102		.632418
Employment Rate	0.8528	0.94000		.543721
Rough Divorce Rate	0.7912	0.24819		.789476 .923773 .897513 .913705 .531925 .600984 .633485 .306611 .331822 .147675

As a result of comparing the test results given in Table 3, according to the 5% margin of error, it is seen that the primary hypothesis cannot be rejected. In addition, the probability values of Mahalanobis scores related to the observations were calculated and given (p<.5). Looking at the obtained values, no problem was detected in the distance of any data point from the mean of the predicted variables. When the predicted models were evaluated in general, it was seen that the use of the classical Poisson model was not appropriate due to the excessive spread. It was concluded that the generalized negative binomial model is not

suitable for use due to the propagation parameter. The negative binomial model was appropriate for determining the suicide case. However, in these models, the dependent variable is generally expected to be suitable for the negative binomial distribution. If the dependent variable belongs to a different distribution family, it may not benefit.

For this reason, Bayesian Poisson regression models were estimated, which allow for use in the absence and presence of information about a priori distribution. Bayesian estimates of all the models estimated above were performed, respectively. It was seen that the variables belonging to the models were obtained the same as in the classical models. In these models, the a priori and posterior distribution is estimated to be suitable for multiple normal distributions. The deviation information criterion, expressed as DIC, is used when the posterior distribution of the model is approximately multivariate normal, resulting from obtaining the posterior distributions of the models in the Bayesian model selections by Markov chain Monte Carlo (MCMC) simulation. Since the Akaike information criterion (AIC) has an asymptotic approach, it has been determined that the Bayesian negative binomial model with the highest value is also the most suitable model according to this criterion. However, in the absence of a priori information for the model, the Jeffreys method was also used for the three models mentioned. The Jeffreys, a priori distribution allows obtaining an information-free a priori distribution for any parametric model. According to the appropriate Jeffreys, the models estimated a priori distributions obtained for the different distributions of the observations were compared.

Table: 4
Information Criteria for Bayesian Regression Estimates

Criterias / Models	Log(ML)	DIC
Negative Binomial	-127.7345	188.8925
Generalized Negative Binomial	-114.7324	166.6163

As seen in Table 4, it is seen that the most suitable model whose a priori distribution is determined by Jeffreys method according to the information criteria is the Bayesian negative binomial model. However, in cases where the a priori distribution is unknown, the a priori distribution is determined by the multiple normal distributions in the Jeffreys method to ensure that the regression models provide the assumptions. The posterior is also offered to fit the numerous normal distributions. The Bayesian information criteria of the models are also expected to be suitable for multiple normal distributions due to their asymptotic characteristics. In both cases where the a priori distribution was normal and determined according to Jeffreys, it was observed that the model results were obtained very close to each other, and information criteria were obtained close to each other. However, to determine which distribution or distributions are suitable for the data, the distribution determination process was performed through the EasyFit 5.6 program. As a result of examining the suicide numbers data, it was determined that the distribution is right-skewed. Therefore, as a result of the examination made to determine the a priori distribution of the model, it was seen that it is suitable for the Beta distribution. The results of the distribution are given in Table 5.

Table: 5
Distribution Conformity Results

Test / Distribution	Kolmogorov-Smirnov	Chi-Square
Beta $\begin{pmatrix}\alpha = 1{,}2012\\ \beta = 1{,}0174\end{pmatrix}$	0,5423 (rank: 36)	0,5929 (rank: 35)

As seen in Table 5, it is seen that the use of Beta distribution among statistical distributions according to each of the tests is appropriate. Bayesian negative binomial regression estimation results where the a priori distribution is beta distribution are given in Table 6.

Table: 6
Bayesian Negative Binomial Regression Estimation Results with an A priori Distribution of Beta

$Suicide\ Count_t = 4.987 + 0.118 Poverty\ Rate_t + 0.472 RoughDivorceRate_t + 0.306 GiniCoefficient_t - 0.023 EmploymentRate_t$

Values / Independent Variables	Mean	Standard Error	MCSE	Reliable Range (%95)		Median
				Lower Bound	Upper Bound	
Poverty Rate	0.118	0.056	0.010	0.003	0.235	0.120
Rough Divorce Rate	0.472	0.220	0.043	0.032	0.904	0.488
Gini Coefficient	0.306	1.021	0.271	-1.384	2.527	0.217
Employment Rate	-0.023	0.015	0.001	-0.054	0.006	**-0.023**
Constant Term	4.987	1.037	0.238	2.880	6.996	4.946
$ln\alpha$	-4.711	0.592	0.029	-4.731	-5.805	-3.462

Number of MCMC iterations: 12,500
MCMC sample size: 10,000
Efficiency: min: 0.0014
Avg: 0.0032
Max: 0.0073

Since the a priori distribution of the model whose estimation results are given in Table 6 is beta distribution, the posterior distribution is also used as beta due to the information from the conjugate distribution families in informational situations. A comparison was made between the Bayesian negative binomial regression determined by the Jeffreys method used in cases where the a priori distribution was unknown and the models in which the a priori distribution was defined as beta. It was decided that using the Bayesian negative binomial regression model is more appropriate because it has more minimal criteria. The minor knowledge criterion of this model is thought to be because the dependent variable used in negative binomial regression generally conforms to the Poisson or normal distribution in practice. Therefore, the efficiency criterion of the model estimated according to the Jeffreys method is given in Table 7.

Table: 7
Effectiveness Summary of the Negative Binomial Model with A priori Distribution of the Jeffreys Method

Criteria / Variables	Activity Value
Rough Divorce Rate	0.0329
Poverty Rate	0.0455
Gini Coefficient	0.0472
Employment Rate	0.0393
Constant Term	0.0386
$ln\alpha$	0.0584
σ^2	0.0237

As can be seen in Table 7, it is seen that the activity value calculated for the variance and the efficiency values of the variables in the model are very close to each other. For this reason, it has been concluded that the model is generally effective and can be evaluated. In this study, the criteria of AIC and the asymptotic form of this criterion, DIC, were compared between the two approaches. The Bayesian approach was preferred because the Bayesian negative binomial regression has a lower information criterion value. At the same time, another important reason is the necessity of the Poisson distribution of the dependent variable in the classical Poisson regression method. The Bayesian approach was preferred in this study because it counted data, but its distribution can be differentiated.

The relative risk ratios of the model estimated in Table 6 are examined. While other variables are fixed, the average number of suicides is 248,044. The increase in the poverty rate causes a 1,127-fold increase in suicides. The increase in crude divorce rate causes a 1,642-fold increase in suicides. The increase in the Gini coefficient causes a 2.39-fold increase in suicides. The increase in employed individuals causes a 0.976-fold decrease in suicides. In both approaches, it was observed that the coefficients and the marginal effects of the coefficients were obtained very close to each other. However, since the simulation process is carried out in the Bayesian regression estimation and has an iterative process, it can give different results, albeit close to each other, in each estimation process. Therefore, coefficient estimators can give deviating results. It is seen that the reliable Range of the coefficients estimated by the Bayesian method is more comprehensive than in the classical approach. This is because the standard errors of the coefficients estimated by the Bayesian method are more minor. If a decision is made between both approaches, the DIC criterion, AIC in the classical approach and AIC in the Bayesian approach, can be evaluated. However, in the Bayesian approach, since the standard errors are obtained smaller due to the iteration process, the information criteria are obtained at a minimum compared to the classical approach. Therefore, it seems more likely to choose the model estimated by the Bayesian approach.

5. Conclusion

This study tried to determine the socioeconomic factors related to suicidal behaviour by classical and Bayesian regression approaches. Considering the hypothesis tests and knowledge criteria, the most suitable model for both approaches is the negative binomial

regression model. The extant literature shows that the Bayesian estimation method can give more effective parameter estimation when the assumptions are not met in regression types, such as linear regression, Poisson regression, etc. However, when the premises are met and there is no prior knowledge, the classical approach seems more appropriate in obtaining parameter estimators without deviation. In determining the preliminary distribution of Bayesian models, i) pre-distribution that reflects the knowledge of the researcher or the expert, and ii) the preliminary information coming from the theory depends entirely on the application's content. For example, if there is social relationship modelling, a pre-distribution can be determined using the survey technique based on the survey results. Suppose the mentioned example is to be expressed for this study. In that case, it will be possible to estimate the model's parameters, established in line with the questionnaire results, by surveying individuals who apply to emergency service for committing suicide for an uncertain pre-distribution. As a result of the estimation of this model, the findings can be considered preliminary information. This model, involving preliminary information and distribution of similarity, and the general model that examines the case of suicide will be integrated. The final allocation will be formed, and the parameters can be estimated. In this study, the Bayesian approach was considered more appropriate, based on the possibility of not providing the assumption of the dependent variable in the classical approach. As the pre-distribution is known, a Bayesian approach is beneficial in health and natural science research. According to the estimated model result, the relevant theory obtained the effect of the examined variables on the number of suicides.

We observed that the number of suicides increased due to the decline in individuals' economic status. In contrast, the number of suicides decreased with increased employment rates. We also witnessed that an increase in the Gini coefficient, which expresses the state of justice in the income distribution of individuals, leads to increases in the number of suicides. The findings are supported by studies examining economic factors in the suicide literature (Rodriguez-Andres et al., 2011; Ayla et al., 2018; Gerdtham & Johannesson, 2003; Tunalı & Özkaya, 2016; Blakely et al., 2003). In addition, we observed that the increase in the rate of gross divorce decreased the number of suicides. The findings are supported by studies examining sociological factors in the suicide literature (Varol & Karagöz, 2020; Acar, 2009). When the results were evaluated in general, it was determined that suicidal behaviour in the 15-24 age group -young people- was affected by social and economic factors.

During the youth period, difficulties arise for policymakers, as psychological, biological, and sociological factors bring problems, and those factors are transient. Significantly, the acceleration of communication improves the relations of individuals and societies with today's technology. Young individuals have the opportunity to share their expectations, wishes, and opinions. This extended communication further improves the qualities of young individuals based on their psychological and physiological characteristics. The concentration of the young population in developing countries results in some problems either. At this point, reducing risks with an understanding based on social support is also essential. Although the necessity of a holistic approach has been confirmed in line with the

findings obtained from the study, the existence of many variables makes it difficult to examine this complex issue holistically. Thus, non-governmental organizations and official authorities must adopt the aim of alleviating suicidal tendencies. It is necessary to target the total population in general and the high-risk groups. According to Durkheim, although suicide has always been existed in human life, in modern societies, suicides increase pathologically. Due to the lack of social regulations and social integration (Ritzer & Stepnisky, 2014: 98). When the reasons for the suicide of young people in the 15-35 age group are examined, both individual and social protection measures will indeed have positive reflections in defeating this problem (Küpçük et al., 2004: 7). The findings of this study supported this argument. To demonstrate more realistic interdisciplinary suicide, cases of suicide should be examined, and solutions should be developed without traditional or modern prejudices.

To increase the life quality of young people, necessary steps should be taken in areas such as increasing access to social and economic opportunities, preventing discrimination, protecting participation rights, and providing employment opportunities. As a result of the increase in life quality, social development will also be positively affected. Due to the rise in the rate of the young workforce, economic growth and development will proceed either. Active, participatory, skilled youth should gain more attention, particularly in developed countries, transforming into an information society. We think that developing programs that enable young people to adapt to social life and support programs is essential. It is necessary to create flexible models that are handled from different aspects, such as acquiring basic life and occupational skills, poverty alleviation programs, and ensuring a fair income distribution. In particular, the inequality of income distribution and poverty are fundamental problems that await a solution among Turkey's many unsolved socioeconomic issues. This situation experienced by young people, who are more at risk of being exposed to the adverse effects of poverty than adults, negatively impacts both individuals and society. Thus, spreading the policies towards young people in the inferior parts of society, regulating income distribution problems, and eliminating social inequality is required. We saw that the theories about suicide, a highly complex phenomenon, usually explain just one aspect. However, this study revealed that the individual should be examined with a holistic model. Internal and external factors such as biological, psychological, and social factors are evaluated together in explaining suicidal behaviour.

References

Acar, A. (2009), "Acil Servise Gelen İntihar Vakalarının Sosyodemografik Açıdan İncelenmesi", *Yüksek Lisans Tezi*, İstanbul: Marmara Üniversitesi Sağlık Bilimleri Enstitüsü.

Atay, İ.M. et al. (2012), "Suicide Attempt, Prevalence of Death Thoughts and Risk Factors in Isparta City Center", *Turkish Journal of Psychiatry*, 23, 1-10.

Ayla, D. et al. (2019), "Social Impact of the Economic Crisis: An Application on Turkey (1980-2016)", *Atatürk University Journal of Economic and Administrative Sciences*, 33(2), 415-434.

Baş, H. (2017), "Bir Sosyal Belediyecilik Uygulaması Olarak İstanbul Esenler Belediyesi Gençlik Merkezi Örneği", *AİBÜ Sosyal Bilimler Enstitü Dergisi*, 17(1), 150.

Batıgün, A.D. & N.H. Şahin (2009), "Testing a Model for Determining Suicide Risk in High School and University Students", *Turkish Journal of Psychiatry*, 20(1), 28-36.

Blakely, T. et al. (2003), "Unemployment and Suicide Evidence for A Causal Association?", *Epidemiol Community Health*, 57(8), 594-600.

Bozkurt, V. (2012), *Değişen Dünyada Sosyoloji: Temeller, Kavramlar, Kurumlar*, İstanbul: Ekin Kitabevi.

Durkheim, E. (2002), *İntihar*, (Çev.: Ö. Ozankaya), İstanbul: Cem Yayınevi.

İnce, M.A. (2007), "İntihar Din-Psikolojik Bir İnceleme (Van İli Örneği)", *Yüksek Lisans Tezi*, Kayseri: Erciyes Üniversitesi Sosyal Bilimler Enstitüsü.

Kübalı, Z. (2007), "Ankara İlinde Bir Kamu Hastanesi Acil Bölümünde İntihar Girişim Vakalarının İncelenmesi", *Yüksek Lisans Tezi*, Ankara: Gazi Üniversitesi Sağlık Bilimleri Enstitüsü.

Küpçük, Y. vd. (2004), *İntiharın Önlenmesi Birinci Basamak Sağlık Çalışanları İçin Kaynak*, (Çev: T. Kurtuluş & A.T. Demirtaş), Ankara: T.C. Sağlık Bakanlığı TSHGM.

O'Conner, R.C. & N.P. Sheehy (1997), "Suicide and Gender", *Mortality*, 2(3), 239-253.

Ritzer, G. & J. Stepnisky (2014), *Sosyoloji Kuramları*, (Çev.: H. Hülür), Ankara: Deki Yayınları.

Rodriguez-Andres, A.R. et al. (2011), "Socioeconomic Determinants of Suicide in Japan", *The Journal of Socioeconomics*, 40, 723-731.

Şevik, A.E. vd. (2012), "İntihar Girişimlerinin İncelenmesi: Risk Faktörleri ve Takip", *Klinik Psikiyatri*, 15, 218-225.

Smirnov, N.V. (1939), "On the Estimation of the Discrepancy Between Empirical Curves of Distribution for Two Independent Samples", *Bulletin of Moscow University*, 2(2), 3-14.

Taşdelen, M. (2006), "İnanç Açısından İntihar", *Yüksek Lisans Tezi*, Konya: Selçuk Üniversitesi Sosyal Bilimler Enstitüsü.

Tatlılıoğlu, K. (2012), "Sosyal Bir Gerçeklik Olarak İntihar Olgusu: Sosyal Psikolojik Bir Değerlendirme", *AİBÜ Sosyal Bilimler Enstitüsü Dergisi*, 12(2), 135-157.

Tel, H. & S. Uzun (2003), "İntihar Girişimi İle Acil Servise Başvuran Hastaların Sosyal Destek ve Stresle Baş Etme Durumları", *Anadolu Psikiyatri Dergisi*, 4, 151-158.

Tunalı, H. & S. Özkaya (2016), "Türkiye'de İşsizlik-İntihar ilişkisinin analizi", *Kırklareli Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 5(2), 56-70.

Ulf-G, G. & M. Johannesson (2003), "A Note on The Effect of Unemployment on Mortality", *Journal of Health Economics*, 22(3), 505-518.

Varol, Z. & K. Karagöz (2020), "Affective Socioeconomic Factors on Suicide in Turkey: An Econometric Analysis", *Manisa Celal Bayar Üniversitesi Sosyal Bilimler Dergisi*, TBMM 100. Yıl Özel Sayısı, 260-280.

Sosyoekonomi

2022, Vol. 30(51), 149-164

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.08
Date Submitted: 19.05.2021
Date Revised: 08.11.2021
Date Accepted: 09.01.2022

Analysing the Tax Structure of Turkish Economy: A Time-Varying Causality Analysis

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Türkiye Ekonomisinde Vergi Yapısının İncelenmesi: Zamanla Değişen Bir Nedensellik Analizi

Abstract

The tax structure shows the country's choice between the principles of justice and efficiency in tax policy. In a modern economy, the tax structure is expected to change in favour of direct taxes according to the principle of justice. This article investigates the causality between tax structure and per capita GDP in Turkey using asymmetric and time-varying causality analysis. The findings reveal that the per capita GDP doesn't change the tax structure in Turkey and doesn't show any change in favour of direct taxes to ensure justice in income distribution. This situation can be evaluated as the relationship between per capita GDP, and tax structure may have been drifted apart.

Keywords : Tax Policy, Tax Structure, Turkish Economy, Asymmetric Causality Analysis, Time-Varying Causality Analysis.

JEL Classification Codes : H21, H24, H71.

Öz

Vergi yapısı, ülkenin vergi politikalarında adalet ve verimlilik ilkeleri arasındaki seçimini göstermektedir. Modern bir ekonomide vergi yapısının adalet ilkesi doğrultusunda, dolaysız vergiler lehine değişmesi beklenmektedir. Bu makale, asimetrik ve zamana göre değişen nedensellik analizi kullanarak Türkiye'deki vergi yapısı ile kişi başına düşen hasıla arasındaki nedenselliği araştırmaktadır. Bulgular, Türkiye'de kişi başına düşen hasılanın vergi yapısını değiştirmediğini ve gelir dağılımında adaleti sağlayacak şekilde, doğrudan vergiler lehine herhangi bir değişiklik göstermediğini ortaya koymaktadır. Bu durum, kişi başına düşen hasıla ile vergi yapısı arasındaki ilişkinin kopmuş olabileceği şeklinde değerlendirilebilir.

Anahtar Sözcükler : Vergi Politikası, Vergi Yapısı, Türkiye Ekonomisi, Asimetrik Nedensellik Analizi, Zamanla Değişen Nedensellik Analizi.

1. Introduction

The welfare of a society depends on the macroeconomic activities in the country. Also, there are many other determinants of the welfare of society. However, taxation policy is one of the most critical determinants on the macroeconomic level. As it is known, the source of taxes is society's savings. This link makes taxes a determinant of significant macroeconomic variables and an important factor in the distribution of income in a society (Ansari, 1982: 1035). That makes tax policies a more critical issue for the economy's long run. Therefore, the government can impact economic output with its tax policies.

The taxation policy aims to support economic growth (Romer, 1990) and many other objectives such as increasing the funds required for financing public expenditure, rearranging income distribution, ensuring financial stability, affecting the allocation of resources, and preventing externalities. While applying the taxation policy, principles such as efficiency and justice come to the fore. An effective taxation policy does not mean that a fair taxation policy is used at all times. Sometimes, following the principle of economic efficiency, the focus of justice can be ignored. Ensuring economic efficiency in taxation is an important goal for every economy, but, as mentioned earlier, taxation policy is not just a policy to increase tax revenues. At the same time, it has different targets, such as ensuring economic stability and justice in income distribution. To implement a fair taxation policy, the concept of tax structure, which expresses the combinations of direct and indirect taxes in total tax revenues, gains importance. Whether the taxes are direct or indirect depends on the tax policies. However, in the theoretical framework, it is accepted that indirect taxes cause unfairness in taxation.

On the other hand, indirect taxes also negatively affect the justice of income distribution (Atkinson, 1977: 592). When examined in this context, it is seen that as the level of economic development of countries increases, the principle of justice comes to the fore in taxation. While the share of indirect tax revenues in total tax revenues is higher in underdeveloped or developing economies, direct taxes are higher in developed economies. Therefore, the high percentage of indirect tax revenues is considered an indicator of underdevelopment.

In Turkey, the taxation policies are not efficient enough. At the same time, they are not transparent. Furthermore, the tax burden in the country is not distributed fairly and concentrates on paid workers, depending on the tax structure (Siverekli-Demircan, 2003: 113; Binay, 2003: 257; Katircioglu, 2010: 105; Caliskan, 2010: 129). This fiscal inefficiency inherently causes some problems in the economy. Cause it is important to design tax policy correctly to ensure economic efficiency (Yereli & Ata, 2011: 30). To achieve macroeconomically effective results, the fiscal policies to be followed should consider the effects of the tax structure on outputs. The length of the analysed period gains importance as this phenomenon has a long-term impact on the economy. We think that this study will contribute to the literature regarding the period it examines and the methods it uses.

This study aims to investigate the causality relationship between direct and indirect taxes and per capita GDP in the Turkish economy by using Fourier Unit Root Test, Bootstrap Toda-Yamamoto Causality, and Symmetric Causality Analysis. This paper is organised as follows: Section 2 includes a literature review. Section 3 describes the data, methodology, and empirical findings. Finally, Section 4 presents the conclusions of the study.

2. Literature Review

The taxation policies of the economies are various. These policies have some effects on different macroeconomic variables in the economy. This section reviews the literature on the impact of taxes on economic variables. It is well known that there is much theoretical literature based on the Laffer curve and Supply-Side economics (Lucas, 1990). However, a literature review focuses on the relationship between taxes and GDP using similar methods.

Some of this literature can be summarised as follows: Karabacak & Mecik (2018) use the bootstrap Toda-Yamamoto causality test developed by Hacker and Hatemi-J to examine the relationship between per capita GDP, direct and indirect taxes in the 1965-2016 period in Turkey. The study determines only one-way causality from per capita GDP to indirect taxes. However, Yildiz & Sandalci (2019) analyses 2004-2014 in the Turkish economy. The study finds a significant two-way causality between the variables of per capita direct tax revenues, per capita indirect tax revenues, and per capita GDP. Similarly, Durkaya & Ceylan (2006), Temiz (2008), Gocer et al. (2010), Terzi & Yurtkuran (2016) indicate that there is two-way causality between the variables. Differently, Korkmaz et al. (2019) analyses the Turkish economy for the 2006-2018 period and find a positive and significant impact of indirect taxes on economic growth and direct taxes' adverse and powerful effects.

Acikgoz (2008) examines taxation policies and economic growth relationships in 1968-2006. The study shows a one-way causal relationship between economic growth and taxation. It is also similar to Mucuk & Alptekin (2008) findings, which shows one-way causality from indirect taxes to economic growth in 1975-2006 for Turkey. Erdogan, Topcu & Bahar (2013) and Arikan & Yalcin (2013) support these findings, respectively, in 1998-2011 and 2004-2012.

Furthermore, according to the literature, tax revenues in Turkey are also an important factor in economic growth (Dam & Ertekin, 2018; Akinci, 2019; Boga, 2020: 502). On the other hand, literature detects a negative relationship between tax revenues and economic growth (Idikut-Ozpence, 2017; Çiğdem & Altaylar, 2021: 34). In addition, Ozpence & Mercan (2020: 151) determined that the relationship between tax burden and economic growth in Turkey for the period 1970-2018 is also negative.

The relationship between tax revenues and economic growth has also been applied to different country examples in the literature. One of these is Baiardi et al. (2019), which analyses OECD countries from 1970 to 2014. The study's findings show a negative relationship between tax revenue and economic growth. Also, it compares those findings

with Arnold et al. (2011), which analyses 21 OECD countries over the period 1971 to 2004 and shows differences in the short and long run.

As it is known, taxes have a significant impact on income distribution. There is also literature examining the effects of tax profile on income distribution for various examples. According to Hayrullahoglu & Tuzun (2020), direct taxes' share in most OECD countries' tax systems is higher than that of indirect taxes allows an equal distribution of income as tax revenues increase. However, even though indirect taxes are against the social purpose of taxation because they focus on spending rather than earning income, according to Demirgil (2014), we can say that the increase in direct taxes in Turkey, which covers the period between 1980 and 2014, reduces the income distribution injustice, while the rise in indirect taxes increases the inequity of income distribution. Also, Balseven & Tugcu (2017) analyses the explanatory power of taxation and transfers on income inequality in 17 developing and 30 developed countries between 1990 and 2014. The study's findings highlight that tax revenues decrease income inequalities in developing countries while social benefits decrease income inequality in developed countries.

3. Data, Methodology and Empirical Findings

In our study, we used per capita GDP (GDPP), the share of indirect taxes (INDIRECT), and direct taxes (DIRECT) in total tax revenues, covering the period of 1960-2019 in Turkey. Direct and indirect tax data was collected from the Republic of Turkey Ministry of Treasury and Finance website, and GDP per capita data was collected from OECD statistics. To test the causality between the variables, we applied the bootstrap Toda-Yamamoto causality test developed by Hacker and Hatemi-J (2006) and the time-varying version of the same test, the asymmetric bootstrap Toda-Yamamoto causality test developed by Hatemi-J (2012). As is known, the series must be stationary or cointegrated to apply the Granger (1988) causality test. Therefore, Granger (1988) 's method requires many pre-tests and realising multiple conditions simultaneously. Unlike the Granger causality test, based on the VAR (p) model, the Toda-Yamamoto causality test requires estimating the VAR (p + d) model where p is the optimal lag length for the VAR model, and d is the maximum integration order of the series. So that it is insensitive to time-series properties such as stationarity and cointegration (Buyukakin et al., 2009: 111; Akcay, 2011: 84). Therefore, it does not require estimating the cointegration test and the vector error correction model. So, the Toda-Yamamoto (1995) test procedure is (equation (2)) based on the VAR(p) process in equation (1) that augmented with d.

$$y_t = v + A_1 y_{t-1} + ... + A_p y_{t-p} + \mu \tag{1}$$

$$y_t = \hat{v} + \hat{A}_1 y_{t-1} + ... + \hat{A}_p y_{t-p} + ... + \hat{A}_{p+1} y_{t-p-d} + \hat{\mu}_t \tag{2}$$

Equation (1) expresses a VAR model with a vector of k variables while v a vector of constants, error terms, and a matrix of parameters. The null hypothesis of the absence of

Granger causality is tested by applying a constraint that equates the first p parameter in equation (2) to zero. To describe Toda- Yamamoto test statistic, we can define;

$Y:(y_1,...,y_T)$, an (nxT) matrix,

$\hat{D}=\left(\hat{v},\hat{A}_1,...,\hat{A}_p,...,\hat{A}_{p+d}\right)$ an (n x (1+$n(p+d)$)) matrix,

$$Z_t=\begin{vmatrix} 1 \\ y_t \\ y_{t-1} \\ \vdots \\ y_{t-p-d+1} \end{vmatrix}$$ a ((1+$n(p+d)$)x1) matrix, for t=1,...,T,

$Z=(Z_0,...,Z_{T-1})$ a ((1+$n(p+d)$)xT) matrix, and

$\hat{\delta}=(\hat{\mu}_1,...,\hat{\mu}_T)$, an (nxT) matrix.

This definition lets us write a VAR (p+d) model that includes an estimated constant term ($\hat{v}$), as;

$$Y=\hat{D}Z+\hat{\delta} \tag{3}$$

The null hypothesis ($H_0:C\beta=0$) showing the absence of Granger causality can be tested with the Wald statistic:

$$MWALD=(C\beta)'\left[C\left((Z'Z)^{-1}\otimes S_U\right)C'\right]^{-1}(C\beta) \tag{4}$$

Equation (4) $\otimes$ shows the Kronecker product, and C is a $p\times n(1+n(p+d))$ matrix and denotes the indicator function that includes constraints. Here β = *vec (D)*, where *vec* denotes the column-stacking operator. And $S_U=\left(\hat{\delta}_U'\hat{\delta}_U\right)/T$ shows the variance-covariance matrix calculated for the unconstrained VAR model. Hatemi -J developed a new information criterion (HJC)[1].

The Modified-Wald (MWALD) statistics have asymptotically χ^2 distribution, as implied by Toda and Yamamoto. However, Hacker and Hatemi-J (2003) show that the MWALD statistics may over-reject the H_0 due to non-normality and autoregressive

[1] $HJC=ln\left(det\,\hat{\Omega}_j\right)+\left(\frac{n^2lnT+2n^2ln\,(lnT)}{2T}\right)$ $(j=0,1,2,\dots,K)$.

conditional heteroscedasticity (ARCH) effects (Gunduz & Hatemi-J, 2005). Hacker and Hatemi-J (2003) developed a leveraged bootstrap technique to deal with these circumstances. As a first step, this study tested the causality between direct/indirect taxes and per capita GDP in the Turkish economy, applying the Leveraged Bootstrap Toda-Yamamoto Causality test.

As it is known, Toda-Yamamoto's (1995) methodology does not separate the effects of symmetric and asymmetric shocks. Yet, according to Hatemi-J (2012), the impact of negative shocks might be different from the positive shocks. Investors' response to negative shocks is usually more significant than positive ones. So, considering the effects of negative and positive shocks may give more information about causality between the variables. Therefore, Hatemi-J developed a causality test that considers the impact of negative and positive shocks separately based on the "hidden cointegration" idea of Granger & Yoon (2002):

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i} \tag{5}$$

and

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i} \tag{6}$$

where y_{1t} and y_{2t} are both integrated random walk processes $t = 1, 2, ...T$, $y_{1,0}$ the constants that signify the initial values, and the white noise error terms. Definitions of positive and negative shocks are given respectively as $\varepsilon_{1i}^{+} = \max(\varepsilon_{1i}, 0) = \max(\varepsilon_{2i}, 0), \varepsilon_{1i}^{-} = \min(\varepsilon_{1i}, 0)$ and $\varepsilon_{2i}^{-} = \min(\varepsilon_{2i}, 0)$. So, we can express $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$ and $\varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$. By using these expressions, we can rewrite equations (5) and (6) as:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-} \tag{7}$$

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-} \tag{8}$$

Now we can rewrite the positive and negative shocks in cumulative form as:

$$y_{1t}^{+}=\sum_{i=1}^{t}\varepsilon_{1i}^{+}, y_{1t}^{-}=\sum_{i=1}^{t}\varepsilon_{1i}, y_{2t}^{+}=\sum_{i=1}^{t}\varepsilon_{2i}^{+} \text{ and } y_{2t}^{-}=\sum_{i=1}^{t}\varepsilon_{2i}^{-}.$$

As a result, allowing for only the cumulative positive shocks, we can obtain a VAR(p) model for the test of causality under the assumption that $\left(y_t^{+}=y_{1t}^{+}, y_{2t}^{+}\right)$[2]:

$$y_t^{+}=v+A_1 y_{t-1}^{+}+...+A_p y_{t-1}^{+}+u_t^{+} \tag{9}$$

Equation (9) y_t^{+} expresses a 2x1 vector of variables, v a 2x1 vector of intercepts and u_t^{+} 2x1 vector of error terms. Finally, A_r it represents a 2x2 matrix consisting of parameters with lag order r (r= *1,...,* p). To see the effects of asymmetric shock, we applied Asymmetric Bootstrap Toda-Yamamoto Causality Test as a second step. However, we also used a time-varying causality test because causality may change over time.

The time-varying causality test process can be expressed as follows: Firstly, subsamples - containing equal observations - are chosen. Then the Hatemi-J (2006) causality test is applied to the subsample, which includes the first observation and the last observation (say 'n') in the first subsample. Then the first observation is excluded, and this test is applied to the second subsample between the second observation and the (n+1)th observation in the second stage. The test is continued until the last observation in the data range is used by excluding the first observation at each new stage and adding a new observation to the previous observation. The test statistic obtained at each sub-sample is normalised with the bootstrap critical value to test the significance of obtained test statistics. The Wald test statistics and the critical bootstrap values change with time in this process. Hence, the test statistic obtained at each sub-sample is normalized to the 10% critical bootstrap value obtained. The values are plotted to interpret the resulting Wald test statistics. The values above the "1" line (in Graphics 1, 2, 3 and 4) show that the null hypothesis (the absence of Granger-causality) should be rejected (Yilanci & Bozoklu, 2014).

3.1. Bootstrap Toda-Yamamoto Causality Test

Toda & Yamamoto (1995) propose to use additional lag(s) in the VAR model equal to the maximum integration order of the series employed in the analysis. For this reason, generally, before applying Toda-Yamamoto (1995) causality test, the series are subjected to the unit root tests. However, Dolado & Lutkepohl (1996) stated that adding one additional lag would be sufficient. Therefore, one additional lag will be added to the VAR model by following Dolado & Lutkopohl's suggestion in this study. According to test results, there is

[2] *For the test of causality between cumulative negative shocks ($y_t^{-}=y_{1t}^{-}, y_{2t}^{-}$) vector can be used.*

no causality from per capita GDP to direct and indirect taxes. Moreover, there is also no causality from indirect/direct taxes to per capita GDP.

Table: 1
Toda-Yamamoto Causality Test Findings

GDP per capita to Indirect Taxes				
Lag VAR(d+k_{max})	Test Stats.	Critical Values		
		%1	%5	%10
3	0.029	10.884	6.807	5.086
GDP per capita to Direct Taxes				
Lag VAR(d+k_{max})	Test Stats.	Critical Values		
		%1	%5	%10
3	0.037	10.873	6.782	5.087
Direct Taxes to per capita GDP				
Lag VAR(d+k_{max})	Test Stats.	Critical Values		
		%1	%5	%10
3	2.895	11.924	7.386	5.479
Indirect Taxes to per capita GDP				
Lag VAR(d+k_{max})	Test Stats.	Critical Values		
		%1	%5	%10
3	2.946	11.960	7.383	5.490

These results are indeed unexpected. This is because an increase in per capita GDP, an indicator of the level of economic development, is expected to cause an increase indirect taxes and a decrease in indirect taxes. These expectations are usually met in the literature. Nevertheless, we could not detect causality from per capita GDP to direct and indirect taxes or direct and indirect taxes to per capita GDP. Therefore, these findings make the subject more interesting. Hence, we needed to examine the issue more. As mentioned earlier, the Toda-Yamamoto test does not separate between positive and negative shocks. However, generally, the effect of adverse shocks might be more significant than positive shocks. For this reason, we thought that applying an asymmetric causality test would be useful for a detailed analysis of the subject.

The results obtained from the asymmetric causality test are clear enough not to require a long explanation. Considering negative and positive shocks separately did not change the outcome either. It showed there is no causality from negative shocks to negative shocks and positive shocks to positive shocks amongst variables. More importantly, there is no causality between positive shocks in GDP per capita and positive shocks indirect taxes. It is expected that there will be a positive relationship between increases in per capita income and direct taxes. Therefore, positive shocks in GDP per capita are expected to provide information about shocks indirect taxes. However, the absence of any causal relationship between the two variables can be seen as a sign that the tax structure has not changed in favour of direct taxes despite the increases in the development level of the economy. This situation can be accepted as an indication that income is not distributed fairly, and that income distribution is realised in favour of producers and capital owners. With these exceptional results, we wanted to apply a time-varying causality test to shed light on the subject with the idea that causality can change over time.

Table: 2
Asymmetric Toda-Yamamoto Causality Test Findings

Causality from positive shocks in GDP per capita to positive shocks in Indirect Taxes				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
3	0.505	12.231	7.428	5.558
Causality from negative shocks in GDP per capita to negative shocks in Indirect Taxes				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
3	0.159	8.979	4.350	2.782
Causality from positive shocks in GDP per capita to positive shocks in Direct Taxes				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
3	1.333	11.295	7.011	5.252
Causality from negative shocks in GDP per capita to negative shocks in Direct Taxes				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
3	1.182	12.816	4.337	2.512
Causality from positive shocks in Indirect Taxes to positive shocks in GDP per capita				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
3	0.135	11.741	6.951	5.115
Causality from negative shocks in Indirect Taxes to negative shocks in GDP per capita				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
	0.043	9.589	4.772	2.943
Causality from positive shocks in Direct Taxes to positive shocks in GDP per capita				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
3	1.502	11.535	7.142	5.457
Causality from negative shocks in Direct Taxes to negative shocks in GDP per capita				
Lag VAR($d+k_{max}$)	Test Stats.	Critical Values		
		%1	%5	%10
2	0.519	12.840	4.760	2.657

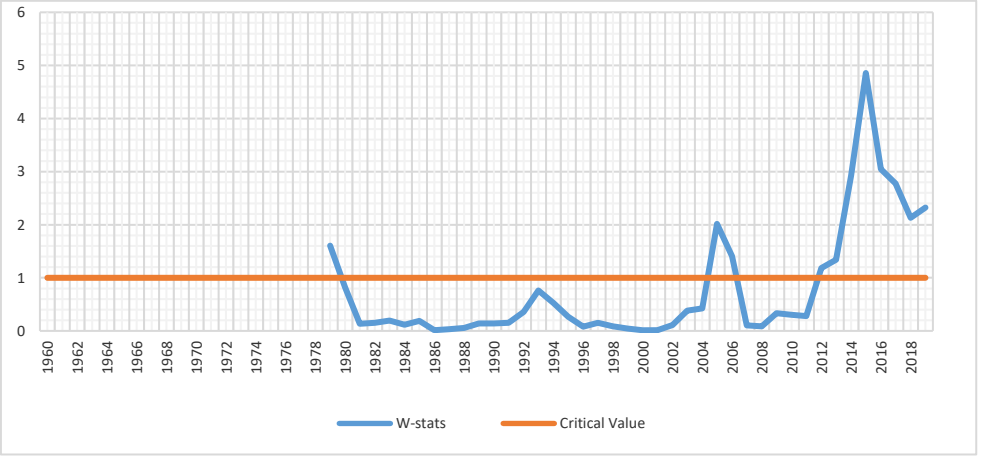
3.2. Time-Varying Symmetric Causality Test

Time-varying symmetric causality test results from per capita GDP to direct taxes are given in Graphic 1. As seen in Graphic 1, the W statistic calculated for 1979 is above 10% test critical value. The W statistics calculated for the following periods are below the critical values until 2005. According to the test results, other periods of causality from per capita GDP to direct taxes are 2005, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019. There is no causality from per capita GDP to direct taxes in other periods.

In 1985, The corporate tax rate in Turkey was 46%, and it was reduced to 25% in 1990. In fact, during the '90s, new regulations have been constantly introduced for Corporate Tax. However, it should be noted that these regulations, especially the tax rate reduction made in 1990, do not reflect positively on taxpayers. Because in this period, corporate earnings were also subject to income tax withholding. In addition, there may be significant differences between the regulations made in the legal tax rate and the "effective tax rate". For example, due to the implementation of "reduced corporate tax," a company investing in Turkey will hardly pay taxes on the tax base of $ 10 million. Thus, while the tax structure and its consequences are analysed in Turkey, many details can be passed over (Yildirim, 2019: 91-92).

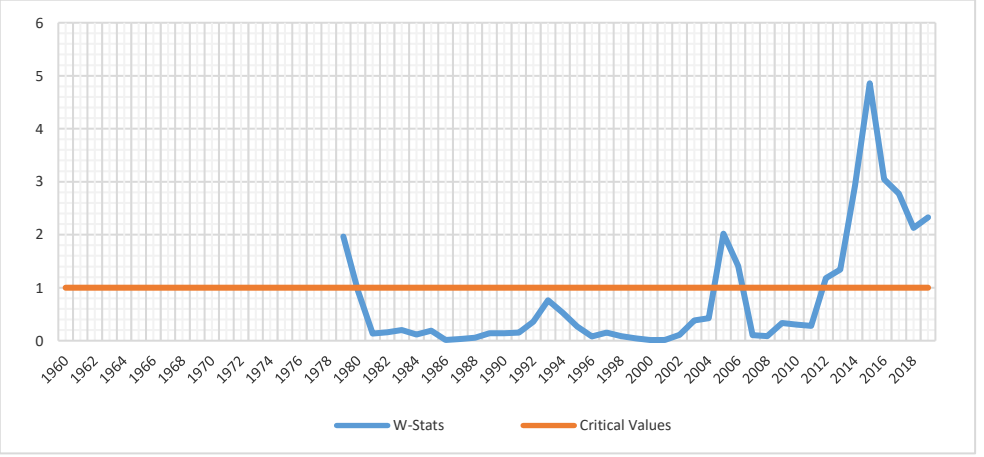
Time-varying symmetric causality test results from per capita GDP to indirect taxes are given in Graphic 2. According to the results, the W statistic calculated for 1979 is above 10% test critical value. The W statistics calculated for the following periods are below the critical values until 2005. In 1979, 2005, 2006, 2012, 2013, 2014, 2015, 2016, 2017, 2018, and 2019, there is causality from per capita GDP to indirect taxes. There is no causality from per capita GDP to direct taxes in other periods.

Graphic: 1
Causality from per capita GDP to Direct Taxes



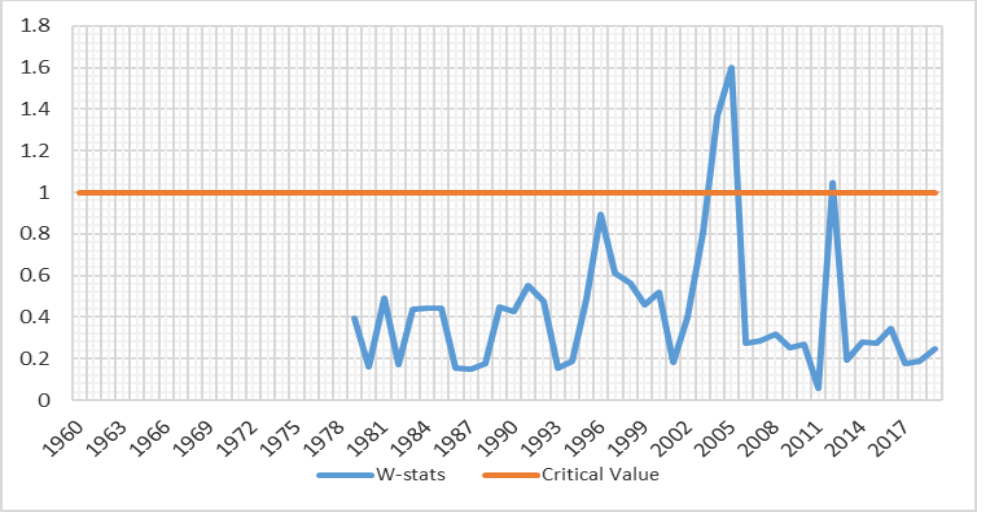
The findings indicate that at least specified years, economic development may have an indirect tax-reducing effect. However, some facts should not be overlooked at this point. Since our number of observations is insufficient, we cannot apply the time-varying asymmetric causality test. However, looking at the causality dates according to the symmetrical time-varying causality test results, we refrain from saying that the positive shocks in GDP per capita may have had an indirect tax-reducing effect as expected or instead desired. Because we know that in 2002, a new indirect tax that was not previously applied in Turkey, the Special Consumption Tax came into force. In addition, we see that in 2004, the Special Communication Tax and the Tax on Games of Chance started to be applied, and these three new tax practices are continuing.

Graphic: 2
Causality from per capita GDP to Indirect Taxes

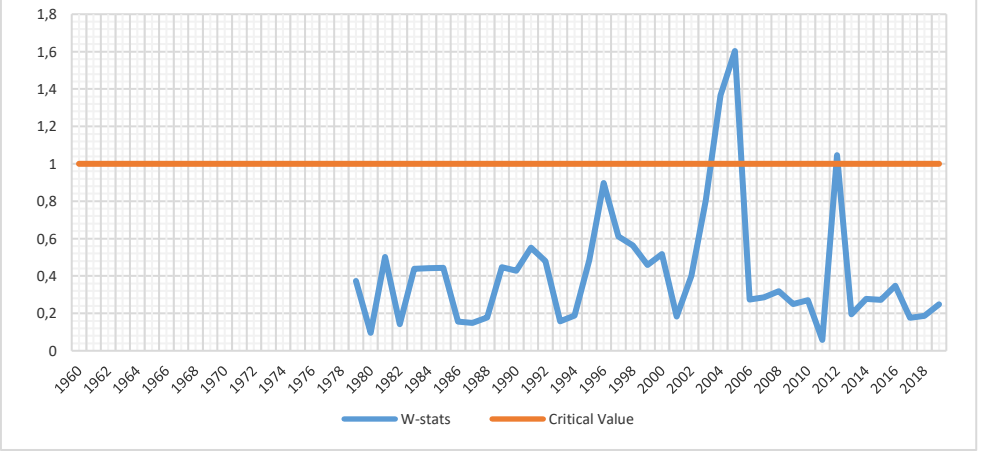


Time-varying symmetric causality test results of causality from indirect taxes to per capita GDP are given in Graphic 3. As seen in the Graphic, the W statistics calculated until 2004 are below the critical values. In this case, there is no causality relationship from indirect taxes to per capita GDP for the period before 1985-2004. The W- statistic calculated for 2004 is above 10% test critical value. In this case, there is causality from indirect taxes to per capita GDP between 1985-2004. According to the test results, other periods of causality from indirect taxes to per capita GDP is 1986-2005, 1993-2012.

Graphic: 3
Causality from Indirect Taxes to per capita GDP



Graphic: 4
Causality from Direct Taxes to per capita GDP



Finally, Graphic 4 shows time-varying symmetric causality test results of causality from direct taxes to per capita GDP. The Graphic indicates that the W statistics calculated until 2004 are below the critical values. For this reason, there is no causality from indirect taxes to per capita GDP before the period of 1985-2004. The W- statistic calculated for 2004 is above 10% test critical value. In this case, there is causality from indirect taxes to per

capita GDP between 1985-2004. According to the test results, other periods of causality from indirect taxes to per capita GDP are as follows: 1986-2005, 1993-2012.

4. Conclusion

In this study, we investigate the causality relationship between per capita GDP and direct and indirect taxes in the Turkish economy using Bootstrap Toda-Yamamoto Causality and Asymmetric Toda-Yamamoto Causality *Time-Varying Symmetric Causality Analysis*. The findings show no causality amongst the variables subjected to the analysis, except for certain sub-periods. More importantly, there is no causality from per capita GDP to indirect taxes, nor is there a relationship to direct taxes. The absence of causality from per capita GDP to direct taxes can be interpreted as ignoring the principle of justice in taxation. Nevertheless, it is generally expected that the principle of efficiency will guide tax policies in such a case. Interestingly, however, the absence of causality from GDP per capita to indirect taxes can be interpreted as an indicator that the efficiency principle may also not be considered.

The causality GDP per capita to direct taxes was not observed until the sub-sample covering 1986-2005. It is observed that the relationship that existed at the beginning disappears over time, and it is observed only in certain sub-samples in the following periods. The causality was not reflected in the entire period under consideration. A similar situation is valid for GDP per capita and indirect taxes. When all these findings are analysed together, economic development does not change the tax structure in Turkey. It does not reveal any change favouring direct taxes to ensure justice in income distribution. This condition can be evaluated as the relationship between GDP per capita - an indicator of development- and tax structure may have been broken down.

These circumstances bring to mind the question of the reason for the disconnection between economic development and tax structure. Two possible explanations can be given to this question. The share of indirect taxes in Turkey is approximately 70%, and this rate is around 30% in developed countries. This situation disrupts Turkey's income distribution and shows that income distribution favours capital owners and producers. It is usual to increase the share of indirect taxes in total tax revenues due to the introduction of taxes such as special consumption tax and special communication tax to close the financing gap of the public sector in times of crisis. However, these taxes are made permanent in Turkey and continue to be applied outside of crises. Moreover, their rates are increased.

The other explanation is the concept of tax competition that has increased with globalization. Increasing globalization has pushed emerging market economies that want to attract foreign direct investments and portfolio investments to their countries to lower corporate tax rates. Because, with globalization, mobilization of capital has increased, and capital has started to flee from countries where tax rates are high. Governments trying to attract foreign direct investments to their country have entered into a competition to lower

tax rates and other facilities they provide to foreign investors. This situation even led to the emergence of tax havens.

Like other emerging market economies, Turkey has been involved in this competition and reduced corporate tax rates. The corporate tax rate of 46% in the early 90s has been reduced to 25% today (23% for 2022). However, tax competition was not limited to lowering tax rates and continued with additional tax collection facilitation. The concept of "reduced corporate tax" mentioned earlier is one of the most important examples. Because, although the corporate tax rate appears to be 25%, there has been a situation where no tax is collected for a specific investment level and tax base, thanks to the additional facilities provided to investors. As a result, countries have had to determine their tax policies according to the moves of their competitors. Therefore, the dependence of the tax policy on the policies of other countries caused the domestic purposes and principles to be ignored in tax policy practices, and the connection between this purpose and regulations and the tax policy was broken.

References

Acikgoz, S. (2008), "Türkiye'de Vergi Gelirleri, Vergi Yapısı ve İktisadi Büyüme İlişkisi: 1968-2006", *Ekonomik Yaklaşım*, 19(68), 91-113.

Akcay, S. (2011), "Causality Relationship between Total R&D Investment and Economic Growth: Evidence from United States", *SDÜ İİBF Dergisi*, 16(1), 79-92.

Akinci, A. (2019), "Vergi Gelirlerinin Ekonomik Büyüme Üzerindeki Etkisi", *Finans Ekonomi ve Sosyal Araştırmalar Dergisi*, 4(1), 100-106.

Ansari, M.M. (1982), "Determinants of Tax Ratio: A Cross-Country Analysis", *Economic and Political Weekly*, 17(25), 1035-1042.

Arikan, C. & Y. Yalcin (2013), "Determining the Exogeneity of Tax Components with Respect to GDP", *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 3(3), 242-255.

Arnold, J.M. et al. (2011), "Tax Policy for Economic Recovery and Growth", *The Economic Journal*, 121, 59-80.

Atkinson, A.B. (1977), "Optimal Taxation and the Direct versus Indirect Tax Controversy", *The Canadian Journal of Economics*, 10(4), 590-606.

Baiardi, D. et al. (2019), "Tax policy and economic growth: does it really matter?", *International Tax and Public Finance*, 26, 282-316.

Balseven, H. & C.T. Tugcu (2017), "Analyzing the effects of fiscal policy on income distribution: A comparison between developed and developing countries", *International Journal of Economics and Financial Issues*, 7(2), 377-383.

Binay, S. (2003), "Some issues in fiscal policy and central banking: The case of Turkey", *BIS Papers*, 20, 245-259.

Boga, S. (2020), "Türkiye'de Vergi Gelirleri ve Ekonomik Büyüme Arasındaki Asimetrik İlişki: NARDL Eşbütünleşme Yaklaşımı", *Üçüncü Sektör Sosyal Ekonomi Dergisi*, 55(1), 487-507.

Buyukakin, F. vd. (2009), "Türkiye'de Parasal Aktarımın Faiz Kanalının Granger Nedensellik ve Toda-Yamamota Yöntemleri ile Analizi", *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 33, 101-118.

Caliskan, S. (2011), "Türkiye'de Gelir Eşitsizliği ve Yoksulluk", *Journal of Social Policy Conferences*, 59, 89-132.

Cigdem, G. & M. Altaylar (2021), "Nonlinear relationship between economic growth and tax revenue in Turkey: Hidden cointegration approach", *Istanbul Journal of Economics*, 71(1), 21-38.

Dam, M. & S. Ertekin (2018), "Türkiye'de Vergi Gelirlerinin Ekonomik Büyüme Üzerindeki Etkisinin Analizi", *Vergi Raporu Dergisi*, 228, 19-32.

Demirgil, B. (2018), "Vergilerin gelir dağılımı üzerindeki etkisi: Ampirik bir çalışma", *Cumhuriyet Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 19(2), 118-131.

Dolado, J.J. & H. Lutkepohl (1996), "Making Wald Tests Work for Cointegrated VAR Systems", *Econometric Theory*, 15(4), 369-386.

Durkaya, M. & S. Ceylan (2006), "Vergi Gelirleri ve Ekonomik Büyüme", *Maliye Dergisi*, 150, 79-89.

Erdogan, E. vd. (2013), "Vergi Gelirleri ve Ekonomik Büyüme İlişkisi: Türkiye Ekonomisi Üzerine Eşbütünleşme ve Nedensellik Analizi", *Finans Politik & Ekonomik Yorumlar*, 50 (576), 99-109.

Gocer, I. vd. (2010), "Ekonomik Büyüme ile Vergi Gelirleri Arasındaki İlişki: Sınır Testi Yaklaşımı", *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, (28), 97-110.

Granger, C.W.J. & G. Yoon (2002), "Hidden Cointegration", *Department of Economics Working Paper University of California*, No: 2002-02.

Granger, C.W.J. (1988), "Some Recent Developments in the Concept of Causality", *Journal of Econometrics*, 39, 199-211.

Gunduz, L. & A. Hatemi-J (2005), "Is the tourism-led growth hypothesis valid for Turkey?", *Applied Economics Letters*, (12), 499-504.

Hacker, R.S. & A. Hatemi-J (2003), "Tests for causality between integrated variables based on asymptotic and bootstrap distribution", *Working Paper 2003:02*, Department of Statistics, Lund University, Sweden.

Hacker, R.S. & A. Hatemi-J (2006), "Tests for causality between integrated variables using asymptotic and bootstrap distributions: theory and application", *Applied Economics*, 38(13), 1489-1500.

Hatemi-J, A. (2012), "Asymmetric causality tests with an application", *Empirical Economics*, (43), 447-456.

Hayrullahoglu, B. & O. Tuzun (2020), "The Effect of Taxes on Income Distribution: An Analysis for Turkey and Other Selected OECD Countries", *Journal of Economics, Business & Organization Research*, Proceedings of the Third EBOR Conference 2020, 413-426.

Idikut-Ozpence, A. (2017), "Türkiye'de 1980 Sonrası Kamu Harcamaları, Vergi Gelirleri ve Ekonomik Büyüme Arasındaki İlişkinin Analizi", *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (28), 31-41.

Karabacak, M. & O. Mecik (2018), *The Effectiveness of Tax Policies in Turkey: Causality Analysis*, <https://lisbon2018.econworld.org/papers/Karabacak_Mecik_TheEffectiveness.pdf>, 19.09.2020.

Katircioglu, S.T. (2010), "Is There a Long-Run Relationship between Taxation and Growth: The Case of Turkey", *Romanian Journal of Economic Forecasting*, 13(1), 99-106.

Korkmaz, S. et al. (2019), "The impact of direct and indirect taxes on the growth of the Turkish economy", *Public Sector Economics*, 43(3), 311-323.

Lucas, R.E. (1990), "Supply-Side Economics: An Analytical Review", *Oxford Economic Papers*, 42, 293-316.

Mucuk, M. & V. Alptekin (2008), "Türkiye'de Vergi ve Ekonomik Büyüme İlişkisi: VAR Analizi (1975-2006)", *Maliye Dergisi*, (155), 159-174.

Ozpence, O. & N. Mercan (2020), "The relationship between tax burden and economic growth: Turkey case", *Journal of Business, Economics and Finance*, 9(2), 143-154.

Romer, P.M. (1990), "Endogenous Technological Change", *The Journal of Political Economy*, 98(5), 71-102.

Siverekli-Demircan, E. (2003), "Vergilendirmenin Ekonomik Büyüme ve Kalkınmaya Etkisi", *Erciyes Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 21, 97-116.

Temiz, D. (2008), *Türkiye'de Vergi Gelirleri ve Ekonomik Büyüme İlişkisi: 1960-2006 Dönemi*, <http://debis.deu.edu.tr/userweb/iibf_kongre/dosyalar/temiz.pdf>, 23.10.2020.

Terzi, H. & S. Yurtkuran (2016), "Türkiye'de Dolaylı/Dolaysız Vergi Gelirleri ve GSYH İlişkisi", *Maliye Dergisi*, (171), 19-33.

Toda, H.Y. & Y. Yamamoto (1995), "Statistical inference in vector autoregressions with possibly integrated processes", *Econometrics*, (66), 225-250.

Yereli, A.B. & A.Y. Ata (2011), "Vergi adaletine ulaşma yöntemleri çerçevesinde fayda ilkesinin teorik açıdan değerlendirilmesi", *Maliye Dergisi*, 161, 21-32.

Yilanci, V. & S. Bozoklu (2014), "Türk sermaye piyasasında fiyat ve işlem hacmi ilişkisi: zamanla değişen asimetrik nedensellik analizi", *Ege Akademik Bakış*, 14(2), 211-220.

Yilanci, V. et al. (2020), "Testing the Unemployment Hysteresis in G7 Countries: A Fresh Evidence from Fourier Threshold Unit Root Test", *Romanian Journal of Economic Forecasting*, XXIII (3), 49-59.

Yildirim, A.H. (2019), "Vergi Rekabeti ve Türkiye'de Kurumlar Vergisi Üzerine Etkisi", *Yüksek Lisans Tezi*, Marmara Üniversitesi: İstanbul.

Yildiz, F. & U. Sandalci (2019), "Vergi Yapısı ve Ekonomik Büyüme Arasındaki Nedensellik İlişkisi: Türkiye'de İller Düzeyinde Ampirik Bir Analiz (2004-2014)", *Vergi Dünyası*, 38(452), 20-34.

Sosyoekonomi

2022, Vol. 30(51), 165-197

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.09
Date Submitted: 31.05.2021
Date Revised: 07.11.2021
Date Accepted: 10.01.2022

The Mediating Role of Impulsive Buying in The Relationship Between Fear of COVID-19 and Compulsive Buying: A Research on Consumers in Turkey

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COVID-19 Korkusu İle Kompulsif Satın Alma Arasındaki İlişkide İmpulsif Satın Almanın Aracı Rolü: Türkiye'deki Tüketiciler Üzerinde Bir Araştırma

Abstract

This study aims to reveal the mediating effect of impulsive buying behaviour in the relationship between fear of COVID-19 and compulsive buying behaviour. In this direction, the data collected from 721 participants by online survey method were analysed using various statistical methods. According to the findings, the fear of COVID-19 experienced by individuals affects compulsive and impulsive buying behaviours. In addition, the mediator effect of impulsive buying behaviour was found in the impact of fear of COVID-19 on compulsive buying behaviour. It is expected that the research results will contribute to the literature in terms of revealing the effect of negative emotional states on consumer purchasing behaviour.

Keywords : Fear of COVID-19, Compulsive Buying, Impulsive Buying, Consumer Behaviour, Consumer Psychology.

JEL Classification Codes : M30, M31, M39.

Öz

Bu çalışmanın amacı COVID-19 korkusu ile kompulsif satın alma davranışı arasındaki ilişkide impulsif satın alma davranışının aracılık etkisini ortaya koymaktır. Bu doğrultuda 721 katılımcıdan online anket yöntemi ile toplanan veriler çeşitli istatistiksel yöntemler kullanılarak analiz edilmiştir. Elde edilen bulgulara göre bireylerin yaşadıkları COVID-19 korkusu, kompulsif ve impulsif satın alma davranışlarını etkilemektedir. Bunun yanında COVID-19 kaygısının kompulsif satın alma davranışına olan etkisinde impulsif satın alma davranışının mediatör etkisi bulunmuştur. Araştırma sonuçlarının olumsuz duygu durumların tüketici satın alma davranışlarına olan etkisinin ortaya konması bakımından yazına katkı sağlaması beklenmektedir.

Anahtar Sözcükler : COVID-19 Korkusu, Kompulsif Satın Alma, İmpulsif Satın Alma, Tüketici Davranışları, Tüketici Psikolojisi.

1. Introduction

The coronavirus, which emerged in Wuhan, China, in December 2019 and spread throughout the world, has deeply affected the world and humanity in economic, social and many other aspects after being declared a pandemic by the World Health Organization. While it remains unclear how long the pandemic will last, it has become important to reveal how consumers are affected by this process, test the validity of past findings, reveal the reasons behind current behavioural differences and consumption patterns, and make predictions for the future. It is a matter of curiosity to determine the underlying causes of these behaviours of consumers who have been observed to make unplanned purchases during the Covid-19 process (Xiao et al., 2020) and how they will continue in the future. Studies reveal that fear of covid-19 affects consumers' impulsive shopping (Roy & Chakraborty, 2020). While one of the frequently observed unplanned and impulsive purchases during the pandemic process is impulsive buying behaviour, the other is compulsive buying behaviour (Lopes et al., 2020; Xiao et al., 2020). According to Sulaiman et al. (2020), compulsive buying behaviour that increases in emergencies such as the virus epidemic falls outside the existing theories that explain consumers' normal time buying behaviour.

After being included in psychology books for the first time at the beginning of the 20th century, compulsive buying behaviour, which is one of the unexpected buying behaviours that researchers did not attach importance to for many years, came to the fore again in the late 80s, this time in the field of consumer behaviour, and many studies have been carried out in the last 20 years. Although there are different results regarding the incidence in society, it is seen that compulsive buyers have increased, especially in the young adult population in developed or developing countries in the last 20 years. Compulsive buying, which is frequently associated with chronic depression (Christenson, 1994), impulse disorder (McElroy et al., 1994), obsessive-compulsive disorder (Lejoyeux et al., 2005), and mood disorder (Müller et al., 2015) buying behaviour is sometimes confused with impulsive buying (Johnson & Attmann, 2009).

However, there are significant differences between the two concepts in impulsive buying behaviour; the individual buys a certain product with a sudden, impulsive, uncontrollable desire and impulse triggered by an external stimulus (Rook, 1987). It has been found that researchers agree that individuals experience a momentary loss of impulse control in impulsive purchases. It is thought that individuals who make frequent impulse purchases experience more frequent loss of impulse control, which becomes chronic over time, leading to impulse control disorder (Rook, 1987; Hoch & Loewenstein, 1991). The similarity between compulsive and impulsive buying caused by impulse control disorder has attracted the attention of some researchers. They have determined that individuals' impulsivity, frequently repetitive unplanned and impulse purchases, and purchasing behaviours that are not on shopping lists lead to compulsive buying behaviours over time (Puri, 1996; DeSarbo & Edwards, 1996; Lejoyeux et al., 1996; Shoham & Brencic, 2003; Sun et al., 2004 Lejoyeux & Weinstein, 2010). Behavioural therapy research also

emphasizes that impulsive buying behaviour is a part of compulsive buying behaviour (Müeller et al., 2015).

Very few studies reveal the impact of extraordinary negativities such as epidemics, wars, and natural disasters, which affect humanity on a global scale, on impulsive buying, of which many antecedents have been identified (Sneath et al., 2009). In addition, although compulsive purchases are observed in individuals with anxiety disorders, studies on which types of anxiety affect individuals and how much have not been discussed in detail by researchers until now. Moreover, research on impulsive and compulsive buying has examined different variables that may affect these behaviours and the situations that arise as a result of purchases; it did not consider the hierarchical structure between these two purchasing behaviours together with current variables.

This study examined the effects of negative emotional states such as fear and anxiety, caused by an epidemic that affects all societies globally, on impulsive and compulsive buying behaviours. In this context, in line with the views of researchers who associate impulsive buying behaviour with the impulsiveness of individuals and state that this behaviour can lead to compulsive buying behaviour over time; it is thought that individuals may show compulsive buying behaviour in the face of different anxieties and fears caused by COVID-19, and impulsive buying behaviour has a mediating role in this interaction. This study aims to determine the mediator role of impulsive buying behaviour in the effect of anxiety caused by COVID-19 on compulsive buying behaviours in individuals. This is because it reveals how the impulsive buying behaviour, which is generally associated with positive emotions, is affected by negative emotions, emphasizes the effect of specific anxiety types on impulsive and compulsive buying behaviour instead of a general anxiety state, and considers the hierarchical structure between impulsive and compulsive buying behaviour together with a current variable, this research is expected to contribute to the literature. Moreover, one of the two most researched variables in the literature regarding consumers' impulsive and compulsive buying behaviours is the shopping environment. At the same time, the other is the gender of the individuals who make the purchase. For this reason, the possible differences of the conceptual model determined within the scope of the current research, according to the gender of the participants and the environment in which the participants' shop, will be examined.

The study consists of four parts. Following the introduction, the effects of COVID-19 on consumer purchasing behaviour were emphasized with examples from recent studies, and the conceptual framework for impulsive and compulsive buying behaviours was determined. Afterwards, the method section and the results of the field research were included. The findings obtained in the study were compared with the previous analysis. Some theoretical and practical inferences were made, and suggestions were made for similar research to be carried out in the future.

2. COVID-19 Pandemic Period and Its Socio-economic Effects

The coronavirus pandemic is one of the events that deeply affected countries and citizens of the world in the first quarter of the 21st century, socially, psychologically, economically, and socially. Curfews, social isolation practices, travel restrictions, and many other measures have affected the daily lives of individuals. Fear of catching the disease and death, fear of losing their relatives due to this disease, and the fear of famine have led to various concerns in individuals (Arpacı et al., 2020; Salari et al., 2020). These anxieties and fears affect many behaviours and consumers' purchasing behaviours (Khan et al., 2021). Although there is much evidence in the literature that individuals triggered by anxiety and fear make impulsive purchases, which purchases increase according to anxiety type is a detailed researcher have relatively ignored. Gallagher et al. (2017) found that physical and cognitive concerns trigger compulsive buying, but social anxiety does not affect consumer buying behaviour. It has been determined that the health anxiety experienced by individuals affects their obsessive-compulsive disorders (Murphy et al., 2010; Brand et al., 2013). It is known that compulsive buying behaviour, which is considered an obsessive-compulsive disorder, also causes compulsive buying in social isolation, loneliness, and alienation resulting from social dynamics (Valence et al., 1988; O'Guinn & Faber, 1989). So, did the isolation of individuals, social isolation, and various fears due to the COVID-19 process affect compulsive buying behaviours?

Lopes et al. (2020) found that fear of COVID-19 explains a significant part of the variance towards compulsive buying behaviour. During the pandemic process, the number of shopping made in the store environment is decreasing (Grashuis et al., 2020); even consumers who do not usually prefer online shopping have started to shop online during the pandemic period (Watanabe & Omori, 2020). Another consumption habit change caused by the fear of coronavirus is the stocking behaviour (Sheth, 2020) caused by the fear of scarcity (Hamilton, 2021; Jezewska-Zychowicz et al., 2020). This behaviour is associated with individuals' fast and emotion-oriented thinking (Melo, 2020). Islam et al. (2020) found that the fear of scarcity caused by COVID-19 increased impulsivity and significantly affected impulsive and compulsive buying behaviours. In response to the uncertainty they experienced during the pandemic, individuals preferred to stock up by purchasing toilet paper, durable food and cleaning materials, and medical supplies, which they saw as basic needs (Terlep, 2020; Dietrich et al., 2020). For example, Chenarides et al. (2021), in their study conducted in May-2020, when the first severe effects of the coronavirus were seen in the United States, found that many consumers shopped at the grocery store excessively compared to their regular purchases due to the fear of product stocks being left. They were hesitant to make these purchases in the store environment. Schiller et al. (2021) consider this type of significant stocking behaviour during the pandemic period as an obsessive-compulsive tendency. The stocking behaviour of the individual is seen as a way of coping with the stress of life-threatening situations, suppressing or overcoming anxiety (Krafft et al., 2020). Chen et al. (2017) explained such behaviours of consumers in the context of Compensatory Control Theory and stated that uncertainty, anxiety, fear from the pandemic caused control weakness. Çelik and Köse (2021), on the other hand, found that increased

anxiety and stress in Turkish consumers with COVID-19 increased compulsive buying and stocking. Xiao et al. (2020) found that COVID-19 pressure increases perceived uncertainty, which increases individuals' daily arousal levels, and this increase in arousal increases impulsive buying.

One of the most important reasons that cause such shopping is anxiety disorder (Petersen, 2020), mood disorder, excessive internet use, and extreme loneliness and depression due to social isolation (Donthu & Gustafsson, 2020). Li et al. (2020) stated that individuals, being stimulated due to negative emotions such as fear, perform panic buying behaviour, which is a kind of impulsive buying behaviour common in consumers during crisis periods (Roy & Chakraborty, 2021). Nakano et al. (2020) found that those who made more panic purchases during the pandemic were prominent family members, were generally male, and prone to impulsive purchases. Lovato et al. (2020) found that unusual purchases were associated with voluntary social isolation behaviours during the COVID-19 process. It is necessary to clarify how much the fear of COVID-19 and the impulsive shopping behaviour applied to calm down the negative emotions caused by this fear affect the society in emergencies and crisis processes, at what level, and whether it continues in the future (Billore & Anisimova, 2021). Taylor et al. (2020) also stated that more studies are needed in this area to determine the persistence of stress-induced behavioural changes caused by COVID-19.

Although it is known that impulsive buying, which depends on the emotional state of individuals, usually occurs after positive emotional states (Rook & Gardner, 1993), studies revealing the effect of negative emotions are very few. Shahjehan et al. (2012) expressed this situation as "definition myopia". This study examined the impact of various fears experienced by individuals as a negative factor causing impulsive buying behaviour. The hypotheses are determined in this direction.

H1: Psychological fear directly affects impulse buying.
H2: Psychosomatic fear directly affects impulse buying.
H3: Social fear directly affects impulse buying.
H4: Economic fear directly affects impulse buying.

3. Compulsive Buying

3.1. Theoretical Background and Definitions

Compulsive purchasing is an internal (rarely external) and overbearing behaviour with an overwhelming purchase impulse (O'Guinn & Faber, 1989). Some researchers replace the expression of compulsive buying with shopping addiction (Glatt & Cook, 1987; Schernorn et al., 1990), shopping spree (Winestine, 1985; Koran, 1999), consumption disorder (Faber et al., 1995), compulsive consumption. (Faber et al., 1987), consumption addiction (Hirschman, 1992), spending addiction (Hanley & Wilhelm, 1992; Campbell, 2000). Unlike regular purchases, compulsive buying behaviour, characterized by excessiveness, frequent repetition, and causing negative situations, is a particular form of

compulsive consumption. The differences between the two concepts are explained in consumption and addiction O'Guinn and Faber (1989). Consumption of any substance includes experiences such as time, space, and the benefit obtained from its use (Schmit, 1999). However, in compulsive purchasing, it is the act of shopping that matters rather than the experience or benefit of using the purchased product (Lejoyeux et al., 1996). This feature indicates that compulsive buying is a kind of addiction (Lejoyeux & Weinstein, 2010). However, shopping is an act to escape from negativities such as tension, anxiety, anger, not the product. Addictions such as alcohol, cigarettes, drugs, overeating, and sex cause physiological harm to the individual. However, few of the damages caused by shopping addiction are stress-related, so they are considered physiologically (O'Guinn & Faber, 1989). The harms that occur in compulsive shopping are in the form of insolvency, regret, tensions in family or friends (Goldsmith & McElroy, 2000). In addition, while the interest in the product continues in substance addiction, after the compulsive shopping, the interest in the product ends (O'Guinn & Faber, 1989).

Before compulsive buying behaviour, the individual is strongly triggered by an internal stimulus. Negative moods such as fear, anxiety, boredom, self-critical thinking, and sadness determine the severity of arousal. The only thought of where, when, and how to shop occupies the individual's mind, whose urge to shop in a way that disables the cognitive processes are intensified, and one's willpower weakens. At this stage, the individual's aim is not what the product to buy or how it will benefit, but to get rid of the negative emotional state and tension, even temporarily, by shopping (Dell'Osso et al., 2006). The relief experienced is short-lived, followed by feelings of regret and guilt (Faber & O'Guinn, 1988; Lee & Workman, 2018).

Moreover, excessive shopping for this temporary sense of relief can lead to various socio-economic and legal problems and even family conflicts (Christenson et al., 1994; Park & Burns, 2005; Black, 2007). Despite these negative situations after shopping in compulsive buying behaviour, the individual soon purchases by following the same stages. Although the individual notices the loss of impulse control and the negative situations observed as a result of the behaviour, the compulsive buying behaviour is seen as an addiction due to the repetition of the same behaviour (Valance et al., 1988; DeSarbo & Edwards, 1996).

3.2. Compulsive Buyers

Compulsive buyers generally have low self-esteem (Yurchisin & Johnson, 2004), high brand attachment (Japutra et al., 2019), materialistic (Dittmar, 2005; Xu, 2008; Mueller et al., 2011), propensity to daydream high (Edwards, 1992), prone to depression (Scherborn et al., 1990; Mueller et al., 2011), low self-esteem (Krueger, 1988; Marlatt et al., 1988), high anxiety level (Schlosser et al., 1994; Black, 2007) are characterized as individuals. In addition, compulsive buyers have more credit cards (Dittmar, 2005), are willing to talk more on mobile phones and connect to online shopping sites frequently (Lejoyeux et al., 2007), and are prone to online shopping due to the ease of access (Wang & Yang, 2008). Although their shopping frequency varies from once a month to several times a day, they shop 2-3

times a week on average (Christenson et al., 1994; Schlosser et al., 1994). Compulsive buyers, who can't help but think about shopping or spending in their daily lives, care about their appearance (Krueger, 1998), are fond of fashion (Park & Burns, 2005), and are highly interested in new products (Black, 2007). A significant proportion of compulsive buyers have mood disorders (Lejoyeux et al., 1996), anxiety (Schlosser et al., 1994; Roberts & Jones, 2001), substance use (Christenson et al., 1994; Black et al.) 1998), eating disorder (Finke & Huston, 2003; Faber, 2010), internet addiction (Mueller et al., 2011), impulse control disorder (Hanley & Wilhelm, 1992), obsessive-compulsive disorder (McElroy et al., 1994; Black et al., 1998), excessive stacking (Frost et al., 2002, Lejoyeux & Weinstein, 2010) have been observed. Schlosser et al. (1994) also observed behaviours such as returning purchases, not taking them out of the package, selling or giving to someone else in compulsive buyers.

Hirschman (1992) categorized compulsive buyers as sociopathic and distressed. For compulsive buyers at the sociopathic level, the act of shopping is a kind of addiction. In contrast, for distressed compulsive buyers, the purchased products are a way of relaxation and stress relief (Neuner et al., 2005). Edwards (1993) categorized compulsive buying behaviour as chronically addicted, compulsive, uncertain, and non-compulsive buying behaviours. Faber and O'Guinn (2008) made a similar distinction, and compulsive buyers were categorized as pathological buyers and excessive buyers. According to the researchers, who suggest measuring both groups with the same scale, more research should be done in the future to distinguish between these two groups of consumers.

DeSarbo and Edwards (1996) suggested examining individuals' purchasing motivations to interpret whether their purchases are excessive or compulsive. While buyers at the pathological level make compulsive purchases chronically and repetitively, unreasonable buyers are not as severe as the other group. Although extreme buyers are similar to pathological buyers in many aspects, they make purchases positively (Beatty & Ferrel, 1998) and use what they buy (Yurchisin & Johnson, 2004). While pressure and tension are dominant in pathological buyers when something is not purchased, such a situation is not observed in excessive buyers (Rook & Gardner, 1993).

According to the researchers who consider compulsive purchasing behaviour an impulse control disorder, the most crucial difference in compulsive purchasing behaviour as in all impulse control disorders is related to gender (Popkin, 1989; McElroy et al., 1991; Christenson et al., 1992). Although studies are showing that men and women make compulsive purchases at similar rates (Koran et al., 2006), the standard view among researchers is that compulsive buyers are generally women (O'Guinn & Faber, 1989; Roberts, 1998; Yurchisin & Johnson, 2004; Dittmar, 2005). While women (Schlosser et al., 1994; Black, 2001, 2007) generally make compulsive purchases in clothing, shoes, cosmetics, and jewellery, men (McElroy, 1994) buy automotive and technological products their hardware parts. In addition, it is known that compulsive buyers are generally between the ages of 18-30, when they move away from their nuclear families and step into a free life when they can get a loan for the first time and have their first credit card, and who have not

thought of getting married yet (Black, 2007). Although there is no generalizable relationship between compulsive shopping behaviour and income level (Christenson et al., 1992), pathological compulsive buying behaviour is observed more frequently in low-income individuals (Black, 2001).

Research on consumer buying behaviour has shown that any single factor cannot explain compulsive buying behaviour. Therefore, researchers have adopted the bio-psycho-social model, assuming that all physiological, biological, genetic, psychological, social, and cultural factors cause this behaviour disorder (Faber, 1992). Despite this approach, studies on the details of fears or anxieties that impact individuals' impulsive buying behaviours have remained very limited in previous studies. This study examined the effects of psychological, psychosomatic, social, and economic fears experienced by individuals on compulsive buying behaviour. The hypotheses are determined in this direction.

H5: Psychological fear directly affects compulsive buying.
H6: Psychosomatic fear directly affects compulsive buying.
H7: Social fear directly affects compulsive buying.
H8: Economic fear directly affects compulsive buying.

4. Impulsive Buying

4.1. Theoretical Background

Impulsive buying behaviour has become a topic of interest to marketing researchers since the early 50s (Clover, 1950). Initially, the common view was that impulsive purchasing was a form of unplanned purchasing behaviour (West, 1951). According to this view, impulsive purchasing was in the form of a positive difference between the shopping list planned before shopping and after the actual purchase (Weinberg & Gottwald, 1982). This period examined what impulsive purchases were among unplanned purchases in general, not the factors that affected impulsive purchasing behaviour. As consumer-focused approaches in the field of marketing become up-to-date, researchers have associated impulsive purchases with moods and impulsiveness (Lee & Yi, 2008), and it has been found that this behaviour occurs thoughtlessly, in search of excitement, and as a result of high arousal (Kacen & Lee, 2002). Researchers have focused mainly on determining the antecedents of impulsive buying behaviour in recent years.

Impulsive buying behaviour is associated with reactive personality traits (Rook, 1987). These people experience tension to get rid of the negativities they encounter quickly. They try to overcome the current negative situation by losing their cognitive control. One of these ways is impulse buying behaviour (Weinberg & Gottwald, 1982). Impulsive buying is an instantaneous behaviour stimulated by a strong and often irresistible urge, with no consequences, which is likely to cause emotional conflict due to its hedonic complexity (Rook, 1987). In impulsive purchases, the individual does not experience processes such as collecting information about the product, making comparisons, and getting recommendations, and the feeling of relief after the purchase is at the forefront as an

individual makes an instant purchase decision to suppress the impulse (Jones et al., 2003; Verplanken & Sato, 2011; Jones et al., 2003). After impulsive shopping, some financial problems, mood disorders, weak willpower, guilt, and various social issues may occur (Rook, 1987; Gardner & Rook, 1988; Kivetz & Zheng, 2006; Zhang & Shrum, 2009).

Some factors that affect the impulse buying behaviour of individuals consist of in-store variables controlled by marketers such as advertising activities, well-trained salespeople, various sales, and the atmosphere and design of the store consisting of store type, size, lighting, and sound system. (Youn & Faber, 2000; Karabasivar & Yarahmadi, 2011; Chang et al., 2011; Mohan et al., 2013; Vishnu & Raheem, 2013; Sun & Yazdanifard, 2015). These variables are now expressed as innovative sales, promotions, creative messages, and appropriate technologies (Schiffman & Kanuk, 2010). In online purchases, these factors include the time spent on the website, the website's ease of use, the page's colouring and design, and the online support services on the page (Ling & Yazdanifard, 2015). Internal factors that have an impact on impulse purchasing behaviour are different personalities and characteristics (Muruganantham & Bhakat, 2011; Putra et al., 2017; Sofi & Nika, 2016; Miao et al., 2019), positive emotions (Chang et al., 2011), individual norms (Rook & Fisher, 1995), greater feelings of amusement, delight, enthusiasm, joy (Weinberg & Gottwald, 1982), lifestyle, materialism and sensation seeking (Rook, 1987), a personal tendency to buying impulse (Rook & Fisher, 1995; Putra et al., 2017), variety seeking (Sharma et al., 2010), lack self-control (Youn & Faber, 2000), hedonic needs and motivations (Hausman, 2000; Beatty & Ferrel, 1998; Dey & Srivastava, 2017). In addition, location, shopping duration, shopping period and shopping habits (Shapiro, 1992; Jeffrey & Hodge, 2007), functional benefits (Schiffmann & Kanuk, 2010), product-oriented involvement (Jones et al., 2003; Chen, 2008); Liang, 2012), the attractiveness of product packaging (Hubert et al., 2013), affects spending habits and impulsive buying behaviours (Beatty & Ferrel, 1998). Sneath et al. (2009) found that stress and depressed mood affect impulsive and compulsive purchasing.

Emphasizing that impulsive buying behaviour is positively affected by changing market dynamism and consumption habits (Hock & Loewenstein, 1991), impulsive buying tendency (Sun & Wu, 2011; Foroughi et al., 2013), internet addiction (Sun & Wu, 2011), increase in income level (Beatty & Ferrel, 1998), widespread use of the internet and online shopping (Kacen & Lee, 2002; Sun & Wu, 2011), rise in technological developments (Lee & Yi, 2008), cultural effects (Dawson & Kim, 2009) and various consumption impulses; beside; It has been determined (Rook & Fisher, 1995), that the norms that characterize the society as risky, immature, wasteful and irrational and task orientation (Sun & Wu, 2011) negatively affect it. Hausman (2000) emphasized that individuals reporting negative emotions after impulsive purchases are less than expected, and therefore, impulsive buying behaviour is more associated with satisfaction, hedonism, and positive emotional components.

4.2. Impulsive Buyers

Impulsive buyers enjoy touching the product before purchasing (Peck & Childers, 2006), have high brand loyalty (Japutra et al., 2019); generally, women and young (Sharma, 2011) have a strong emotional bond with the product and desire instant satisfaction (Sharma, 2011), have extroverted personalities (Verplanken & Herabadi, 2001), are materialistic (Troisi et al., 2006), and do not take into account possible post-purchase negativities (Hoch & Loewenstein, 1991). In addition, these people are highly aroused by external stimuli and immediately respond to impulse buying impulses (Rook & Fisher, 1995). These individuals, who are interested in the symbolic aspects of products, see shopping as a means of expressing themselves. However, it varies from person to person, and often buy products such as perfumery, cosmetics, clothing, fashion products, and sports products instantly (Dittmar et al., 1995, 1996; Pradhan, 2016). One of the most studied variables in impulsive buying behaviour was gender. Many studies show that positive emotions towards purchasing, irresistible urges towards shopping, and unplanned shopping are more common in women (Coley & Burgess, 2003). Verplanken and Sato (2011) emphasize that impulsive buyers cannot give up on purchasing despite having economic difficulties because of high impulsiveness. For this reason, individuals with high impulsive buying tendency, when they encounter attractive products, desire to own them even if they do not have enough cash, even by using a credit card. (Roberts & Jones, 2001; Ramanathan & Menon, 2006).

Faber (2010) considered impulsive purchasing behaviour as an unexpected and ordinary behaviour that everyone can experience at least once in their life, while compulsive buying is regarded as a psychological disorder that is present in a small number of people and emphasized the negative feelings experienced by the individual as a result. Shoham and Brenic (2003) stressed that the first step of consumers' compulsive purchasing behaviour process is unplanned, instant, sudden, and impulsive purchases made with an impulse from outside. Kwak et al. (2006) emphasized that impulsive and compulsive purchasing behaviour cannot be considered separately because of impulse control disorder or weakness and negative moods, being unplanned, generally making large amounts of purchases from the same products, and negative situations that occur after purchasing are similar. Darrat et al. (2016) emphasized that the tension that will arise after impulsive buying can trigger compulsive buying behaviour. Verplanken and Sato (2011) stressed that impulsive buying could turn into compulsive buying behaviour over time, and in this case, pathological consequences of impulsive buying behaviour may occur. D'Astous (1990) emphasized that if the impulse to buy is persistent and excessive, it can become low-level compulsive buying behaviour.

On the other hand, the mediating role of impulsive buying behaviour, which has been found to mediate compulsive buying behaviour in a limited number of studies, on the effect of fears created by COVID-19 in consumers on compulsive buying behaviour has been examined within the scope of this research. The hypotheses are determined in this direction.

H9: Impulsive buying directly affects compulsive buying.

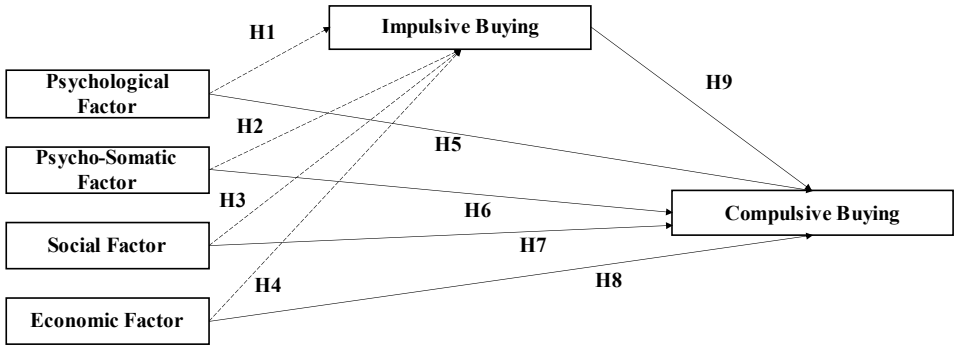
H10: Impulsive buying has a mediating effect on COVID-19 fear on compulsive buying.

5. Methodology

5.1. Research Model, Measures and Procedures

The primary purpose of this research is to examine the relationship between the various fears that individuals experience during the COVID-19 pandemic and compulsive buying behaviours and determine the mediator role of impulsive buying behaviour in this relationship. The research is explanatory. Within the scope of the study, first of all, a detailed literature review was done. In the current studies in the literature, it has been determined that various fears experienced by individuals due to COVID-19 affect their purchasing behaviour. The research has determined that multiple fears caused by COVID-19 mainly focus on compulsive buying, which can be expressed as excessive or obsessive buying behaviour, impulsive buying, which can be defined as impulse buying, and panic buying behaviour. Accordingly, individuals under the influence of negative moods may exhibit compulsive buying behaviour, and impulsive buying behaviour was interpreted as a variable that could mediate this interaction and was included in the research model. The research model and hypotheses specified in Figure 1 were created in this direction.

Figure: 1
Research Model



Although there is no clinically definitive diagnostic guide for the detection of compulsive buying behaviour, the most frequently used methods in the field of consumer behaviour and psychiatry are observing the purchasing behaviour of individuals in terms of amount, duration, spending amount, detecting other accompanying mental disorders or using face to face interview technique is to ask questions (Müller et al., 2015).

When the literature is examined, studies investigating the relationship between the purchasing behaviour of individuals and various demographic characteristics, the environment in which they shop, the frequency of shopping, the frequently preferred

payment method, and the product group purchased have been found. On top of that, while the questionnaire was being prepared, online interviews were conducted with 20 participants who participated voluntarily. Questions were asked about the details of their shopping during the pandemic period. The answers obtained were brought together. The questionnaire form included questions to determine the participants' demographic characteristics and shopping habits and the answer alternatives included in these questions. After the questionnaire form was created at the beginning of the study, a pilot study was conducted in which 50 people participated. According to the data obtained from this study, it was observed that the corrected item-total correlation value of 32 items was not found to be below 0.3 (0.508 - 0.781), and it was decided to apply the questionnaire to the final participants.

5.2. Participants

The online survey method was preferred as a data collection technique in the study. Data were collected between 10.05./20.05.2021 after obtaining the approval of the ethics committee. While transferring the questions to the online survey provider, some measures were taken to protect the data quality. Accordingly, rules such as answering only one survey from each electronic device, giving a system warning in case of incomplete answers, and showing the progress on the home page have been set. Due to the global pandemic conditions, the convenience sampling method was applied to make it easier for the participants to reach the survey and increase the number of answers. Accordingly, the access link to the study was systematically shared with 20 people in the close circle of the researchers, and these people were asked to answer the survey first and then share it with 20 people in their process. In addition, the researchers transferred the link to the questionnaire with the people they were in close contact with through their social media accounts, and the same request was made from these people. Since the target population to be studied within the scope of the research is more significant than ten thousand, the sufficient sample size was determined as at least 384 according to the calculation method suggested by Aaker et al. (2013: 382). However, the previously targeted sample size was exceeded to reduce the sampling error during the data collection phase. At the end of the data collection process, it was seen that 721 participants answered the questionnaire thoroughly.

6. Findings

6.1. Demographic Characteristics

75.9% of the participants are women, 65.7% are married, 20.5% are between the ages of 18-28, 41.2% are between the ages of 29-39, 23.3% are between the ages of 40-50 period, 12.5% are 51-61 years old, and 2.5% are 62 years old or over. While 14% of the participants have a postgraduate education level, 61.6% are 4-year university graduates, 6.8% are 2-year university graduates, and 17.6% have a high school or lower education. In addition, 8.9% of the participants are students, 46.6% are civil servants, 15.8% are private-sector employees, 8.5% are self-employed, 9.3% are retired, 9,8% are unemployed, 1.1% are housewives. On the other hand, when the monthly incomes of the participants are examined, 23% of them

are 2.500 TL or less, 34% of them are between 2,501 - 5.000 TL, 30.4% are between 5.001 - 7.500 TL, 8.2% are between 7.501 - 10,000 TL, 4.4% of them were found to be 10,001 TL or more.

6.2. Shopping Habits During Pandemic

When the product groups that the participants spent the most during the pandemic process were examined, it was observed that 72.5% of the participant spent on food while 10.7% cleaning, 3.3% paper and cosmetic products, 2.6% baby and mother care products, 3.2% various household product, 1.2% for electronic products, 2.9% for books, magazines or stationery products, and 3.5% for clothing. While 38.8% of the participants preferred the store environment for their shopping, 61.2% of them shopped online. 1.5% of the individuals participating in the study had shopping several times a day during the pandemic process while 8.5% once every day, 15.4% once every two days, 31.3% twice a week, 25%, 4 of them shop once a week, 11.1% twice a month, and 6.8% had shopping once a month. 19.4% of the participants preferred to pay in cash during the pandemic period, while 75.6% were selected by credit card, 2.6% by money order-eft, 1.9% by cash on delivery, and 0.4% by shopping loans.

6.3. Validity and Reliability of Measures

6.3.1. Fear of COVID-19

The COVID-19 Phobia Scale developed by Arpacı, Karataş, and Baloğlu (2020) was used to determine the fears of the individuals participating in the study about COVID-19. The original form of the scale is 4-dimensional, consists of a total of 20 items, and is graded with a 5-point Likert scale (*1=Strongly Disagree and 5=Strongly Agree*). As a result of the explanatory factor analysis, Arpacı et al. (2020) observed that the factor loads of the items in the scale were between 0.45 and 0.87 and determined that the Cronbach's alpha coefficient was 0.925 as an internal consistency measure of the scale. Explanatory factor analysis was conducted to determine the factor structure of the measurement scales used to measure the study's participants' fears. While applying the factor analysis, varimax rotation was chosen. Factors with an eigenvalue greater than one were taken into account to determine the optimal number of independent factors (Hair et al., 2014). In the explanatory factor analysis performed with varimax rotation in the current study, it was seen that the scale had four dimensions, and the total explained variance was 68.869% (*KMO: 0.927, Bartlett χ2:9295,422, p:0.000*). The first dimension is named as "Psychological Fear" dimension. It was determined that the psychological fear dimension explained 20.203% of the total variance, consisting of 6 items ($\bar{x}$=3.88, σ=0.91), and the factor loadings of the items were between 0.49 and 0.83. The second dimension was named "Psychosomatic Fear", and it was seen that there were five items ($\bar{x}$=1.83 σ=0.89) under this dimension, which explained 17.731% of the total variance, and the factor loadings of the items were between 0.64 and 0.85. The third dimension of the scale was named "Social Fear", and it was seen that this dimension consisted of five items ($\bar{x}$=3.11, σ=1.11), explained 16.631% of the total variance,

and factor loadings the items ranged between 0.63 and 0.79. The fourth dimension of the scale was named "Economic Fear", and it was seen that this dimension consisted of four items ($\bar{x}$=2.12, σ=0.99), explained 14,305% of the total variance, and the factor loads of the items varied between 0.74 and 0.79. The Cronbach's alpha value calculated as the internal consistency coefficient of the scale is 0.932, and this value is 0.89 in the psychological fear dimension, 0.89 in the psychosomatic fear dimension, 0.89 in the social fear dimension, and 0.85 in the economic fear dimension. Since the scale was adapted to a different sample group, confirmatory factor analysis was applied to the obtained data. It was observed that the initial model was not confirmed, and the modifications suggested by the model were performed accordingly (*χ^2/df:6,071, GFI:0,870, CFI: 0,910, NFI:0,894, TLI:0,895, RMSEA:0,084*). At this stage, after the covariances were drawn between the 1st and 2nd items for the economic anxiety of COVID-19 and between the 3rd and 4th items for the social anxiety, the model reached acceptable levels of fit. The compatibility of the collected data with the scale in the literature was verified (*χ^2/df:3,815, GFI:0,920, CFI: 0,950, NFI:0,934, TLI:0,895, RMSEA:0,063*). It was found that the standardized factor loads obtained as a result of the analysis were 0.59 to 0.85 (AVE=0.59, CR=0.90) in the psychological fear dimension, 0.72 and 0.87 (AVE=0.64, CR=0.90) in the psychosomatic fear dimension, 0.71 to 0.84 (AVE=0.57, CR=0.87) in the social fear dimension and 0.52-0.88 (AVE=0.56, CR=0.90) in the economic fear dimension. To determine the construct validity, it was seen that the construct validity of the scale was provided according to the average explained variance (AVE) and composite reliability (CR) values with standardized factor loads obtained by exploratory factor analysis.

6.3.2. Compulsive Buying Scale

The Compulsive Buying Scale developed by Faber and O'Guinn (1992) was used to measure the compulsive buying behaviours of individuals in the current study. The original form of the scale consists of a total of 7 items and is graded with a 5-point Likert scale (*1=Strongly Disagree and 5=Strongly Agree*). Since the compulsive buying scale was adapted into Turkish with different expressions by many researchers, permission to use the scale was obtained from *Thomas O'Guinn* before it was used within the scope of the current study. The items were adapted into Turkish by adhering to the literature. Since the scale was developed a long time ago, several procedures were followed to comply with today's conditions and at the same time adhere to the original form. Accordingly, the opinions of English and Turkish language experts were taken for the translated scale items. Then the views of two Turkish researchers working as an academician in the Department of Business Administration in the United States were sought. In line with the suggestions received, the translations were revised. This time, a pre-test was conducted for 20 graduate students with a doctorate or master's degree in business administration and a good command of English or Turkish languages. In addition to the notifications from these individuals, the opinions of 2 different academicians working as an academician in the Department of Business Administration in Turkey and two academicians in the Department of Psychology were taken.

Finally, to prevent the possibility of Turkish expression disorder in expressions, the scale was checked by Turkish language experts. The final form of the compulsive buying scale was given following the use of the current study. According to the explanatory factor analysis applied to the scale, the compulsive buying scale is one-dimensional, and the total explained variance of the scale is 60,334% (*KMO:0,849 Bartlett, χ2:1270,041, p:0,000*). Since the factor loads of the 6th and 7th items in the ranking were below the values recommended by Tabachnick and Fidell (2013), they were excluded from the study. In this case, the scale's factor load of 5 items ($\bar{x}$=2,02, σ=0,94) varies between 0.70 and 0.82. The Cronbach's Alpha value, which is the internal consistency coefficient of the scale, was calculated as 0.829. Confirmatory factor analysis was applied since the ranking was adapted into Turkish, and a new sample group was studied. The goodness of fit values obtained according to the confirmatory factor analysis results applied for the compulsive buying scale could not be verified in line with the data obtained from the initial model (*χ^2/df:11,421, GFI:0,938, CFI: 0,823, NFI:0,916, TLI:0,884, RMSEA:0,120*). After the modifications suggested by the model were carried out, the standardized factor loadings of the 6th and 7th items in the scale were excluded from the study because their factor loadings were below 0.5. It was seen that the values obtained as a result of repeated analysis provided an acceptable fit (*χ^2/df:2,956, GFI:0,992, CFI: 0,992, NFI:0,988, TLI:0,985, RMSEA:0,052*). As a result of the confirmatory factor analysis, standardized factor loads were between 0.60 and 0.78 (AVE=0.51, CR=0.84). According to the results obtained, it was seen that the scale provided one-dimensional construct validity.

6.3.3. Impulsive Buying Behaviour Scale

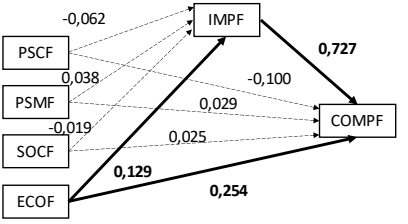
A 5-item, 5-point Likert scale developed by Weun, Jones, and Betty (1997) was used to determine participants' impulsive buying behaviours. The Turkish adaptation, validity, and reliability analysis of the scale was performed by Torlak and Tiltay (2010). Before the scale was used within the scope of the research, permissions were obtained by Michael Jones and Muhammet A. Tiltay. The form of the expressions in the scale, adapted to Turkish respondents validly and reliably, was used in the same way. According to the explanatory factor analysis applied to the scale, the impulsive buying scale is unidimensional, and the total explained variance of the scale is 69.307% (*KMO:0.790, Bartlett χ2:1274.015, p:0.000*). It was excluded from the study because the factor loading of the 5th item in the scale was less than 0.32 (Tabachnick & Fidell, 2013). In this case, the factor load of the four expressions (*$\bar{x}$=2,29, σ=1,02*) in the scale varies between 0.79 and 0.87. The Cronbach's Alpha value, which is the internal consistency coefficient of the scale, was calculated as 0.851. Confirmatory factor analysis was applied since the scale was adapted into Turkish, and a new sample group was studied. Similar to other scales used in this study, it was observed that the first model obtained as a result of the confirmatory factor analysis applied to the impulsive buying behaviour scale was outside the acceptable goodness of fit values, and the modifications suggested by the model were applied. (*χ^2/df:10,036, GFI:0,971, CFI: 0,967, NFI:0,963, TLI:0,933, RMSEA:0,112*). As a result of the modifications, the 5th item of the impulsive buying behaviour scale was excluded from the study because the

standardized factor load was below 0.5, the covariance between the 3rd and 4th items was drawn, and the analysis was repeated, revealing that the resulting values were in perfect agreement (*χ^2/df:0,032, GFI:1,000, CFI:1,000, NFI:1,000, TLI:1,000, RMSEA:0,000*). Standardized factor loads obtained from confirmatory factor analysis are between 0.63 and 0.90 (*AVE=0,57, CR=0,84*). According to the confirmatory factor analysis, the construct validity of the measurement tools was ensured (Fornell & Larcker, 1981; Byrne, 2016), and according to the calculated Cronbach's Alpha values, measurement scales are reliable (Robinson et al., 1991).

6.4. Testing the Research Model

The mediation effect in the research model was tested with the structural equation model. Before the analysis, the conformity of the data to the normal distribution was tested. The suitability of measurement tools to normal distribution was evaluated according to the kurtosis and skewness measures. Accordingly, since the calculated statistical value of each dimension is in the range of +/- 1.5, it has been determined that the data are by the normal distribution (Tabanchnick & Fidell, 2013). The research model created to determine the mediating effect of impulsive buying behaviour in the effect of fear of COVID-19 on compulsive buying behaviour was tested with the structural equation model, and the test result is summarized in Figure 1. Before testing the hypotheses in the research model with the structural equation model, confirmatory factor analysis was applied to the conceptual model as a whole. As a result of the analysis, it was determined that the model showed a good fit (*χ^2/df:3,495, GFI:0,888, CFI:0,928, NFI:0,902, TLI:0,918, RMSEA:0,059*).

Figure: 1
Test of Research Model



According to the analysis results, the psychological, psychosomatic, and social fears of the individuals participating in the research due to COVID-19 do not affect compulsive and impulsive buying behaviour; On the other hand, economic worries seem to be influential on impulsive and compulsive buying behaviours. In addition, it is seen that individuals' impulsive purchases affect their compulsive buying behaviours. On the other hand, according to the analysis results, it was seen that impulsive buying behaviour had a partial mediating effect on the effect of economic fear caused by COVID-19 on compulsive buying behaviour in individuals.

Table: 1
Summary of The Research Model

Model-1: The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying					
Parameters				**β**	**p**
Impulsive Buying ← Economic Fear				0,129	**0,003**
Compulsive Buying ← Economic Fear				0,254	***
Compulsive Buying ← Impulsive Buying				0,727	***
χ^2/df:3,451 GFI:0,887 CFI:0,928 NFI:0,901 TLI:0,920 RMSEA:0,058					
	Direct Effect		**Indirect Effect**	**Total Effect**	
	Economic Fear	**Impulsive Buying**	**Economic Fear**	**Economic Fear**	**Impulsive Buying**
Impulsive Buying	0,129	0,000	0,000	0,129	0,00
Compulsive Buying	**0,254**	**0,727**	**0,094**	**0,348**	0,727

The model that measures the mediating effect of impulsive buying behaviour in the impact of the fear of COVID-19 on the compulsive buying behaviour of the individuals participating in the research was examined by multiple group analyses according to the gender of the participants. As a result of the study, the model for women is summarized in Figure 2, and the model for men is outlined in Figure 3.

Figure:2
The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying for Women

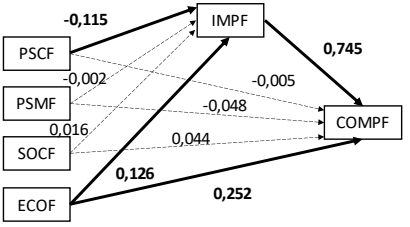
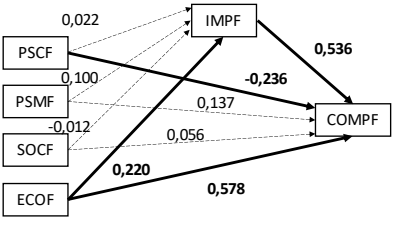


Figure: 3
The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying for Men



According to the analysis results, it was seen that the psychosomatic and social fears of the women participating in the study about COVID-19 did not affect impulsive and compulsive buying behaviour. However, it is seen that impulsive buying behaviour has a partial mediation effect on the effect of economic fears on compulsive buying behaviours of both men and women. In addition, the impact of women's psychological fears about

COVID-19 on compulsive buying behaviour is fully mediated by impulsive buying behaviour. Women's psychological fears of COVID-19 negatively affect their impulsive and compulsive buying behaviour, while economic fears affect positively. In men, unlike women, the psychological fears caused by COVID-19 negatively affect compulsive buying behaviour. On the other hand, impulsive buying behaviour partially mediates the effect of economic concerns about COVID-19 on compulsive purchasing behaviour in male participants.

Table: 2
Summary of The Multigroup Analysis Model by Gender

Model-2: The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying (Multiple Group Analysis by Gender)

Parameters	Women β	Women p	Men β	Men p
Impulsive Buying ← Psychologic Fear	-0,115	**0,035**	0,022	0,825
Impulsive Buying ← Economic Fear	0,126	**0,025**	0,220	**0,033**
Compulsive Buying ← Psychologic Fear	-0,005	0,909	-0,236	**0,008**
Compulsive Buying ← Economic Fear	0,252	***	0,578	***
Compulsive Buying ← Impulsive Buying	0,745	***	0,536	***

χ^2/df:2,522 GFI:0,849 CFI:0,912 NFI:0,863 TLI:0,902 RMSEA:0,046

Women

	Direct Effect			Indirect Effect		Total Effect		
	Economic Fear	**Psychologic Fear**	**Impulsive Buying**	**Economic Fear**	**Psychologic Fear**	**Economic Fear**	**Psychologic Fear**	**Impulsive Buying**
Impulsive Buying	0,126	-0,115	0,000	0,000	0,000	0,126	-0,115	0,000
Compulsive Buying	**0,252**	-0,005	0,745	**0,094**	**-0,085**	**0,346**	**-0,090**	0,745

Men

	Direct Effect			Indirect Effect		Total Effect		
	Economic Fear	**Psychologic Fear**	**Impulsive Buying**	**Economic Fear**	**Psychologic Fear**	**Economic Fear**	**Psychologic Fear**	**Impulsive Buying**
Impulsive Buying	0,220	0,022	0,000	0,000	0,000	0,220	0,022	0,000
Compulsive Buying	**0,578**	**-0,236**	0,536	**0,070**	**0,011**	**0,696**	**-0,224**	0,536

In the model created to measure the mediating effect of impulsive buying behaviour in the impact of the COVID-19 anxiety of the individuals participating in the research on compulsive buying behaviour, multiple group analysis was carried out according to the participants' environment shopped. The model that emerged from the study is summarized in Figure 4 and Figure 5.

Figure: 4
The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying for Store Environment Shopping

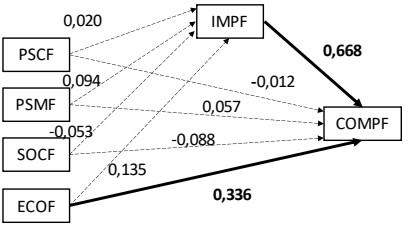
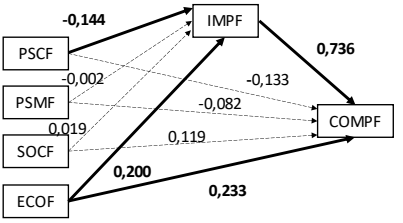


Figure: 5
The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying for Online Shopping



According to the analysis results, there is a partial mediation effect of the impulsive buying behaviour in the impact of the economic concerns of the individuals shopping in the store environment towards the COVID-19 on the compulsive buying behaviour.

Table: 3
Summary of The Multigroup Analysis Model by Shopping Environment

Model-3: The Mediation Effect of Impulsive Buying in The Effect of COVID-19 Fear on Compulsive Buying (Multiple Group Analysis by Shopping Place)

Parameters	Store β	Store p	Online β	Online p
Impulsive Buying ← Psychologic Fear	0,000	0,999	-0,144	**0,018**
Impulsive Buying ← Economic Fear	0,135	0,089	0,200	**0,001**
Compulsive Buying ← Economic Fear	0,336	***	0,233	***
Compulsive Buying ← Impulsive Buying	0,668	***	0,736	***

χ^2/df:2,454 GFI:0,852 CFI:0,915 NFI:0,866 TLI:0,905 RMSEA:0,045

Online

	Direct Effect			Indirect Effect			Total Effect	
	Economic Fear	**Psychologic Fear**	**Impulsive Buying**	**Economic Fear**	**Psychologic Fear**	**Economic Fear**	**Psychologic Fear**	**Impulsive Buying**
Impulsive Buying	0,200	-0,144	0,000	0,000	0,000	0,200	-0,144	0,000
Compulsive Buying	**0,233**	0,000	0,736	**0,147**	**-0,106**	**0,380**	**-0,106**	0,736

According to the analysis results, impulsive buying behaviour has a full mediating effect on the psychological fear of COVID-19 on the compulsive purchasing behaviour of

individuals who shop online. In contrast, impulsive buying behaviour has a partial mediating role in the effect of compulsive purchasing of economic fears. On the other hand, the financial worries of individuals who shop in a store environment affect their compulsive purchasing behaviour.

7. Conclusion

The majority of 721 individuals participating in this study are female, married, young adult, university graduate, working, and middle-income. During the COVID-19 process, the participants mainly shopped twice a week, bought food and cosmetic products, made their purchases online, and mostly preferred credit cards as the payment method. Participants' psychological fears of COVID-19 were high, and their psychosomatic fears were relatively low. It has been determined that the individuals participating in the research have higher impulsive buying tendencies than compulsive buying tendencies during the COVID-19 process. In addition, the rate of excessive buyers ($2.5<\bar{x}<4$) among the total participants was 14.2% ($n=103$), while the rate of those who made pathological compulsive purchases ($\bar{x}\geq4$) was 5.9% ($n=43$) has been identified. On the other hand, the rate of excessive impulsive buyers ($2.5<\bar{x}<4$) was 21.9% ($n=158$), while the rate of pathologically impulsive buyers ($\bar{x}\geq4$) was 10.1% ($n=73$) seen.

According to the results of the analysis, women's psychological ($p=0,002$, $t=3,041$, $\bar{x}=3,93$) and psychosomatic fears ($p=0,038$, $t=2,76$, $\bar{x}=1,86$) of COVID-19 are higher than men. On the other hand, women's compulsive (p=0,000, t=4,897, $\bar{x}$=2,09) and impulsive buying behaviours (p=0,000, t=3,962, $\bar{x}$=2,36) are higher than men during the pandemic process. Singles have higher averages for compulsive ($p=0,000$, $t=-3,739$, $\bar{x}=2,21$) and impulsive buying behaviours ($p=0,001$, $t=-3,416$, $\bar{x}=2,47$) compared to married individuals. On the other hand, the average of online shoppers for compulsive ($p=0,000$, $t=-5,762$, $\bar{x}=2,16$) and impulsive buying behaviour ($p=0,000$, $t=-4,667$, $\bar{x}=2,43$) is higher than those who prefer to shop from the store. While social fears ($F=4,588$, $p=0,001$, $\bar{x}=3,52$) of individuals aged 62 and above are higher than individuals aged 29-39, compulsive ($F=12,178$, $p=0,000$, $\bar{x}=2,38$) and impulsive buying behaviours ($F=7,470$, $p=0,000$, $\bar{x}=2,51$) of individuals aged 18-28 are higher compared to individuals aged 62 and above. Individuals with a monthly income of 2.500 TL or less have psychological ($F=6.582$, $p=0.000$, $\bar{x}=4.15$), social ($F=8.415$, $p=0.000$, $\bar{x}=3.49$), and economic fears ($F=2.414$, $p=0.048$, $\bar{x}=2.29$) is higher compared to individuals with higher income. In addition, individuals with a monthly income of 2,500 TL or less have a higher average for compulsive buying behaviour ($F=2.991$, $p=0.018$, $\bar{x}=2.20$) compared to individuals with an income of 5.001-7.500 TL. On the other hand, the average impulsive buying behaviours of individuals with an income of 10.001TL or more ($F=2.898$, $p=0.021$, $\bar{x}=2.75$) is higher than individuals with an income of 2.500TL or less.

It has been determined that individuals with doctoral-level education have higher social fears ($F=3.759$, $p=0.002$, $\bar{x}=3.71$) towards COVID-19 compared to individuals with

undergraduate education. In addition, it has been observed that individuals with master's degree education have lower economic fears (*F=4.022, p=0.001, $\bar{x}$=2.05*) compared to individuals with an associate degree or doctoral education. The impulsive buying behaviours of individuals with primary education levels during the pandemic process (*F=4.022, p=0.001, $\bar{x}$=2.30*) are lower than individuals with higher education. It was determined that the psychosomatic fears of the housewife's participants (*F=2.912, p=0.008, $\bar{x}$=2.93*) were higher than the other individuals. On the other hand, individuals working as civil servants were found to have lower social fears (*F=3.634, p=0.001, $\bar{x}$=2.99*) compared to students or retired individuals. It is observed that the economic concerns of retired individuals (*F=2.773, p=0.011, $\bar{x}$=2.45*) are higher than the self-employed individuals. It is seen that the compulsive buying tendencies of retired individuals participating in the research (*F=5.858, p=0.000, $\bar{x}$=1.66*) in their shopping during the pandemic period have a lower average than students, self-employed or civil servants. In addition, it is observed that the students' impulsive tendencies (F=4.025, p=0.001, $\bar{x}$=2.49) during the pandemic period are higher than the self-employed or retired individuals.

Among the participants, the fear of COVID-19 of the individuals who use a credit card as a payment method (p<0.05) is higher than those who prefer to pay cash. Similarly, compulsive (*F=4.172, p=0.002, $\bar{x}$=2.07*) and impulsive buying behaviours (*F=4.074, p=0.003, $\bar{x}$=2.36*) in the COVID-19 process of individuals who prefer credit cards as a payment method higher than individuals who prefer to pay cash. In the COVID-19 process, individuals who shop once every day have a higher tendency to buy compulsive (*F=5,379 p=0,000, $\bar{x}$=2,63*) and impulsive (*F=6,864, p=0,000, $\bar{x}$=2,95*) compared to individuals who shop once a week, once a month, or twice a month. It was observed that individuals who buy food products frequently (*F=2.817, p=0.007, $\bar{x}$=3.06*) have lower social fears compared to individuals who buy cleaning products. The compulsive purchasing tendencies of the participants (*F=6.399, p=0.000, $\bar{x}$=3.58*) stated that they most frequently purchased the paper and cosmetic products during the COVID-19 process were higher than the individuals who bought food and cleaning products. In addition, individuals who frequently purchase mother or baby care products from the participants have higher impulsive purchasing tendencies during the COVID-19 process (*F=2.784, p=0.007, $\bar{x}$=2.82*) compared to individuals who buy cleaning products.

Table: 4
Hypothesis Test Results

Hypotheses	Research Model	Multi-Group Analysis by Gender		Multi-Group Analysis by Shopping Environment	
	General	Women	Men	Store Shopping	Online Shopping
H1	*Rejected*	***Accepted***	*Rejected*	*Rejected*	***Accepted***
H2	*Rejected*	*Rejected*	*Rejected*	*Rejected*	*Rejected*
H3	*Rejected*	*Rejected*	*Rejected*	*Rejected*	*Rejected*
H4	***Accepted***	***Accepted***	***Accepted***	*Rejected*	***Accepted***
H5	*Rejected*	*Rejected*	***Accepted***	*Rejected*	*Rejected*
H6	*Rejected*	*Rejected*	*Rejected*	*Rejected*	*Rejected*
H7	*Rejected*	*Rejected*	*Rejected*	*Rejected*	*Rejected*
H8	***Accepted***	***Accepted***	***Accepted***	***Accepted***	***Accepted***
H9	***Accepted***	***Accepted***	***Accepted***	***Accepted***	***Accepted***
H10	***Accepted***	***Accepted***	***Accepted***	*Rejected*	***Accepted***

The hypotheses tested in detail according to the multi-group analysis in the study are summarized in Table 4. Within the scope of the research, it has been seen that the fear of individuals due to COVID-19 affects compulsive buying behaviour, and impulsive buying behaviour has a partial mediator role in this interaction. According to the model, 27% of individuals' economic concerns on compulsive buying is mediated by impulsive buying behaviour. It is seen that the research model works differently according to the gender of the participants. Psychological fears caused by COVID-19 affect impulsive and compulsive purchasing behaviour in women. In addition, 94% of the effect of women's psychological fears on compulsive purchasing behaviour arises due to the mediating effect of impulsive buying behaviour. In addition, 27.1% of the impact of women's economic concerns on compulsive buying behaviour emerged due to the mediating influence of impulsive buying behaviour. In men, 10% of the effect of financial fear on compulsive buying behaviour is mediated by impulsive buying behaviour.

Moreover, it is seen that the effect of impulsive buying behaviour seen in women on compulsive buying behaviour is more. In men, it is observed that the psychological fear caused by COVID-19 affects compulsive purchasing behaviour more strongly and negatively than women. In addition, economic fears experienced by male participants were found to affect impulsive and compulsive buying behaviours more strongly than female participants.

It was observed that the research model produced different results according to the environment in which the participants shopped during the pandemic period. It has been observed that the economic fear of COVID-19 that individuals who prefer to do their shopping in the store environment positively affect compulsive buying. Moreover, it has been observed that the psychological anxiety caused by COVID-19 affects compulsive buying behaviour in individuals who prefer to do their shopping on the internet. The impulsive buying behaviour has a full mediator effect in this interaction. In addition, 38.6% of the impact of the economic fears of online shoppers on compulsive buying behaviour is realized through impulsive buying. In addition, while psychological fears negatively affect impulsive and compulsive buying in online individuals, economic fears positively affect them.

8. Discussion and For Future Research

This research has three distinctive aspects. This study examined the effects of different types of fears caused by COVID-19 on compulsive buying behaviour. The second unique aspect of the study is the effects of various concerns that create a negative mood on impulsive buying behaviour. Some of the "dark motives" that affect the impulse buying behaviour of consumers are revealed. Finally, the effects of two different impulsive based buying behaviours, unplanned and impulsive shopping types, are examined.

Considering the shopping frequency of excessive buyers and compulsive buyers at the pathological level, it is seen that they shop twice a week, similar to the studies of

Christenson et al. (1994) and Schlosser et al. (1994). On the other hand, the increase in cosmetic products in compulsive purchases is similar to the study of McElroy et al. (1994). However, disinfectant products were also evaluated in cosmetic products in the current study. It was interpreted that the factor causing this situation was related to various psychological concerns caused by COVID-19. In addition, the increase in compulsive purchases of paper products is thought to be related to hoarding behaviour. However, since the stocking behaviour of individuals was not examined in the current study, it is necessary to investigate hoarding behaviour caused by the fear of COVID-19 in future studies to reach a definitive conclusion.

While the coronavirus pandemic increased psychological fears in the participants, psychosomatic fears remained low compared to other worries. This result is consistent with the results of Baloğlu et al. (2021). Since no study deals with consumers' impulsive and compulsive buying behaviours together in the COVID-19 process, the fact that the average for impulsive buying behaviour is higher than compulsive buying behaviour does not allow comparison. Whether this result is a general trend or a situation-specific to this period is open to debate. For example, Japutra et al. (2019) found that the averages for impulsive buying behaviour were higher than the averages for compulsive buying behaviour in their study, where they evaluated the impulsive and compulsive buying variables together.

For this reason, it will contribute to the literature to consider the effects of negative emotions together with impulsive and compulsive buying behaviours in future studies. The percentage of compulsive buyers at the pathological level (*n=43, 5.9%, $\bar{x}$=4.43*) among individuals participating in the study is similar to the result in the US population in the study of Koran et al. (2006). On the other hand, it is expected that the current calculation will contribute to the literature since no estimate has been made about compulsive receptors at the pathological level in the general population in Turkey recently. Shortly, the increase in studies examining the compulsive buying behaviour of consumers in the COVID-19 process will contribute to the literature in terms of revealing the effect of the pandemic on compulsive buying.

In the present study, the fact that impulsive buying behaviour was higher in women than in men was interpreted as a result similar to Chen's (2001) research. This has been associated with shopping is generally more liked by women; women both spend more time and are willing to do so, shopping, browsing stores, examining product shelves and prices, and researching products. On the other hand, it is thought that this result is related to the fact that women are generally the shoppers in terms of the roles women and men assume in society. In the current study, the fact that women's average for compulsive buying is higher than men's is in line with the reflections in the literature (Roberts, 1998; Yurchisin & Johnson, 2004; Dittmar, 2005). The fact that the mean of single individuals for compulsive buying is high in the current study is in line with the investigations of Lejoyeux et al. (1999, 2007).

On the other hand, the high average of single participants' impulsive buying behaviour is one of the surprising results obtained from this study. Because Özoğlu and Bülbül (2017) found in their research that the impulse buying behaviour of married individuals is higher, the difference seen in this study may be related to the selected population or the period in which the survey was conducted, as well as different psychological variables that may have affected the impulse buying behaviour of single individuals. To clarify this difference, measuring the mediation effect of other psychological variables in studies dealing with consumers' impulsive buying behaviour in terms of marital status will contribute to the literature.

One of the surprising results of this study is that the compulsive and impulsive purchases of the individuals participating in the research, who prefer to shop mainly online during the COVID-19 process, are higher than those who like to shop from the store. It is thought that the reasons such as the curfew restrictions of individuals and the widespread use of door-to-door service by online shopping sites as of the period of the research increased these purchases. On the other hand, like Faber and O'Guinn (1989, 2008) suggested, the loneliness and social isolation experienced by individuals during the COVID-19 process affected their psychological balance. Therefore, it was interpreted as increasing online compulsive and impulsive purchases. However, studies comparing compulsive and impulsive buying behaviour with online and store shopping should soon increase to reach comparative and supportive information about this situation.

Similarly, the compulsive and impulsive purchasing averages of the participants who generally prefer to pay by credit card during the pandemic period are higher than the individuals who prefer to pay in cash, which is in line with the study of Roberts and Jones (2001). In addition, the increase in shopping with contactless credit cards during the COVID-19 process and the fact that shopping is usually done online due to curfews have been associated with this situation. The higher fear of COVID-19 among those who shop with credit cards than those who prefer the cash method has also been associated with the same reasons.

Considering the differences between the age of the participants and their fears about COVID-19, it is associated with the fact that middle-aged individuals have higher social anxiety than young individuals, and these individuals are more affected by curfews. In addition, young individuals' compulsive and impulsive purchases are higher than those of middle age, which is also similar to the literature (Sharma, 2011; Black, 2007). In addition, identical to the result obtained from Black's (2001) study, compulsive buying behaviours of low-income individuals are higher than those of higher-income individuals in the current study. Low-income individuals with a heightened fear of COVID-19 have been associated with limited opportunities and believe they can lose them more easily. In addition, the high level of impulsive purchases in individuals with high-income groups, as stated by Beatty and Ferrel (1998), is associated with an increase in unplanned purchases in parallel with the rise in income level. Although a general inference between individuals' education levels and spontaneous purchasing behaviour has not been formed in the literature yet, unlike Yang et

al. (2011), some differences were found in the present study. Accordingly, the higher the education level, the higher the impulsive buying tendency. More research is needed to generalize about the education variable. On the other hand, the relationships between the participants' or participants' or retirement status and their impulse buying behaviours were consistent with the results obtained from the age variable.

Similar to the conclusion reached by Gallagher et al. (2017), in the current study, the social anxiety of individuals did not affect their purchasing behaviour. However, economic concerns experienced by individuals increased impulsive and compulsive purchasing behaviours. In addition, the financial stress experienced increased impulsive buying behaviour and increased compulsive buying. In this study, the positive effect of impulsive buying on compulsive buying ($\beta=0.727$, $p<.01$) was higher in the study of Shehzedi et al. (2016) and Sun et al. (2004). It is thought that this situation is caused by the fear of COVID-19 increasing the impulsive buying behaviour in individuals, causing more loss of impulse control over time, and the effect of social isolation and loneliness.

According to the gender factor, which is frequently examined by researchers in impulsive buying behaviour, in the present study, women's psychological concerns negatively affected their impulsive buying behaviour. This showed that negative emotions affect impulsive and compulsive buying in a reducing way. According to this result, female participants are negatively affected by the fear of catching coronavirus or the fear of their relatives getting this disease and reducing their unplanned purchasing behaviour. Similarly, psychological anxiety caused by the coronavirus negatively affected compulsive buying in men. However, the present study did not support compulsive and impulsive purchasing behaviour, which is seen as one way to avoid negative emotions in previous studies. The fact that individuals reduce their impulsive and compulsive purchases due to the psychological concerns they experience may suggest more than one reason. Since psychological anxiety towards COVID-19 is generally related to the fear of individuals or their relatives contracting the disease, it can reduce excessive purchases and contact with products, outlets, or vendors, thus reducing the likelihood of contracting the disease.

However, economic concerns caused by COVID-19 strengthened compulsive buying behaviour in women and men participating in the research. This situation has been interpreted as stock problems such as scarcity anxiety experienced by individuals, depletion of food, drink, and cleaning materials, triggering hoarding and stocking behaviour (Hamilton, 2020; Jezewska-Zychowicz et al., 2020; Sheth, 2020). Another surprising result obtained from the research is that individuals' economic concerns trigger impulsive buying, resulting in compulsive buying. This observed situation has also been associated with the stocking behaviour of individuals who shop online. In the future, examining the effects of different psychological variables in studies that associate the concerns caused by COVID-19 with impulsive buying behaviours will contribute to the literature in terms of clarifying consumer purchasing behaviours.

References

Arpaci, I. et al. (2020), "The development and initial tests for the psychometric properties of the COVID-19 phobia scale", *Personality and Individual Differences*, 164, 110108.

Baloglu, M. et al. (2021), "Psychological and socio-economic effects of the COVID-19 pandemic on Turkish population", *Emerging Technologies During the Era of COVID-19 Pandemic*, 348, 245.

Beatty, S.E. & M.E. Ferrell (1998), "Impulse buying: modeling its precursors", *Journal of Retailing*, 74(2), 169-19.

Billore, S. & T. Anisimova (2021), "Panic buying research: a systematic literature review and future research agenda", *International Journal of Consumer Studies*, Special Issue, 1-28.

Black, D.W. (2001), "Compulsive buying disorder", *Cns Drugs*, 15(1), 17-27.

Black, D.W. (2007), "Compulsive buying disorder: a review of the evidence", *Cns Spectrums*, 12(2), 124-132.

Black, D.W. et al. (1998), "Family history and psychiatric comorbidity in persons with compulsive buying: preliminary findings", *American Journal of Psychiatry*, 155(7), 960-963.

Byrne, B.M. (2016), *Structural equation modeling with amos basic concepts, applications, and programming (multivariate applications series)*, Third Edition, Routledge.

Campbell, C. (2000), "Shopaholics, spendaholics and the question of gender", in: A.L. Benson (ed.), *I shop, therefore I am: compulsive buying and the search for self* (57-75), Aronson Press.

Chang, H.J. et al. (2011), "Application of the stimulus-organism-response model to the retail environment: the role of hedonic motivation in impulse buying behaviour", *The International Review of Retail, Distribution and Consumer Research*, 21(3), 233-249.

Chen, M.H. (2001), "The determinants and traits of impulsive buying behaviour", *Journal of Takming University*, 17, 59-74.

Chen, T. (2008), "Impulse purchase varied by products and marketing channels", *Journal of International Management Studies*, 3(1), 154-161.

Chenarides, L. et al. (2021), "Food consumption behaviour during the COVID-19 pandemic", *Agribusiness*, 37(1), 44-81.

Christenson, G.A. et al. (1994), "Descriptive characteristics and psychiatric comorbidity of compulsive buying", *Journal of Clinical Psychiatry*, 55, 5-11.

Clover, V.T. (1950), "Relative importance of impulse-buying in retail stores", *Journal of Marketing*, 15(1), 66-70.

Coley, A. & B. Burgess (2003), "Gender differences in cognitive and affective impulse buying", *Journal of Fashion Marketing and Management: An International Journal*, 7(3), 282-295.

Çelik, S. & G.G. Köse (2021), "Mediating effect of intolerance of uncertainty in the relationship between coping styles with stress during pandemic (COVID-19) process and compulsive buying behaviour", *Progress in Neuro-Psychopharmacology and Biological Psychiatry*, 110, 110321.

D'Astous, A. (1990), "An inquiry into the compulsive side of "normal" consumers", *Journal of Consumer Policy*, 13(1), 15-31.

Darrat, A.A. et al. (2016), "How impulse buying influences compulsive buying: the central role of consumer anxiety and escapism", *Journal of Retailing and Consumer Services*, 31, 103-108.

Dawson, S. & M. Kim (2009), "External and internal trigger cues of impulse buying online", *Direct Marketing: An International Journal*, 3(1), 20-34.

Dell'Osso, B. et al. (2006), "Epidemiologic and clinical updates on impulse control disorders: a critical review", *European Archives of Psychiatry and Clinical Neuroscience*, 256(8), 464-475.

Desarbo, W.S. & E.A. Edwards (1996), "Typologies of compulsive buying behaviour: a constrained clusterwise regression approach", *Journal of Consumer Psychology*, 5(3), 231-262.

Dey, D.K. & A. Srivastava (2017), "Impulse buying intentions of young consumers from a hedonic shopping perspective", *Journal of Indian Business Research*, 9(4), 266-282.

Dietrich, A. et al. (2020), "News and Uncertainty About COVID-19: Survey Evidence and Short-Run Economic Impact", *Working Paper*, Federal Reserve Bank of Cleveland.

Dittmar, H. (2005), "Compulsive buying-a growing concern? An examination of gender, age, and endorsement of materialistic values as predictors", *British Journal of Psychology*, 96(4), 467-491.

Dittmar, H. et al. (1995), "Gender identity and material symbols: objects and decision considerations in impulse purchases", *Journal of Economic Psychology*, 16(3), 491-511.

Dittmar, H. et al. (1996), "Objects, decision considerations and self-image in men's and women's impulse purchases", *Acta Psychologica*, 93(1-3), 187-206.

Donthu, N. & A. Gustafsson (2020), "Effects of COVID-19 on business and research", *Journal of Business Research*, 117, 284.

Edwards, E.A. (1992), "The measurement and modeling of compulsive buying behaviour", *Dissertation Abstracts International*, 53(11-A),

Edwards, E.A. (1993), "Development of a new scale for measuring compulsive buying behaviour", *Financial Counseling and Planning*, 4(1), 67-84.

Faber, R.J. & T.C. O'Guinn (1988), "Expanding the view of consumer socialization: a nonutilitarian mass-mediated perspective", *Research in Consumer Behaviour*, 3, 49-77.

Faber, R.J. & T.C. O'Quinn (1992), "A clinical screener for compulsive buying", *Journal of Consumer Research*, 19(3), 459-469.

Faber, R.J. (2010), "Diagnosis and Epidemiology of Compulsive Buying", in: A. Müller & J.E. Mitchell (eds.), *Compulsive Buying: Clinical Foundations and Treatment* (3-19), Routledge.

Faber, R.J. et al. (1987), "Compulsive Consumption", in: M. Wallendorf & P. Anderson (eds.), *Advances in Consumer Research* (132-135), Provo, UT: Association for Consumer Research.

Faber, R.J. et al. (1995), "Two forms of compulsive consumption: comorbidity of compulsive buying and binge eating", *Journal of Consumer Research*, 22, 296-304.

Finke, M.S. & S.J. Huston (2003), "Factors affecting the probability of choosing a risky diet", *Journal of Family and Economic Issues*, 24, 291-303.

Fornell, C. & D.F. Larcker (1981), "Evaluating structural equation models with unobservable variables and measurement error", *Journal of Marketing Research*, 18(1), 39-50.

Foroughi, A. et al. (2013), "Impulse buying behaviour and moderating role of gender among Iranian shoppers", *Journal of Basic and Applied Scientific Research*, 3(4), 760-769.

Frost, R.O. et al. (2002), "Compulsive buying, compulsive hoarding, and obsessive-compulsive disorder", *Behaviour Therapy*, 33(2), 201-214.

Gallagher, C.E. et al. (2017), "'I fear, therefore, I shop!' Exploring anxiety sensitivity in relation to compulsive buying", *Personality and Individual Differences*, 104, 37-42.

Gardner, M.P. & D.W. Rook (1988), "Effects of impulse purchases on consumers' affective states", *ACR North American Advances*, 15, 127-130.

Glatt, M.M. & C.C. Cook (1987), "Pathological spending as a form of psychological dependence", *British Journal of Addiction*, 82, 1257-1258.

Goldsmith, T. & S. Mcelroy (2000), "Compulsive Buying: Associated Disorders and Drug Treatment", in: A.L. Benson (ed.), *I shop, therefore I am: compulsive buying and the search for self* (217-242), Aronson Press.

Grashuis, J. et al. (2020), "Grocery shopping preferences during the COVID-19 pandemic", *Sustainability*, 12(13), 5369.

Hair, J.F.J. et al. (2014), *Multivariate data analysis*, Seventh Edition Prentice Hall.

Hamilton, R. (2021), "Scarcity and coronavirus", *Journal of Public Policy & Marketing*, 40(1), 99-100.

Hanley, A. & M.S. Wilhelm (1992), "Compulsive buying: an exploration into self-esteem and money attitudes", *Journal of Economic Psychology*, 13(1), 5-18.

Haugtvedt, C.P. et al. (2008), "Compulsive Buying: Review and Reflection", in: R.J. Faber & T.C. O'Guinn (eds.), *Handbook of Consumer Psychology* (1027-1044), Routledge.

Hausman, A. (2000), "A multi-method investigation of consumer motivations in impulse buying behaviour", *Journal of Consumer Marketing*, 17(5), 403-419.

Hirschman, E.C. (1992), "The consciousness of addiction: toward a general theory of compulsive consumption", *Journal of Consumer Research*, 19(2), 155-179.

Hoch, S.J. & G.F. Loewenstein (1991), "Time-inconsistent preferences and consumer self-control", *Journal of Consumer Research*, 17(4), 492-507.

Hubert, M. et al. (2013), "Neural correlates of impulsive buying tendencies during perception of product packaging", *Psychology & Marketing*, 30(10), 861-873.

Islam, T. et al. (2021), "Panic buying in the COVID-19 pandemic: a multi-country examination", *Journal of Retailing and Consumer Services*, 59, 102357.

Japutra, A. et al. (2019), "Self-congruence, brand attachment and compulsive buying", *Journal of Business Research*, 99, 456-463.

Jeffrey, S.A. & R. Hodge (2007), "Factors influencing impulse buying during an online purchase", *Electronic Commerce Research*, 7(3), 367-379.

Jeżewska-Zychowicz, M. et al. (2020), "Consumers' fears regarding food availability and purchasing behaviours during the Covid-19 pandemic: the importance of trust and perceived stress", *Nutrients*, 12(9), 2852, 1-14.

Johnson, T. & J. Attmann (2009), "Compulsive buying in a product specific context: clothing", *Journal of Fashion Marketing and Management: An International Journal*, 13(3), 394-405.

Jones, M.A. et al. (2003), "The product-specific nature of impulse buying tendency", *Journal of Business Research*, 56(7), 505-511.

Kacen, J.J. & J.A. Lee (2002), "The influence of culture on consumer impulsive buying behaviour", *Journal of Consumer Psychology*, 12(2), 163-176.

Karbasivar, A. & H. Yarahmadi (2011), "Evaluating effective factors on consumer impulse buying behaviour", *Asian Journal of Business Management Studies*, 2(4), 174-181.

Khan, M.R. et al. (2021), "A study of changing consumer behaviour of four metro cities in India during COVID-19 pandemic", *Wesleyan Journal of Research*, 13(57), 81-92.

Kieffer, K.M. (1998), "Orthogonal versus oblique factor rotation: a review of the literature regarding the pros and cons", Paper Presented at *The Annual Meeting of The American Educational Research Association*, New Orleans.

Kivetz, R. & Y. Zheng (2006), "Determinants of justification and self-control", *Journal of Experimental Psychology: General*, 135(4), 572.

Koran, L. (1999), *Obsessive compulsive and related disorders in adults*, Cambridge University Press.

Koran, L.M. et al. (2006), "Estimated prevalence of compulsive buying behaviour in the united states", *American Journal of Psychiatry*, 163(10), 1806-1812.

Krafft, J. et al. (2020), "An ecological momentary assessment study investigating the function of hoarding", *Behaviour Therapy*, 51(5), 715-727.

Krueger, D. (1988), "On compulsive shopping and spending: a psychodynamic inquiry", *American Journal of Psychotherapy*, 42, 574-585.

Kwak, H. et al. (2004), "Compulsive comorbidity and its psychological antecedents: a cross-cultural comparison between the US and South Korea", *Journal of Consumer Marketing*, 21(6), 418-434.

Laato, S. et al. (2020), "Unusual purchasing behaviour during the early stages of the COVID-19 pandemic: the stimulus-organism-response approach", *Journal of Retailing and Consumer Services*, 57, 102224.

Lee, G.Y. & Y. Yi (2008), "The effect of shopping emotions and perceived risk on impulsive buying: the moderating role of buying impulsiveness trait", *Seoul Journal of Business*, 14(2), 67-92.

Lee, S.H. & J.E. Workman (2018), "Consumer Tendency To Regret, Compulsive Buying, Gender, and Fashion Time-of-Adoption Groups", *International Journal of Fashion Design, Technology and Education*, 11(3), 265-276.

Lejoyeux, M. & A. Weinstein (2010), "Compulsive buying", *The American Journal of Drug and Alcohol Abuse*, 36(5), 248-253.

Lejoyeux, M. et al. (1996), "Phenomenology and psychopathology of uncontrolled buying", *The American Journal of Psychiatry*, 153(12), 1524-1529.

Lejoyeux, M. et al. (2005), "Study of compulsive buying in patients presenting obsessive-compulsive disorder", *Comprehensive Psychiatry*, 46(2), 105-110.

Lejoyeux, M. et al. (2007), "Prevalence of compulsive buying among customers of a Parisian general store", *Comprehensive Psychiatry*, 48(1), 42-46.

Li, J. et al. (2020), "Changing grocery shopping behaviours among chinese consumers at the outset of the COVID-19 outbreak", *Tijdschrift Voor Economische En Sociale Geografie*, 111(3), 574-583.

Liang, Y.P. (2012), "The relationship between consumer product involvement, product knowledge and impulsive buying behaviour", *Procedia-Social and Behavioural Sciences*, 57, 325-330.

Lim, P.L. & R. Yazdanifard (2015), "What internal and external factors influence impulsive buying behaviour in online shopping?", *Global Journal of Management and Business Research*, 15(5), 25-32.

Lopes, B. et al. (2020), "Paranoia, hallucinations and compulsive buying during the early phase of the COVID-19 outbreak in The United Kingdom: a preliminary experimental study", *Psychiatry Research*, 293, 113455.

Marlatt, G.A. et al. (1988), "Addictive behaviours: etiology and treatment", *Annual Review of Psychology*, 39(1), 223-252.

Mcelroy, S.L. et al. (1991), "Treatment of compulsive shopping with antidepressants: a report of three cases", *Annals of Clinical Psychiatry*, 3(3), 199-204.

McElroy, S.L. et al. (1994), "Compulsive buying: a report of 20 cases", *The Journal of Clinical Psychiatry*, 55(6), 242-248.

Melo, G. (2020), "The path forward: us consumer and food retail responses to COVID-19", *Choices*, 35(3).

Miao, M. et al. (2019), "The effects of personality, culture and store stimuli on impulsive buying behaviour: Evidence from emerging market of Pakistan", *Asia Pacific Journal of Marketing and Logistics*, 32(1), 188-204.

Mohan, G. et al. (2013), "Impact of store environment on impulse buying behaviour", *European Journal of Marketing*, 47(10), 1711-1732.

Mueller, A. et al. (2011), "Depression, materialism, and excessive internet use in relation to compulsive buying", *Comprehensive Psychiatry*, 52(4), 420-424.

Muruganantham, G. & R.S. Bhakat (2013), "A review of impulse buying behaviour", *International Journal of Marketing Studies*, 5(3), 149.

Müller, A. et al. (2015), "Compulsive buying", *The American Journal on Addictions*, 24(2), 132-137.

Nakano, S. et al. (2021), *Consumer panic buying: understanding its behavioural and psychological aspects*, Available at SSRN 3796825.

Neuner, M. et al. (2005), "Compulsive buying in maturing consumer societies: an empirical re-inquiry", *Journal of Economic Psychology*, 26(4), 509-522.

O'Guinn, T.C. & R.J. Faber (1989), "Compulsive buying: A phenomenological exploration", *Journal of Consumer Research*, 16(2), 147-157.

Park, H.J. & L.D. Burns (2005), "Fashion orientation, credit card use, and compulsive buying", *Journal of Consumer Marketing*, 22(3), 135-141.

Peck, J. & T.L. Childers (2006), "If i touch it i have to have it: individual and environmental influences on impulse purchasing", *Journal of Business Research*, 59(6), 765-769.

Petersen, A. (2020), "Your video therapist will see you now; sessions have gone virtual amid the coronavirus pandemic, raising new challenges", *Wall Street Journal*, April 26.

Popkin, M.K. (1989), "Impulse control disorders not elsewhere classified", in: H.I. Kaplan & B.J. Sadock (eds.), *Comprehensive Textbook of Psychiatry* (1145-1155), Williams & Wilkins.

Pradhan, V. (2016), "Study on impulsive buying behaviour among consumers in supermarket in kathmandu valley", *Journal of Business and Social Sciences Research*, 1(2), 215-233.

Puri, R. (1996), "Measuring and modifying consumer impulsiveness: a cost-benefit accessibility framework", *Journal of Consumer Psychology*, 5(2), 87-113.

Putra, A.H.P.K. et al. (2017), "Implication of external and internal factors of mall consumers in ındonesia to impulsive buying behaviour", *International Journal of Business Accounting and Management*, 2(4), 1-10.

Ramanathan, S. & G. Menon (2006), "Time-varying effects of chronic hedonic goals on impulsive behaviour", *Journal of Marketing Research*, 43(4), 628-641.

Roberts, J.A. & E. Jones (2001), "Money attitudes, credit card use, and compulsive buying among american college students", *Journal of Consumer Affairs*, 35(2), 213-240.

Roberts, J.A. (1998), "Compulsive buying among college students: an investigation of its antedecents, consequences, and implications for public policy", *Journal of Consumer Affairs*, 32(2), 295-319.

Robinson, J.P. et al. (eds.) (1991), *Criteria for scale selection and evaluation in measures of personality and social psychological attitudes*, Academic Press.

Rook, D.W. & M.P. Gardner (1993), "In the mood: impulse buying's affective antecedents", *Research in Consumer Behaviour*, 6(7), 1-28.

Rook, D.W. & R.J. Fisher (1995), "Normative influences on impulsive buying behaviour", *Journal of Consumer Research*, 22(3), 305-313.

Rook, D.W. (1987), "The buying impulse", *Journal of Consumer Research*, 14(2), 189-199.

Roy, S. & C. Chakraborty (2021), "Panic buying situation during COVID-19 global pandemic", *Journal of Information Technology Management*, 13(2), 231-244.

Salari, N. et al. (2020), "Prevalence of stress, anxiety, depression among the general population during the COVID-19 pandemic: a systematic review and meta-analysis", *Globalization and Health*, 16(1), 1-11.

Scherhorn, G. et al. (1990), "Addictive Buying in West Germany: An Empirical Study", *Journal of Consumer Policy*, 13(4), 355-387.

Schiffman, L. & L. Kanuk (2010), *Consumer behaviour*, Prentice Hall.

Schiller, F. et al. (2021), "Stockpile purchasing in the emerging COVID-19 pandemic is related to obsessive-compulsiveness", *Journal of Affective Disorders Reports*, 4, 100116.

Schlosser, S. et al. (1994), "Compulsive Buying: Demography, Phenomenology, and Comorbidity In 46 Subjects", *General Hospital Psychiatry*, 16(3), 205-212.

Schmitt, B. (1999), "Experiential marketing", *Journal of Marketing Management*, 15(1-3), 53-67.

Shahjehan, A. et al. (2012), "The effect of personality on impulsive and compulsive buying behaviours", *African Journal of Business Management*, 6(6), 2187-2194.

Shapiro, J.M. (1992), "Impulse buying: a new framework", *Developments in Marketing Science*, 15, 76-80.

Sharma, P. et al. (2010), "Impulse buying and variety seeking: a trait-correlates perspective", *Journal of Business Research*, 63(3), 276-283.

Sharma, R. (2011), "An investigation into ımpulse buying behaviour among indian urban adolescents", *Abhigyan*, 28(4), 43-50.

Shehzadi, K. et al. (2016), "Impact of personality traits on compulsive buying behaviour: mediating role of impulsive buying", *Journal of Service Science and Management*, 9(05), 416.

Sheth, J. (2020), "Impact of COVID-19 On Consumer Behaviour: Will The Old Habits Return or Die?", *Journal of Business Research*, 117, 280-283.

Shoham, A. & M.M. Brenčič (2003), "Compulsive buying behaviour", *Journal of Consumer Marketing*, 20(2), 127-138.

Sneath, J.Z. et al. (2009), "Coping with a natural disaster: losses, emotions, and impulsive and compulsive buying", *Marketing Letters*, 20(1), 45-60.

Sofi, S.A. & F.A. Nika (2016), "The Role of Personality in Impulse Buying Behaviour", *Jindal Journal of Business Research*, 5(1), 26-50.

Sulaiman, E. et al. (2021), "Model antecedents, behaviour and consequences (abc) of social media information and compulsive panic buying relationship to buying decisions: a conceptual framework", *International Journal of Ecma Science*, 1(1), 1-7.

Sun, T. & G. Wu (2011), "Trait predictors of online ımpulsive buying tendency: a hierarchical approach", *Journal of Marketing Theory and Practice*, 19(3), 337-346.

Sun, T. et al. (2004), "Psychological antecedents of impulsive and compulsive buying: a hierarchical perspective", *In The Proceedings of The Society For Consumer Psychology 2004 Winter Conference*, 168-174.

Sun, T.R. & R. Yazdanifard (2015), "The review of physical store factors that influence impulsive buying behaviour", *International Journal of Management, Accounting and Economics*, 2(9), 1048-1054.

Tabachnick, B.G. & L.S. Fidell (2013), *Using Multivariate Statistics*, Sixth Edition, Pearson.

Taylor, S. et al. (2020), "Development and initial validation of the COVID stress scales", *Journal of Anxiety Disorders*, 72, 102232.

Terlep, S. (2020), "Why clorox wipes are still so hard to find; shortage isn't improving; 'within 30-45 minutes they're gone", *Wall Street Journal*, May 7.

Torlak, Ö. & M.A. Tiltay (2010), "Anlık satın alma ölçeklerinin türk tüketicisi için uyarlanmasına yönelik bir deneme", *Ulusal Pazarlama Kongresi*, İzmir, 406-422.

Troisi, J.D. et al. (2006), "Materialism and money spending disposition as predictors of economic and personality variables", *North American Journal of Psychology*, 8(3), 421-436.

Valence, G. et al. (1988), "Compulsive buying: concept and measurement", *Journal of Consumer Policy*, 11(4), 419-433.

Verplanken, B. & A. Herabadi (2001), "Individual differences in impulse buying tendency: Feeling and no thinking", *European Journal of Personality*, 15(1), 71-83.

Verplanken, B. & A. Sato (2011), "The Psychology of Impulse Buying: An Integrative Self-Regulation Approach", *Journal of Consumer Policy*, 34(2), 197-210.

Vishnu, P. & A.R. Raheem (2013), "Factors influencing impulse buying behaviour", *European Journal of Scientific Research*, 100(3), 67-79.

Wang, C.C. & H.W. Yang (2008), "Passion For Online Shopping: The Influence of Personality and Compulsive Buying", *Social Behaviour and Personality: An International Journal*, 36(5), 693-706.

Watanabe, T. & Y. Omori (2020), "Online Consumption During The COVID-19 Crisis: Evidence From Japan", *COVID Economics*, 38(16), 218-252.

Weinberg, P. & W. Gottwald (1982), "Impulsive consumer buying as a result of emotions", *Journal of Business Research*, 10(1), 43-57.

West, C.J. (1951), "Results of two years' of study into impulse buying", *Journal of Marketing (pre-1986)*, 15(3), 362.

Weun, S. et al. (1997), "A Parsimonious Scale To Measure Impulse Buying Tendency", *In Ama Educators' Proceedings*, 8, 8-26.

Winestine, M.C. (1985), "Compulsive Shopping As A Derivative of A Childhood Deduction", *The Psychoanalytic Quarterly*, 54(1), 70-72.

Xiao, H. et al. (2020), "A Diary Study of Impulsive Buying During The COVID-19 Pandemic", *Current Psychology*, 1-13.

Xu, Y. (2008), "The influence of public self-consciousness and materialism on young consumers' compulsive buying", *Young Consumers*, 9(1), 37-48.

Yang, D.J. et al. (2011), "A study of the factors that affect the impulsive cosmetics buying of female consumers in kaohsiung", *International Journal of Business and Social Science*, 2(24), 275-282.

Youn, S. & R.J. Faber (2000), "Impulse buying: its relation to personality traits and cues", *Advances in Consumer Research*, 27, 179-185.

Yurchisin, J. & K.K. Johnson (2004), "Compulsive buying behaviour and its relationship to perceived social status associated with buying, materialism, self-esteem, and apparel-product involvement", *Family and Consumer Sciences Research Journal*, 32(3), 291-314.

Zhang, Y. & L.J. Shrum (2009), "The influence of self-construal on impulsive consumption", *Journal of Consumer Research*, 35(5), 838-850.

Sosyoekonomi

2022, Vol. 30(51), 199-214

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.10
Date Submitted: 27.08.2021
Date Revised: 27.10.2021
Date Accepted: 11.01.2022

The Effect of Information-Communication Technologies (ICT) and Air Pollution on Health Expenditures

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Bilgi-İletişim Teknolojileri (BİT) ve Hava Kirliliğinin Sağlık Harcamalarına Etkisi

Abstract

This study analyses the effects of ICT and air pollution on health expenditures of 81 Turkish provinces during 2011-2018. Models were analysed through a panel data method. The results indicated that air pollution and mobile phone subscribers do not affect health expenditure. In contrast, the number of internet subscribers and index variable (devised by the authors) have a negative effect on health expenditure. This study has a unique value and contributes to the literature. It is one of the first studies scrutinizing the impact of air pollution and ICT on health expenditures in Turkey.

Keywords : Information and Communication Technologies, Health Expenditures, Air Pollution.

JEL Classification Codes : P46, Q53, Q55.

Öz

Bu çalışma Türkiye'de 2011-2018 yıllarına ait BİT ve hava kirliliğinin 81 ilin sağlık harcaması üzerine etkisini analiz etmeyi amaçlamıştır. Bu doğrultuda 4 model kurulmuş ve bu modeller panel veri yöntemiyle analiz edilmiştir. Elde edilen bulgular doğrultusunda hava kirliliği ve cep telefonu abone sayısının sağlık harcaması üzerine etkisi bulunmazken, internet abone sayısı ve endeks değişkenlerinin (yazarların kendi hesaplaması) sağlık harcaması üzerine etkisi negatiftir. Çalışma, Türkiye'de hava kirliliği ve BİT'lerin sağlık harcaması üzerine etkisini inceleyen ilk çalışmalardan olması açısından özgün bir değere sahip olmakta ve literatüre katkı sağlamaktadır.

Anahtar Sözcükler : Bilgi ve İletişim Teknolojileri, Sağlık Harcamaları, Hava kirliliği.

1. Introduction

Health indicators and health conditions are gradually changing worldwide and in Turkey. According to the World Bank 2020 data, indicators such as life expectancy or healthy life expectancy at birth significantly increase. For example, life expectancy at birth has increased globally from 52.5 in 1960 to 67.5 in 2000 and 72.7 in 2019. The same indicator increased from 45.3 in 1960 to 70 in 2000 and 77.6 in 2019 in Turkey (World Bank, 2020). Thus, significant improvements in health conditions can be observed globally and in Turkey. Even though health indicators have improved significantly, factors positively and negatively affect health status, increasing public and individual health expenditure. The increase in health expenditure, a significant proportion in both public and individual households, has led to increased studies on the determinants of health expenditure. Considerable works have been carried out on the determinants of health expenditure (Gerdtham et al., 1992; Gbesemete & Gerdtham, 1992; Murthy & Ukpolo, 1995; Hansen & King, 1996; Di Matteo & Di Matteo, 1998; Gerdtham & Lothgren, 2000; Murthy & Okunade, 2000; Herwartz & Theilen, 2003). These studies have considered several determinants of health expenditure (such as ageing, population, income, number of physicians, female participation rate, public health financing, foreign aid, and urbanization), which consist of economic and non-economic factors. However, apart from these factors, strong economic growth, especially in developing countries, has led to higher energy consumption and increasing air pollution, threatening human health (Yahaya et al., 2016). In addition, the development of technology and the increasing importance of communication have led to the use of the internet and mobile phones worldwide. The expanding use of information and communication technologies (ICT) affects health indicators and conditions.

Air pollution harms the biosphere and the natural balance of the environment as solid, liquid, and gaseous air pollutants (PM: particulate matter; CO: carbon monoxide; NO_x: nitrogen oxides; SO_2: sulfur dioxide; VOC: volatile organic compounds; ozone, methane) mount (Kılıç et al., 2014). It has been proven that these pollutants have a multifaceted effect on human health (Zeng & He, 2019). Thus, an increase in air pollution can lead to childhood asthma (Buteau et al., 2018), low birth weight in infants born near industrial areas (Gong et al., 2018), middle ear infections in early childhood (Deng et al., 2017), cancer (Fernandez-Navarro et al., 2017), infant deaths (Fotourehchi, 2016), and low life expectancy (Correia et al., 2013). Consequently, the deterioration of air quality causes many diseases and deaths, affecting both public and individual health budgets (Yahaya et al., 2016). Depending on these diseases, the demand for hospital services increases (Lagravinese et al., 2014; Fotourehchi, 2016). Accordingly, one can predict an increase in the use of health services due to severe weather impacts (Blázquez-Fernández et al., 2019). The OECD confirmed such a prediction in a 2016 study, according to which an increase in outdoor air pollution will have a global economic cost of 1% of global GDP by 2060. It will also lead to extra health expenditures in the long run (Zeng & He, 2019).

Recently, another factor that increasingly affects the health of human beings has turned out to be ICT. Change and transformation in ICTs affect our lives and well-being.

The effect of ICTs can be observed in various aspects of life (education, transportation, security, banking and shopping, communication) and health care. Positive effects include multiple improvements in the provision of healthcare (e.g., electronic health records, online access to healthcare providers, e-health technologies, and online medical appointments) and easier access to medical information for patients (e.g., more information about diseases, treatments, and support via an online platform) (Benvenuto et al., 2019; Iverson et al., 2008). In addition, the development of ICT facilitates communication with friends and family, contributing to a reduction in depression and thus a decrease in health care expenditures (Bessière et al., 2010). However, excessive and unnecessary use of ICT has adverse effects on health. For instance, facilitating personal information searches can lead to self-diagnosis of diseases, which may increase health spending (e.g., redundant hospitalizations) and adversely affect the sustainability of health systems (Benvenuto et al., 2019; Iverson et al., 2008). Furthermore, the widespread use of smartphones has led to physical such as headaches, neck, back, and wrist pain and mental problems such as anxiety, depression, lack of attention, decrease in social interaction, a decline in academic success, and professional difficulties. Accordingly, increasing health problems due to ICT use is expected to increase individual and public health expenditure.

In Turkey, a developing country, increased air pollution and a rising trend in health indicators and related expenditures have been observed. For example, in the World Air Quality Report 2020 prepared by IQAir Group, Turkey ranked 46th out of 106 countries. Compared to European countries, Turkey has consistently recorded higher levels of particulate matter in the atmosphere than Europe over the past 17 years. Although atmospheric particulate matter levels in Europe have been regularly decreasing, those levels have been periodically increasing in Turkey in the same period. Thus, air pollution in Turkey, which was 5.6% higher than in Europe in 2003, grew to 31.0% in 2019 (TMMOB, 2019). Due to this air pollution, health expenditure in Turkey has also increased. For example, in 2021, the Health and Environment Alliance (hereafter HEAL) published a report highlighting the health issues and financial burdens of air pollution from thermal power plants in Turkey. There were about 5 thousand premature deaths in Turkey in 2019 due to air pollution from coal-fired power plants. On the other hand, these power plants caused many chronic and acute diseases, including 26 500 cases of bronchitis in children, 3 000 premature births, and 3230 issues of bronchitis in adults. Because of all these health problems, it has been stated that air pollution from coal-fired power plants in Turkey causes health costs of about 53.60 billion Turkish Lira (TL) every year (HEAL, 2021).

With the development of technology and the increasing importance of communication, the excessive use of the internet and mobile phones increases in Turkey and other countries. For example, according to the Household Information Technology Usage Survey (Turkish Statistical Institute) (2020), the internet usage rate among individuals between 16 and 74, 75.3% in 2019, increased to 79% in 2020. On a household basis, it increased from 88.3% in 2019 to 90.7% in 2020. Mobile phone usage increased from 93.5% to 95.3% over this period (TÜİK, 2020). It can easily be observed that air pollution and ICT use have increased in Turkey in recent years. As the effects of these elements on health

intensify, the number of studies on this topic also increases. Several studies are examining the impact of air pollution on health (Karasoy & Demirtaş 2018; Tıraş & Türkmen, 2020); and some of the studies examining the effect of ICT use on health (Günal & Pekçetin, 2019); Kuyucu (2017) can be recalled readily.

While there are a limited number of studies in the literature examining the effect of air pollution on health expenditure, a recent study (Benvenuto, Sambati and Viola, 2019) directly examines the impact of ICTs on health expenditures has been found. In the case of Turkey, besides a study examining the effect of air pollution on health expenditures (Tıraş & Türkmen 2020), no study directly examining the impact of ICTs on health expenditures was found in the literature.

The current study is essential since it is the first study to examine the effects of air pollution and ICTs on health expenditures on a regional basis in Turkey. Additionally, to measure the use of ICTs more comprehensively, the ICT index variable covering the number of fixed telephone line subscribers, the number of mobile telephone line subscribers, and the number of internet subscribers was created using the Principal Component Analysis technique. Therefore, the study differs from other studies examining the effect of ICTs on health expenditure and creating an index that measures ICTs more comprehensively, thus contributing to the literature. This study investigates whether air pollution and ICT use affect health expenditure and, if so, to what extent.

This study consists of four parts. In the second section, studies conducted in Turkey and foreign literature on the topic of the study are reported. In the third part, the data set and the methodology are explained, and, in the last section, the study results and the conclusions are presented.

2. Background Literature

Studies focusing on the determinants of health expenditures have classified these determinants as income and non-income. While per capita income is usually used as an income determinant, they have identified components such as demographic structure, people's lifestyle, health care delivery model, technological development, or environmental factors as non-income determinants (Zeng & He, 2019; Blázquez-Fernández et al., 2019; Apergis et al., 2020; Yahaya et al., 2016).

The most referred determinant can be recognized as income. In studies dealing with the determinants of health expenditure, extensive literature on income exists. Many researchers (Newhouse, 1977; Hitiris & Posnett, 1992; Samadi & Homaie, 2013; Chaabouni & Abednnadher, 2014; Yahaya et al., 2016; Boachie & Ramu, 2016; Taşkaya & Demirkıran, 2016; Karasoy & Demirtaş, 2018; Zeng & He, 2019; Blázquez-Fernández et al., 2019; Öztürk & Küsmez, 2019; Apergis et al., 2020) acknowledge income as the primary explanatory variable. Most of these studies have found a positive relationship between health expenditure and income. However, the income elasticity of health expenditure differs

according to the explanatory variables used, the estimation method, and the country sample analyzed.

The demographic structure comes as the second significant determinant. Population structure has an impact on health expenditures. Therefore, previous studies have indicated that being over 60 and under 5 or 15 means increasing health expenditures. It has been stressed that primarily the elderly population causes higher health expenditures and requires more health services. There is a correlation between the ageing population and health expenditures for upper-middle and high-income countries where the elderly population is rapidly expanding (Kea et al., 2011). Consequently, the impact of the ageing population on health and welfare systems is the focus of political agendas in developed countries (Apergis et al., 2020). In low-income countries, it is not expected to cause an increase in health expenditures since the elderly population is not substantial (Kea et al., 2011). Works by Di Matteo and Di Matteo (1998), Murthy and Okunade (2009), Chaabouni and Abednnadher (2014), Novignon et al. (2015), Bloom et al. (2015), Ergün and Polat (2018), and Apergis et al. (2020) can be referred as the studies examining the effect of demographic structure on health expenditures.

Environmental impact comes as the third determinant. In recent years, the effects of weather conditions and environmental factors on health have increased, primarily in developing countries, depending on economic performance. Accordingly, more than 5.5 million people die at an early age every year due to health problems caused by air pollution. Consequently, deterioration of air quality causes various diseases affecting both public and individual health budgets (Yahaya et al., 2016). This condition has increased the number of studies examining the effects of air and environmental quality indicators on health expenditures.

Studies examining the effects of air and environmental quality indicators on health expenditures have been classified according to the countries'level of development, analysing a sample of developed countries and finding a negative effect on health expenditure (Apergis et al., 2018; Janke et al., 2009; Narayan & Narayan, 2008; Jerrett et al., 2003; Brunekreef & Holgate, 2002). Such studies also found a negative effect in a sample of developing countries (Shen et al., 2021; Yahaya et al., 2016; Qureshi et al., 2015; Khoshnevis-Yazdi et al., 2014). Some studies have examined mixed samples of both developed and developing countries, have similarly found a negative impact on health expenditure (Blázquez-Fernández et al., 2019; Khoshnevis-Yazdi & Khanalizadeh, 2017). Examples of developed, developing, and underdeveloped countries were examined (Apergis et al., 2020). However, air pollution on health expenditure is more dominant in developed countries. A study conducted in Turkey (Tıraş & Türkmen, 2020) found that air pollution does not affect health expenditure.

When the abovementioned studies'findings are broadly assessed, increasing air pollution increases health expenditures. However, this effect differs in developed countries and Turkey. While the result was more dominant in developed countries, Turkey was not observed.

The fourth determinant is technology development, mainly the development of ICTs. The result of information and communication technologies contributes globally to improving health systems. Technology can improve healthcare and other health indicators in many ways. Information and communication technologies enhance access to healthcare in geographically isolated communities, support healthcare workers, and increase data sharing. The result of ICTs improves access to healthcare in geographically insulated communities, provides support for healthcare workers, and improves data sharing.

Similarly, online health information generates positive health outcomes through various mechanisms, some of which are as follows: Firstly, web health information can empower patients and increase their sense of control over the disease by increasing the knowledge and self-awareness needed to make informed decisions that improve their quality of life (Broom, 2005). Secondly, web health information contributes to the effective and efficient use of clinical time. Some healthcare professionals have reported that empowering patients helps them diagnose diseases early and helps them seek healthcare (Laing et al., 2004). Thirdly, health information on the web improves patients'knowledge of their health problems and their relationships with their doctors (Ferguson, 2000). Due to health information on the internet, less time is needed to decide on the treatment to be applied due to learning basic information about the disease (Gerber & Eiser, 2001). Some studies examining the effects of air pollution and ICTs on health are included in the literature review. Studies examining the impact of air pollution on health expenditures will be included primarily, and then reflections on ICT and health will be covered.

Studies examining the effects of ICTs on health have been classified according to the development level of countries. Studies focusing on developed countries (Iverson et al., 2008; Bessière et al., 2010; Liu et al., 2011; Kim & Kim, 2015; Benvenuto et al., 2019; Alsalameh et al., 2019; Baabdullah et al., 2020) have found a positive effect (Benvenuto et al., 2019), adverse effects (Liu et al., 2011; Kim & Kim, 2015; Alsalameh et al., 2019; Baabdullah et al., 2020) and both positive and negative effects (Iverson et al., 2008; Bessière et al., 2010). Some of the studies focused on a sample of developing countries (Blaya et al., 2010; Déglise et al., 2011; Zhang et al., 2019; Hanphitakphong et al., 2021; Yuan, 2021). Accordingly, some studies state that it has a positive effect (Blaya et al., 2010; Déglise et al., 2012; Zhang et al. 2019), some studies that say a negative impact (Hanphitakphong et al., 2021), and some report both positive and negative effects (Yuan, 2021). Mixed samples of developed and developing countries (Cole-Lewis & Kershaw, 2010) have identified a positive impact.

Studies conducted in Turkey (Günal & Pekçetin, 2019; İnal & Arslan, 2021; Mustafaoglu et al., 2021) find that ICTs on health has a negative effect.

Analysing the study findings broadly in developed and developing countries, it can be understood that the effect of ICTs on health vary in developed countries, the negative impact is more dominant; in contrast, in developing countries, the positive results are more

prevalent; in Turkey, which is included in the sample of developing countries, the negative impact is more prevalent.

A study by Benvenuto, Sambati, and Viola (2019) directly examined the effect of ICTs on health expenditures, but no such research in Turkey exists. Although other studies reviewed in the literature have examined the impact of ICT on health in various aspects, this has been discussed as it will indirectly affect health expenditures. In this respect, the present study is critical since it is the first to examine the effects of air pollution and ICTs on health expenditure on a regional basis in Turkey.

3. Model, Data, and Methodology

In this part of the study, the effects of ICT and air pollution variables for 2011-2018 on the health expenditures of 81 provinces in Turkey are analysed. Based on the theoretical framework and empirical literature, econometric models applied to assess the determinants of health expenditure have been expanded to cover air pollution and ICTs and analyse them on a regional basis for Turkey. The prediction models of the research are defined in the following equations:

$$\ln\text{health} = \beta_{0it} + \beta_{1it}\ln income + \beta_{2it}\ln \text{population} + \varepsilon_{it} \quad \textbf{(Model I)}$$

$$\ln\text{health} = \beta_{0it} + \beta_{1it}\ln income + \beta_{2it}\ln \text{population} + \beta_{3it}\ln air + \varepsilon_{it} \quad \textbf{(Model II)}$$

$$\ln\text{health} = \beta_{0it} + \beta_{1it}\ln income + \beta_{2it}\ln \text{population} + \beta_{3it}\ln ICT + \varepsilon_{it} \quad \textbf{(Model III)}$$

$$\ln\text{health} = \beta_{0it} + \beta_{1it}\ln income + \beta_{2it}\ln \text{population} + \beta_{3it}\ln index + \varepsilon_{it} \quad \textbf{(Model IV)}$$

In the equations, i = 1, 2, 3,…,N denotes cross-section units, t = 1, 2, 3,…,T denotes time dimension and Ɛ denotes panel error term. The abbreviations, explanations, and sources of the variables used in this study are listed in Table 1.

Table: 1
Variables Used and Their Descriptions

Abbreviations	Variables	Description	Source
health*	Health expenditure per capita	Real gross domestic product per capita* Share of health expenditure in total household consumption expenditure	TUIK
income	Income per capita	Real gross domestic product per capita	TUIK
population	Population	Total population	TUIK
air	Air pollution	PM10 value is taken as the unit measuring air quality.	Republic of Turkey Ministry of Environment and Urbanization
phone**	Information Communication Technologies	Number of mobile phone subscribers per 100 people	BTK
internet**	Information Communication Technologies	Number of internet subscribers per 100 people	BTK
index**	Information Communication Technologies	Number of internets, mobile, and fixed telephone subscribers per 100 people	Devised by the authors

Note: [a] *The logarithms of the variables are taken.*

[b] *The health expenditure values prepared by TUIK in the 2nd Level of the Classification of Statistical Regional Units were distributed to the provinces in the same group and converted to province level. The province-level health expenditure variable multiplied the provinces'real per capita gross domestic product values.*

[c] *Three different variables were adopted in this study as indicators of ICT. These variables consist of the number of mobile phone subscribers (phone), the number of internet subscribers (internet), and the index variable (index) developed by the authors through making use of the Principal Component Analysis technique. The dataset for these variables was created as per 100 inhabitants due to the differences in the population numbers of the provinces.*

Table: 2
Descriptive Statistics

Variables	Mean	Min.	Max.	S.D	Obs.	Num. of Provic.
lnhealth	2.575593	2.065714	3.289212	.2224079	648	81
lnincome	4.309268	3.786112	4.899021	.1880421	648	81
lnpopulation	5.744387	4.878637	7.178048	.4107834	648	81
lnair	1.735978	1.079181	2.095588	.174874	572	81
lnphone	1.906529	1.683544	2.16317	.0660638	648	81
lninternet	1.61727	.721809	2.104183	.2835915	648	81
lnindex	1.937692	1.599505	2.239606	.0935416	648	81

Before estimating the models, it is essential to test the multicollinearity assumption, which shows no exact relationship between the independent variables. The multicollinearity problem causes issues such as the R^2 value being higher than it should be, the coefficient variances being significant, and the variables being meaningless (Gujarati, 1999). Variance Inflation Factor (VIF) values were estimated to detect this problem. A VIF value less than 10 indicates no multicollinearity problem between the variables (Hair et al., 1998) to see this problem.

Table: 3
Variance Inflation Factor (VIF) Values

Variables	VIF Value	Variance Coefficient
lnincome	3.34	0.299190
lnpopulation	1.29	0.774479
lnair	1.23	0.812433
lnphone	1.73	0.579496
lninternet	2.65	0.376651

When the obtained VIF values were considered, it was determined that the explanatory variables used in the study took values between 1.23 and 3.34. In line with these

findings, it can be assumed that there is no multicollinearity problem between the explanatory variables.

It is essential to decide which fixed effects, random-effects, and classical models will be used for estimation to determine whether air pollution and ICT use affect health expenditures. Thus, F test, Breusch-Pagan LM and Hausman tests were adopted. The analysis results of these tests are presented in Table 4.

Table: 4
Results of F test, LM, and Hausman Test

Tests	**Type**	**Statis.**	**Effective Estimator**							
			Model I		**Model II**		**Model III**		**Model IV**	
F-Test	Pooled	F-sta.	9.08	FE	8.33	FE	7.28	FE	8.56	FE
	FE	Prob	0.00		0.00		0.00		0.00	
LM Test	Pooled	χ^2 sta.	401.1	RE	368.5	RE	417.6	RE	367.2	RE
	RE	Prob> χ^2	0.00		0.00		0.00		0.00	
Hausman Test	FE	χ^2 sta.	72.51	FE	32.52	FE	14.25	FE	39.66	FE
	RE	Prob	0.00		0.00		0.006		0.00	

FE, Fixed Effect; RE, Random Effect.

In the first stage, the F-Test was applied to determine whether to use the fixed effects model or the classical model. It was concluded that the fixed effects model is more effective than the classical model. In the next step, the LM test was applied to choose between the random effect model and the classical model in the solution of the model. According to the results, the random effect model is a more efficient estimator than the classical model. In the last stage, the Hausman test was applied to choose between the random effect model and the fixed effect model in the solution of the model. The findings show that the fixed-effects model is a more efficient estimator than the random-effects model.

Before proceeding to the solution of the model, it should be concluded whether there is autocorrelation, heteroscedasticity, and cross-section dependence (CD) in the error terms of the model. Modified Wald Test for heteroscedasticity, detection of autocorrelation with Durbin-Watson and Baltagi-Wu LBI test, and CD with Pesaran test. Details of the tests are presented in Table 5.

Table: 5
Heteroscedasticity, Autocorrelation, and CD Test Results

		Model I		**Model II**		**Model III**		**Model IV**	
	Tests	**Test sta.**	**Result**	**Test sta.**	**Result**	**Test sta.**	**Result**	**Test sta.**	**Result**
HC	MWald Test	2506.4	✓	1.7e+28	✓	3770.5	✓	2815.7	✓
		0.000		0.000		0.000		0.000	
AC	D-W and Baltagi-Wu LBI	.73410	✓	.77905	✓	.7467	✓	.7419	✓
		1.1389		1.2784		1.143		1.143	
CD	Pesaran	4.220	✓	3.210	✓	1.039	X	1.360	X
		0.000		0.000		0.298		0.173	

AC, Autocorrelation; HC, Heteroscedasticity; ✓, Available; X, None.

Tests for detecting heteroscedasticity, autocorrelation, and CD in the error terms of the model show heteroscedasticity, autocorrelation, and CD (except Model III and IV) in the error terms of the model. In the presence of these problems, the standard errors should be

corrected with resistant standard errors without touching the parameter estimates (Hoechle, 2007). Various resistant estimators have been developed to make predictions in the presence of these problems. One of them is the estimator of Arellano, Froot, and Rogers. Arellano, Froot, and Rogers produced resistant standard errors in the presence of heteroscedasticity and autocorrelation. Although the Arellano, Froot, and Rogers estimators are resistant to the problems of heteroscedasticity and autocorrelation, it does not consider CD (Driscoll & Kraay, 1998; Hoechle, 2007). Some estimators consider account heteroscedasticity, autocorrelation, and CD. One of them is the Driscoll Kraay. The Driscoll Kraay estimator can produce robust standard error estimations in cases of heteroscedasticity, autocorrelation, and CD regardless of the cross-section size N (Driscoll & Kraay, 1998; Hoechle, 2007). Therefore, the Arellano, Froot, and Rogers estimator was used in Models I and II since heteroscedasticity and autocorrelation were problems. The Driscoll Kraay estimator was used in Models III and IV, as there was heteroscedasticity, autocorrelation, and CD. Table 6 presents the estimation results.

Table: 6
Estimation Results

Dependent Variable (health expenditure)	Model I	Model II	Model III	Model IV
C	-5.125** (1.02)	-4.570** (1.37)	-5.869** (1.54)	-3.620** (2.30)
lnincome	.838* (.041)	.877* (.057)	1.021* (.057)	1.011* (.087)
lnpopulation	.712** (.205)	.567*** (.287)	.694 (.287)	.436 (.432)
lnair		.054 (.033)		
lninternet			-.095* (.033)	
lnphone			.110 (.208)	
lnindex				-.341** (.146)
R^2	.784	.785	.790	.789
Prob	0.000	0.000	0.000	0.000

*Note: *, **, *** indicate the significance level of 0.01, 0.05, 0.10, respectively.*

According to the findings, income and population statistically affect individual health expenditure in Model 1. Accordingly, for a 1% change in income, health expenditure increases by 8%, and for a 1% change in population, health expenditure increases by 7%.

In Model 2, the air pollution variable was added to Model 1 (income and population). As in Model 1, income and population have a statistically significant effect on individual health expenditure, while the impact of air pollution on health expenditure is statistically insignificant, although it is positive.

In Model 3, besides the variables in Model 1 (income and population), internet usage and mobile phone subscribers were added as ICT variables. While income and internet usage have a statistically significant effect on individual health expenditure, the impact of population and mobile phone subscribers on health expenditure is statistically insignificant,

even though it is positive. A 1% change in internet usage, which is statistically significant, reduces individual health expenditure by approximately 1%.

Finally, in Model 4, in addition to the variables in Model 1 (income and population), the index variable obtained by the Principal Components Analysis technique from internet usage, mobile, and fixed telephone subscribers was added as an ICT variable. While income and internet use have a statistically significant effect on individual health expenditure, the impact of the population variable on health expenditure is statistically insignificant, although positive. A 1% change in the statistically significant index variable reduces the individual health expenditure by 3%.

In line with the findings, air pollution, which constitutes the aim of the study, has a positive effect on health expenditure, as it can be seen by the ICT variables (excluding the number of mobile phone subscribers), internet use, and index variables. Therefore, the increase in internet usage and ICT technologies reduces expenditures on health.

4. Conclusion

This study aimed to analyse the effects of ICT and air pollution on the health expenditures of 81 provinces in Turkey during 2011-2018. In this context, four models are fashioned. Tests for detecting heteroscedasticity, autocorrelation, and CD in the error terms of the models show that there is heteroscedasticity, autocorrelation, and CD (except Model III and IV) in the error terms of the model. Due to these problems, the standard errors were corrected with resistant ones without touching the parameter estimates. Thus, Models I and II used the Arellano, Froot, and Rogers estimators because of heteroscedasticity and autocorrelation difficulties. The Driscoll Kraay estimator was used in Models III and IV since heteroscedasticity, autocorrelation, and CD existed.

Model 1 analyses the impact of income and population on health care spending. Both revenue and population have a significant and positive influence on health expenditure. Although the effects of income and population on health expenditure are substantial, it should be recalled that the study's key target was the impact of air pollution and ICTs on health expenditure. Accordingly, in addition to income and population, air pollution was included in Model 2. In this step, it was detected that the effect of the air pollution variable on health expenditure was not statistically significant, although it was positive. Thus, air pollution hardly affected health expenditures at the provincial level. Three different variables were used to measure the impact of ICT on health expenditure. Therefore, Model 3 appraised the impact of the variables the number of mobile phone subscribers and the number of internet subscribers. The findings indicated that mobile phone subscribers were positive but not statistically significant.

In contrast, the number of internet subscribers on health expenditure was statistically significant and negative. In model 4, the effect of the index variable formulated by the authors on health expenditure was analysed using the Principal Component Analysis

technique. The impact of the index variable, the third variable used as an ICT indicator on health expenditure, was statistically significant and negative. As a result, air pollution and mobile phone subscribers cannot affect health expenditure. In contrast, the number of internet subscribers and index variable on health expenditure is negative. Thus, the increase in internet use can be recognized as a factor in decreasing health expenditure in Turkey.

This study has a unique value as it contributes to the literature on the impact of air pollution and ICT on health expenditure in Turkey. Henceforward, some suggestions are offered to researchers and policymakers.

As a suggestion for researchers, it is considered that the topic can be further developed given different aspects by classifying provinces differently (e.g., development level, geographical location), by making comparisons through differentiating econometric methods, and by extending the study period in case of accessing to more extended time series.

As for recommendations for policymakers, in fixed broadband internet penetration rate, Turkey ranks among the last among OECD countries. Considering this situation, it can be expected that increasing internet access in Turkey will reduce health expenditures. It can also help reduce existing inequalities in access to health services, with increased access to the internet. In addition to increasing existing internet access, it is also beneficial to increase applicable health-related online content. Thus, since helpful information about the health problem will be obtained online, it can reduce unnecessary health expenditures. Although it is beneficial to facilitate access to health-related information, the practical situation can become harmful due to information pollution on the internet. In this context, it is essential to carry out the necessary inspection. Otherwise, it is expected to increase health expenditures as unnecessary demand for health services increases.

References

Alsalameh, A.M. et al. (2019), "Evaluating the Relationship Between Smartphone Addiction/Overuse and Musculoskeletal Pain Among Medical Students at Qassim University", *J Family Med Prim Care*, 8(9), 2953-2959.

Apergis, N. et al. (2018), "US State-Level Carbon Dioxide Emissions: Does It Affect Health Care Expenditure?", *Renewable and Sustainable Energy Reviews*, 91, 521-530.

Apergis, N. et al. (2020), "Health Care Expenditure and Environmental Pollution: A Cross-Country Comparison across Different Income Groups", *Environmental Science and Pollution Research*, (27), 8142-8156.

Baabdullah, A. et al. (2020), "The Association Between Smartphone Addiction and Thumb/Wrist Pain: A Cross-Sectional Study", *Medicine (Baltimore)*, 99(10), 1-5.

Benvenuto, M. et al. (2019), "The Impact of Internet Usage on Healthcare Expenditures and Sustainability", *5th International Scientific Conference ERAZ - Knowledge Based Sustainable Development*, 95-107.

Bessière, K. et al. (2010), "Effects of Internet Use on Health and Depression: A Longitudinal Study", *J Med Internet Res*, 12(1), e6.

Blaya, B.J.A. et al. (2010), "E-Health Technologies Show Promise in Developing Countries", *Health Affairs*, 29(2), 244-251.

Blázquez-Fernández, C. et al. (2019), "On the Nexus of Air Pollution and Health Expenditures: New Empirical Evidence", *Gaceta Sanitaria*, 33(4), 389-394.

Bloom D.E. et al. (2015), "Macroeconomic Implications of Population Ageing and Selected Policy Responses", *The Lancet*, 385(9968), 649-657.

Boachie M.K. & K. Ramu (2016), "Effect of Public Health Expenditure on Health Status in Ghana", *International Journal of Health*, 4(1), 6-11.

Broom, A. (2005), "Virtually Healthy: The Impact of Internet Use on Disease Experience and The Doctor-Patient Relationship", *Qual. Health Res.*, 15(3), 325-345.

Brunekreef, B. & S.T. Holgate (2002), "Air Pollution and Health", *The Lancet*, 360, 1233-1242.

Buteau, S. et al. (2018), "A Population-Based Birth Cohort Study of The Association Between Childhood-Onset Asthma and Exposure to Industrial Air Pollutant Emissions", *Environ. Int.*, 121(1), 23-30.

Chaabouni, S. & C. Abednnadher (2014), "The Determinants of Health Expenditures in Tunisia: An ARDL Bounds Testing Approach", *International Journal of Information Systems in the Service Sector (IJISSS)*, 6(4), 60-72.

Cole-Lewis, H. & T. Kershaw (2010), "Text Messaging as A Tool for Behavior Change in Disease Prevention and Management", *Epidemiol Rev.*, (32), 56-69.

Correia, A.W. et al. (2013), "Effect of Air Pollution Control on Life Expectancy in The United States: An Analysis of 545 U.S. Counties for The Period From 2000 to 2007", *Epidemiology*, 24(1), 23-31.

Déglise, C. et al. (2012), "Short Message Service (SMS) Applications for Disease Prevention in Developing Countries", *Journal of Medical Internet Research*, 14(1), e3.

Deng, Q. et al. (2017), "Association Between Prenatal Exposure to Industrial Air Pollution and Onset of Early Childhood Ear Infection in China", *Atmos. Environ.*, 157, 18-26.

Di Matteo, L. & R. Di Matteo (1998), "Evidence on the Determinants of Canadian Provincial Government Health Expenditures: 1965-1991", *Journal of Health Economics*, 17(2), 211-228.

Driscoll, J. & A.C. Kraay (1998), "Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data", *The Review of Economics and Statistics*, 80(4), 549-560.

Ergün, S. & M. Polat (2018), "Türkiye'de Bölgeler Düzeyinde Sağlık Harcamalarını Etkileyen Unsurların Panel Veri Analizi İle Belirlenmesi", *Business & Management Studies: An International Journal*, 6(4), 1296-1306.

Ferguson, T. (2000), "Online Patient-Helpers and Physicians Working Together: A New Partnership for High Quality Health Care", *BMJ*, 321(7269), 1129.

Fernandez-Navarro, P. et al. (2017), "Industrial Pollution and Cancer in Spain: An Important Public Health Issue", *Environ. Res.*, 159, 555-563.

Fotourehchi, Z. (2016), "Health Effects of Air Pollution: An Empirical Analysis for Developing Countries", *Atmos. Pollut. Res.*, 7(1), 201-206.

Gbesemete K.P. & U.G. Gerdtham (1992), "Determinants of Health Care Expenditure in Africa: A Cross-Sectional Study", *World Development*, 20(2), 303-308.

Gerber, B.S. & A.R. Eiser (2001), "The Patient-Physician Relationship in The Internet Age: Future Prospects and The Research Agenda", *J. Med. Internet Res.*, 3(2), e15.

Gerdtham, U.G. & M. Lothgren (2000), On Stationarity and Cointegration of International Health Expenditures and GDP, *J Health Econ.*, 19, 461-475.

Gerdtham, U.G. et al. (1992), "An Econometric Analysis of Health Care Expenditure: A Crosssection Study of The OECD Countries", *J Health Econ*, 11, 63-84.

Gong, X. et al. (2018), "Associations Between Maternal Residential Proximity to Air Emissions from Industrial Facilities and Low Birth Weight in Texas, *USA*", *Environ. Int*, 120, 181-198.

Gujarati, D.N. (1999), *Temel Ekonometri*, (Çev. Ü. Şenesen), İstanbul: Literatür Yayınları.

Günal, A. & S. Pekçetin (2019), "Üniversite Öğrencilerinde Akıllı Telefon Bağımlılığı İle Servikal Bölge ve Üst Ekstremite Ağrısı Arasındaki İlişki", *Sürekli Tıp Eğitimi Dergisi*, 28(2), 114-119.

Hair, J. et al. (1998), *Multivariate Data Analysis*, New Jersey: Prentice-Hall.

Hanphitakphong, P. et al. (2021), "Smartphone Addiction and Its Association with Upper Body Musculoskeletal Symptoms Among University Students Classified by Age and Gender", *J Phys Ther Sci*., 33(5), 394-400.

Hansen P. & A. King (1996), "The Determinants of Health Care Expenditure: A Cointegration Approach", *Journal of Health Economics*, 15(1), 127-137.

Herwartz, H. & B. Theilen (2003), "The Determinants of Health Care Expenditure: Testing Pooling Restrictions in Small Samples", *Health Economics*, 12(2), 113-124.

Hitiris, T. & J. Posnett (1992), The Determinants and Effects of Health Expenditure in Developed Countries, *Journal of Health Economics*, 11(2), 173-181.

Hoechle, D. (2007), "Robust Standard Errors for Panel Regressions with Cross-Sectional Dependence", *Stata Journal*, 7(3), 281-312.

İnal, Ö. & S.S. Arslan (2021), "Investigating the Effect of Smartphone Addiction on Musculoskeletal System Problems and Cognitive Flexibility in University Students", *Work*, 68(1), 107-113.

Iverson, S.A. et al. (2008), "Impact of Internet Use on Health-Related Behaviors and the Patient-Physician Relationship: A Survey-Based Study and Review", *J Am Osteopath Assoc.*, 108(1), 699-711.

Janke, K. et al. (2009), "Do Current Levels of Air Pollution Kill? The Impact of Air Pollution on Population Mortality in England", *Health Economics*, 18, 1031-1055.

Jerrett, M. et al. (2003), "Environmental Influences on Health Care Expenditures: An Exploratory Analysis from Ontario, Canada", *J Epidemiol Commun Health*, 57, 334-338.

Karasoy, A. & G. Demirtaş (2018), "Sağlık Harcamalarının Belirleyicileri Üzerine Bir Uygulama: Çevre Kirliliği ve Yönetişimin Etkilerinin İncelenmesi", *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 7(3), 1917-1939.

Kea, X. et al. (2011), "The Determinants of Health Expenditure: A Country-Level Panel Data Analysis", *World Health Organization, Working Paper*, 1-26.

Khoshnevis Yazdi, S. et al. (2014), "Public Healthcare Expenditure and Environmental Quality in Iran", *Recent Adv Appl Econ.*, 233, 126-34.

Khoshnevis Yazdi, S.K. & B. Khanalizadeh (2017), "Air Pollution, Economic Growth and Health Care Expenditure", *J Econ Res.*, 30, 1181-90.

Kılıç, A. et al. (2014), "Marmara Bölgesi'ndeki Hava Kirliliğinin Modellenmesi, Kirlilik Azaltımı ve Maruziyet Analizi", *BAÜ Fen Bil. Enst. Dergisi*, 16(1), 27-46.

Kim, H.J. & J.S. Kim (2015), "The Relationship between Smartphone Use and Subjective Musculoskeletal Symptoms and University Students", *J Phys Ther Sci.*, 27(3), 575-9.

Kuyucu, M. (2017), "Gençlerde Akıllı Telefon Kullanımı ve Akıllı Telefon Bağımlılığı Sorunsalı: 'Akıllı Telefon (Kolik)' Üniversite Gençliği", *Global Media Journal*, 7(14), 328-359.

Lagravinese, R. et al. (2014), "The Impact of Air Pollution on Hospital Admissions: Evidence from Italy", *Reg. Sci. Urban Econ.*, 49, 278-285.

Laing, A. et al. (2004), "Healthcare and the Information Revolution: Re-Configuring the Healthcare Service Encounter", *Health Serv. Manag. Res.*, 17(3), 188-199.

Liu, T.C. et al. (2011), "Problematic Internet Use and Health in Adolescents: Data from a High School Survey in Connecticut", *The Journal of Clinical Psychiatry*, 72(6), 836-845.

Murthy, N.R. & V. Ukpolo (1995), "Aggregate Health Care Expenditure in the United States: New Results", *Applied Economics Letters*, 2(11), 419-421.

Murthy, N.R.V. & A.A. Okunade (2000), "Managed Care, Deficit Financing, and Aggregate Health Care Expenditure in The United States: A Cointegration Analysis", *Health Care Management Science*, 3(4), 279-285.

Murthy, V.N. & A.A. Okunade (2009), "The Core Determinants of Health Expenditure in the African Context: Some Econometric Evidence for Policy", *Health Policy*, 91(1), 57-62.

Mustafaoglu, R. et al. (2021), "The Relationship Between Smartphone Addiction and Musculoskeletal Pain Prevalence Among Young Population: A Cross-Sectional Study", *Korean J Pain.*, 34(1), 72-81.

Narayan, P.K. & S. Narayan (2008), "Does Environmental Quality Influence Health Expenditures? Empirical Evidence from A Panel of Selected OECD Countries", *Ecological Economics*, 65(2), 367-374.

Newhouse, J.P. (1977), "Medical Care Expenditure: A Cross-National Survey", *Journal of Human Resources, Economic Journal*, 12(1), 115-25.

Novignon, J. et al. (2015), "Health Status and Labour Force Participation in Sub-Saharan Africa: A Dynamic Panel Data Analysis", *African Development Review*, 27(1), 14-26.

Öztürk, S. & T. Küsmez (2019), "Sağlık Harcamalarının Belirleyicileri: BRICS-T Ülkelerinin Analizi", *Çukurova Üniversitesi İİBF Dergisi*, 23(1), 31-47.

Qureshi, M.I. et al. (2015), "The Battle of Health with Environmental Evils of Asian Countries: Promises to Keep", *Environmental Science and Pollution Research*, 22(15), 11708-11715.

Sağlık ve Çevre Birliği HEAL (Health and Environment Alliance) (2020), *Pollution from Coal Power Costs Turkey As Much As 27% of Its Total Health Expenditure - New Report*, <https://www.env-health.org/pollution-from-coal-power-costs-turkey-as-much-as-27-of-its-total-health-expenditure-new-report/#1528198360386-07c79b25-0009>, 08.07.2021.

Samadi, A.H. & E. Homaie Rad (2013), "Determinants of Healthcare Expenditure in Economic Cooperation Organization (ECO) Countries: Evidence from Panel Cointegration Tests", *International Journal of Health Policy and Management*, 1(1), 73-79.

Shen, J-S et al. (2021), "Does Industrial Air Pollution Increase Health Care Expenditure? Evidence from China", *Front. Public Health*, 9, 695-664.

Taşkaya, S. & M. Demirkıran (2016), "Enflasyon, Gelir ve Sağlık Harcaması Arasındaki Nedensellik İlişkisi", *TAF Preventive Medicine Bulletin*, 15(2), 127-131.

Tıraş, H.H. & S. Türkmen (2020), "Sağlık Harcamalarının Belirleyicilerine Yönelik Bir Araştırma; AB ve Türkiye Örneği", *Bingöl Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 4(1), 108-139.

TMMOB (2019), *Hava Kirliliği 2019 Raporu*, <https://www.tmmob.org.tr/sites/default/files/2019.pdf>, 29.06. 2021.

TÜİK (2020), *Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanım-Araştırması*, <https://data.tuik.gov.tr/Bulten/Index?p=Hanehalki-Bilisim-Teknolojileri-(BT)-Kullanim-Arastirmasi%202020-33679>, 24.06.2021.

World Bank (2020), *Life Expectancy at Birth, Total (Years)*, <https://data.worldbank.org/indicator/SP.DYN.LE00.IN?locations=TR>, 29.06.2021.

Yahaya, A. et al. (2016), "How Relevant is Environmental Quality to Per Capita Health Expenditures? Empirical Evidence from Panel of Developing Countries", *Springer Plus*, 5(925), 1-14.

Yuan, H. (2021), "Internet Use and Mental Health Problems among Older People in Shanghai, China: The Moderating Roles of Chronic Diseases and Household Income", *Aging & Mental Health*, 25(4), 657-663.

Zeng, J. & Q. He (2019), Does Industrial Air Pollution Drive Health Care Expenditures? Spatial Evidence from China", *Journal of Cleaner Production*, 218, 400-408.

Zhang, Y. et al. (2019), "Factors Affecting ICT Use in Health Communication among the Older Population in Jiangsu", *China. Libri*, 69(1), 41-53.

Sosyoekonomi

2022, Vol. 30(51), 215-239

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.11
Date Submitted: 11.06.2021
Date Revised: 31.10.2021
Date Accepted: 12.01.2022

The Effect of Unemployment and Urbanization on Migration in Turkey: An Evaluation in terms of the Harris-Todaro Model

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Türkiye'de İşsizlik ve Kentleşmenin Göç Üzerindeki Etkisi: Harris-Todaro Modeli Açısından Bir Değerlendirme

Abstract

This study tested whether there was a relationship between migration, unemployment, and urbanization based on the Harris-Todaro model in 12 regions of Turkey, which were formed according to NUTS-1 classification, in the period between 2008 and 2019. For this purpose, panel data methods that consider cross-section dependency were used in the study. As a result of the analysis, it was concluded that the Harris-Todaro model was valid in TR1, TR2, TR3, TR4, TR5, and TR6 regions. In TR7, TR8, TR9, TRA, TRB, and TRC regions, it was found that the Harris-Todaro model was not valid.

Keywords : Migration, Unemployment, Urbanization, The Harris-Todaro Model.

JEL Classification Codes : J61, J64, R10, O18, C23.

Öz

Bu çalışmada, Düzey 1 sınıflandırmasına göre Türkiye'nin 12 bölgesinde 2008-2019 döneminde Harris-Todaro modelinin geçerli olup olmadığı test edilmiştir. Bu amaçla çalışmada, yatay kesit bağımlılığını dikkate alan panel veri yöntemleri kullanılmıştır. Analiz sonucunda, TR1, TR2, TR3, TR4, TR5 ve TR6 bölgelerinde Harris-Todaro modelinin geçerli olduğu sonucuna ulaşılmıştır. TR7, TR8, TR9, TRA, TRB ve TRC bölgelerinde Harris-Todaro modeli geçerli değildir.

Anahtar Sözcükler : Göç, İşsizlik, Kentleşme, Harris- Todaro Modeli.

1. Introduction

Migration is generally defined as a permanent or semi-permanent change of residence due to urbanisation, industrialisation, and economic development (Lee, 1966: 49). Also, migration is a process that causes an increase in the number of cities and the growth rate of cities and creates a division of labour and specialisation and causes urban-specific changes in people's behaviour and relationships (Keles, 1972: 6).

Although migration has many aspects, such as economic, cultural, psychological, and legal, the economic dimensions of migration were investigated in our study. The economic dimensions of migration can be discussed mainly through urbanisation and unemployment rates. This discussion focuses on whether urban wages and rural wages differ. Migration from rural areas to urban areas is expected to increase when the urban salary is more than the rural wage. If the rural salary is more than the urban wage, the migration from rural to urban is expected to decrease. In this case, also known as Harris-Todaro (1970), migration from rural to urban continues as long as the urban wage is higher than the rural wage.

Migration in Turkey has been a phenomenon from rural to urban areas issue since the 1950s, and the rural population ratio has shown a continuous decrease within the total population. The rural population ratio that constituted 75% of the country's population back in 1950 was 56.1% in 1980 and fell to 41.1% in 1990 (Yılmaz, 2015: 163-64). The gap between the rural and urban populations got wider in years. According to TURKSTAT data, the ratio of the urban population in the total population was 64.9%, whereas the rural population ratio fell back to 35.1% in 2000. According to Address Based Population Registration System (ABPRS), the ratio of rural population was 25.04% in 2008, 8.65% in 2013, 8.25% in 2014, 7.9% in 2015, 7.7% in 2016, 7.49% in 2017, 7.73% in 2018, and 7.22% in 2019. On the other hand, the urban population was 74.96% in 2008, and this rate went up to 92.78% in 2019[1].

This study tested whether there was a relationship between migration, the urbanisation rate, and the unemployment rate according to the Nomenclature of Territorial Units for Statistics (NUTS-1) between 2008-2019 in Turkey. In this context, it can be commented on the causes of migration in these regions by determining which regions receive migration (or send migration). Therefore, it can be determined whether the increase in urban unemployment was caused by internal migration or other reasons. This determination allows policymakers to view different aspects of unemployment and urbanisation when implementing unemployment and migration policies. In this context, it is essential to accurately determine the causality relationship between migration, unemployment, and urbanisation for rural development and increase living standards in urban areas. Also, the accurate determination of the relationship among these variables can make it easier for policymakers to achieve their goals about policies that will be implemented to reduce

[1] *The main reason of the difference between 2008 and 2013 was the division changes in the Municipal Law according to law number 5747 and 6360.*

regional inequalities. Therefore, for Turkey and countries with intense migration movements like Turkey, this study provides essential information to policymakers about regional development, improved living standards, and reduced regional inequalities.

The main aim of this study is to determine whether there is a relationship between migration, unemployment rate, and urbanisation rate at the regional level in Turkey. In this context, we will try to determine the migration dynamics based on the Harris-Todaro model at the regional level. Also, it will be determined whether all these twelve regions receive or send migration, and the reasons for receiving and giving migration will be designated. Moreover, we will try to determine whether the migration occurs in each of the twelve regions from urban-to-urban or from rural to urban.

The possible contributions of this study to the literature are as follows: (I) This study is the first study to examine the migration dynamics based on the Harris-Todaro (1970) model in Turkey according to the NUTS-1 classification. (II) It is crucial to investigate the causes of migration in Turkey at the regional level for researching the problems and possible solutions about migration. This study also covers all regions of Turkey. Thus, this study is expected to guide policy authorities such as central and local authorities in Turkey and set an example for countries experiencing similar migration problems. (III) In the study, econometric methods that consider cross-section dependency were used. In the literature, the causes of migration are mostly estimated by traditional econometrics methods such as panel fixed effect, random effect, panel VAR, time-series VAR, Granger causality, and Johansen co-integration test. These methods do not take into account cross-section dependency. Therefore, the results of these methods can be biased.

2. Literature Review

2.1. Theoretical Literature Review

Although many definitions have been made in the literature on migration, studies on the theoretical basis of migration can be examined under two approaches. The first approach of the cost-benefit approach defends that individuals migrate when their costs surpass their benefits. This approach is interpreted differently from classical and neo-classical perspectives. Schultz (1961) and Sjaastad (1962), known as pioneers of the classical view, analysed migration with the concept of human capital. Besides, they stated that the utilities of migration and costs include personal and social factors and have monetary and non-monetary components. Todaro (1971) and Harris &Todaro (1970) are regarded as pioneers of the Neo-classical perspective. Todaro (1971) emphasised the social and economic inequalities and concluded that the reasons for migration between regions and countries were originated from socio-economic inequality.

On the other hand, Harris & Todaro (1970) investigated migration to cities in developing countries. They stated that the main reason for migration was better wages and employment opportunities in urban areas than in rural areas. The second approach that explains the phenomenon of migration is the approach of push-pull factors. Push factors can

force people to leave their homes and are related to the country from which a person migrates. Push factors include poverty, rapid population growth, "primitive" or "poor" living conditions, desertification, famines/droughts, fear of political persecution, inadequate healthcare, loss of wealth, and similar factors (Aydemir & Sahin, 2018: 120). Pull factors, which attract people to a specific location, are the opposite of push factors. Typical examples of pull factors are more job opportunities and better living conditions, easy availability of land for settling and agriculture, political or religious freedom, superior education system and level of welfare, better transportation and communication facilities, better healthcare system, stress-free environment, and security (Lee, 1966: 49-54). Lee (1966) and Ravenstein (1985), who are the pioneers of this approach, emphasise that the primary sources of migration are insufficiency in economic opportunities and social areas such as education, health, and transportation.

Theoretical studies in the literature are primarily based on the Harris-Todaro model. In the works of Brueckner (1990) and Brueckner & Zenou (1999), they argue that the Harris-Todaro model is a model where rural and urban migration equalise expected wages. Besides, they state that the escalation in urban land rents is an element that should not be ignored. They emphasise that the increase in urban land rents in developing countries is an additional factor limiting migration size. The most striking result of this modified model, which defends the validity of the Harris-Todaro model, is the limitation to the additional migration from the countryside by escalating land prices. The reason is that despite the chance to find a formal job, land rental increases reduce the expected benefit of immigrants. In another study supporting the Harris-Todaro model, Brueckner & Zenou (1999) defended that the increase in formal employment did not cause the expansion of the informal sector in the urban economy. This situation originates that the rise in informal employment is not large enough to offset the first increase in formal employment. Escalation of urban land rent, which Brueckner and Zenou (1999) added to the Harris-Todaro model, and the impact of the expected utility model on migration balance may be ambiguous. However, land price increases can play an essential role in the migration balancing process, especially in developing countries, by increasing urban living costs. Brueckner & Kim (2001) evaluated the part of land rent increase within the scope of urban living costs in balancing the rural-urban migration process. The authors also emphasise that, while making the immigrants' migration decision, the transition between formal and informal employment is made considering the expected wages. Also, they defend that the Harris -Todaro condition equates to the real income between the urban and the rural areas in developing countries.

2.2. Empirical Literature Review

The literature shows that the relationship between migration movements and unemployment is mostly reviewed in terms of international and country scale. In the empirical literature, national and international studies focusing on migration and unemployment within the scope of migration from rural to urban areas are very limited. Although migration and immigration have different dynamics, national and international

literature focusing on the relationship between unemployment and migration types is included.

In the literature, independent from the Harris-Todaro (1970) model, some studies applied econometric models examining the relationship between international migration and unemployment. Jean & Jimenez (2007) investigated the effects of migration on unemployment between 1984-2003 in eighteen OECD countries. They applied the Generalised Method of Moments (GMM). As a result of the research, it was concluded that migration has no permanent effect on unemployment, even in the short term. Heid a& Larch (2012) analysed the relationship between migration and unemployment using dynamic panel data methods in their study between 1997-2007 for 24 OECD countries. As a result of the analysis, it was determined that migration negatively affected the average unemployment rate in the countries. Boubtane et al. (2013) examined the relationship between migration, unemployment, and economic growth between 1980-2005 in twenty-two OECD countries using GMM and Granger causality methods. As a result of the analysis, the authors concluded that unemployment negatively affected migration only in Portugal, and migration did not cause unemployment in other countries. Chuikina & Fard (2012) investigated whether the migration rate was effective on the unemployment rate between 1997-2011 in the United Kingdom (U.K.) and Sweden by multiple regression methods. The study's findings showed that the migration rate did not significantly impact the unemployment rate of England and Sweden. Fromentin (2013) investigated the relationship between migration and unemployment in France by using the co-integration and vector error correction model (VECM) between 1970 and 2008. The analysis results showed no observed increase in total unemployment due to migration in the long term. It was also concluded that migration negatively affected unemployment quickly but positively affected wages.

In the national literature, in Altunc et al. (2017) study, the relationship among immigration, economic growth, inflation, and unemployment rates in Turkey was analysed using Granger causality tests. According to the study's findings, while a bilateral causality relationship between immigration and economic growth, no indications of causality were found between unemployment and inflation. Ceritoglu et al. (2017) estimated the effect of immigration from Syria on the workforce of Turkey using DID (Difference-in-difference) method for nine regions of NUTS 2 (located in East and South-eastern Anatolia) for the period between 2010-2013. The findings obtained from the study showed that immigration from Syria had increased the registered employment and unemployment rates in the 9 NUTS 2 region. Also, it was seen that the contribution of the local population to the workforce, unregistered work, and the ability to find a job were all receded. Aksu et al. (2018) studied the effects of mass immigration from Syria on the workforce in Turkey using the data of the 2004-2015 period for overall NUTS 2 (26 regions) regions. The 2SLS (Two-Stage Least Squares) results show that immigration from Syria does not negatively affect total male employment in Turkey but creates a negative effect on female work. Köseoğlu & Artan (2020) tested the relationship among migration, unemployment, and GDP between 2000 and 2016 using a panel data analysis method for 27 OECD countries. The study's findings

showed that the unemployment rate has a negative effect on migration. It was concluded that a 1% increase in the employment rate decreases migration at 0.3% in OECD countries.

In the international literature, Tripathi & Kaur (2017) investigated the determinants of rural migration in India. They tested the relationship between migration, employment, unemployment, and consumption in 2001 in the 51 major cities of India using the OLS method. As a result of the analysis, the authors concluded that rural migration had a negative impact on employment and unemployment at the urban level. Zeng & Xia (2016) investigated the relationship between urbanisation and services sector employment using SVAR (Structural vector autoregressive) model and the Granger causality test between 1978-2013 in China. The study's findings showed that employment in the services sector was not a Granger cause of urbanisation. Also, in national literature, some studies analyse the relationship between migration and unemployment within the country. To illustrate, Celik & Arslan (2018) studied the relationship between migration and unemployment using the 2014-2016 data of NUTS 2 (26 regions) regions of Turkey. The results of the study in which Spearman correlation analysis was used showed a strong positive relationship between migration and general unemployment for the region overall.

Sancar & Akbas (2020), in their studies, analysed the relationship between net migration rate and unemployment between 2008 and 2018 using panel data method for 26 Level 2 regions and regions overall. The study's findings showed that an increase in net migration rate in the short term in TR21, TR41, and TR42 Level 2 regions of Marmara leads to a decrease in the employment rate. In the TRA1 and TRA2 Level 2 regions of eastern Anatolia, unemployment rises the higher the migration rate. The migration towards the TRC2 Level 2 region of the South-eastern Anatolian region increases this unemployment. When migration occurs in TR61 and TR62 Level 2 regions of the Mediterranean Region, the unemployment rate also rises. All over the Level 2 regions of Aegean, Central Anatolian, and Blacksea regions, no relationship was found between migration and unemployment variables in the short term. The overall Marmara, Mediterranean, Blacksea, East Anatolia, and Southeastern Anatolia showed that migration increases unemployment in the short term.

Aktas & Sahin (2019) studied the validity of the Harris-Todaro migration model using the Vector Autoregression (VAR) model within the scope of migration movements from rural areas towards urban areas between 1970 and 2014 in Turkey. The result of the study revealed that the Harris-Todaro model could explain the migration movements within Turkey. Using the panel data method, Evin et al. (2020) attempted to determine the relationship between urbanisation and migration between 2008-2019 in 12 regions in Turkey created according to Level 1 classification. The study results showed that in Level 1 regions of Southeastern Anatolia, Istanbul, Western Marmara, Eastern Marmara, Western Anatolia, Mediterranean, Western Blacksea and Easter Blacksea there is a statistically significant positive relationship between urbanisation and migration. The relationship between urbanisation and Northeastern Anatolia, Central-Eastern Anatolia, and Aegean was insignificant.

Aydın & Levent (2021), in their study, focused on the socio-economic factors of migration between 2008 and 2018 for Level 1 regions of Turkey using panel data analysis. The study's findings showed a long-term positive relationship among unemployment, education level, and migration rate. An increase in the level of unemployment leads to a 1.80 increase in migration.

There are differences in the empirical studies that focus on migration and unemployment in terms of country/countries, period, and econometric method used. With this respect, some studies could not find the relationship between migration and unemployment (Jimenez, 2007; Chuikina & Fard, 2012; Fromentin, 2013; Altunc et al., 2017), that could find a negative relationship (Ceritoglu et al. 2017; Esposito et al., 2019; Tripathi & Kaur, 2017; Köseoğlu & Artan, 2020), and that could obtain a positive relationship (Heid & Larch, 2012; Celik & Arslan, 2018; Aydın & Levent, 2021) between the variables. While studies reveal the positive relationship between migration and the unemployment rate within this scope, some studies claim a negative relationship. In addition to this, the results obtained from a limited number of studies on the subregional scale in Turkey show differences in the relationship between unemployment and migration or urbanisation at a regional scale (Sancar & Akbas, 2020; Evin et al., 2020). In the literature, no other study that focuses on the relationship between migration, unemployment, and urbanisation using the Harris-Todaro model and that makes inferences at Level 1 regional scale could be found. In the national literature, the study of Aktas & Sahin (2019) only tested the Harris-Todaro model on Turkey overall scale. This study is thought to have contributed to the literature thanks to the fact that the study, being the first study, to test migration, urbanisation, and unemployment phenomenon using Harris-Todaro model and at Level 1 regional scale.

3. Model Specification

The model used in this study is based on the Harris-Todaro (1970) migration model. The Harris-Todaro model investigates the migration process of employees in the economic system, which consists of 2 sectors called the rural and urban sectors[2].

A Cobb-Douglas production function can describe the production process of the rural sector:

$$Y_r = A_r N_r^{\varphi} \tag{1}$$

[2] *Since the industrial sector is intense in the urban area, the urban sector represents the industrial sector in the urban area. In addition, the agricultural sector is intense in a rural area. Therefore, the rural sector was used to represent the agricultural sector in the rural area.*

Where Y_r is the production level of the rural sector, N_r is the number of workers used in the rural sector. $A_r>0$ and $0<\varphi<1$ are parametric constants.

Similarly, the urban sector can also be described as a Cobb-Douglas production function as follows:

$$Y_u = A_u N_u^{\alpha} \tag{2}$$

Where Y_u is the production level of the urban sector, N_u is the number of workers employed in the production of the urban sector. $A_u > 0$ and $0<\alpha<1$ are parametric constants.

The primary hypothesis of the Harris-Todaro model is that immigrants react mainly to earnings differentials, economic incentives, and the probability of getting a job to influence the migration decision. In other words, it is posited in this model that migration from rural to urban will occur as long as the urban expected wage exceeds the rural wage. It can be deduced from this crucial assumption of the Harris-Todaro model that the migratory dynamics lead the economic system toward an equilibrium with urban concentration and high urban unemployment (Espindola et al., 2006: 603). In this model, the equilibrium condition can be provided with the following equation:

$$w_u^e = w_r = 0 \tag{3}$$

Where w_u^e and w_r represent the expected urban wage and rural wage, respectively. w_u^e can be expressed as follows:

$$w_u^e = \frac{N_m}{N_u} w_m \tag{4}$$

Where N_m represents the population working in a sector in the urban area and N_u represents the total urban population. Hence, $\frac{N_m}{N_u}$ is an estimate of the probability that a worker living in the urban will find work in the urban sector. w_m means minimum wages in the urban area. Also, w_m is assumed fixed institutionally at a level above equilibrium in this labour market, so w_m can be written as follows:

$$w_m = \alpha A_m N_m^{\alpha-1}, \text{ such that } N_m \leq N_u \tag{5}$$

While the urban wage is calculated in this way, the rural wage can be expressed as follows:

$$w_r = \varphi A_\alpha N_\alpha^{\varphi-1} p \tag{6}$$

In equation (6), *p* is the price of the rural sector. Also, w_r is perfectly flexible and equal to the marginal productivity of the labour market. Therefore, the model assumes full employment in the rural sector. Thereby, urban unemployment is taken into account when the unemployment rate is calculated for the model.

Equation (3), known in the literature as the Harris-Todaro condition, implies that long-term equilibrium will be achieved when the expected urban wage reaches the level where it will be equal to rural salary. Therefore, in $w_u^e > w_r$, migration from rural areas to urban areas is expected to occur, while in the case of $w_u^e < w_r$, migration from urban areas to rural areas is expected to occur. If the urban wage converges to the rural wage, migration between the rural and urban areas will likely remain constant; it will not change (Espindola et al., 2006).

Harris and Todaro (1970) argue that the differential of expected wages in equation (3) can be a constant value ($\delta \neq 0$). When this differential reach (δ), the net migration ceases. This generalised Harris-Todaro condition can be expressed as follows:

$$w_u^e - w_r = \delta \tag{7}$$

The following equation is obtained if equations 4 and 6 are written into equation 7.

$$\frac{N_m}{N_u} w_m - \varphi\rho A_\alpha^{1-\eta} A_m^{\frac{\eta}{1-\alpha}} \left(\frac{\alpha}{w_m} \right)^{\frac{\alpha\eta}{1-\alpha}} X \frac{1}{\left(N - N_u \right)^{1-\varphi+\varphi\eta}} = \delta \tag{8}$$

Where $0 < \varphi < 1$, $\rho > 0$, $A_m > 0$, $\eta > 0$ and $0 < \alpha < 1$ are parametric constants.

Equations 7 and 8 state the relationship between the urban population and migration. We can deduce from these equations that the urban population positively affects the net migration rate. Therefore, the urbanisation rate is expected to increase the net migration rate. If there is no change in the urbanisation rate, the net migration rate is expected to remain stationary. There is a unidirectional causal relationship between the unemployment rate and

the Harris-Todaro model's migration rate. Individuals who have been unemployed for a long time due to the increase in the unemployment rate are expected to migrate to more economically favourable places. This event lowers the net migration rate, as this will cause emigration (Chaudhuri, 2000: 353-354). Due to these relationships between urbanisation rate, unemployment rate, and migration rate, the Harris-Todaro model can be modified in econometric form as follows:

$$NMR_{it} = a_i - b_1 UER_{it} + b_2 UR_{it} + u_{it} \quad (9)$$

NMR represents the net migration rate, and the U.R. and UER represent the urbanisation rate and urban unemployment rate. According to Equation 9, the unemployment rate and the urbanisation rate coefficients are negative and positive, respectively. According to this result, if there is an increase in the unemployment rate, the net migration rate in that region decreases; that region sends migration. Also, if the urbanisation rate increases in an area, the net migration rate increases in that region. That is, that region receives migration.

4. Data[3] and Methodology

In this study, based on the Harris-Todaro model, we investigated a relationship between net migration, unemployment, and urbanisation rate between 2008-2019 in 12 regions of Turkey. We used the data from 12 regions[4] that were determined according to the NUTS[5] in the study. The net migration rate represented the internal migration rate (NMR). We used the urban unemployment rate to proxy (UER). A number of people per kilometre square (U.R.), which is also used by the United Nations (United Nations, 2019), was used in the study to represent the urbanisation rate. We used annual data in the study. Also, the data of NMR and UER are proportional (%). The data were obtained from the website of the Turkish Statistical Institute (TURKSTAT). We preferred the data according to their availability in the database. For the analysis, panel data methods that considered cross-section dependency and homogeneity were used.

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[3] *According to the official data of the Directorate General of Migration Management of the Republic of Turkey <https://multeciler.org.tr/turkiyedeki-suriyeli-sayisi/> in 2020, there are 4 million people in total living in Turkey under Temporary Protected Status after the ongoing civil war that started in 2011 (3.6 million people from Syrians and 400 thousand people from other nations). TURKSTAT pays attention to individuals' conditions in a household in terms of job, migration, and urbanization, not to individuals' nationalities, while preparing data regarding migration and unemployment. Therefore, in this study, the data regarding the Turkish citizens and the data for individuals under Temporary Protected Status were used.*

[4] *TRA: North-eastern Anatolia, TRB: Central East Anatolia, TRC: South-eastern Anatolia, TR1: İstanbul, TR2: Western Marmara, TR3: Aegean, TR4: Eastern Marmara, TR5: Western Anatolia, TR6: Mediterranean, TR7: Central Anatolia, TR8: Western Black Sea, TR9: Eastern Black Sea.*

[5] *Nomenclature D'unités Territoriales Statistiques (NUTS).*

4.1. Panel Unit Root Test

Pesaran (2006) prepared the panel unit root test that considers the correlation between cross-section units. This test, derived from the IPS test, called for the cross-sectionally IPS (CIPS) test. The CIPS test calculates the stationarity of all units forming the panel. It does not calculate the stationarity of each unit in the panel. Therefore, this test does not allow for heterogeneity.

The CIPS test statistic can be calculated as follows:

$$\overline{CADF} = CIPS = \frac{\sum_{i=1}^{N} t_i}{N} \tag{10}$$

Where N indicates the number of observations, t is time, and i is the number of units. In the CIPS test, the null hypothesis expresses that all countries forming the panel have included unit root, while the alternative hypothesis states that whole countries are stationary. (Akbas et al., 2012: 356).

4.2. Panel Co-integration Test

Westerlund (2008) developed a test known as the Durbin-Hausman (D.H.) test, which can be used both in cross-sectional dependency and when the stationarity of the series is different. Thereby, the D.H. test allows for the stability ranks of the independent variables to be different. In other words, the D.H. test allows the series has a different order of stationarity. Common factors are taken into account in this test. Westerlund did not model the D.H. test on the assumption of cross-section dependency.

On the other hand, Monte Carlo simulations show that the power of the D.H. test is high even when there is a cross-sectional dependency in the model (Akbas et al., 2013: 797). D.H. test has two statistics. The group statistic obtains the results under heterogeneity, while the panel statistic estimates under homogeneity (Westerlund, 2008: 203). According to Table A1, it is concluded that all of the models are homogenous. Therefore, we preferred the panel statistic in this study for analysis.

The hypothesis of the panel statistics are as follows:

$H_0 : \phi_i = 1$ No co-integration for all i

$H_0 : \phi_i < 1$ Co-integration for all i

The DH test can be calculated as follows:

$$DH_g = \sum_{i=1}^{n} \hat{S}_i \left(\hat{\phi} - \tilde{\phi}\right)^2 \sum_{t=2}^{T} \hat{e}_{it-1} \tag{11}$$

$$DH_p = \hat{S}_n = \left(\hat{\phi} - \tilde{\phi}\right)^2 \sum_{i=1}^{n} \sum_{t=2}^{T} \hat{e}_{it-1} \tag{12}$$

Where $\hat{\phi}$ is the OLS estimator of ϕ, $\tilde{\phi}$ is the Instrumental Variable estimator of ϕ. DH_p states the panel statistic, while DH_g expresses the group statistics.

4.3. CUP-FM OLS Estimator

Bai & Kao (2006) proposed the panel co-integration test takes cross-section dependency and endogeneity into consideration. This test assumes that the units forming the panel are homogeneous. Thereby, this test does not allow the co-integration relationship to differ from cross-section to cross-section. Besides, the limit distribution of the fully modified estimator for cointegrating panel coefficients is derived. Bai & Kao (2006) developed a continuous, updated, fully modified (CUP-FM) estimator based on these assumptions. Monte Carlo results indicate that the CUP-FM estimator's size and power are big enough even in the small sample properties. Moreover, the CUP-FM OLS estimator allows the variables to be I (1) or I (0).

Standard panel regression analysis is as follows:

$$y_{it} = \alpha_{it} + \beta x_{it} + e_{it},\ i = 1,....,N,\ t = 1,.....,T \tag{13}$$

Where y_{it} is 1 × 1, β is a 1 × k vector of the slope parameters, α_{it} is the intercept, and e_{it} is the stationary regression error. It is assumed that x_{it} is a k × 1 integrated process of order one for all i, where

$$x_{it} = x_{it-1} + \varepsilon_{it}$$

Under these specifications, equation (13) describes a system of cointegrated regressions, i.e., y_{it} is cointegrated with x_{it}.

To model the cross-section dependency, it is presumed that the error term, e_{it}, follows a factor model (e.g., Bai & Ng, 2006: 1142):

$$e_{it} = \lambda_i^{'} F_t + u_{it}$$

Where F_t is a r × 1 vector of common factors, λ_i is a r × 1 vector of factor loadings, and u_{it} is the idiosyncratic component of e_{it}.

After these assumptions, the CUP-FM estimator can be described. Before identifying the CUP-FM estimator, defining the feasible F.M. estimator is necessary.

$$\hat{\beta}_{FM} = \left[\sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{y}_{it}^{+} \left(x_{it} - \overline{x}_i \right)' - T \left(\hat{\lambda}_i' \hat{\Delta}_{F\varepsilon i}^{+} + \hat{\Delta}_{u\varepsilon i}^{+} \right) \right) \right]$$

$$\left[\sum_{i=1}^{N} \sum_{t=1}^{T} \left(x_{it} - \overline{x}_i \right)' \right]^{-1} \tag{14}$$

Where $\hat{y}_{it}^{+} = y_{it} - \left(\hat{\lambda}_i \Omega_{F\varepsilon i} + \hat{\Omega}_{u\varepsilon i} \right) \hat{\Omega}_{\varepsilon i}^{-1} \Delta x_{it} \,.\, \hat{\lambda}_i$ is the corresponding matrix of the estimated factor loadings.

Following the Feasible FM estimator, CUP-FM can be obtained as follows:

$$\hat{\beta}_{CUP} = \left[\sum_{i=1}^{N} \left(\sum_{t=1}^{T} \hat{y}_{it}^{+} \left(\hat{\beta}_{CUP} \right) \left(x_{it} - \overline{x}_i \right)' - T \left(\hat{\lambda}_i' \left(\hat{\beta}_{CUP} \right) \hat{\Delta}_{F\varepsilon i}^{+} \left(\hat{\beta}_{CUP} \right) \right) \right) \right]$$

$$\left[\sum_{i=1}^{N} \sum_{t=1}^{T} \left(x_{it} - \overline{x}_{it} \right) \left(x_{it} - \overline{x}_i \right)' \right]^{-1} \tag{15}$$

In this test, it is assumed that the number of factors, r, is known. Bai and Ng (2006) indicated that the number of factors could be found by minimising the following:

$$IC(k) = \log\left(V\left(k \right) \right) + k \left(\frac{N+T}{NT} \right) \log\left(\frac{NT}{N+T} \right) \tag{16}$$

After these calculations, t-statistic can be obtained as follows:

$$t_j = \frac{\sqrt{N} T \left(\hat{\beta}_{jFM} - \beta_0 \right)}{s_j} \;,\; N(0,1) \tag{20}$$

5. Empirical Findings

This study used panel data methods to determine whether the Harris-Todaro model is valid in Turkey. Before using panel data methods, whether cross-sectional dependency and homogeneity in the data set should be determined. Different panel data methods are used

depending on the problems of cross-section dependency and homogeneity situations. Therefore, identify whether there are econometric problems such as cross-section dependency and homogeneity in the data set. Table A1 shows the results of the cross-sectional dependency and homogeneity tests. According to these results, the null hypothesis of no cross-sectional dependence is rejected for all regions' net migration rate, unemployment rate, and urbanisation rate in CD tests. There is a cross-sectional dependency problem for three variables in each of the 12 regions.

Moreover, the results of Delta tests analysing the homogeneity under the null hypothesis show that each of the 12 regions has a homogeneous structure. As a result, TR1, TR2, TR3, TR4, TR5, TR6, TR7, TR8, TR9, TRA, TRB, and TRC regions include cross-sectional dependency, and these regions have a homogeneous structure. The fact that there is a cross-sectional dependency problem in any region shows that a shock in one of these regions may also affect other cities forming the region. That is to say, an immediate change of unemployment or urbanisation rate in any of these regions may influence the other cities in the region. The results of Delta tests confirm the homogeneity of regions that prove the consistency of NUTS-1 classification. The homogeneous regions indicate that the cities have similar structures regarding migration, unemployment, and urbanisation.

After cross-sectional dependency and homogeneity are tested, we can apply the panel data analysis. In panel data analysis, stationarity and co-integration should be tested at first to estimate the model because these tests are preliminary analyses. Since there is a cross-sectional dependency problem in NUTS-1 regions and these 12 regions have a homogeneous structure, methods that consider cross-sectional dependency and assume homogeneity were used.

Unit root test was performed initially to test the Harris-Todaro model's validity. The panel unit root test results are shown in Table 1.

Table: 1
The Results of CIPS Panel Unit Root Test

Variables			
Regions	NMR	UER	UR
TR1	-0.8085	-3.3791	-3.0720
TR2	-1.289	-1.596	-3.0882
TR3	-3.3871	-1.2362	-0.7797
TR4	-2.0612	-1.2175	-1.9927
TR5	-1.7197	-3.3535	-1.7847
TR6	-3.3674	-2.1431	-1.4696
TR7	-2.6759	-1.6104	-2.8529
TR8	-0.2249	-2.2434	-1.9117
TR9	-1.5895	-1.6847	-1.7661
TRA	-0.5708	-2.3511	0.1295
TRB	-1.5895	-1.6616	-2.6007
TRC	-1.9549	-1.7327	-0.4308

Note: The critical values for the CIPS test were obtained from Pesaran (2007), Table II(b) Case II.

According to Table 1, the assumption that a unit root under the null hypothesis cannot be rejected in 12 regions for all three variables. According to this, the migration rate,

unemployment rate, and urbanisation variables include unit root in these 12 regions. Therefore, the migration, unemployment, and urbanisation rates are not stationary in each of the 12 regions. Therefore, when there is an instantaneous change in migration, unemployment, and urbanisation in any of these 12 regions, this shock cannot return to the pre-shock period by itself in the long term. In this case, external intervention is necessary to eliminate this shock. Therefore, the migration, unemployment, and urbanisation rate in these 12 regions can be affected by government policies. With this respect, policy implementation such as development policies against inequalities among regions, programs for fighting against unemployment, and urbanisation policies can affect migration.

Following the unit root test, we used the co-integration test to determine whether there is a relationship between migration, unemployment, and urbanisation in the long term. The results of the co-integration test are indicated in Table 2.

Table: 2
Panel Co-Integration Test Results

Dependent variable: NMR	t-stat	
Regions	DHg	DHp
TR1	3.845	6.3089***
TR2	9.500	12.944***
TR3	3.010	9.286***
TR4	0.313	3.153***
TR5	1.701	2.707***
TR6	2.831	2.679***
TR7	0.647	5.762***
TR8	10.876	9.768***
TR9	2.445	6.230***
TRA	1.465	0.453
TRB	9.083	7.687***
TRC	3.952	-1.329

*Note: ***, **, * determine significance at 1%, 5%, and 10% level respectively.*

According to the co-integration test results, the null hypothesis states that no co-integration is rejected for all regions except TRA and TRC. According to this, there is a long-term relationship between migration, unemployment, and urbanisation rate in these ten regions. With this respect, changes in unemployment and urbanisation for each of the ten regions can affect the cities' migration rate forming these ten regions. Thus, the precautions and the policy implementations for urbanisation and fighting against unemployment by the central authority or local administrations can affect the migration rate in these regions.

After testing whether there is a long-term relationship between migration, unemployment, and urbanisation, we can estimate the validity of the Harris-Todaro model. The estimation results of this model are shown in Table 3.

Table: 3
The Results of CUP-FM OLS Estimator

Regions	CUP-FM-OLS			
	UER		UR	
	Coefficient	St.Error	Coefficient	St.Error
TR1	-0.5845***	0.8363***	0.1974	0.253
TR2	-7.300***	109.56***	0.795	30.96
TR3	-0.638***	13.699**	0.178	6.567
TR4	-0.190**	2.865***	0.079	0.987
TR5	-3.276***	2.639***	0.698	0.881
TR6	-0.919**	9.596**	0.349	4.438
TR7	-0.756	632.6***	0.506	59.039
TR8	-0.428	1.596	0.334	1.126
TR9	-0.973	0.10483	0.8023	0.9767
TRA	0.511	9.624	0.687	68.96
TRB	0.336	44.25	0.215	30.11
TRC	-0.047	2.891	0.106	2.010

*Note: ***, **, * determine significance at 1%, 5%, and 10% level respectively.*

According to the results in Table 3, the unemployment rate in the TR1 region is statistically significant and negative (-0.5845). Also, the urbanisation rate is statistically significant and positive (0.10483). This result may result from the price level index being too high in the TR1 region. According to a report by TURKSTAT in 2017, Istanbul, which is the largest urban in Turkey in terms of population, has the highest price level index in Turkey. Therefore, the cost of living in the TR1 region is exceptionally high. It isn't easy to live in the TR1 region for individuals who cannot find any job. Hence, individuals prefer to return to their hometowns when they cannot find a job in the TR1 region. We can explain the relationship between the net migration rate and the unemployment rate in this way. The fact that the urbanisation rate coefficient is positive indicates a positive relationship between urbanisation and net migration rates. As the urbanisation rate rises, the net migration rate grows as well. In other words, as the urbanisation rate increases, the TR1 region receives migration while the urbanisation decreases, the TR1 region sends migration.

Moreover, the central population and the total district population of the TR1 region have increased for a long time. That is, there is an increase in the urban population[6] of the TR1 region. Besides, the population growth rate in the TR1 region is higher than the average of Turkey. Also, the TR1 region is among the regions receiving migration in Turkey. The TR1 region has a high population growth rate and a high net migration growth rate, indicating that migration originates mainly from urban-to-urban. The Harris-Todaro model is valid in the TR1 region according to these results.

The results for TR2 indicate that the unemployment rate and urbanisation rate in the TR2 region are statistically significant. Results show that an increase in the unemployment rate in the TR2 region leads to a decrease in the net migration rate. An increase in the unemployment rate leads the TR2 region to send migration. Also, the urbanisation rate coefficient has a positive sign indicating that an increase in the urbanisation rate increases

[6] *See <https://www.tuik.gov.tr/Home/Index> (TURKSTAT) for detailed information about population, migration and urbanization of the twelve regions included in the NUTS 1 classification.*

the net migration rate. That is, the TR2 region receives migration as the urbanisation rate increases. The external economies hypothesis can explain the rise of the urbanisation rate in the TR2 region. According to External Economies Hypothesis (Marshall, 1890; Pigou, 1956; Markusen, 1996), industry concentration in a region increases industrial activities and populations in regions close to this region. TR1 (Istanbul) and TR4 (Bursa, İzmit) regions, neighbouring TR2 regions, are where the industry sector is concentrated. Therefore, the growth of the population and thus increasing urbanisation in the TR2 region can originate that the industrial sector is focused on TR1 and T.R. 4 regions. The urban population grows in connection with industrial activities increasing. It can be expected to see an increase in the urbanisation rate for the TR2 region, similar to this situation.

On the other hand, the urbanisation rate's increase may also result from increased migration. Also, the central population and the total district population of the TR2 region show an increase. That is, there is an increase in the urban population of the TR2 region. Besides, the population growth rate in the TR2 region is higher than the average of Turkey. These conditions show that the population growth in the TR2 region does not originate from migration from rural to urban. Besides, the TR2 region is among the regions receiving migration in Turkey. The TR2 region has a high population growth rate and a high net migration growth rate, indicating that migration originates mainly from urban-to-urban. The Harris-Todaro model is valid for the TR2 region according to these results.

The relationship between migration, unemployment, and urbanisation in the TR3 region is similar to the results in the TR2 region. The unemployment rate and the urbanisation rate are statistically significant. Coefficients are -0.63 and 13.70 for unemployment and urbanisation, respectively. Accordingly, when there are an increase in the unemployment rate, the net migration rate decreases. As the unemployment in the TR3 region increases, this region sends migration. The cities in the TR3 region (İzmir, Aydın, Manisa) are where the industry sector is intensive in Turkey. Also, the TR3 region is a region receiving migration. The difference between the urban and rural populations in the TR3 region did not change significantly between 2015 and 2019. While the rural population rate is 5% and the urban population rate was 95% in 2015, these rates were still approximately valid in 2019. These results show that unemployment causes giving migration in the TR3 region.

The fact that the population growth rate is over the average of Turkey and the rural and urban population rates didn't show significant differences show that migration is not from rural to urban but from the urban-to-urban pattern. The statistically significant and positive coefficient of urbanisation indicates that the migration rate increases as the urbanisation rate increases. This condition shows that rapid urbanisation in the TR3 region leads to the fact that this region receives migration. TR3 region is among regions where industrialisation is high, and the population growth rate is over the average of Turkey, just like TR4 and TR1 regions. The TR3 region is also more developed in terms of socio-economic structure from the other nine regions except for TR4 and TR1. This condition is one of the pull factors that make the TR3 region attractive. Hence, this region is exposed to

the flow of migration both as a requirement of industrialisation and since it is more developed than other regions in terms of socio-economy. These results indicate that migration originates mainly from urban-to-urban in the TR3 region. The Harris-Todaro model is also valid in the TR3 region, according to these results.

The unemployment rate and urbanisation rate are statistically significant in the TR4 region. According to these results, there is a negative relationship between the unemployment rate and the migration rate. As the unemployment rate increases, the net migration rate decreases. As unemployment increases, the TR4 region sends migration or vice versa. Also, there is a positive relationship between the urbanisation rate and the net migration rate. As the urbanisation rate increases, the TR4 region receives migration. The Harris-Todaro model is valid in the TR4 region according to these results. The fact that similar results were obtained with TR1, TR2, and TR3 regions originates from the fact that these regions show a great deal of similarity in socio-economy. Economic activities, mainly the industry sector, and social opportunities in these four regions (TR1, TR2, TR3, and TR4) are more developed than in other regions.

When the TR5 region is assessed, it is shown that the unemployment rate and the urbanisation rate are statistically significant. According to this result, when there is an increase in the unemployment rate, the TR5 region sends migration. The cities that include the TR5 region are Ankara and Konya. The industry sector in Konya is intensive. Ankara has an intense bureaucracy due to being the capital of Turkey. The industry sector in Ankara is less developed than in İstanbul and İzmir. Therefore, the economy of the TR5 region is less developed than TR1, TR2, TR3, and TR4 regions. Thus, employment possibilities in the TR5 region are less than in these regions.

Besides, in the report published by TURKSTAT in 2017, Ankara is in the third-order following Istanbul and İzmir in terms of an urban price index. Both the fact that industrialisation's intensity in Ankara is less than the cities in the first four regions and the high price index may lead individuals to migrate because the cost of living is heightened when they are unemployed. However, the TR5 region has received migration for a long time. Besides, a negative relationship between the unemployment rate and net migration rate in the TR5 region indicates that this region has a higher amount of receiving migration than giving migration. Also, the positive relationship between the urbanisation rate and the net migration rate in the TR5 region reveals that an increase in the urbanisation rate leads to migration towards this region. As a result, Ankara has an intense bureaucracy that has a significant effect. The population growth rate in the TR5 region is higher than the average of Turkey. In addition to this, the urban population of the TR5 region showed a partial increase while the rural population showed a partial decrease in years. This result indicates that the population growth in the TR5 region is partially from rural areas to urban areas, but mainly the migration is originated from other cities and regions. Therefore, the migration in the TR5 region is both rural and urban-based. These results show that the Harris-Todaro model is valid in the TR5 region.

In the TR6 region, Table 3 shows that the unemployment rate is statistically significant and negative (-0.919). This result shows similarity with the TR1, TR2, TR3, TR4, and TR5 regions. The similarity of this result with the results of these five regions is originated from the fact that industrialisation is high in the TR6 region. Also, the urbanisation rate is statistically significant and positive (9.596). Therefore, the migration rate increases as the urbanisation rate increases in the TR6 region. TR6 region comprises the cities of Antalya, Adana, Mersin, and Hatay. The industry, agriculture, and tourism sectors are developed in these cities, which increases employment possibilities. In this region, while Antalya and Mersin are receiving migration, Adana and Hatay are giving migration. However, the TR6 region generally received migration in 2019. The fact that there is a negative relationship between the unemployment rate and net migration rate can be explained because the tourism sector affects the labour market seasonally. When the tourism sector is intensive, the unemployment rate decreases because the employment possibilities are high. This condition leads to the receiving migration of this urban. During seasons when tourism activities are low, employment possibilities fall. This case leads to giving migration. Also, the population growth rate in the TR6 region did not show significant changes.

Additionally, the urban and rural population has not changed significantly after 2013. Therefore, it can be understood that the migration TR6 region receives is not from rural to urban but from urban to urban. The Harris-Todaro model is valid in the TR6 region according to these results.

For the TR7 region, only the urbanisation rate is statistically significant and positive. This result shows that the TR7 region receives migration as the urbanisation rate increases. The TR7 is a region giving migration, and the population growth rate is decreasing slowly. In addition to this, the urban population rate of the TR7 region shows a partial increase over the years, while the rural population rate shows a decrease. The urban population rate of the TR7 region increases, although TR7 is a migration giving region, which indicates that the TR7 region receives migration from rural to urban. According to these results, only the urbanisation rate affects the net migration rate in the TR7 region. Therefore, the Harris-Todaro model is not valid for the TR7 region.

The unemployment and urbanisation rates in the TR8, TR9, TRA, and TRB regions are insignificant. The TR8 region is a migration giving region. Also, the population growth rate is negative in this region. That is, the population in the TR8 region has decreased since 2010. Additionally, the population in the rural area decreases over the years, while the urban population increases. This condition shows that the TR8 region gives migration from rural areas to urban centres and other regions. These results show that the Harris-Todaro model is not valid in these regions.

TR9, TRA, and TRB regions also show similar results with the TR8 region. These three regions show similarity with TR8 in terms of demographics. Accordingly, in these three regions, the rural area population decreases in years while the urban population increases. This result indicates that the TR9, TRA and TRB regions give migration from

rural areas to urban centres and other regions. Also, rural areas are not developed sufficiently since the geographical conditions are unfavourable for industry and agriculture investments in these regions. This situation limits employment, especially in rural areas. In these three regions, geographical conditions are more favorable than rural areas in urban areas, which may reverse the relationship between migration, unemployment, population, and, consequently, urbanisation. Even though there is a significant relationship between migration, unemployment, and urbanisation in urban areas, there is no meaningful relationship between these variables in rural areas that may cause the relationship between these three variables to be insignificant throughout TR9, TRA, and TRB regions.

Finally, Table 3 indicates that the unemployment rate in the TRC region is statistically significant and negative. According to this result, the net migration rate decreases as unemployment in the TRC region increases. This region gives migration as the unemployment rate in the TRC region increases. The TRC is an emigrating region. Moreover, the population growth rate in the TRC region has gradually decreased, and while the urban population increases, the rural population decreases. This condition shows that the migration in the TRC region occurs from rural areas to urban areas. Besides, since the TRC region is a migration giving region, migration from the urban to the urban or the other regions occurs. Similarly, the urbanisation rate does not have a significant effect on migration. According to these results, the Harris-Todaro model is not valid in the TRC region.

6. Results and Discussion

This study tested whether the Harris-Todaro model was valid between 2008 and 2019 in 12 regions determined according to the NUTS-1 classification. We used panel data methods considering cross-section dependency to analyse the Harris-Todaro model. As a result of the analysis concluded that the Harris-Todaro model was valid in TR1, TR2, TR3, TR4, TR5, and TR6 regions. These findings obtained from the study shows that the Harris-Todaro model is also valid for the regions under discussion, as in parallel to the results obtained by Aktaş & Şahin (2019) for Turkey overall. In addition, in the study in which Aydın & Levent (2021) analysed the socio-economic effects of migration, it was concluded that Level 1 regions send migration when there is an overall unemployment increase. Meanwhile, the study's positive bilateral relationship between urbanisation and migration in TR1, TR2, TR3, TR4, TR5, and TR6 regions were also found in Evin et al. (2020) study for TR1, TR2, TR4, and TR5 regions. On the other hand, we concluded that the Harris-Todaro model was not valid in TR7, TR8, TR9, TRA, TRB, and TRC regions.

According to these results, the Harris-Todaro model is valid in socio-economically developed regions in Turkey. On the other hand, this model is not valid in TR7, TR8, TR9, TRA, TRB, and TRC regions less developed socio-economically than TR1, TR2, TR3, TR4, TR5, and TR6 regions. According to these results, it is understood that the Harris-Todaro model is valid in socially and financially developed regions in Turkey.

In addition to the fact that regions where the Harris-Todaro model is not valid, are less developed than regions where this model is valid, the rural population is more intense than the urban population in regions where the model is not valid. In these six regions where the Harris-Todaro model is valid, the policies implemented to encourage urban employment can increase migration from rural to urban areas and cause more significant migration, unemployment, and urbanisation problems. However, the rural development policy implementations by policy authorities for TR7, TR8, TR9, TRA, TRB, and TRC regions may help the development of these regions and cause a reverse migration from TR1, TR2, TR3, TR4, TR5, and TR6 regions to rural areas. Thus, the people living in TR1, TR2, TR3, TR4, TR5, and TR6 may have a chance to benefit from infrastructure investments such as education, health, and clean water in a better way. Moreover, the migration of individuals with no job or low living standards to rural areas from TR1, TR2, TR3, TR4, TR5, and TR6 regions where the population is dense may help decrease unemployment in these six regions. Thus, rural development policies are important in effectively and efficiently using Turkey's sources.

Regional conditions should be taken into consideration while implementing rural development policies. For example, in TRA, TRB, and TRC regions, the security problem is felt more intensively than in other areas due to terror actions. This situation has forced the individuals to migrate from these three regions to other regions for a long time. Therefore, if the policy authorities implement policies that can make these three regions more secure in terms of terror, these regions may grow faster. Also, taking the migration from these regions towards regions that are socio-economically more developed under control can only be possible by practising financial development and social development policies that complement each other simultaneously. Region-specific spatial dimensions should be considered when social and economic policies to solve migration and unemployment problems are implemented in TRA, TRB, and TRC regions. In planning and executing the social policies by considering regional dynamics, the target should be increasing employment. Areas like poverty, education, health, and social security, targeted to be developed in terms of social development, are sectors open for growth in these regions.

In TR7, TR8, and TR9 regions, where the Harris-Todaro model is not valid, economic activities cannot develop since geographical conditions are unfavourable for investment. Thus, improving transportation infrastructure conditions like roads, railways, and airlines is of great importance in TR8 and TR9 regions so that rural development policies can succeed. Both geographical conditions and low population growth lead to a lack of new employment areas in these regions. Apart from that, there is severe socio-economic disequilibrium between rural and urban areas in the TR8 and TR9 regions.

While implementing policies regarding employment and urbanisation, apart from regional conditions, taking the living conditions of individuals from other nations into consideration is of capital importance, starting from Syrians under Temporary Protected Status (TPS). According to the Directorate General of Migration Management of the Republic of Turkey, most Syrians will live in Istanbul, Hatay, Gaziantep, Kilis, and Mardin

in 2020. Therefore, the TR1, the TRC1, and the TR2 are the regions where most Syrian populations live. Since employment possibilities in the TR1 region are higher than in the other regions, it is realised that Syrians prefer living in this region. Also, it is thought that individuals under Temporary Protected Status prefer living in TRC1 and TRC2 regions since these regions are near to Syria. According to these results, while the relationship between migration, unemployment, and urbanisation in Turkey is investigated, Syrian people, who constitute a significant majority of individuals from other nations under Temporary Protected Status, play an essential role. Thus, to test the validity of the Harris-Todaro model in a healthy manner in Turkey, it is necessary to determine why Syrians migrate and employment conditions and shelter conditions. Syrians' religion, language, traditions, and cultures who have migrated to Turkey show similarity with Turkish citizens. Also, civil war has been going on in Syria since 2011. Because of these reasons, it is expected that Syrians will settle in Turkey permanently. Therefore, policy authorities should carry out diplomatic activities to facilitate the Syrian's return to their homeland and implement policy measures to enable Syrians' participation in the labour market who cannot return to their homeland. One of the most critical steps to ensure Syrians' integration into the labour market is to create the skill profile of the immigrant labour force. Moreover, immigrants should be provided with Turkish language courses to eliminate the language deficiencies they encounter in the labour market. Such practices can stabilise the migration activities of Syrians' by integrating them into the labour market.

It is also possible that the Syrian emigration that is expected to be permanent has a circular migration movement in years due to cultural, historical, religious connections, and geographical proximity, all of which were aforementioned. Within the scope of this probability, whether fixed programs designed for circular migration or flexible practices will be preferred is a significant topic that policymakers should decide. Provided that circular migration is practised in regular programs, practices regarding the limitation of workers and sectors can be opted for. An alternative policy preference can be a natural and evolving one rather than circular migration being practised regularly. However, our country would be more rational to practice regular programs rather than liberating the circular migration movement. This policy recommendation seems to be inevitable in terms of solving the possible problems in the workforce market.

On the other hand, one of the most significant steps to be taken to integrate both Syrian refugees and migrating population from rural areas to urban workforce market is to activate thew workforce programs. Within the scope of active workforce programs, compulsory labour training for those who migrate from rural areas to access the workforce market must be the first step to be taken. Furthermore, aids for job seeking, counselling on job and profession, utility programs must be provided for migrants. Also, to alleviate the negative effects of migration in Turkey, non-agricultural employment facilities must be created in rural and less industrialised regions. Providing the rural areas with social and economic conditions that will decrease the off-putting of such areas will minimise the negative effects of migration on the workforce market and urbanisation.

References

Akbas, Y.E. et al. (2012), "The Analysis of Fluctuations and Causality of Current Deficit, Economic Growth and Short Term Capital Flows of Organization for Economic Co-Operation and Development", *Journal of Applied Economic Sciences*, 4(22), 334-344.

Akbas, Y.E. et al. (2013), "Testing for Causality Between the Foreign Direct Investment, Current Account Deficit, GDP and Total Credit: Evidence from G7", *Panoeconomicus*, 60(6), 791-812.

Aksu, E. et al. (2018), "The Impact of Mass Migration of Syrians on the Turkish Labor Market", *Discussion Paper Series*, 12050, IZA - Institute of Labor Economics, Germany, Bonn.

Aktas, E. & A. Sahin (2019), "Harris-Todaro Göç Modeli: Türkiye Örneği", *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi*, 28(1), 222-234.

Altunc, Ö.M. vd. (2017), "Dış Göçlerin Türkiye Ekonomisinde İşsizlik Enflasyon ve Ekonomik Büyüme Üzerine Etkileri: Ekonometrik Bir Analiz (1985-2015)", *Social Science Studies*, 5(8), 197-212.

Aydemir, S. & M.C. Sahin (2018), "Zorunlu-Kitlesel Göç Olgusuna Sosyolojik Bir Yaklaşım: Türkiye'deki Suriyeli Sığınmacılar Örneği", *Dini Araştırmalar,* 21(53), 121-148.

Aydın, F.F. & C. Levent (2021), "Göçün Sosyo-Ekonomik Etkileri: Düzey-1 Bölgelerinde Ekonometrik Bir Uygulama", *Adıyaman Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 14(38), 397-427.

Bai, J. & C. Kao (2006), "Chapter 1- On the Estimation and Inference of a Panel Cointegration Model with Cross-Sectional Dependence", *Contributions to Economic Analysis*, 274, 3-30.

Bai, J. & S. Ng (2006), "Confidence Intervals for Diffusion Index Forecasts and Inference for Factor-Augmented Regressions", *Econometrica*, 74(4), 1133-1150.

Boubtane, E. et al. (2013), "Immigration, Unemployment and GDP in the Host Country: Bootstrap Panel Granger Causality Analysis on OECD Countries", *Economic Modelling*, 33, 261-269.

Brueckner, J.K. & H.A. Kim (2001), "Land Markets in the Harris-Todaro Model: A New Factor Equilibrating Rural-Urban Migration", *Journal of Regional Science*, 41(3), 507-520.

Brueckner, J.K. & Y. Zenou (1999), "Harris-Todaro Models with a Land Market", *Regional Science and Urban Economics*, 29, 317-339.

Brueckner, J.K. (1990), "Analysing Third World Urbanization: A Model With Empirical Evidence", *Economic Development and Cultural Change*, 38(3), 587-610.

Celik, R. & I. Arslan (2018), "Göç ve İşsizlik Arasındaki İlişki: Ampirik Bir Uygulama", *Sosyal Siyaset Konferansları Dergisi*, 74, 65-75.

Ceritoglu, E. et al. (2015), "The Impact of Syrian Refugees on Natives' Labor Market Outcomes in Turkey: Evidence from a Quasi-Experimental Design", *Working Paper*, 15/5, Central Bank of the Republic of Turkey, Ankara.

Chaudhuri, S. (2000), "Rural-Urban Migration, The Informal Sector,Urban Unemployment, and Development Policies: A Theoretical Analysis", *Review of Development Economics*, 4(3), 353-364.

Chuikina, V. & S.A. Fard (2012), "The Effects of Immigration on Unemployment: A Case Study of Sweden and The U.K.", *Bachelor Thesis in Economics*, Malardalen University, School of Sustainable Development of Society and Technology, Vasteras.

Espindola, A.L. et al. (2006), "A Harris-Todaro Agent-Based Model to Ruralurban Migration", *Brazilian Journal of Physics*, 36, 603-609.

Esposito, P. et al. (2019), "Immigration and Unemployment in Europe: Does the Core-Periphery Dualism Matter?", *GLO Discussion Paper Series*, 310, Global Labor Organization, Germany.

Evin, H. vd. (2020), "Kentleşme ve Göç İlişkisi: Türkiye ve Düzey 1 Bölgeleri İçin Bir Uygulama", *Akademik Yaklaşımlar Dergisi*, 11(2), 142-157.

Fromentin, V. (2013), "The Relationship Between Immigration and Unemployment: The Case of France", *Economic Analysis & Policy*, 43(1), 51-66.

Harris, J.R. & M.P. Todaro (1970), "Migration, Unemployment and Development: A Two-Sector Analysis", *American Economic Review*, 60 (1), 126-142.

Heid, B. & M. Larch (2012), "Migration, Trade and Unemployment", *SSRN Electronic Journal*, 6(4), 1-40.

Jean, S. & M. Jimenez (2007), "The Unemployment Impact of Immigration in OECD Countries", *Working Papers*, 563, OECD Economics Department, France.

Keles, R. (1972), *Şehirciliğin Kuramsal Temelleri*, Ankara: Ankara Üniversitesi Siyasal Bilgiler Yayınları.

Koseoglu, M. & G. Artan (2020), "Göç, İşsizlik ve Gelir Arasındaki İlişkilerin Analizi: OECD Ülkeleri Örneği", *Uluslararası Ekonomi ve Yenilik Dergisi*, 6(1), 61-81.

Lee, E. (1966), "A Theory of Migrarion", *Demography*, *3*(1), 47-57.

Markusen, A. (1996), "Sticky Places in Slippery Space: A Typology of Industrial Districts", *Economic Geography*, 72, 293-313.

Marshall, A. (1890), *Principles of Economics*, London: Macmillan.

Pesaran M.H. (2007), "A Simple Panel Unit Root Test in The Presence of Cross-Section Dependence", J*ournal of Applied Econometrics*, 22, 265-312.

Pesaran, M.H. (2006), "A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence", *Working Paper*, 0346, Cambridge Working Papers in Economics, Cambridge.

Pigou, A. (1956), *Memorials of Alfred Marshall*, New York: Kelly & Millman Inc.

Ravenstein, E.G. (1985), "The Laws of Migration", *Journal of the Statistical Society of London*, 48(2), 167-235.

Sancar, C. & Y.E. Akbas (2020), "Türkiye'de Düzey 2 Bölgeleri Ölçeğinde İç Göç ve İşsizlik İlişkisininEkonometrik Analizi", *Gümüşhane Üniversitesi Sosyal Bilimler Enstitüsü Elektronik Dergisi*, 11(1), 41-57.

Schultz, T.W. (1961), "Investment in Human Capital", *The American Economic Review*, 51(1), 1-17.

Sjaastad, L.A. (1962), "The Costs and Returns of Human Migration", *Journal of Political Economy*, 70(5), 80-93.

Todaro, M.P. (1971), "Income Expectations, Rural-Urban Migration and Employment in Africa", *International Labour Review*, 104 (5), 391-413.

Tripathi, S. & H. Kaur (2017), "Determinants of Rural to Urban Migration in Large Agglomerations in India: An Empirical Analysis", *MPRA Paper*, 76484, Munich Personal RePEc Archive, Phagwara, Punjab.

United Nations (2019), W*orld Urbanization Prospects The 2018 Revision*, Department of Economic and Social Affairs, New York.

Westerlund, J. (2008), "A Panel Co-integration Tests of the Fisher Effect", *Journal of Applied Econometrics*, 23, 193-233.

Yılmaz, M. (2015), "Türkiye'de Kırsal Nüfusun Değişimi ve İllere Göre Dağılımı (1980-2012)", *Doğu Coğrafya Dergisi*, 20(33), 161-187.

Zeng, S.H. & J.C. Xia (2016), "Why Rapid Urbanization Process can not Improve Employment Absorption Capacity of Service Industry in China - Also on The Interactive Mode Innovation Between Service Industry Development with Urbanization Under The Background of Transformation and Upgrading", *China Finance and Economic Review*, 4(9), 1-12.

Appendix

Table: A1
The Results of Cross-section Dependency and Homogeneity Tests

Regions	CD_{LM1}			CD_{LM2}			Delta	Delta_tilde
	NMR	UER	UR	NMR	UER	UR		
TR1: Istanbul	0.000	0.000	0.000	0.001	0.001	0.001	0.562	0.575
TR2: Western Marmara	0.010	0.163	0.018	0.012	0.044	0.026	0.500	0.500
TR3: Egean	0.000	0.000	0.000	0.001	0.001	0.001	0.835	0.879
TR4: Eastern Marmara	0.000	0.000	0.000	0.001	0.001	0.001	0.269	0.229
TR5: Western Anatolia	0.000	0.008	0.098	0.027	0.012	0.009	0.676	0.709
TR6: Mediterranean	0.000	0.000	0.000	0.001	0.001	0.001	0.841	0.885
TR7: Central Anatolia	0.000	0.136	0.000	0.033	0.001	0.017	0.719	0.757
TR8: Western Blacksea	0.000	0.041	0.000	0.056	0.003	0.035	0.807	0.851
TR9: Eastern Blacksea	0.000	0.034	0.000	0.044	0.002	0.027	0.751	0.754
TRA: North Eastern Anatolia	0.000	0.000	0.000	0.001	0.001	0.001	0.890	0.930
TRB: Central East Anatolia	0.000	0.000	0.000	0.001	0.001	0.001	0.597	0.616
TRC: South Eastern Anatolia	0.001	0.012	0.002	0.012	0.024	0.044	0.754	0.796

Sosyoekonomi

2022, Vol. 30(51), 241-260

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.12
Date Submitted: 21.06.2021
Date Revised: 25.11.2021
Date Accepted: 13.01.2022

Repurchasing an Environmental Related Crisis Experienced Automobile Brand: An Examination in the Context of Environmental Consciousness, Brand Trust, Brand Affect, and Resistance to Negative Information

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Çevre ile ilgili bir Kriz Deneyimlemiş bir Otomobil Markasını Tekrar Satın Alma Niyeti: Çevre Bilinci, Marka Güveni, Marka Duygusu ve Olumsuz Bilgiye Karşı Direnç Çerçevesinde İncelenmesi

Abstract

This study explores the direct effects of brand trust and environmental consciousness on the intention to repurchase a brand; tests the indirect impacts of brand affect and resistance to negative information in the effect of brand trust on intention to repurchase. The data collected from 110 current users of a particular brand of an automotive company that has recently faced an environmental crisis. SEM and process analysis are used to test the hypotheses. Brand trust positively affects repurchase intention, whereas environmental consciousness does not. Brand affect and resistance to negative information are mediators. For an environmental crisis experienced brand; this study clarifies the significance of brand related concepts (e.g., brand trust, brand affect) and resistance to negative information instead of environmental consciousness in an emerging market, Turkey.

Keywords : Environmental Crisis, Environmental Consciousness, Brand Trust, Brand Affect, Resistance to Negative Information, Repurchase Intention.

JEL Classification Codes : M10, M19, M30, M31.

Öz

Marka güveninin ve çevre bilincinin bir markayı tekrar satın alma niyeti üzerindeki doğrudan etkilerini araştırmak, marka güveninin yeniden satın alma niyeti üzerindeki etkisinde marka duygusu ve olumsuz bilgiye karşı direncin dolaylı etkilerini test etmek amaçlanmaktadır. Veriler çevresel krizle karşı karşıya kalan bir otomotiv firmasının belirli bir markasını kullanan 110 katılımcıdan toplanmıştır. Hipotezler SEM ve process analizi ile test edilmiştir. Marka güveni, tekrar satın alma niyetini olumlu yönde etkilerken, çevre bilinci etkilememiştir. Marka duygusu ve olumsuz bilgilere karşı direncin aracı etkisi bulunmaktadır. Çevresel kriz yaşamış bir marka için; bu çalışma, gelişmekte olan bir ülke olan Türkiye'de çevre bilinci yerine marka ile ilgili kavramların (örn. marka güveni, marka duygusu) ve olumsuz bilgilere karşı direncin önemli olduğunu ortaya koymaktadır.

Anahtar Sözcükler : Çevresel Kriz, Çevre Bilinci, Marka Güveni, Marka Duygusu, Olumsuz Bilgiye Karşı Direnç, Tekrar Satın Alma Niyeti.

1. Introduction

Environmental problems occur since people have consumed the environment for centuries for different purposes, methods, and dimensions (Krause, 1993). Although the early environmental issues are not a significant threat to society (Krause, 1993), especially after the Industrial Revolution, the environmental problems increase significantly and become dangerous (Daly & Zannetti, 2007).

In this context, Abratt and Sacks (1988) state that criticisms arise to the purchases made by customers without considering the social benefit. Along with the criticisms stated, a societal marketing orientation arises, suggesting that researchers should also address the social and ethical perspective (Takas, 1974). Societal marketing emphasizes that managers should take the environment into account in producing goods and services (Prothero, 1990). Within the societal marketing approach framework, the consumers' environmental consciousness level gains importance.

Environmentally conscious consumers have an awareness of environmental problems. These consumers are the people who support and may be able to solve environmental issues (Ariffin et al, 2016). Environmental consciousness levels of consumers worldwide are increasing (Schlegelmilch et al., 1996). Therefore, consumers' purchasing intention for environmentally friendly products is also growing (Kalafatis et al., 1999). Despite the increase in the purchase intention of environmentally conscious consumers and environmentally friendly products, some brands may come to the fore with the damage they cause to the environment. In such cases, brands may face crises due to companies' activities that harm the environment and nature (Mitroff et al., 1987).

In this case, consumers with high environmental consciousness may negatively affect their intention to repurchase the brand after the crisis. The level of environmental consciousness affects consumer behaviour (Garvey & Bolton, 2017). However, no specific study in the literature examines this direct impact. Investigating this issue is also crucial for companies' crisis management. Environmental brand crises that may arise in societies with high environmental consciousness can cause more harm to the company compared to crises that may arise from societies with low environmental consciousness.

Furthermore, brand crises can negatively affect the continuity and profitability, putting the future of the relevant brand at risk (Pace et al., 2017). For this reason, crises can pose a threat to brands and affect the brand negatively (Claeys et al., 2010). However, the brand trust developed before the crisis can protect the brand against the crisis and the negativities arising from the crisis (Peltekoğlu, 2014: 469). Trust is essential in developing a positive brand-customer relationship (Delgado-Ballester & Luis Munuera-Alemán, 2001). According to Upamannyu, Bhakar, and Gupta (2015) brand trust is a long-term experience (Upamannyu et al., 2015). The brand and customers rely on the consumers' beliefs and

reliance on the brand (Chaudhuri & Holbrook, 2001), which might protect the company during and after crises.

In the literature, brand trust is generally considered together with the concept of brand affect (Upamannyu et al., 2015) since brand affect is an approach that can complement brand trust. Brand affect is the positive emotion potential (Chaudhuri & Holbrook, 2001) that the brand can create in the consumer and consists of feelings that develop instantly (Upamannyu et al., 2015). Firms may need brand affect as well as brand trust in a crisis.

In addition, crises faced by brands can cause negative information about brands (Dawar & Lei, 2009). Negative information can damage its reputation and negatively affect its sales (Eisingerich et al., 2011). In such a situation, consumers' reaction to negative information is essential. For example, in some cases, consumers can resist negative information for several reasons. Namely, a socially responsible, customer-oriented, service-oriented, or sensitive to environmental issues may be less affected by negative information about itself (Eisingerich et al., 2011), which might be a result of brand trust. More specifically, the brand trust that affects resistance to negative information (Turgut & Gultekin, 2015) might shelter the brand in times of crisis. In other words, brand trust can also lead to consumer non-adoption of negative information resulting from the brand crisis, which might increase the likelihood of repurchasing the same brand. However, the number of studies examining the possible effects of negative information emerging for a brand or company and consumers' reactions to this information in question is limited (Ahluwalia, Burnkrant, & Unnava, 2000). Therefore, in crises, companies and researchers need to investigate the impact of brand trust on resistance to negative information and resistance to negative information on purchase intention.

Investigating environmental consciousness and brand trust in the context of real-world brand crises firstly, contributes to the literature and practitioners by collecting data in an emerging market, Turkey. Secondly, although these underlying relationships between brand trust, brand affect, resistance to negative information, and repurchase intention is vital for a company's success, up to our knowledge this proposed model has not been tested internationally and nationally. The findings of this study would help managers in Turkey during their allocation of the marketing budget and preparation of related promotional messages.

In this framework, this paper aims to measure the direct effects of brand trust and environmental consciousness on the intention to repurchase a brand. Then this study examines the related mediating effects of brand affect and resistance to negative information in the impact of brand trust on intention to repurchase a specific automobile brand that has experienced an environmental crisis. In the last section, results, limitations of the study, suggestions for future research, and suggestions for managers are given.

2. Conceptual Framework

2.1. Environmental Consciousness - Repurchase Intention Linkage

Ethical issues are related to the environmental impact on the purchasing behavior of consumers (Newholm & Shaw, 2007). Consumers' value judgments are a vital tool for predicting purchasing intentions (Ariffin et al., 2016). Environmentally conscious consumers are the "people who are aware of environmental problems, who support or may be able to solve these problems" (Ariffin et al., 2016: 393).

In the literature, there are studies (Ariffin et al., 2016; Menon et al., 1999) showing that environmental consciousness affects repurchase intention. In addition, environmentally conscious consumers purchase environmentally friendly products more and are prone to pay higher prices for these products (Ariffin et al., 2016; Kong et al., 2014). Consumers' environmental consciousness also positively affects their intention to repurchase environmentally friendly products (Menon et al., 1999). Therefore, environmental consciousness enables consumption being right and good for society and individuals (Lin et al., 2015).

On the other hand, crises faced by brands can affect consumer attitudes and behaviours (Yannopoulou et al., 2011). Many studies (Lin et al., 2011; Souiden & Pons, 2009) emphasize that various crises faced by firms harm consumer purchase intention. In addition, the non-environmentally friendly activities of brands can negatively affect the purchasing preferences of consumers with high environmental consciousness (Lin et al., 2015). As a result, the crisis and its aftermath negatively affect sales (Carter, 1997). Kong et al. (2014) mention that 77% of the participants stated that they do not buy the products of a specific brand because it harms the environment. The greenhouse gas emission and fuel consumption levels of automobiles are essential decision-making criteria for potential and existing automobile users (Chowdhury et al., 2016).

Based on this information, the purchasing intention of environmentally conscious consumers towards brands facing the crisis may be adversely affected due to environmental consciousness. That is to say, the environmental consciousness of the consumers may harm the intention of purchasing the company's products faced with an environmental crisis. The hypothesis proposed is as follows.

H1. Environmental consciousness negatively affects the intention to repurchase the brand that has experienced an environmental crisis.

2.2. Brand Trust - Repurchase Intention Linkage

Trust is the mutual belief that the parties will not take advantage of each other's weaknesses (Barney & Hansen, 1994). Trust is the desire or expectation to rely on the other party in risky or uncertain situations (Matzler et al., 2008). Brand trust enables customers to purchase the brand in question by reducing uncertainty for customers (Mishra et al., 2016).

In other words, while consumers are making purchasing decisions, they can choose the brands they trust to reduce the risk (Yannopoulou et al., 2011).

There is a positive impact of brand trust on brand loyalty (Chaudhuri & Holbrook, 2001; Orzan et al., 2016), brand commitment (Delgado-Ballester & Luis Munuera-Alemán, 2001), and intention to repurchase (Fang et al., 2011; Lin et al., 2011). Brand trust also causes customers to buy large amounts (Mishra et al., 2016). Customers buy the brands they trust more often (Chaudhuri & Holbrook, 2001). Relying on the commitment-trust theory (Morgan & Hunt, 1994), brand trust is critical in consumers' purchasing decisions and commitment. According to this information, it can be argued that consumers would continue buying after the crisis due to brand trust. Thus, another hypothesis suggested is as follows:

H2. Brand trust positively affects the repurchase intention of the brand that has experienced an environmental crisis.

2.3. Mediating Role of Brand Affect between Brand Trust and Repurchase Intention

Brand Trust-Brand Affect Linkage

Brand affect refers to the relationship between the brand and the consumer (Upamannyu et al., 2015). Having a high brand affect means that the consumer has a good impression and feeling about the brand and glorifies the brand in her/his mind (Mishra et al., 2016). Experiencing a brand can establish an emotional connection between the customer and the brand due to the brand affect (Chaudhuri & Holbrook, 2001).

Consumers can choose the product they approach more emotionally due to the low risk attached (Mishra et al., 2016). This low risk perception and positive feelings might be due to brand trust. Kabadayi & Koçak Alan (2012) stated the difference between brand trust and brand affect, as the former being the cognitive component that needs a long time and thought to occur. The latter being the emotional response that is more impulsive and spontaneous. Orzan et al. (2016) state that as consumers trust brands, they develop emotional attachments and find that brand affect occurs due to their trust in the brand. Therefore, brand affect might stem from the brand trust.

Brand Affect-Repurchase Intention Linkage

Emotions and feelings can have a significant impact on customer preferences (Westbrook, 1987). Chaudhuri & Holbrook (2001) mention that consumers tend to buy brands that make them happy, entertained, and delighted. Similar to this view, brand affect has a positive impact on purchasing (Matzler et al., 2006). For example, with the impact of the brand affect or when consumers have an emotional bond with one of the restaurants they visit, consumers prone to pay a high price for the restaurant and visit this restaurant frequently (Chaudhuri & Holbrook, 2001). In addition to these, brand affect positively influences brand loyalty (Chaudhuri & Holbrook, 2001, 2002). Brand loyalty mitigates the

harmful effects of a crisis faced by a brand on customers' purchase intention (Park & Lee, 2013). For this reason, even after crises the brand affect would positively influence the repurchase intention.

Thus, we expect that the brand trust would positively influence brand affect, which in turn has a positive impact on the repurchase intention, and the hypothesis formed is as follows:

H3. Brand affect has a mediating role between brand trust and intention to repurchase the brand.

2.4. Mediating Role of Resistance to Negative Information between Brand Trust and Repurchase Intention

Brand Trust-Resistance to Negative Information Linkage:

Companies need to focus on long-term goals in a competitive environment to establish relationships with consumers, rather than short-term and profit-oriented goals (Grönroos, 1997). Trust is critical for firms to establish a long-term and strong relationship with consumers (Matzler et al., 2008). In addition, trust is an essential factor that shapes the brand-customer relationship (Mishra et al., 2016).

Brand trust is an important phenomenon, especially in uncertainty or fear of opportunism (Laroche et al., 2012). Brand trust helps reduce uncertainties in consumers' minds (North, 2011). The role of trust in such situations is to reduce consumer concerns and make them feel safe towards brands (Laroche et al., 2012). Consumers consider brand trust in their purchasing process and the whole process of interacting with the brand (Delgado-Ballester et al., 2003).

Trust created before the crisis protects the brand against the crisis's adverse effects (Peltekoğlu, 2014: 457). Trust is when one party believes that the other will take an action that will lead to positive results (Morgan & Hunt, 1994). In other words, trust is the belief that the parties will not take action that will have negative consequences for each other.

Based on this information, the possible effect of brand trust on resistance to negative information becomes crucial. Eisingerich et al. (2011) argue that corporate social responsibility, customer orientation, and service quality protect brands against negative information. Accordingly, consumers can trust a brand that is socially responsible, customer-oriented, service-oriented, or sensitive to environmental issues and is less affected by negative information about this brand.

The trust and reputation formed due to the company's communication strategies in the pre-crisis period can reduce the harmful effects of the crisis (Peltekoğlu, 2014: 457). In addition, during the crisis, the brand trust established previously can protect the firm against the adverse effects of the crisis (Peltekoğlu, 2014: 469). Therefore, if consumers' trust in a

brand is high, they can be expected to resist to negative information caused by the crisis that arose for that brand. Similarly, Turgut and Gultekin (2015) show that brand trust positively affects resistance to negative information.

Resistance to Negative Information-Repurchase Intention Relationship Linkage

Resistance to negative information is the fact that the general opinion of consumers about any brand is not affected adversely by unfavourable messages (Eisingerich et al., 2011). Consumers can resist unfavourable information for various reasons. According to Liu (2006), the value of the information can affect the resistance to negative information. Also, consumers' strong relationship with the brand can be a valid reason to resist negative information (Aaker et al., 2004).

Consumers are frequently exposed to a variety of information. For this reason, they are often selective by eliminating some of the information and tend to use only the necessary information (Dawar & Pillutla, 2000). Consumers' judgments about products and their intention to try new products can be positively or negatively affected by the information obtained (Liu, 2006). One of the types of information that consumers utilize is negative information that can arise about the brand. Negative information can damage the company's reputation and negatively affect the company sales (Eisingerich et al., 2011). Unfavourable information and how firms deal with negative information affect customers' purchasing decisions (Ahluwalia et al., 2000). Consumers regard negative information as more informative or explanatory than positive information (Ahluwalia et al., 2000). Therefore, managing negative information is vital for companies.

Negative information about a product can reduce product sales (Chevalier & Mayzlin, 2006). Furthermore, the effect of negative information on reducing product sales is stronger than the potential positive effect of positive information on product sales (Chevalier & Mayzlin, 2006). As the resistance to negative information reduces, the consumers' intention to boycott diminishes (Kang et al., 2021). Based on this information, due to resistance to negative information, consumers might repurchase the same brand that has experienced an environmental crisis. Therefore, the following hypothesis is proposed as follows:

H4. Resistance to negative information has a mediator role on the positive influence of brand trust on the intention to repurchase the brand.

2.5. Brand Trust - Brand Affect - Resistance to Negative Information - Repurchase Intention Linkage

Consumers' emotions and feelings towards the brand constitute the consumer-brand relationship (Chen-Yu et al., 2016). Consumers use emotions as the source of information about the brand (Mishra et al., 2016). In other words, consumers can act in line with their feelings towards brands. Furthermore, brand affect positively affects brand loyalty

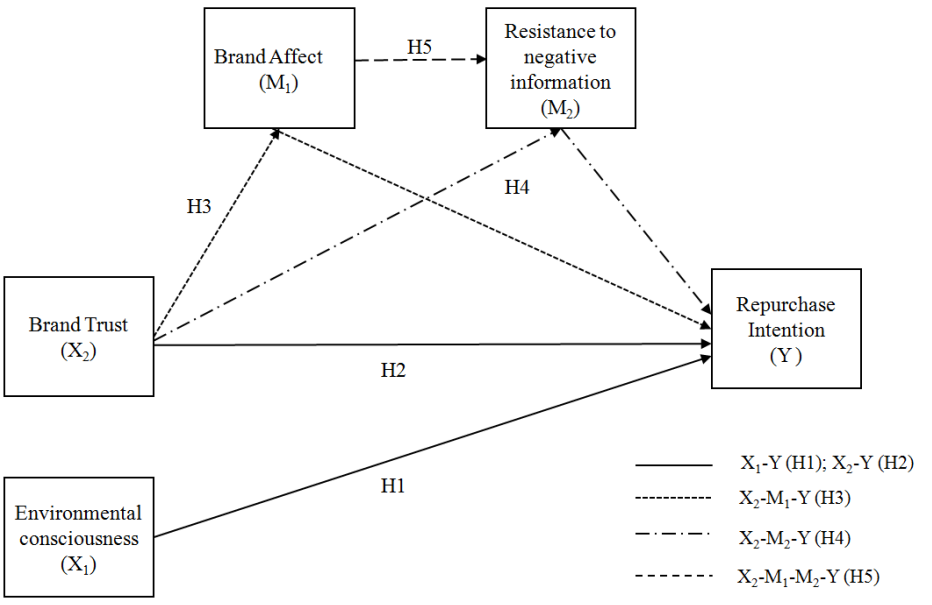
(Chaudhuri & Holbrook, 2001, 2002). Consumers' loyalty to the brand, which is the subject of negative information, may cause them to resist such information (Ahluwalia et al., 2000).

Various problems faced by brands (i.e., recall due to a chronic problem, racism, and sexual abuse) may cause negative information about companies and brands (Pullig et al., 2006) and lead to brand crises (Fearn-Banks, 2017: 304). Therefore, crises encountered by brands cause negative information. However, emotional factors can affect the consumers' reaction to unfavourable information about the brand. For example, when consumers have high emotional relationships with brands or their favourite objects, resistance to negative information may arise (Eisingerich et al., 2011). Similarly, brand love is a mediator between brand trust and resistance to negative information (Turgut & Gultekin, 2015). In this sense, the positive brand affect can increase the resistance against negative information, boosting the possible repurchase intention. In this sense, the following hypothesis is formed:

H5. The impact of brand trust on repurchase intention is mediated by two mediators of brand affect and resistance to negative information.

The model of the study with the proposed hypotheses is given in Figure 1.

Figure: 1
Proposed Model



3. Methodology

3.1. Sampling

The research data were gathered through a convenience sampling method from 110 participants living in Ankara who were actively using an automobile brand that had previously faced a crisis. The participants were asked on a nominal scale (Yes/No) whether they were using the X-branded automobile and whether they were aware of the particular environmental crisis in a specified time. Participants who marked "Yes" for both statements were included in the research sample. The brand name of this automobile is not stated for ethical reasons. The average age of the participants is 31 years, and approximately 80% are men. Furthermore, 60% of the participants stated that they are university graduates, and 70% are middle-income.

3.2. Measures

To measure *environmental consciousness*, environmentally friendly purchasing behaviour, knowledge, recycling behaviour and political action dimensions of the scale were adapted from the study of (Bohlen et al., 1993: 422-425).

The environmentally friendly product *purchasing behaviour* dimension includes seven items (i.e., "Choose the environmentally-friendly alternative regardless of price", "Try to discover the environmental effects of products prior to purchase") related to the frequency of purchase. These items were measured with a 5-point Likert-type scale as "Never" (1), "Always" (5) (Bohlen et al., 1993: 419). The 11 items within the *environmental knowledge* (i.e., knowledge about the "sea/river pollution", "global warming", "pollution from pesticides/insecticides") were utilized (Bohlen et al., 1993: 419). For the items within the knowledge dimension, a 5-point Likert-type scale with "Know nothing about" (1), "Know a great deal about" (5) was used (Bohlen et al., 1993: 419). Environmental activities such as the level of *recycling* (i.e., "Recycling paper", "Recycling glass") and *political action* to encounter environmental issues (i.e., "Supporting environmental pressure groups," "Lobbying about green issues") are measured with eight items. For the items of this dimension, a 5-point Likert-type scale was used as "Would never do" (1), "Do often" (5) (Bohlen et al., 1993: 419).

We adapted the brand trust and brand affect scales (Chaudhuri & Holbrook, 2001). There are four items in the brand trust scale (i.e., "I trust this brand", "I rely on this brand"). For these statements, a 5-point Likert-type scale was used as "Strongly Disagree" (1), "Strongly Agree" (5), and three items in the brand affect (i.e., "I feel good when I use this brand", "This brand makes me happy") (Chaudhuri & Holbrook, 2001: 87).

The scale of resistance to negative information was adapted from the study of Eisingerich et al. (2011). There are four items on the scale (i.e., "Negative information about [company name] does not change my general view of the firm", "Negative information about

[company name] has no effect on me") (Eisingerich et al., 2011: 66). For these statements, a 5-point Likert-type scale was used as "Strongly Disagree" (1), "Strongly Agree" (5).

The repurchase intention scale is adapted from the study of (Chiu et al., 2012). There are three statements on the scale (i.e., "If I could, I would like to continue using [company name]," "I plan to continue using [company name] in the future) (Chiu et al., 2012: 844). For these statements, a 5-point Likert-type scale was used as "Strongly Disagree" (1), "Strongly Agree" (5).

Before the questionnaire, a voluntary participation form was presented to inform the participants about the study and get permission for their participation. Participation in the study was voluntary. Participants could quit filling out the questionnaire for any reason. In addition, common method variance was not concerned relying on Harman's one-factor test (Podsakoff & Organ, 1986) due to the most prominent factor having just 25.84% of the variance, which is less than 50%.

3.3. Analyses

Confirmatory Factor Analysis (CFA) assessed whether the data fit the environmental consciousness scale of three dimensions: environmentally friendly purchasing behaviour, environmental knowledge, and recycling behaviour and political action. CFA revealed an acceptable model fit after modifications due to low factor loadings (Environmentally friendly purchasing behaviour-Item 1 and Recycling and Political Action- Item 7 and Item 8) ($\chi2$=340.760, d.f.=225, $\chi2$/d.f.=1.514; CFI=0.906; RMSEA=0.069). Then the average score of each dimension is taken for further analysis.

To test the H1. and H2., structural equation modelling was conducted. In structural equation modelling, to assess the study's validity, the measurement model was run with the variables Results firstly show unacceptable fit ($\chi2$= 228.459, d.f.=109, $\chi2$/d.f.=2.096; CFI=0.918; RMSEA=0.100). Making the related modifications, acceptable model fit is achieved ($\chi2$= 162.559, d.f.=106, $\chi2$/d.f.=1.534; CFI=0.961; RMSEA=0.070). All the factor loadings are high and statistically significant (Anderson and Gerbing 1988) and range between 0.62-0.92. Cronbach's Alpha, Average Variance Extracted (AVE) and Composite Reliability (CR) values and other descriptive statistics are given in Table 1.

Table: 1
Mean, Standard Deviation and Correlations of the Variables

Variables	Mean	Std. Dev.	Cronbach's Alpha	CR	AVE	1.	2.	3.	4.	5.
1. Environmental Consciousness	3.42	.64	.77	.78	.54	**.73**				
2. Brand Trust	4.07	.72	.89	.88	.66	.10	**.81**			
3. Brand Affect	4.16	.78	.92	.92	.81	.03	.74**	**.90**		
4. Resistance to Negative Information	3.21	.94	.90	.88	.66	.18	.53**	.43**	**.81**	
5. Repurchase intention	3.89	.85	.80	.92	.80	.15	.63**	.70**	.44**	**.89**

*** p<0.01; Std. Dev.: Standard Deviation; CR: Composite Reliability; AVE: Average Variance Extracted; Dioganal axis represents the square root of AVE.*

Cronbach's Alpha and Composite Reliability (CR) values are above 0.70, stating the reliability of the scales. Average Variance Extracted (AVE) values are above 0.50 (Fornell & Larcker, 1981), and the square root of each scale's AVE value is greater than its highest correlation with other scales. Thus, discriminant validity is established.

Path analysis revealed that brand trust positively affects the repurchase intention of the same brand ($\beta = .77$, $p < .001$, $R^2 = .61$). However, environmental consciousness did not have any significant impact on repurchase intention ($\beta = .13$, $p > .05$) ($\chi2=178.044$, d.f.=111, $\chi2$/d.f.=1.604; CFI=0.954; RMSEA=0.074). Therefore, H2 is supported whereas H1 is not.

Then, mediator roles of the brand affect (M1) and resistance of negative information (M2) in the relationship between the brand trust and repurchase intention are simultaneously tested with the brand trust-brand affect-resistance to negative information-repurchase intention link via process analysis (Model 6). The study uses 5000 bootstrapping samples and 90% Confidence Interval process analysis. The results of the analysis revealed that brand affect (b = .44, Boot S.E. = 0.10, 90% CI [.27, .62]) is a mediator between the brand trust; repurchase intention and resistance to negative information (b = .07, Boot S.E. = 0.04, 90% CI [.004, .16]) have a mediating role in the relationship between the brand trust and repurchase intention since confidence interval levels (upper-lower) does not include zero. Accordingly, H3 and H4 are supported.

On the other hand, the brand trust-brand affect-resistance to negative information-repurchase intention linkage is not statistically significant since there is 0 between lower-level and upper-level confidence intervals (b = .007, Boot S.E. = 0.02, 90% CI [-.01, .04]). Thus, H5 is not supported. The analysis results are presented in Table 2.

Table: 2
Regression-Based Analysis Results for Mediating Roles of Brand Affect and Resistance to Negative Information on the Relationship between Brand Trust and Repurchase Intention

	b	SE.	t	p
Direct and Total Effects				
Brand Trust → Repurchase Intention	.74	.08	8.57	.00
Brand Trust → Brand Affect	.80	.06	11.71	.00
Brand Affect → Repurchase Intention	.55	.10	5.02	.00
Brand Affect → Resistance to Negative Information	.08	.14	.56	.57
Brand Trust → Resistance to Negative Information	.63	.15	3.97	.00
Resistance to Negative Information → Repurchase Intention	.11	.07	1.58	.11
Indirect effects	Boot b/ β	Boot S.E.	Boot LLCI	Boot ULCI
Brand Trust → Brand Affect (M1) → Repurchase Intention	.44/.37	.10	.27	.62
Brand Trust → Resistance to Negative Information (M2) → Repurchase Intention	.07/.06	.04	.004	.16
Brand Trust → Brand Affect (M1) → Resistance to Negative Information (M2) → Repurchase Intention	.007/.006	.02	-.01	.04

b: unstandardized coefficient, β: standardized coefficient, SE: Standard error of unstandardized estimate, LLCI: Low level confidence interval, ULCI: Upper-level confidence interval; M1: Mediator 1; M2: Mediator 2.

4. Conclusion and Discussion

Even the automobile brand had an environmental crisis recently, the first hypothesis (H1) that proposed direct negative impact of environmental consciousness on repurchase intention is insignificant. The participants' environmental consciousness (EC) level is slightly above the average ($\bar{X}_{EC}$= 3.42). However, participants' environmental consciousness has no impact on their repurchase intention in a crisis involving the environment. In other words, although the environmental consciousness of the participants is above the average, this is not sufficient to reduce their repurchase intentions. This result is similar to the result of Özer, Kement, and Gültekin (2015), which state that the attitude towards visiting green hotels is not a determinant of revisiting these hotels. Furthermore, for those who actively drive green cars and potential green car users, the environmental impacts of green cars come after features such as price, brand, and engine power (Chowdhury et al., 2016).

The automobile subject to this research is in the category of shopping goods. According to Sriram and Forman (1993), consumers care less about the product's environmental impact than convenience goods in their shopping good purchasing process. Therefore, the failure to support the negative relationship between environmental consciousness and the intention to buy again within the brand crisis framework may be because the product discussed in this study is a shopping good. For this reason, instead of environmental consciousness, the variable of brand trust is at the forefront in the repeat purchasing intentions of the participants.

The second hypothesis (H2) that proposes the positive impact of brand trust on repurchase intention is significant. This result is consistent with commitment-trust theory (Morgan & Hunt, 1994) and is similar to the results of other studies (Fang et al., 2011; Garbarino & Johnson, 1999; Lin et al., 2011; Turgut & Gultekin, 2015; Zboja & Voorhees, 2006) examining the effect of trust on repeat purchasing intention. According to the results of this study, it can be concluded that brand trust has more priority than environmental concerns and sensitivities.

The third, fourth, and fifth hypotheses examine the link between brand trust-repurchase intention within the mediators' framework. The third hypothesis is supported; brand trust positively affects the repeat purchasing intention of consumers through the brand affect. The fourth hypothesis is supported; brand trust positively affects the repeat purchasing intention of consumers via resistance to negative information.

McKenzie (2019), Nielsen's Global Intelligence Leader, states that it is impossible to regain brand trust when it is damaged; when brand trust is established, the brand trust provides essential benefits for companies. The data obtained from this study also show that trust (BT) in the brand that has experienced a crisis is high ($\bar{X}_{BT}$= 4,07). This finding shows that brand trust acts as a shield after the brand crisis and positively affects repeat purchasing intention by supporting the brand affect and creating resistance to negative information.

Brand trust positively affects repeat purchasing intention through brand affect after the crises (H3). As the participants trust in brand increases, brand affect boosts which in turn positively influences their purchase intentions. Brand affect is an essential concept for companies. Namely, the emotional reactions arising from consumers' experiences towards the brand create the brand affect (Orzan et al., 2016). This study found that the participants of this study have a positive brand affect (BA) ($\bar{X}_{BA}$ = 4,16). For example, more than 80% of the participants responded positively to the items measuring the brand affect, such as liking the brand and favouring the brand. There are studies showing that brand affect is a precursor to brand loyalty (Matzler et al., 2006; Nezakati et al., 2013; Ong et al., 2012). The repeat purchase intention of the consumers in a brand experiencing a crisis might be due to brand trust via brand affect.

Furthermore, brand trust positively affects repeat purchasing intention through resistance to negative information (H4). This result is similar to Turgut and Gultekin (2015)'s study, which found that brand trust positively affects resistance to negative information. Accordingly, this study emphasizes the importance of brand trust, which relies on the consumers' belief that the brand has competencies such as consistency, honesty, and taking responsibility (Delgado-Ballester & Munuera-Alemán, 2005).

Based on this information, relying on brand trust, customers believe in the brand's honesty, ability to take responsibility, and resist negative information about the brand. More specifically, the annual sales of some automobile companies that experience a brand crisis are increasing year by year after the brand crisis (Reuters, 2019), which might be due to this brand trust and resistance to negative information.

However, the fifth hypothesis (H5) is not supported; brand trust- brand affect-resistance to negative information-repurchase intention link is insignificant. In other words, the impact of the first mediator (brand affect) on the second mediator (resistance to negative information) is not significant. Most of the effect is brand trust-brand affect-repurchase intention relationships and then from brand trust to resistance to negative information and resistance to negative information to repurchase intention. Similarly, Chaudhuri, Holbrook (2001: 82) mention, "overall, we view brand trust as involving a process that is well thought out and carefully considered, whereas the development of brand affect is more spontaneous, more immediate, and less deliberately reasoned in nature". Relying on this perspective, brand affect and resistance to negative information are not sequential mediators but two separate mediators between brand trust and repurchase intention linkage. In other words, brand affect does not positively impact the resistance to negative information. This finding differs from Turgut and Gultekin (2015) study in which brand love positively affects resistance to negative information. Turgut and Gultekin (2015) examined brand love and resistance to negative information within the framework of clothing brands. Customers do not consider the brand affect in products such as automobiles in the context of resistance to negative information. Although brand affect has a positive effect on word-of-mouth communication activities for brands (Kabadayi & Koçak-Alan, 2012; Westbrook, 1987), in

this study, brand affect did not provide an effect on resistance to negative information. The relationship between brand affect and resistance to negative information is explicitly evaluated for a brand that has experienced a crisis. The finding that the brand affect does not have an impact on resistance to negative information reflects that brand trust is still necessary after the crisis. It makes sense for companies to invest in longer-term issues such as brand trust to develop resistance to negative information, which increases the likelihood of repurchase intention.

5. Managerial Implications

All brands might encounter a crisis (Priporas & Vangelinos, 2008) that is considered both a threat and an opportunity (Okay & Okay, 2014: 382). The influence of environmental consciousness on the purchase intention that has experienced a crisis is not significant. However, consumers' attention to environmental-related features might be different. Consumers may resist negative information emerging against brands they consider environmentally responsible (Eisingerich et al., 2011). In addition, the activities of companies that benefit the environment (e.g., reducing greenhouse gas emissions) can positively affect the intention of consumers to purchase these products (Hartmann & Apaolaza-Ibáñez, 2012). For example, Swedish consumers also attach importance to the greenhouse gas emission factor in their car purchase decision (Chowdhury et al., 2016).

Managers need to emphasize brand-customer relations in the pre-crisis period and their importance during and after the crisis. Therefore, in crisis management and the reactions of company managers during the crisis, the trust they have built before the crisis is also of critical importance. Trust arises from the mutual expectations of both sides to believe in each other (Matzler et al., 2008). Companies must show an honest approach that will strengthen and not threaten the trust for companies to create brand trust. Examples such as keeping the promises, the consistency and accuracy of the statements made, the transparency that is shown in crises, and taking responsibility for the mistake/s, if any, are critical in maintaining the established trust and relationship. Furthermore, brand trust enables the belief that the brand to perform as expected. To ensure brand trust, the products offered by the brand must be equal to or more than the consumer expectations (Orzan et al., 2016).

Businesses do not only focus on selling and making a profit but also to make an effort by making investments to establish long-term relationships with consumers and develop brand equity (Morgan & Hunt, 1994). Among these efforts, there are various social responsibility projects for the environment. At the same time, businesses claim that they are environmentally friendly in their advertising messages (Shrum et al., 1995), recently some of the automobile advertisements include CO_2 emissions released. In an environment where environmental issues gain such importance, companies' ignoring the environment and environmental problems in their marketing strategies can cause several consequences that may cause the company to lose millions of dollars and, at the same time, damage their reputation (Dauvergne & Lister, 2012). Since customers continue paying attention to

environmental problems, companies should invest in the company's trust and reputation. However, the environmental consciousness does not affect their intention to repurchase the brand that has experienced a crisis.

Brand trust positively affects repurchase intention through brand affect and resistance to negative information. However, in this process, brand affect does not have an impact on resistance to negative information. Therefore, expressions related to brand affect after the crisis do not mean that customers will resist negative information. Therefore, in the context of brand affect and resistance to negative information relationships, firms' emphasis on brand trust may be more beneficial for a brand that has experienced a crisis.

Similarly, considering the findings of this study, the effect of brand trust on repeat purchase through brand affect is greater than the effect of brand trust through resistance to negative information in terms of repurchase intention. For this reason, it is vital to give messages about brand trust and emphasize the brand affect on the marketing communication activities of the company after the crisis period.

6. Limitations and Recommendations for Future Research

This study has constraints in terms of method and variables. First, the results of the study are limited to the sample obtained. In addition, in future studies, the comparative analysis could consider the users of different automobile brands that have encountered a crisis. This research discusses the customers' perceptions regarding the automobile being considered a shopping good. Therefore, examining subsequent studies by considering the crisis of convenience, speciality, or unsought goods may contribute to the literature.

One of the research variables, resistance to negative information, is a new concept in recent years. This research examines the concept with environmental consciousness, brand trust, and brand affect. Since the negative information affects the consumers' purchasing behaviour (Ahluwalia et al., 2000; Eisingerich et al., 2011), future studies might investigate the adverse effect of the resistance to negative information on the company's sales. For example, when consumers are exposed to negative information about a product, they may qualify for poor quality. In contrast, positive information does not affect consumers' classification of products in this way (Ahluwalia et al., 2000). According to Ahluwalia et al. (2000), consumers can obtain positive information about the products more frequently and easily. For this reason, future studies can discuss the effects of resistance to negative information about brands that have experienced a crisis on the perceived quality of products and consumers' purchasing decision process.

In future studies, the proposed model can be tested in different countries. In addition to these, future studies can address the impact of corporate social responsibility activities of brands experiencing a crisis in the context of resistance to negative information and repurchase intention. There are studies in the literature on the moderating role of environmental consciousness (Garvey & Bolton, 2017; Lin et al., 2015; Russell & Russell,

2010). It is crucial to consider the moderating role of environmental awareness within the framework of the brand crisis in future studies. Furthermore, the study of Garvey and Bolton (2017) reveals that the environmental consciousness level has a moderating effect on the relationship between environmentally friendly product selection and environmental behaviour. In this context, in future studies, an environmentally friendly car (e.g., an electric car) that has experienced a crisis in the past can be examined within the model's scope in this study.

References

Aaker, J. et al. (2004), "When good brands do bad", *Journal of Consumer Research*, 31(1), 1-16.

Abratt, R. & D. Sacks (1988), "The marketing challenge: Towards being profitable and socially responsible", *Journal of Business Ethics*, 7(7), 497-507.

Ahluwalia, R. et al. (2000), "Consumer response to negative publicity: The moderating role of commitment", *Journal of Marketing Research*, 37(2), 203-214.

Ariffin, S. et al. (2016), "Factors Influencing Perceived Quality and Repurchase Intention Towards Green Products", *Procedia Economics and Finance*, 37, 391-396.

Barney, J.B. & M.H. Hansen (1994), "Trustworthiness as a Source of Competitive Advantage", *Strategic Management Journal*, 15(S1), 175-190.

Bohlen, G. et al. (1993), "Measuring ecological concern: A multi-construct perspective", *Journal of Marketing Management*, 9(4), 415-430.

Carter, T. (1997), "Crisis management for sales force managers", *Journal of Professional Services Marketing*, 15(2), 87-103.

Chaudhuri, A. & M.B. Holbrook (2001), "The chain of effects from brand trust and brand affect to brand performance: The role of brand loyalty", *Journal of Marketing*, 65(2), 81-93.

Chaudhuri, A. & M.B. Holbrook (2002), "Product-class effects on brand commitment and brand outcomes: The role of brand trust and brand affect", *Journal of Brand Management*, 10(1), 33-58.

Chen-Yu, J. et al. (2016), "Brand perception and brand repurchase intent in online apparel shopping: An examination of brand experience, image congruence, brand affect, and brand trust", *Journal of Global Fashion Marketing*, 7(1), 30-44.

Chevalier, J.A. & D. Mayzlin (2006), "The effect of word of mouth on sales: Online book reviews", *Journal of Marketing Research*, 43(3), 345-354.

Chiu, C.M. et al., (2012), "Re-examining the influence of trust on online repeat purchase intention: The moderating role of habit and its antecedents", *Decision Support Systems*, 53(4), 835-845.

Chowdhury, M. et al. (2016), "Consumer preferences and policy implications for the green car market", *Marketing Intelligence and Planning*, 34(6), 810-827.

Claeys, A.S. et al. (2010), "Restoring reputations in times of crisis: An experimental study of the Situational Crisis Communication Theory and the moderating effects of locus of control", *Public Relations Review*, 36(3), 256-262.

Daly, A. & P. Zannetti (2007), "An Introduction to Air Pollution - Definitions, Classifications, and History", in: P. Zannetti et al. (Eds.), *Ambient Air Pollution* (1-14), The Arab School for Science and Technology (ASST) and The EnviroComp Institute.

Dauvergne, P. & J. Lister (2012), "Big brand sustainability: Governance prospects and environmental limits", *Global Environmental Change*, 22(1), 36-45.

Dawar, N. & J. Lei (2009), "Brand crises: The roles of brand familiarity and crisis relevance in determining the impact on brand evaluations", *Journal of Business Research*, 62(4), 509-516.

Dawar, N. & M.M. Pillutla (2000), "Impact of product-harm crises on brand equity: The moderating role of consumer expectations", *Journal of Marketing Research*, XXXVII(May), 215-226.

Delgado-Ballester, E. & J.L. Munuera-Alemán (2001), "Brand trust in the context of consumer loyalty", *European Journal of Marketing*, 35(11/12), 1238-1258.

Delgado-Ballester, E. & J.L. Munuera-Alemán (2005), "Does brand trust matter to brand equity?", *Journal of Product and Brand Management*, 14(3), 187-196.

Delgado-Ballester, E. et al. (2003), "Development and validation of a brand trust scale", *International Journal of Market Research*, 45(1), 35-54.

Eisingerich, A.B. et al. (2011), "Doing good and doing better despite negative information?: The role of corporate social responsibility in consumer resistance to negative information", *Journal of Service Research*, 14(1), 60-75.

Fang, Y.H. et al. (2011), "Understanding customers' satisfaction and repurchase intentions: An integration of IS success model, trust, and justice", *Internet Research*, 21(4), 479-503.

Fearn-Banks, K. (2017), *Crisis communications: A casebook approach* (Fifth), New York: Routledge Taylor & Francis.

Garbarino, E. & M.S. Johnson (1999), "The different roles of satisfaction, trust, and commitment in customer relationships", *Journal of Marketing*, 63(April), 70-87.

Garvey, A.M. & L.E. Bolton (2017), "Eco-product choice cuts both ways: How proenvironmental licensing versus reinforcement is contingent on environmental consciousness", *Journal of Public Policy and Marketing*, 36(2), 284-298.

Grönroos, C. (1997), "From marketing mix to relationship marketing - towards a paradigm shift in marketing", *Management Decision*, 35(4), 322-339.

Hartmann, P. & V. Apaolaza-Ibáñez (2012), "Consumer attitude and purchase intention toward green energy brands: The roles of psychological benefits and environmental concern", *Journal of Business Research*, 65(9), 1254-1263.

Kabadayi, E.T. & A. Koçak-Alan (2012), "Brand Trust and Brand Affect: Their Strategic Importance on Brand Loyalty", *Journal of Global Strategic Management*, 6(1), 80-88.

Kalafatis, S.P. et al. (1999), "Green marketing and Ajzen's theory of planned behaviour: A cross-market examination", *Journal of Consumer Marketing*, 16(5), 441-460.

Kang, J. et al. (2021), "Felt betrayed or resisted? The impact of pre-crisis corporate social responsibility reputation on post-crisis consumer reactions and retaliatory behavioral intentions", *Corporate Social Responsibility and Environmental Management*, 28, 511-524.

Kong, W. et al. (2014), "The Influence of Consumers' Perception of green Products on Green Purchase Intention", *International Journal of Asian Social Science*, 4(8), 924-939.

Krause, D. (1993), "Environmental Consciousness: An Empirical Study", *Environment and Behavior*, 25(1), 126-142.

Laroche, M. et al. (2012), "The effects of social media based brand communities on brand community markers, value creation practices, brand trust and brand loyalty," *Computers in Human Behavior*, 28(5), 1755-1767.

Lin, C.P. et al. (2011), "Understanding Purchase Intention During Product-Harm Crises: Moderating Effects of Perceived Corporate Ability and Corporate Social Responsibility", *Journal of Business Ethics*, 102(3), 455-471.

Lin, C.P. et al. (2015), "Forecasting the purchase intention of IT product: Key roles of trust and environmental consciousness for IT firms", *Technological Forecasting and Social Change*, 99, 148-155.

Liu, Y. (2006), "Word of mouth for movies: Its dynamics and impact on box office revenue", *Journal of Marketing*, 70(3), 74-89.

Matzler, K. et al. (2006), "Individual determinants of brand affect: The role of the personality traits of extraversion and openness to experience", *Journal of Product and Brand Management*, 15(7), 427-434.

Matzler, K. et al. (2008), "Risk aversion and brand loyalty: The mediating role of brand trust and brand affect", *Journal of Product and Brand Management*, 17(3), 154-162.

McKenzie, S. (2019), *Trust: If you break it, you might lose it forever. But if you get it right, it pays you back*, <https://www.linkedin.com/feed/update/urn:li:activity:6554498077468749824/>, 05.29.2021.

Menon, A. et al. (1999), "Evolving Paradigm for Environmental Sensitivity in Marketing Programs: A Synthesis of Theory and Practice", *Journal of Marketing Theory and Practice*, 7(2), 1-15.

Mishra, M.K. et al. (2016), "The relationship between risk aversion, brand trust, brand affect and loyalty: Evidence from the FMCG industry", *Journal of Indian Business Research*, 8(2), 78-97.

Mitroff, I.I. et al. (1987), "Effective Crisis Management", *The Academy of Management Executive*, 1(4), 283-292.

Morgan, R.M. & S.D. Hunt (1994), "The Commitment-Trust Theory of Relationship Marketing", *Journal of Marketing*, 58(July), 20-38.

Newholm, T. & D. Shaw (2007), "Studying the ethical consumer: a review of research", *Journal of Consumer Behaviour*, 6(5), 253-270.

Nezakati, H. et al. (2013), "Antecedents impact on brand loyalty in cosmetics industry", *Journal of Applied Sciences*, 13(1), 126-132.

North, N.S. (2011), *Social media's role in branding: A study of social media use and the cultivation of brand affect, trust, and loyalty*, University of Texas at Austin, <https://repositories.lib.utexas.edu/handle/2152/ETD-UT-2011-12-4924>,11.08.2021.

Okay, A. & A. Okay (2014), *Halkla ilişkiler kavram ve strateji uygulamaları (Public relations concepts and strategy applications)* (7th ed.), İstanbul: Der Yayınları (Der Publishing).

Ong, F.S. et al. (2012), "Path analysis of atmospherics and convenience on flow: the mediation effects of brand affect and brand trust", *International Review of Retail, Distribution and Consumer Research*, 22(3), 277-291.

Orzan, G. et al. (2016), "Conceptual model regarding the influence of social media marketing communication on brand trust, brand affect and brand loyalty", *Economic Computation and Economic Cybernetics Studies and Research*, 50(1), 141-156.

Özer, L. et al. (2015), "Genişletilmiş Planlanmış Davranış Teorisi Kapsamında Yeşil Yıldızlı Otelleri Tekrar Ziyaret Etme Niyeti", *HÜ İİBF Dergisi*, 33(4), 59-85.

Pace, S. et al. (2017), "The effects of social media on brand attitude and WOM during a brand crisis: Evidences from the Barilla case", *Journal of Marketing Communications*, 23(2), 135-148.

Park, S.-Y. & S.W. Lee (2013), "Effects of a perceived brand crisis on product evaluation and purchase intention: the moderating roles of brand credibility and brand attachment", *Journal of Global Scholars of Marketing Science*, 23(2), 213-226.

Peltekoğlu, F.B. (2014), *Halkla ilişkiler nedir? (What is Public Relations?)*, (8th ed.), İstanbul: Beta Basım Yayım Dağıtım.

Podsakoff, P.M. & D.W. Organ (1986), "Self-Reports in Organizational Research: Problems and Prospects", *Journal of Management*, 12(4), 531-544.

Priporas, C.V. & G. Vangelinos (2008), "Crisis management in pharmaceuticals: Evidence from Greece", *International Journal of Pharmaceutical and Healthcare Marketing*, 2(2), 88-102.

Prothero, A. (1990), "Green consumerism and the societal marketing concept: Marketing strategies for the 1990's", *Journal of Marketing Management*, 6(2), 87-103.

Pullig, C. et al. (2006), "Attitude basis, certainty, and challenge alignment: A case of negative brand publicity", *Journal of the Academy of Marketing Science*, 34(4), 528-542.

Reuters (2019), *Volkswagen delivered 10.8 million vehicles in 2018, eyes world No.1 spot*, <https://www.reuters.com/article/us-volkswagen-sales/volkswagen-delivered-10-8-million-cars-in-2018-eyes-world-no-1-spot-idUSKCN1P5111>, 29.05.2021.

Russell, D.W. & C.A. Russell (2010), "Here or there? Consumer reactions to corporate social responsibility initiatives: Egocentric tendencies and their moderators", *Marketing Letters*, 21, 65-81.

Schlegelmilch, B.B. et al. (1996), "The link between green purchasing decisions and measures of environmental consciousness", *European Journal of Marketing*, 30(5), 35-55.

Shrum, L.J. et al. (1995), "Buyer characteristics of the green consumer and their implications for advertising strategy", *Journal of Advertising*, 24(2), 71-82.

Souiden, N. & F. Pons (2009), "Product recall crisis management: The impact on manufacturer's image, consumer loyalty and purchase intention", *Journal of Product and Brand Management*, 18(2), 106-114.

Sriram, V. & A.M. Forman (1993), "The Relative Importance of Products′ Environmental Attributes: A Cross-cultural Comparison", *International Marketing Review*, 10(3), 51-70.

Takas, A. (1974), "Societal Marketing: A Businessman's Perspective", *Journal of Marketing*, 38(4), 2-7.

Turgut, M.U. & B. Gultekin (2015), "The Critical Role of Brand Love in Clothing Brands", *Journal of Business, Economics & Finance*, 4(1), 126-152.

Upamannyu, N.K. et al. (2015), "Effect of Corporate Image on Brand Trust and Brand Affect", *International Journal of Appied Science-Research and Review*, 2(1), 20-33.

Westbrook, R.A. (1987), "Product/Consumption-Based Affective Responses and Postpurchase Processes", *Journal of Marketing Research*, 24(3), 258-270.

Yannopoulou, N. et al. (2011), "Media amplification of a brand crisis and its affect on brand trust", *Journal of Marketing Management*, 27(5-6), 530-546.

Zboja, J.J. & C.M. Voorhees (2006), "The impact of brand trust and satisfaction on retailer repurchase intentions", *Journal of Services Marketing*, 20(5), 381-390.

Sosyoekonomi

2022, Vol. 30(51), 261-282

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.13
Date Submitted: 01.06.2021
Date Revised: 03.11.2021
Date Accepted: 14.01.2022

Gelişmiş ve Gelişmekte Olan Ülkelerde Kaynaklarına Göre Vergi Türleri ve Ekonomik Büyüme İlişkisi[1]

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Relationship Between the Tax Types According to Sources and Economic Growth in Developed and Developing Countries[2]

Abstract

This study aims to investigate the effect of taxes on income, wealth and expenditures, which are tax types according to their sources, on economic growth. This study, which includes 28 developed and 34 developing countries, covers 1990-2018. In the analysis, reel Gross Domestic Product (GDP) per capita was taken as the dependent variable. Two models have been established for both developed and developing countries; In the first model, basic taxes were born, and in the second model, the taxes were under these basic taxes. Data on tax revenues were accessed from the OECD official website. The panel-ARDL method was used because it allows the analysis of stationary and non-stationary variables.

Keywords : Taxes, Economic Growth, Panel-ARDL.

JEL Classification Codes : E62, H20, O40.

Öz

Bu çalışmanın amacı; kaynaklarına göre vergi türleri olan gelir, servet ve harcamalar üzerinden alınan vergilerin ekonomik büyümeye olan etkisini araştırmaktır. 28 gelişmiş ve 34 gelişmekte olan ülkenin alındığı bu çalışma 1990-2018 dönemini kapsamaktadır. Analizde, bağımlı değişken olarak kişi başı Reel Gayri Safi Yurtiçi Hasıla (RGSYH) alınmıştır. Hem gelişmiş hem de gelişmekte olan ülkeler için iki model kurulmuş olup; birinci modelde temel vergiler, ikinci modelde ise bu vergilerin altında yer alan vergiler olarak alınmıştır. Vergi gelirleri ile ilgili verilere, OECD resmi internet sitesinden erişilmiştir. Durağan ve durağan olmayan değişkenlerin birlikte analiz edilmesine imkân verdiği için Panel-ARDL yöntemi kullanılmıştır.

Anahtar Sözcükler : Vergi Türleri, Ekonomik Büyüme, Panel-ARDL.

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[1] *Bu makale, Semra Aydoğdu-Bağcı tarafından 2020 yılında Aksaray Üniversitesi Sosyal Bilimler Enstitüsünde savunulan "Kaynaklarına Göre Vergi Türleri ve Ekonomik Performans İlişkisi" adlı doktora tezinden üretilmiştir.*

[2] *This study is derived from the doctoral dissertation of Semra Aydoğdu-Bağcı entitled "Relationship between the tax types according to sources and economic performance" in Aksaray University, Institute of Social Sciences, 2020.*

1. Giriş

Kamu ekonomisinin önemli bir gelir kaynağını oluşturan vergiler kaynaklarına göre sınıflandırıldığında gelir, servet ve harcamalar üzerinden alınmaktadır. Gelir ve servet üzerinden alınan vergiler dolaysız vergiler olarak adlandırılırken, harcama üzerinden alınan vergiler dolaylı vergiler olarak adlandırılmaktadır.

Bu çalışmada, kaynaklarına göre vergi gelirlerinin GSYH'ye oranı ile ekonomik büyüme arasındaki ilişki incelenmiş ve gelişmiş ile gelişmekte olan ülkelerin güncel verileri kullanılarak yeni bir yöntem olan Gecikmesi Dağıtılmış Otoregresif modeli olarak çevrilen Autoregressive Distributed Lag (ARDL) yöntemi uygulanmıştır. Bu bağlamda çalışmanın amacı; kaynaklarına göre vergi türlerinin ekonomik büyüme üzerindeki etkisini araştırmak ve böyle bir etkinin olması durumunda bu etkinin pozitif ya da negatif yönlü olduğunu saptamaktır. Bu araştırmada kapsamlı olarak bütün ekonomik performans göstergeleri ile vergi gelirleri arasındaki ilişki, 1990-2018 yılları için gelişmiş ve gelişmekte olan ülkelere göre incelenmiştir.

2. Vergi Kavramı, Vergilendirmenin Amacı, Vergilerin Ekonomik Tasnifi, Vergi Yükü ve Vergilerin İktisadi Büyümeye Olan Etkisi

2.1. Kavram Analizi

Vergi, devlet veya vergilendirme yetkisine sahip kamu kurum ve kuruluşları tarafından gerçek ve tüzel kişilerden kamu giderlerini karşılamak veya sosyoekonomik hedeflere ulaşmak amacıyla hukuki cebir altında ve karşılıksız olarak alınan ekonomik değerlerdir.

Vergilendirmenin en önemli amacı; kamu mal ve hizmetlerini finanse etmektir. Bunun yanı sıra vergilendirmenin; gelir ve servet dağılımının adil bir şekilde sağlanması, kaynak dağılımının etkin yapılması ve ekonomik istikrarın güvence altına alınması gibi diğer amaçları da bulunmaktadır (Musgrave, 2006: 5-7; Arsan, 1975: 19). Kamu sektörü, ekonomik durgunluk döneminde vergilerin artırılması ve ekonomik zirve durumunda vergilerin düşürülmesi ile eşitliğin sağlanması ve zengin ile fakir arasındaki gelir farkının kapatılması yoluyla sosyal ve ekonomik sorunların çözümünü amaçlamaktadır (Chingbu & Njoku, 2015: 111-2).

Vergilerin gelir, servet ve harcama vergileri olarak ayrımı ekonomik tasnif olarak da adlandırılmaktadır. Vergi gelir, servet veya harcama üzerinden alınsa da nihai olarak yükümlüsünün gelirinden ödenir. Gelir vergisi, gelirin elde edildiği anda, servet vergisi; herhangi bir şekilde servete sahip olunması anında; harcama vergisi ise gelir ve servetin kısmen veya tamamen elde çıkarılması başka bir ifade ile harcanması anında ortaya alınmaktadır (Nadaroğlu, 2000: 336).

Vergi yükü, ödenen vergi ile gelir arasındaki oransal ilişkiyi vermektedir (Tosun, 2018: 78). Vergi yükü; ödenen vergi ile doğru, gelir ile ise ters orantılıdır (Arsan, 1975: 9-

10). Toplum ya da bireyler açısından vergi, bir yük meydana getirmektedir. Bu yükün maddi nitelikte olması, objektif vergi yükünü; manevi nitelikte olmasına ise subjektif vergi yükünü açıklamaktadır (Şen & Sağbaş, 2017: 293). Objektif vergi yükü, belirli bir dönemde ödenen vergi ve benzeri ödemelerin aynı dönem içinde elde edilen gelire oranı iken; subjektif vergi yükü, vergi baskısından dolayı vergi yükümlülerin hissettiği yükü açıklamaktadır. Objektif vergi yükünün; toplam vergi yükü, bireysel vergi yükü, net vergi yükü, gerçek vergi yükü ve diğer objektif vergi yükü adları ile çeşitli hesaplamaları bulunmaktadır. Toplam vergi yükü, belli bir dönemde toplanan bütün vergilerin aynı dönemin Gayri Safi Milli Hasıla (GSMH)'ye oranıdır. Bireysel vergi yükü, bireylerin belli bir dönemde ödedikleri vergilerin, aynı dönemde elde ettikleri gelire oranıdır (Demir, 2015: 154-7). Net vergi yükü, bireylerin ödedikleri vergiden, bireylerin kamu hizmetlerinden elde ettikleri faydanın çıkarılması sonucu kalan kısmın milli gelire oranıdır. Gerçek vergi yükü ise; vergilerin ekonomiye dolaylı ve dolaysız bütün etkilerini dikkate alarak hesaplanmaktadır (Arsan, 1975: 13). Bu etkiler; başkalarının vergilerinden bireye yansıtılan veya bireyin vergilerinden başkalarına yansıtılan etkilerdir. Diğer objektif vergi yükleri ise; bölgesel vergi yükü, sektörel vergi yükü, vergi türleri itibariyle vergi yükü ve marjinal ve ortalama vergi yüküdür (Demir, 2015: 156-7). Burada bu çalışma açısından önemli olan vergi yükü; vergi türleri itibariyle vergi yüküdür. Vergi türleri itibariyle vergi yükü; dolaylı-dolaysız, gelir-harcama-servet veya düz oranlı- artan oranlı- tersine artan oranlı gibi vergi türlerinin vergi gelirlerine oranı olarak hesaplanmaktadır (Demir, 2015: 156-7). Ancak bu çalışmada OECD resmi istatistik sayfasında yer alan gelir istatistikleri[3] kısmında gelir-harcama-servet vergilerinin GSYH içindeki payı bulunmaktadır. Bundan dolayı analiz, bu vergi yüküne dayanmaktadır.

Neoklasik büyüme modelinde uzun dönemde vergiler ile ekonomik büyüme arasında herhangi bir ilişki bulunmamaktadır (Solow, 1956; Swan, 1956). İçsel büyüme modellerinde ise uzun dönemli kalıcı büyüme, tekrar üretilebilen sermaye birikimi tarafından gerçekleştirilmektedir. Bu modellerde birikim yapılmış fiziksel ve beşerî sermaye teşviklerini bozucu herhangi bir vergi politikası, büyüme oranının kalıcı olarak azaltmasına neden olmaktadır. Gelir ve kurumlar vergisi gibi sermaye ve sermaye birikimi üzerinden alınan vergilerin ekonomik büyümeyi azaltıcı etkisi olduğu beklenmektedir. Emek arzının çok esnek olduğu durumda ne tüketim ne de emek geliri üzerinden alınan sabit oranlı vergi, emeğin zamanlararası tüketim tercihini olumsuz etkilememekte ve sermaye birikimi kararlarını ve büyümeyi değiştirmemektedir (Widmalm, 2001: 201).

2.2. Teorik Analiz

Vergilerin ekonomik büyüme üzerindeki etkileri Keynesyen yaklaşımda ve bu yaklaşıma karşı oluşturulmuş olan arz yanlı iktisadi yaklaşımında ele alınmaktadır. Keynes, konjonktüre karşı maliye politikasını önermektedir. Böylece konjonktür hareketlerine karşı hareket edilmektedir. Keynesyen ekonomistler, emek yoğun altyapı projelerinde ekonominin durgunluk dönemlerinde; bütçe açığına dayalı devlet harcamalarının oluşmaması için, istihdamın uyarılmasını ve ücretlerin stabilize edilmesini savunmaktadır.

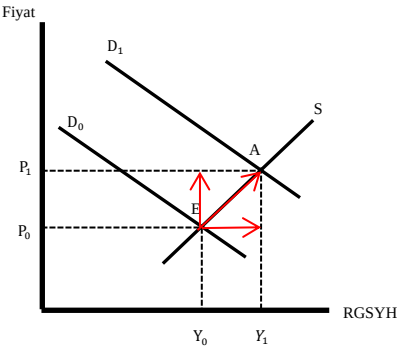
[3] *Bu istatistiklere <https://stats.oecd.org/Index.aspx?DataSetCode=REV> sayfasından erişilebilmektedir.*

Bu durumda ekonomiyi yatıştırmak ve enflasyonu önlemek için vergiler artırılmalıdır (Jahan et al., 2014: 54). Keynes, dolaysız vergileri, artan oranlı gelir vergisini, ek vergileri ve veraset ve intikal vergisini servet eşitsizliğinin giderilmesinde araç olarak görmekte ve özellikle gelir vergisinin çok fazla artırılmasını tehlikeli bulmaktadır. Bunun nedeni artan gelir vergisinin; risk alma motivasyonunu azaltması ve işten kaytarmaya yönlendirmesidir (Sangkuhl, 2015: 39). Keynes, toplumun talep kısmının yüksek istihdamı sağlayabilmek için vergilendirilmesi gerektiğini savunmuştur (Hallwirth, 1998: 657). Keynesyen yaklaşıma göre vergi indirimi dolaysız bir şekilde yapılmaktadır ve bu durum hanehalkının sermayesinin artmasına ve hanehalkının daha çok tüketime yönelmesine neden olmaktadır.

Tüketime olan talep, üretilen ürüne olan talebi ve yurtiçi üreticilerin çıktılarını artırır. Böylece vergilerdeki indirim gelirin ve istihdamın artmasına neden olmaktadır. Bu yaklaşımın iki problemi vardır. Bunlardan birisi tüketicilerin vergi indirimi durumunda tüketim yerine harcamaya yönelmesi, ikincisi ise tüketicinin vergi indiriminden elde ettiği geliri yerli ürüne değil de ithal edilen ürüne harcamasıdır. Bu problemler sonucu talep vergi indiriminin miktarı kadar artış göstermeyebilir ve yurtiçi üretim ve istihdam da vergi indirimi kadar artmayabilir. Ancak Keynes, bu problemlerin önemli olmadığına vurgu yapmıştır (King, 1993: 141).

Vergilerin ekonomik büyüme üzerindeki etkileri Keynesyen yaklaşım açısından incelenecek olursa gelire bağlı veya gelire bağlı olmayan olan vergideki indirim denge gelir düzeyinde artışa neden olmaktadır (Yıldırım vd., 2014: 148-165). Keynesyen yaklaşımda vergi indiriminin etkisi Şekil 1'de gösterilmiştir.

Şekil: 1
Keynesyen Yaklaşımına Göre (Talep Yanlı) Vergi İndirimlerinin RGSYH Üzerindeki Etkisi



Kaynak: Baumol & Blinder, 2009: 228.

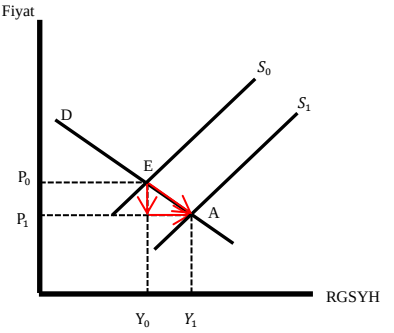
Şekil 1'de Keynesyen yaklaşıma göre vergi indirimi toplam talepte artışa neden olarak toplam talep eğrisini D_0'dan D_1'e kaydırmaktadır. Böylece denge noktası E'den A'ya

kaymakta, fiyat düzeyi P_0'dan P_1'e, RGSYH ise Y_0'dan Y_1'e çıkmaktadır. Bu durum da enflasyonu tetiklemektedir.

Arz yanlı iktisat görüşünün teorik temelleri, 1974 yılında petrol fiyatlarındaki aşırı artıştan kaynaklanan enflasyonla birlikte ortaya çıkan ekonomik durgunluğa karşı çözüm arayışlarına dayanmaktadır. 1970'li yılında Arthur Laffer, enflasyonun nedenini kamu harcamalarındaki artıştan, durgunluğun nedenini ise üretim ve yatırımları olumsuz olarak etkileyen yüksek vergilerden kaynaklandığını iddia etmiştir. Bundan dolayı enflasyonun önlenmesi ve üretimin artırılabilmesi için kamu harcamalarının ve yüksek vergilerin düşürülmesi gerektiği görüşü ortaya çıkmıştır (Aktan, 2009: 45). Böylece bu görüş ekonominin talep yönünü ele alarak arz yanını ihmal eden Keynesyen yaklaşıma tepki olarak oluşmuştur. Arz yanlı iktisat yaklaşımının öncüsü zamanın ABD Başkanı Ronald Reagan'ın danışmanlığını yapan Arthur Laffer'dir. Jude Wanniski ise bu yaklaşımın ABD ve diğer ülkelere duyurulmasını ve uygulama bulmasını sağlamıştır. Arz yanlı iktisat yaklaşımının temelini "marjinal vergi oranlarının aşırı yüksek olduğu" savı oluşturur. Marjinal vergi oranlarının ekonomi üzerindeki etkilerinin araştıran bu yaklaşım, yüksek marjinal vergi oranlarının vergi gelirlerini, milli geliri ve kaynak kullanımını negatif etkilediğini savunmaktadır. Arz yanlı iktisatçılara göre stagflasyon, Keynesyen tarafından iddia edilen talep odaklı genişletici ve daraltıcı politikalarla ortadan kaldırılamaz. Arz şoku olan stagflasyonun çözümü; üretimin artırılması ve bunun için de yüksek olan marjinal vergi oranlarının düşürülmesi ve vergi indirimleri yardımıyla yatırımların desteklenmesidir. Kişisel gelir vergisi oranlarının düşürülmesi ile tasarruflar artmakta, faizler düşmekte ve böylece yatırımlar artmaktadır (Şen & Sağbaş, 2017: 108-111).

Arz yanlı iktisatçılar vergilerin artırılması durumunda vergi ödemekten kaçınma eğiliminin artacağını ve kişilerin çalışma motivasyonlarının azalacağını belirtmişler ve üretimin artırılabilmesi için öncelikli olarak vergi oranlarının azaltılması gerektiğini ortaya koymuşlardır. Vergilerin azaltılmasının yanında kamu harcamalarının da kısılması gerektiğini savunan arz yanlı iktisatçılar, kamu harcamalarının kısılmaması durumunda kamu harcamalarının bütçe açıklarına, bütçe açıklarının da enflasyona sebebiyet vereceğini savunmuşlardır (Pehlivan, 2016: 59-60). Arz yanlı iktisadi yaklaşımına göre vergi indirimleri toplam arzın artmasına neden olmaktadır. Çünkü vergilerde görülen bir azalma çalışmayı, tasarrufu ve yatırımı artırarak sermaye ve işgücüne olan arzın artmasına bu da toplam arzın artmasına neden olmaktadır. Arz yanlı iktisadi yaklaşımına göre vergi indiriminin etkisi Şekil 2'de gösterilmektedir.

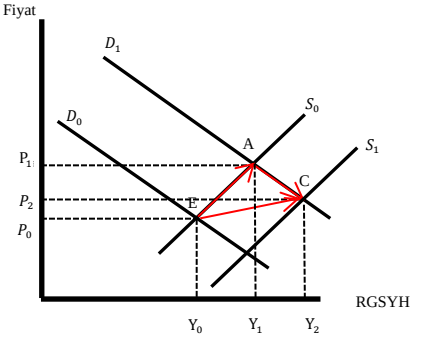
Şekil: 2
Arz Yanlı İktisat Yaklaşımına Göre Vergi İndiriminin Etkisi



Kaynak: Baumol & Blinder, 2009: 230.

Arz yanlı iktisadi yaklaşıma göre gelir vergisi, kurumlar vergisi, sermaye üzerinden alınan vergilerin veya tasarruf üzerinden alınan vergilerin indirilmesi ile birlikte emek ve sermaye artmakta ve böylece toplam arz da artmaktadır. Şekil 2'de de bu vergilerden herhangi birinde görülen bir azalma ile birlikte toplam arz artmakta ve toplam arz eğrisi S_0'dan S_1'e ve denge noktası da E'den A'ya kaymaktadır. Böylece fiyat düzeyi P_0'dan P_1'e düşmekte, RGSYH ise Y_0'dan Y_1'e çıkmaktadır. Arz yanlı vergi indirimleri deflasyonist etkiye neden olmaktadır. Bu sebepten dolayı talep yönlü vergi indirimlerini arz yanlı vergi indirimleri ile telafi etmek optimal çözüm olmaktadır (Baumol & Blinder, 2009: 230). Şekil 3'te ise talep yanlı (Keynesyen) vergi indirimlerinin arz yanlı vergi indirimleri ile telafi edilmesi durumu etkisi yer almaktadır.

Şekil: 3
Talep Yanlı (Keynesyen) Vergi İndirimlerinin Arz Yanlı Vergi İndirimleri ile Telafi Edilmesi



Kaynak: Baumol & Blinder, 2009: 228.

Şekil 3'te toplam talebin artırılmasına neden olan talep yanlı vergi indirimlerine (Şekil 1'e bakınız) ek olarak arz yanlı vergi indirimleri gösterilmiştir. Böylece talep yanlı vergi indirimleri ile talep eğrisi sağa kaymaktadır. Burada fiyatların P_0'dan P_1'e artması ile birlikte enflasyonist açık meydana gelmektedir. Bu açığı azaltabilmek için arz yanlı politikalar izlenmiştir. Böylece toplam arz eğrisi S_0'dan S_1'e kaymış ve denge noktası da A'dan C'ye kaymıştır. Bunun sonucunda fiyat; Şekil 3'ün denge noktası olan C, A'ya göre daha az yükselmiş ve RGSYH artmaya devam etmiştir. Böylelikle toplam talep artışının neden olduğu enflasyonist açık biraz olsun kapatılabilmiştir (Baumol & Blinder, 2009: 228).

3. Literatür Taraması

Literatür çalışmaları incelendiğinde; Birçok ülkenin bulunduğu çalışmada, gelir vergisi gibi dolaysız vergi gelirlerinin ekonomik büyümeyi negatif etkilediği tespit edilmiştir. OECD ve AB ülkelerinde genel olarak; gelir vergisi sosyal sigorta primi ve KDV gelirleri artışının ekonomik büyümeyi negatif etkilediği, kurumlar vergisi gelirlerindeki artışın ise ekonomik büyümeyi pozitif etkilediği tespit edilmiştir. Tüketim ve servet üzerinden alınan vergilerin gelirlerindeki artışın bazı çalışmalarda ekonomik büyümeyi pozitif, bazı çalışmalarda ise negatif etkilediği tespit edilmiştir. Gelişmekte ve gelişmiş ülkelerle ilgili yapılan çalışmalarda gelişmekte olan ülkelerde; mal ve hizmet üzerinden alınan vergilerin ekonomik büyümeyi negatif, gelişmiş ülkelerde ise pozitif etkilediği tespit edilmiştir.

Tekli ülke çalışmalarında ise vergi gelirlerinin değişik etkilerde bulunduğu tespit edilmiştir. Filipinler ve Tayland'da mal ve hizmet üzerinden alınan vergiler ekonomik büyümeyi negatif etkilerken, Singapur'da pozitif etkilemektedir. Türkiye'de vergi yükü ile ekonomik büyüme arasında negatif ilişkinin olduğu tespit edilmiştir. Kanada'da kurumlar vergisi gelirleri ekonomik büyümeyi negatif etkilemektedir. Gana'da ise toplam vergi gelirlerinin ekonomik büyümeyi artırdığı tespit edilmiştir.

Genel olarak incelendiğinde ise çoğunluklu olarak vergi gelirleri ile ekonomik büyüme arasında negatif bir ilişkinin bulunduğu tespit edilmiştir. 2011 yılından günümüze doğru önemli literatür çalışmaları kronolojik sıraya uygun olarak aşağıdaki gibidir:

Gemmell, Kneller & Sanz (2011) çalışmalarında; 1970-2004 yılları arasında 17 OECD ülkesinde gelir vergisi ve kurumlar vergisindeki marjinal değişimin uzun dönemli GSYH üzerindeki etkisini havuzlanmış en küçük kareler yöntemi (Pooled OLS) ve panel hata düzeltme metodu kullanarak araştırmışlardır. Analiz sonucuna göre; gelir vergisi ekonomik büyümeyi negatif etkilerken, kurumlar vergisi ekonomik büyümeyi pozitif yönde etkilemektedir.

Barro & Redlick (2011) yapmış olduğu çalışmada; ABD'de 1912-2006 yılları arasında vergilerin ve kamu harcamalarının makroekonomik etkilerini İki Aşamalı En Küçük Kareler Yöntemi'nin (TSLS) yöntemi ile araştırmışlardır. Analiz sonucuna göre;

ortalama marjinal gelir vergisinin %1 oranında indirilmesi bir sonraki yıla ait kişi başı GSYH'nin %0,6 oranında artmasına neden olmaktadır.

Acosta-Ormaechea & Yoo (2012) çalışmalarında; 1970-2009 yılları arasında 21 yüksek gelirli, 23 orta gelirli ve 25 düşük gelirli ülke olmak üzere toplam 69 ülke için vergi gelirleri ile ekonomik büyüme arasındaki ilişkiyi panel hata düzeltme metodu ile analiz etmişlerdir. Analiz sonucuna göre; gelir üzerinden alınan vergilerin toplamı, gelir vergisi ve sosyal sigorta primi uzun vadede büyümeyi negatif yönde etkilerken; kurumlar vergisi, toplam tüketim ve servet vergileri ekonomik büyümeyi pozitif yönde etkilemektedir.

Ferede & Dalby (2012), Kanada'daki iller için 1977-2006 yılları arasında vergi oranlarının ekonomik büyümeye olan etkisini dinamik panel veri analizi yöntemi ile araştırmıştır. Analiz sonucuna göre; kurumlar vergisi ve büyüme arasındaki ilişki negatif çıkmıştır.

Szarowska (2013), çalışmasında 24 AB ülkesi ve 1995-2010 dönemi için vergiler ve ekonomik büyüme arasındaki ilişkiyi panel regresyon ve Granger nedensellik analizi yöntemi ile araştırmıştır. Panel regresyon sonucuna göre tüketim vergileri ekonomik büyümeyi pozitif etkilerken işgücü vergileri ekonomik büyümeyi negatif etkilemektedir. Granger nedensellik analizine göre GSYH büyüme oranı ile işgücü vergi oranı ve GSYH büyüme oranı ile sermaye vergi oranı arasında tek yönlü bir nedensellik ilişkisi saptanmıştır. GSYH büyüme oranı ve tüketim vergi oranı arasında ise çift yönlü nedensellik ilişkisi tespit edilmiştir.

Stoilova & Patonov (2013), çalışmalarında 1995-2010 yılları arasında 27 AB ülkesinde toplam vergi yükü (toplam vergiler / GSYH) ile ekonomik büyüme arasındaki ilişkiyi sıradan en küçük kareler yöntemi (OLS) ile incelemişlerdir. Analiz sonucunda, dolaysız vergilerin AB ülkelerinin büyümesine daha çok katkıda bulunduğu tespit edilmiştir.

Venkadasalam (2014), çalışmasında Filipinler, Tayland ve Singapur için 1960 yılından itibaren mal ve hizmet üzerinden alınan vergilerin RGSYH üzerindeki etkisini panel veri analizi yöntemiyle incelemiştir. Analiz sonucuna göre; Filipinler ve Tayland'da mal ve hizmet üzerinden alınan vergilerin RGSYH'yi negatif etkilerken Singapur'da mal ve hizmet üzerinden alınan vergilerin ise RGSYH'yi pozitif etkilediği saptanmıştır.

McNabb & LeMay-Boucher (2014), vergi yapısı ile ekonomik büyüme arasındaki ilişkiyi incelemiştir. 1980-2010 verilerinin kullanıldığı ve panel veri analizinin uygulandığı çalışmada, gelişmiş ve gelişmekte olan ülkeler olmak üzere toplam 100 ülke analize dâhil edilmiştir. Analizin genel sonucuna bakıldığında dolaysız vergilerdeki artışın GSYH'nin büyüme oranını negatif ve anlamlı bir şekilde azalttığı tespit edilmiştir. MG tahmincisi sonucunda dolaysız vergilerde görülen %1'lik bir artış GSYH'de %13 oranında bir azalmaya neden olurken, CMG tahmincisi sonucuna göre %16 oranında bir azalmaya neden olmaktadır. CMG tahmincisi sonucuna göre dolaysız vergilerden dolaylı vergilere geçiş ile birlikte GSYH'nin arttığı tespit edilmiştir.

Macek (2015) çalışmasında; panel regresyon metodunu kullanarak 2000-2011 yılları arasında OECD ülkelerinde vergi türleri ile ekonomik büyüme arasındaki ilişkiyi incelemiştir. Analiz sonuçlarına göre; kurumlar vergisi, gelir vergisi, KDV ve sosyal sigorta primi ekonomik büyüme ile negatif ilişkili çıkmıştır.

Organ & Çiftçi (2015), 1980-2015 yılları için toplam vergi gelirlerinin GSYH'ye oranının (vergi yükü) GSYH ile ilişkisini Türkiye için ARDL sınır testi kullanılarak eşbütünleşme analizi ve Granger nedensellik testi yardımıyla araştırılmıştır. ARDL sınır testi sonucunda; uzun dönemde vergi yükünün artışının ekonomik büyümeyi azalttığı tespit edilmiştir. Granger nedensellik analizi sonucunda ise vergi yükünden milli hasılaya doğru tek yönlü bir nedensellik ilişkisi saptanmıştır.

Hakim, Karia & Bujang (2016); vergilerin ekonomik büyümeyi etkileyip etkilemediğini 23 gelişmiş ülke ve 47 gelişmekte olan ülke için panel Arrellano-Bond dinamik panel Genelleştirilmiş Momentler Yöntemi (GMM) yöntemini kullanarak 2005-2012 yılları arasında araştırmıştır. Analiz sonucunda; mal ve hizmet üzerinden alınan vergilerin gelişmekte olan ülkelerde ekonomik büyümeyi negatif etkilerken, gelişmiş ülkelerde pozitif etkilediği saptanmıştır.

Topal (2017), 22 OECD ülkesinin verilerini kullanarak 1971-2014 yılları arasında vergi yapısının uzun dönemde ekonomik büyümeye olan etkisi Durbin-Hausman panel eşbütünleşme testi ile araştırılmıştır. Analiz sonucunda gelir ve servet üzerinden alınan vergilerin (dolaysız vergiler) uzun dönemde ekonomik büyümeyi negatif etkilediği tespit edilmiştir. Tüketim üzerinden alınan vergiler (dolaylı vergiler) ise uzun dönemde ekonomik büyümeyi pozitif etkilemektedir. Ortalama vergi oranındaki artışın da uzun dönemde ekonomik büyümeyi negatif etkilediği tespit edilmiştir.

Stoilova (2017) çalışmasında, 28 AB ülkesinin 1996-2013 dönemine ilişkin verileri kullanarak vergi yapısının ekonomik büyümeye etkisini incelemiştir. OLS ve TSLS kullanıldığı bu araştırmada gelir vergisinin ve sosyal sigorta priminin ekonomik büyüme üzerinde pozitif etkisi olduğu saptanmıştır. Üretim ve ithalat vergileri ve kurumlar vergisinin ekonomik büyüme üzerindeki etkisinin pozitif olduğu, KDV gibi tüketim vergilerinin ise ekonomik büyüme üzerinde negatif etkisi olduğu saptanmıştır.

Takumah & Iyke (2017), Gana için 1986-2014 yılları arasındaki verileri kullanarak ekonomik büyüme ve vergi gelirleri arasındaki ilişkiyi zaman serisi yöntemi ile incelemişlerdir. Yıllık verilerin kullanılması ile toplam vergilerden ekonomik büyümeye doğru tek taraflı bir nedensellik ilişkisinin olduğu ve bu ilişkinin pozitif olduğu tespit edilmiştir.

Di Sanzo, Bella & Graziona (2017) çalışmalarında; 1970-2012 yılları arasında 20 OECD ülkesinde panel eşbütünleşme metodu yardımıyla ekonomik büyüme ve vergi gelirleri arasındaki ilişkiyi incelemişlerdir. Bağımsız değişkenler; fiziksel sermaye yatırımları, nüfus, toplam vergi gelirleri, tüketim vergisi, gelir vergisi ve servet vergisidir.

Araştırmanın sonucuna göre; gelir vergisi ve tüketim vergisi ile ekonomik büyüme arasındaki ilişkinin negatif olduğu, tüketim vergilerinin ekonomik büyüme üzerine olan negatif etkisinin gelir vergisine göre daha fazla olduğu saptanmıştır. Servet vergisi ile ekonomik büyüme arasında pozitif bir ilişki bulunmaktadır.

Altıner & Çalcalı (2019), çalışmalarında Türkiye için 1961-2017 dönemi kapsamında vergi gelirleri ve bütçe harcamaları ile ekonomik büyüme arasındaki ilişkiyi incelemiştir. Hatemi-J (2012) asimetrik nedensellik analizinin kullanıldığı bu çalışmada pozitif ve negatif kaynaklı şokların vergi gelirleri ve büyüme ile bütçe harcamaları ve büyüme arasında nedensellik ilişkisinin bulunup bulunmadığı ve bulunması durumunda bu ilişkinin ne yönde olduğu araştırılmıştır. Pozitif şoklar bütçe açıklarının GSYH'ye oranı değişkeni ve ekonomik büyüme değişkeni arasında çift yönlü nedensellik ilişkisi saptanmıştır. Negatif şokla incelendiğinde bütçe açıklarının GSYH'ye oranı ve ekonomik büyüme değişkeni arasında herhangi bir nedensellik ilişkisine rastlanmamıştır. Pozitif şoklara bakıldığında vergi gelirlerinin GSYH'ye oranı değişkeninden ekonomik büyüme değişkenine doğru herhangi bir nedensellik ilişkisi tespit edilmemiştir, ancak ekonomik büyüme değişkeninden vergi gelirlerinin GSYH'ye oranı değişkenine doğru bir nedensellik ilişkisi saptanmıştır. Negatif şoklar değerlendirildiğinde ise ekonomik büyüme değişkeni ile vergi gelirlerinin GSYH'ye oranı değişkeni arasında herhangi bir nedensellik ilişkisi tespit edilmemiştir.

4. Ampirik Analiz

4.1. Veri Seti ve Betimleyici İstatistik

Bu bölümde çalışmada kullanılan veriler açıklanacak ve bu verilere ilişkin betimleyici istatistik sonuçları ile ilgili bilgi verilecek ve bu sonuçlar yorumlanacaktır.

Çalışmada her ülke grubu için temel ve alt vergiler yardımıyla 2 model kurulmuştur. OECD İstatistik Veri Tabanında vergiler kaynaklarına göre temel vergiler; gelir üzerinden alınan vergiler, servet üzerinden alınan vergiler, mal ve hizmet üzerinden alınan vergiler ve sosyal sigorta primidir. Temel vergilerin alt vergileri de yer almaktadır. Gelir üzerinden alınan vergilerin alt vergileri; gelir vergisi ve kurumlar vergisidir. Servet üzerinden alınan vergilerin alt vergileri; emlak vergisi, VİV ve finans ve sermaye işlemlerinden alınan vergilerdir. Mal ve hizmet üzerinden alınan vergilerin alt vergileri ise KDV, gümrük ve ithalat vergisi ve MTV'dir. Sosyal sigorta priminin alt vergisi bulunmadığından iki modelde de bu vergi geliri alınmıştır. Analizde kullanılan değişkenler ve açıklamaları Tablo 1'de yer almaktadır.

Tablo: 1
Analizde Kullanılan Değişkenler ve Açıklamaları

Kısaltmalar	Değişkenlerin Açıklaması	Kaynak
GDP	Kişi başı Reel GSYH (2010 baz yıllı, US Dolar)	Dünya Bankası/World Development Indicators (WDI)
IT	Gelir üzerinden alınan vergi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
PIT	Gelir vergisi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
CIT	Kurumlar vergisi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
SSC	Sosyal sigorta priminin GSYH'ye oranı	OECD/Revenue Statistics
PT	Servet üzerinden alınan vergi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
JT	Emlak vergisi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
FCT	Finans ve sermaye işlemlerinden alınan vergi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
GST	Mal ve hizmet üzerinden alınan vergi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
VAT	KDV gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
CID	Gümrük ve ithalat vergisi gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics
MVT	MTV gelirlerinin GSYH'ye oranı	OECD/Revenue Statistics

Gelişmiş ve gelişmekte olan ülkeler için analizde kullanılacak modeller aşağıdaki gibidir. Model 1, a ve b olmak üzere iki modelden oluşmuştur. Model 1a temel vergileri, model 1b ise temel vergilerin altında yer alan alt vergileri kapsamaktadır. Böylece ana ve alt vergilerden hangilerinin bağımlı değişkeni etkilediği tespit edilmiştir. Elde edilen veriler Stata 14 programı yardımıyla analize tabi tutulmuştur.

Model 1a: $GDP_{it} = \alpha_{it} + \beta_{1it} IT_{it} + \beta_{2it} SSC_{it} + \beta_{3it} PT_{it} + \beta_{4it} GST_{it} + u_{it}$

Model 1b: $GDP_{it} = \alpha_{it} + \beta_{1it} PIT_{it} + \beta_{2it} CIT_{it} + \beta_{3it} SSC_{it} + \beta_{4it} JT_{it} + \beta_{5it} FCT_{it} + \beta_{6it} VAT_{it} + \beta_{7it} CID_{it} + \beta_{8it} MVT_{it} + u_{it.}$

Tüm dünya ülkelerinin verilerine ulaşılamadığından dolayı ve ülkelerin bir kısmında bazı vergi çeşitlerinin bulunmamasından dolayı IMF ülke ayrımına göre yapılan gelişmiş ve gelişmekte olan ülke grupları için 28 gelişmiş ve 34 gelişmekte olan ülke analize dahil edilebilmiştir. Gelişmiş ülkeler; Avustralya, Avusturya, Belçika, Kanada, Çekya, Danimarka, Estonya, Finlandiya, Fransa, Almanya, Yunanistan, İrlanda, İsrail, İtalya, Japonya, Kore, Litvanya, Lüksemburg, Hollanda, Yeni Zelanda, Norveç, Portekiz, Slovakya, Slovenya, İspanya, İsveç, İsviçre ve Birleşik Krallıktır. Gelişmekte olan ülkeler ise; Şili, Hırvatistan, Meksika, Polonya, Türkiye, Arjantin, Barbados, Belize, Brezilya, Kosta Rika, Dominik Cumhuriyeti, Guatemala, Guyana, Jamaika, Panama, Peru, Trinidad ve Tobago, Uruguay, Kamerun, Fildişi Sahili, Mısır, Kenya, Mali, Morityus, Fas, Niger, Ruanda, Senegal, Güney Afrika, Esvatini, Tunus, Kazakistan, Malezya ve Filipinler'dir. Analizde kullanılan vergi verilerinin çoğu veri kısıtından dolayı 1990-2018 dönemini kapsamaktadır. Tablo 2'de betimleyici istatistik yer almaktadır.

Tablo: 2
Betimleyici İstatistik

Ülke Grubu	Değişkenler	Ortalama Değer	Standart Sapma	Minimum	Maksimum	Gözlem Sayısı (N)/ Gözlenen Grup Sayısı
Gelişmiş Ülkeler	GDP	37741.02	21383.18	0	111968.3	812/28
	LNGDP	4.530942	0.2425397	3.711433	5.049095	783/28
	IT	10.9537	3.705955	0	28.939	812/28
	SSC	9.196865	4.877076	0	19.343	812/28
	PT	1.847618	1.076871	0	7.334	812/28
	GST	10.68173	2.777112	0	16.226	812/28
	PIT	8.83554	4.540195	0	26.282	812/28
	CIT	3.009889	1.5089	0	12.594	812/28
	JT	0.9474251	0.829489	0	3.315	812/28
	FCT	0.5039187	0.4257065	0	2.196	812/28
	VAT	6.295334	2.217039	0	10.009	812/28
	CID	0.2213355	0.3527522	-0.014	2.976	812/28
	MVT	0.5633717	0.2947414	0	1.9	812/28
Gelişmekte Olan Ülkeler	GDP	5764.487	4296.985	0	17446.22	986/34
	LNGDP	3.596663	3.309076	2.341501	4.241701	985/34
	IT	6.119103	3.309076	0.697	22.323	986/34
	SSC	3.038269	3.221823	0	17.69	986/34
	PT	0.6994589	0.6478918	0	3.001	986/34
	GST	9.836667	3.135095	3.015987	18.84	986/34
	PIT	2.562879	1.998625	0	10.025	986/34
	CIT	3.092547	2.226054	0	19.131	986/34
	JT	0.3331297	0.3435783	0	1.969	986/34
	FCT	0.2670695	0.3966182	0	2.2	986/34
	VAT	4.645253	2.52561	0	10.543	986/34
	CID	1.558184	1.196473	0	9.54	986/34
	MVT	0.2724277	3.222474	0	2.246	986/34

Tablo 2'de her iki ülke grubunda GDP değişkeni dışındaki değişkenlerin standart sapmalarının küçük olduğu, ancak GDP değişkeninin standart sapmasının büyük olduğu saptanmıştır. GDP değişkeninin logaritması alındıktan sonra standart sapmalarının oldukça düştüğü tespit edilmiştir. Böylece model 1a ve model 1b;

Model 1a: $LnGDP_{it} = \alpha_{it} + \beta_{1it} IT_{it} + \beta_{2it} SSC_{it} + \beta_{3it} PT_{it} + \beta_{4it} GST_{it} + u_{it}$

Model 1b: $LnGDP_{it} = \alpha_{it} + \beta_{1it} PIT_{it} + \beta_{2it} CIT_{it} + \beta_{3it} SSC_{it} + \beta_{4it} JT_{it} + \beta_{5it} FCT_{it} + \beta_{6it} VAT_{it} + \beta_{7it} CID_{it} + \beta_{8it} MVT_{it} + u_i$

şeklinde değiştirilmiştir.

4.2. Ekonometrik Yöntem

Ekonometrik araştırmalarda kullanılan üç çeşit veri bulunmaktadır. Bunlar; zaman serisi verisi, yatay kesit veri ve panel veridir. Zaman serisi verisi; ay, mevsim, yıl gibi zaman birimlerine göre farklılık gösteren verileri incelemektedir. Yatay kesit veri zamanın belli bir noktasından; birey, hanehalkı, firma, sektör, ülke gibi birimlerden toplanan verileri ifade etmektedir (Tatoğlu, 2018: 1-2). Panel veri ise bireyler, firmalar, hanehalkları gibi birimlere ait yatay kesit gözlemlerinin zaman içindeki değişimlerinin bir araya getirilmesinden oluşmaktadır (Wooldridge, 2010: 6).

Yapılan çalışma birçok ülke ve bir çok birime ait verileri kapsadığından panel veri setidir. Panel veri modelleri ile ekonomik ilişkilerin tahmin edilme yöntemi panel veri analizi olarak adlandırılmaktadır. Panel veri ile ilgili çalışmalar ilk olarak Hildreth (1950),

Kuh (1959), Grunfeld & Griliches (1960), Zellner (1962), Balestra & Nerlove (1966) ve Swamy (1970) tarafından yapılmaya başlanmış ancak uygulamalı olarak panel veri modeli 1990'lı yıllardan itibaren kullanılmıştır (Tatoğlu, 2018: 3).

Modelin betimleyici istatistiğine bakıldıktan sonra eğim parametrelerinin homojenliğinin sınanması gerekmektedir. Pesaran & Yamagata (2008), eğim parametrelerinin homojenliğini test etmek amacıyla Swamy testini geliştirerek delta (Δ) testini ortaya çıkarmıştır. Delta testinin Δ ve Δadj olmak üzere iki ayrı testi bulunmaktadır. Tablo 3'te Stata 14 programı tarafından ölçülen eğim parametrelerinin homojenlik testi olan delta testi sonucu yer almaktadır.

Tablo: 3
Delta Testi Sonuçları

Ülke Grubu	Modeller	Test	Test İstatistiği	Olasılık Değeri (p)
Gelişmiş Ülkeler	Model 1a	Δ	28.593	0.000
		Δadj	32.263	0.000
	Model 1b	Δ	18.193	0.000
		Δadj	22.698	0.000
Gelişmekte Olan Ülkeler	Model 1a	Δ	27.935	0.000
		Δadj	31.372	0.000
	Model 1b	Δ	18.068	0.633
		Δadj	22.328	0.615

Tablo 3'te, delta testleri sonuçlarının olasılık değerleri (p) 0,05'ten küçüktür. Bu durumda bütün modeller için eğim parametrelerinin heterojen olduğu görülmektedir. Birimler arası korelasyon başka bir deyişle yatay kesit bağımlılığı, her bir birim için kurulan eşbütünleşme ya da hata düzeltme modelinin kalıntıları arasında korelasyonun bulunması durumudur (Yerdelen-Tatoğlu, 2020: 21, 238). Birimler arası korelasyonu sınamak için T'nin büyük N'nin küçük olduğu durumda Breusch Pagan'ın (1980) LM; N'nin büyük T'nin küçük olduğu durumda Pesaran'ın (2004) CD testi; T'nin ve N'nin büyük olması durumunda da Pesaran, Ullah & Yamagata'nın (2008) NLM testi kullanılmaktadır (Yerdelen-Tatoğlu, 2020: 237). Burada T (zaman boyutu) 29; N (birim boyutu)'de gelişmiş ülkeler için 28, gelişmekte olan ülkeler için ise 34 olduğundan gelişmiş ülkelerde Breusch Pagan'ın (1980) LM testi, gelişmekte olan ülkelerde ise Pesaran (2004) CD testi kullanılmıştır. Bu testler Eviews 9 programında hesaplanmıştır.

Tablo 4'te gelişmiş ülkeler için Breusch Pagan'ın (1980) LM testi sonucu ve gelişmekte olan ülkeler için Pesaran (2004) CD testi sonucu yer almaktadır.

Tablo: 4
Birimler Arası Korelasyon Testi Sonucu

Ülke Grubu	Modeller	Testin Adı	Test İstatistiği	p
Gelişmiş Ülkeler	Model 1a	Breusch Pagan (1980) LM Testi	3101.634	0.0000
	Model 1b		2238.727	0.0000
Gelişmekte Olan Ülkeler	Model 1a	Pesaran (2004) CD Testi	3.787912	0.0002
	Model 1b		0.619835	0.5354

Tablo 4 incelendiğinde gelişmiş ülkelerin bütün modellerinde ve gelişmekte olan ülkelerde Model 1a'da birimler arası korelasyon testinin p değeri sonucuna göre birimler

arası korelasyonun olduğu sonucuna varılmıştır. Gelişmekte olan ülkelerde Model 1b'de ise birimlerarası korelasyonun olmadığı tespit edilmiştir. Zaman serisi ve panel veri setlerinde durağanlık ölçümü birim kök testleri ile yapılmaktadır (Yerdelen-Tatoğlu, 2013: 199). Eğer seride birimler arası korelasyon varsa ikinci kuşak testler, yoksa da birinci kuşak testler kullanılmaktadır (Yerdelen-Tatoğlu, 2020: 21). Birinci kuşak birim kök testleri iki gruba ayrılmaktadır. Birinci grupta; Levin, Lin ve Chu (LLC), Harris ve Tzavalis (HT), Breitung ve Hadri yer almaktadır. Birinci kuşağın ikinci grubunda ise; Im, Pesaran ve Shin (IPS), Fisher Genişletilmiş Dickey Fuller (ADF) ve Fisher Philips ve Perron (Fisher PP) bulunmaktadır (Yerdelen-Tatoğlu, 2020: 22-45). İkinci kuşak testler üç gruba ayrılmaktadır. Birinci grupta LLC, HT, Breitung, Hadri, IPS, Fisher ADF ve Fisher PP ve Choi Fisher Genişletilmiş Dickey Fuller (Fisher ADF) panel birim kök testleri bulunmaktadır. İkinci kuşak testlerin ikinci grubunda ise Çok Değişkenli Genişletilmiş Dickey Fuller (MADF), Görünürde İlişkisiz Regresyon Genişletilmiş Dickey Fuller (SURADF) panel birim kök testleri bulunmaktadır yer almaktadır. İkinci kuşak testlerin üçüncü grubunda bulunan panel birim kök testleri ise Moon & Perron (2004), Yatay Kesit Genişletilmiş Dickey Fuller (CADF), Yatay Kesit Genişletilmiş Im, Pesaran & Shin (CIPS), Kalıntı ve Ortak Faktörlerin Durağanlığının Panel Analizi (PANIC), Genişletilmiş Sargan ve Bhargava (CSB) ve PANICCA'dır (Yerdelen-Tatoğlu, 2020: 67-100). Hem birimlerarası korelasyonun olması hem de olmaması durumunda Fisher PP panel birim kök testi kullanılabilmektedir. Bu testin sonuçları Tablo 5'te bulunmaktadır.

Tablo: 5
Fisher PP Panel Birim Kök Testi Sonuçları

Ülke Grubu	Değişkenler	Test Seviyesi	Sabit/Trendli	Testin İstatistik Değeri	P Değeri	Karar
Gelişmiş Ülkeler	LNGDP	Düzey	Sabit	0.5034	0.3073	I(1)
		İlk Fark	Sabit	28.2081	0.0000	
	IT	Düzey	Sabit	3.8576	0.0001	I(0)
	SSC	Düzey	Sabit	12.4259	0.0000	I(0)
	PT	Düzey	Sabit	7.4423	0.0000	I(0)
	GST	Düzey	Sabit	13.0691	0.0000	I(0)
	PIT	Düzey	Sabit	-7.3108	0.0000	I(0)
	CIT	Düzey	Sabit	-4.4445	0.0000	I(0)
	JT	Düzey	Sabit	-1.1694	0.1211	I(1)
		İlk Fark	Sabit	-19.8502	0.0000	
	FCT	Düzey	Sabit	10.5149	0.0000	I(0)
	VAT	Düzey	Sabit	8.0256	0.0000	I(0)
	CID	Düzey	Sabit	17.6155	0.0000	I(0)
	MVT	Düzey	Sabit	0.8468	0.1985	I(1)
		İlk Fark	Sabit	57.2825	0.0000	
Gelişmekte Olan Ülkeler	LNGDP	Düzey	Sabit	-2.4095	0.9920	I(1)
		İlk Fark	Sabit	45.0872	0.0000	
	IT	Düzey	Sabit	0.9561	0.1695	I(1)
		İlk Fark	Sabit	76.6707	0.0000	
	SSC	Düzey	Sabit	1.2998	0.0968	I(1)
		İlk Fark	Sabit	82.3450	0.0000	
	PT	Düzey	Sabit	5.0744	0.0000	I(0)
	GST	Düzey	Sabit	6.4071	0.0000	I(0)
	PIT	Düzey	Sabit	5.3648	0.0000	I(0)
	CIT	Düzey	Sabit	3.1327	0.0009	I(0)
	JT	Düzey	Sabit	5.6077	0.0000	I(0)
	FCT	Düzey	Sabit	3.2824	0.0005	I(0)
	VAT	Düzey	Sabit	8.1766	0.0000	I(0)
	CID	Düzey	Sabit	7.0247	0.0000	I(0)
	MVT	Düzey	Sabit	4.7051	0.0000	I(0)

Tablo 5'te gelişmiş ülkeler için LNGDP bağımlı değişkeni ile JT ve MVT değişkeninin ilk farkta, diğer bağımsız değişkenlerin ise düzeyde durağan oldukları görülmektedir. Gelişmiş ülkelerde ise LNGDP bağımlı değişkeni ile IT ve SSC değişkeninin ilk farkta, diğer bağımsız değişkenlerin ise düzeyde durağan oldukları görülmektedir. Diğer bağımsız değişkenler düzeyde durağandır.

Uzun dönem katsayıları tahmin etmek için İngilizce'de Autoregressive Distributed Lag (ARDL) olarak geçen ve Türkçe'ye Ardışık Bağımlı Gecikmesi Dağıtılmış olarak çevrilmiş modeller kullanılmaktadır. Pesaran & Shin (1995) ve Pesaran, Shin & Smith (2001) eşbütünleşmeyi test etmek amacıyla ARDL modelini geliştirmişlerdir. ARDL modelinde değişkenler durağan (I(0)) olabilir ya da durağan olmayabilir (I(1)) ya da model, durağan ve durağan olmayan değişkenlerden oluşabilir (Pesaran et al., 2001: 289-290). Modeller için yapılan panel birim kök testi sonuçları incelendiğinde bağımlı değişkenlerin ve bağımsız değişkenlerin bazılarının düzeyde durağan olduğu, bazı değişkenlerin ise ilk farkta durağan oldukları görülmektedir. Bundan dolayı ARDL yöntemi kullanılmıştır.

ARDL yöntemi için kurulacak hipotezler aşağıdaki gibidir;

H_0: Vergi gelirleri ekonomik büyüme değişkenini etkilemektedir.

H_1: Vergi gelirleri ekonomik büyüme değişkenini etkilememektedir.

Gelişmiş ülkelerde Model 1a için yapılan Panel-ARDL testinin sonuçları Tablo 6'da, Model 1b için yapılan Panel-ARDL testinin sonuçları Tablo 7'de bulunmaktadır. Gecikme uzunluğunun belirlenmesinde Akaike Bilgi Kriteri (AIC) kullanılmıştır.

Tablo: 6
Gelişmiş Ülkeler için ARDL Tahmin Sonuçları (Model 1a)

$(LnGDP_{it} = \alpha_{it} + \beta_{1it} IT_{it} + \beta_{2it} SSC_{it} + \beta_{3it} PT_{it} + \beta_{4it} GST_{it} + u_{it})$

Bağımlı Değişken: Δ LnGDP		
Optimum Gecikme Uzunluğu [1, 1, 1,1]		
Uzun Dönem Eşitliği		
Değişkenler	Katsayı	t istatistiği (p:Olasılık değeri)
IT	-0.021444	3.689578 (0.0002)
PT	0.055617	6.407079 (0.0000)
GST	0.113675	11.42268 (0.0000)
Kısa Dönem Eşitliği		
Hata Düzeltme Terimi	-0.038792	-4.103080 (0.0000)
Δ (IT)	0.005237	3.760662 (0.0002)
Δ (PT)	-0.025589	-1.293292 (0.1964)
Δ (GST)	-0.004196	-2.792888 (0.0054)
Sabit	0.159696	4.198762 (0.0000)

Tablo 6'da Model 1ad incelendiğinde uzun dönemde lnGDP bağımlı değişkenini; IT, PT ve GST değişkenlerinin değiştirdiği saptanmıştır. Bunun sebebi bu değişkenlerin p değerinin 0,05'ten küçük olmasıdır. IT değişkeninin %1'lik artışı lnGDP değişkenini %0,02 oranında azaltmaktadır. Bu durum geliri vergi ile kesintiye uğrayan işgücünün ve kurumların tüketim ve tasarruflarını kısarak milli geliri düşürmeleri olarak düşünülebilir. PT değişkeninin %1'lik artışı lnGDP değişkenini yaklaşık %0,06 oranında artırmaktadır. GST değişkeninin %1'lik artışı ise lnGDP değişkeni üzerinde yaklaşık %0,011 oranında bir artışa

neden olmaktadır. Kamunun servet ve mal ve hizmetler üzerinden aldığı vergileri eğitim, altyapı ve araştırma geliştirme (ar-ge) faaliyetleri gibi alanlarda değerlendirerek ekonomiye pozitif katkı sunması sonrasında büyümeyi olumlu yönde etkilediği söylenebilir.

Hata düzeltme teriminin negatif ve anlamlı çıkması, değişkenlerde kısa ve uzun dönem arasında hata düzeltme sisteminin işlediğini göstermektedir (Yamak & Erdem, 2018: 342).

Hata düzeltme terimi katsayısı 0,04 civarındadır ve bu katsayı %5 anlamlılık düzeyinde istatistiksel açıdan anlamlı çıkmıştır. Kısa dönemde IT değişkeninin %1 artışı lnGDP'yi %0,05 oranında artırmaktadır. Kısa dönemde GST değişkeninin %1 artışı ise lnGDP değişkenini %0,004 oranında azaltmaktadır.

Tablo: 7
Gelişmiş Ülkeler için ARDL Tahmin Sonuçları (Model 1b)

$(LnGDP_{it} = \alpha_{it} + \beta_{1it}\, PIT_{it} + \beta_{2it}\, CIT_{it} + \beta_{3it}\, SSC_{it} + \beta_{4it}\, JT_{it} + \beta_{5it}\, FCT_{it} + \beta_{6it}\, VAT_{it} + \beta_{7it}\, CID_{it} + \beta_{8it}\, MVT_{it} + u_i)$

Bağımlı Değişken: Δ LnGDP		
Optimum Gecikme Uzunluğu [1, 1, 1, 1]		
Uzun Dönem Eşitliği		
Değişkenler	Katsayı	t istatistiği (p:Olasılık değeri)
PIT	-0.015993	-4.575724 (0.0000)
CIT	0.079876	11.57084 (0.0000)
MVT	0.055956	2.562439 (0.0106)
Kısa Dönem Eşitliği		
Hata Düzeltme Terimi	-0.071257	-8.469911 (0.0000)
Δ(PIT)	-0.001228	-0.791116 (0.4292)
Δ(CIT)	0.005166	3.225670 (0.0013)
Δ(MVT)	-0.034859	-2.818196 (0.0050)
Sabit	0.323551	8.506980 (0.0000)

Tablo 7'de Model 1bd incelendiğinde uzun dönemde PIT, CIT ve MVT değişkenlerinin GDP'yi istatistiksel açıdan anlamlı bir şekilde etkilediği görülmektedir. PIT değişkeninin %1'lik artışı lnGDP değişkenini yaklaşık %0,02 azaltmaktadır. Bu sonuç gelir vergisi ödeyen işgücünün tüketimini kısarak daha az harcama yapmasından kaynaklanabilir. CIT değişkeninin %1'lik artışı ise lnGDP değişkenini %0,08 oranında, MVT değişkeninin %1 artışı ise lnGDP değişkenini %0,06 oranında artırmaktadır. Bunun nedeni; kurumlar vergisinin artmasına neden olan kurum kazançlarının kurumlar tarafından tasarruf, tüketim ve istihdama çevrilerek milli gelire olumlu geri dönüş yapması olarak yorumlanabilir. Ayrıca MTV vergilerini ödeyen hanehalkı ya da kurumlar, aldıkları taşıtlarla daha çok yakıt ya da araba için gerekli malzemelerinin satın alınmasına neden olarak yine milli gelir üzerine olumlu etkide bulunacaklardır. Hata düzeltme katsayısı -0,07 civarındadır ve bu katsayı %1 anlamlılık düzeyinde istatistiksel açıdan anlamlıdır. Kısa dönemde CIT değişkeninin %1 artışı lnGDP değişkenini %0,005 oranında artırırken, MVT değişkeninin %1 artışı lnGDP değişkenini %0,03 oranında azaltmaktadır.

Gelişmekte olan ülkelerde Model 1a için yapılan Panel-ARDL testinin sonuçları Tablo 8'de, Model 1b için yapılan Panel-ARDL testinin sonuçları Tablo 9'da yer almaktadır.

Tablo: 8
Gelişmekte Olan Ülkeler için ARDL Tahmin Sonuçları (Model 1a)

$(LnGDP_{it} = \alpha_{it} + \beta_{1it} IT_{it} + \beta_{2it} SSC_{it} + \beta_{3it} PT_{it} + \beta_{4it} GST_{it} + u_{it})$

Bağımlı Değişken: Δ LnGDP		
Optimum Gecikme Uzunluğu [1, 1, 1, 1, 1]		
Uzun Dönem Eşitliği		
Değişkenler	Katsayı	t istatistiği (p:Olasılık değeri)
IT	0.027521	6.475793 (0.0000)
SSC	0.207065	8.012531 (0.0000)
PT	-2.272459	-5.159831 (0.0000)
GST	0.040638	7.669861 (0.0000)
Kısa Dönem Eşitliği		
Hata Düzeltme Terimi	-0.020081	-1.191324 (0.2339)
Δ(IT)	0.002290	1.747699 (0.0809)
Δ(SSC)	0.003350	0.522469 (0.6015)
Δ(PT)	0.032120	0.773600 (0.4394)
Δ(GST)	0.003928	3.385477 (0.0007)
Sabit	0.056040	1.386855 (0.1659)

Tablo 8 incelendiğinde Model 1a'yı uzun dönemde bütün bağımsız değişkenlerin etkilediği görülmektedir. IT, SSC ve GST değişkenleri lnGDP'yi pozitif etkilerken, PT değişkeni lnGDP'yi negatif etkilemektedir. IT değişkeninde görülen %1'lik artış lnGDP'yi %0,03, SSC değişkeninde görülen %1'lik artış lnGDP'yi %0,21, GST değişkeninde görülen %1'lik artış lnGDP'yi %0,04 oranında artırmaktadır. Sosyal sigorta primleri, gelir üzerinden alınan vergiler ile mal ve hizmet üzerinden alınan vergilerin gelirlerinin ekonomik büyümeyi artırması bu gelirlerin devlet tarafından büyümeyi destekleyecek şekilde verimli kullanılmasından kaynaklanabilir. PT değişkeninde görülen %1'lik artış ise GDP'yi %2,27 oranında düşürmektedir. Bu durum, servet vergisi mükelleflerinin ödedikleri vergiler dolayısıyla tüketimlerini kısarak ekonomik büyümeyi negatif etkilemelerinden ortaya çıkabilir. Hata düzeltme terimi negatif olmasına rağmen anlamlı çıkmamıştır. Kısa dönemde GST değişkenindeki %1'lik artış lnGDP değişkenini %0,004 oranında artırmaktadır.

Tablo: 9
Gelişmekte Olan Ülkeler için ARDL Tahmin Sonuçları (Model 1b)

$(LnGDP_{it} = \alpha_{it} + \beta_{1it} PIT_{it} + \beta_{2it} CIT_{it} + \beta_{3it} SSC_{it} + \beta_{4it} JT_{it} + \beta_{5it} FCT_{it} + \beta_{6it} VAT_{it} + \beta_{7it} CID_{it} + \beta_{8it} MVT_{it} + u_i)$

Bağımlı Değişken: Δ LnGDP		
Optimum Gecikme Uzunluğu [4, 4, 4, 4]		
Uzun Dönem Eşitliği		
Değişkenler	Katsayı	t istatistiği (p:Olasılık değeri)
PIT	0.021463	1.341036 (0.1807)
CIT	0.315795	6.707015 (0.0000)
SSC	0.153748	4.658269 (0.0000)
Kısa Dönem Eşitliği		
Hata Düzeltme Terimi	-0.020825	-0.945888 (0.3448)
Δ(LnGDP(-1))	0.113451	1.474494 (0.1411).
Δ(LnGDP(-2))	-0.094194	-1.718587 (0.0865)
Δ(LnGDP(-3))	0.043640	0.753272 (0.4517)
Δ (PIT)	0.011801	0.637446 (0.5242)
Δ(PIT(-1))	0.004812	0.630849 (0.5285)
Δ(PIT(-2))	0.006371	0.665919 (0.5058)
Δ(PIT(-3))	-0.001702	-0.236863 (0.8129)
Δ (CIT)	-0.001769	-0.284884 (0.7759)
Δ(CIT(-1))	-0.000244	-0.051995 (0.9586)
Δ(CIT(-2))	-0.003657	-0.822937 (0.4110)
Δ(CIT(-3))	-0.003528	-1.423915 (0.1552)
Δ (SSC)	-0.012070	-1.384462 (0.1670)
Δ(SSC(-1))	-0.015318	-1.137085 (0.2562)
Δ(SSC(-2))	-0.013500	-0.951937 (0.3417)
Δ(SSC(-3))	-0.007911	-1.179015 (0.2391)
Sabit	0.047977	1.162650 (0.2457)

Tablo 9 incelendiğinde CIT değişkeninin %1 artışının lnGDP değişkenini %0,32; SSC değişkeninin ise %1 artışının lnGDP değişkenini %0,15 oranında artırdığı tespit edilmiştir. Bu duruma artan işletme sayısı ile birlikte kurumlar vergisi ve sosyal sigorta primi gelirlerinde meydana gelen artış neticesinde bu gelirlerin devlet tarafından yatırımlara çevrilerek ekonomik büyümede kullanılmasının neden olduğu söylenebilir. Hata düzeltme terimi anlamlı çıkmamıştır.

5. Sonuç

Keynesyen yaklaşım ve arz yanlı iktisadi yaklaşımı vergi indirimlerinin GSYH'yi artırdığını savunmaktadır.

Literatürde ekonomik performans göstergelerinden ekonomik büyüme ile vergi ilişkisini çeşitli ülke grupları üzerinde inceleyen çok sayıda araştırmaya rastlanılmıştır. Literatür çalışmaları incelendiğinde ülke gruplarına göre vergilerin etkilerinin farklılık gösterdiği, ancak çoğunluklu olarak vergi gelirleri ile ekonomik büyüme arasından negatif bir ilişkinin bulunduğu ve bu sonuçların Keynesyen ve arz yanlı iktisat teorisini desteklediği görülmektedir.

Panel-ARDL analiz yönteminin kullanıldığı bu çalışmaya göre, gelişmiş ülkelerde uzun dönemde temel vergilerden gelir üzerinden alınan vergilerin gelirlerinin GSYH'ye oranının ekonomik büyümeyi azalttığı, servet üzerinden alınan vergilerin ve mal ve hizmet üzerinden alınan vergi gelirlerinin GSYH'ye oranının kişi başı GSYH'yi pozitif etkilediği tespit edilmiştir. Kısa dönemde ise mal ve hizmet üzerinden alınan vergilerinin gelirlerinin GSYH'ye oranı, ekonomik büyümeyi pozitif etkilerken; mal ve hizmet üzerinden alınan vergi gelirlerinin GSYH'ye oranı, ekonomik büyümeyi azaltmaktadır. Gelişmiş ülkelerde alt vergiler incelendiğinde ise gelişmiş ülkelerde kurumlar vergisi ve MTV gelirlerinin GSYH'ye oranı, ekonomik büyümeyi pozitif etkilerken; gelir vergisi ekonomik büyümeyi negatif etkilemektedir. Kısa dönemde ise kurumlar vergisi gelirlerinin GSYH'ye oranı ekonomik büyümeyi pozitif etkilerken, MTV gelirlerinin GSYH'ye oranı ekonomik büyümeyi negatif etkilemektedir. Gelişmekte olan ülkelerde ise uzun dönemde; sosyal sigorta primi, gelir üzerinden ve mal ve hizmet vergisi üzerinden alınan vergilerin gelirlerinin GSYH'ye oranı ekonomik büyümeyi pozitif etkilerken, servet üzerinden alınan vergilerin gelirlerinin GSYH'ye oranı ekonomik büyümeyi azaltmaktadır. Kısa dönemde ise mal ve hizmet vergisi üzerinden alınan vergilerin gelirlerinin GSYH'ye oranı ekonomik büyümeyi pozitif etkilemektedir. Gelişmekte olan ülkelerde alt vergi gelirleri incelendiğinde ise; kurumlar vergisinin ve sosyal sigorta primi gelirlerinin GSYH'ye oranının ekonomik büyümeyi artırdığı tespit edilmiştir.

Gelişmiş ülkelerde uzun dönemde; gelir üzerinden alınan vergilerin, gelir vergisinin, kısa dönemde ise mal ve hizmet üzerinden alınan vergiler ile ekonomik büyüme arasındaki negatif ilişkide, gelişmekte olan ülkelerde ise servet üzerinden alınan vergiler ile ekonomik büyüme arasındaki negatif ilişki Keynesyen iktisat ve arz yanlı iktisat görüşünün savunduğu vergi indiriminin ekonomik büyümeyi iyileştirdiği görüşü ile uyuşmaktadır.

Gelişmiş ülkelerde; gelir üzerinden alınan vergiler ile ekonomik büyümeninin negatif ilişkisi ise literatürde; Acosta-Ormaechea & Yoo (2012)' nin bulduğu sonuç ile uyuşmaktadır. Gelişmiş ülkelerde gelir vergisinin ekonomik büyümeye olan negatif etkisi ise; literatürde Gemmell, Kneller & Sanz (2011), Barro & Redlick (2011), Acosta-Ormaechea & Yoo (2012), Macek (2015), Stoilova (2017), Takumah & Iyke (2017), Di Sanzo, Bella & Graziona (2017)'in yaptığı çalışmaların sonuçları ile aynıdır. Gelişmiş ülkelerde servet üzerinden alınan vergilerin ekonomik büyümeyi pozitif etkilemesi Acosta-Ormaechea & Yoo (2012) ve Di Sanzo, Bella & Graziona (2017)'in çalışması ile benzerlik göstermektedir. Gelişmekte olan ülkelerde servet üzerinden alınan vergilerin ekonomik büyümeye olan negatif etkisi; Acosta-Ormaechea & Yoo (2012) ve Topal (2017)'nin çalışması ile uyum göstermektedir. Gelişmiş ve gelişmekte olan ülkelerde mal ve hizmet üzerinden alınan vergilerin ekonomik büyümeyi pozitif etkilemesi, Venkadasalam (2014)'ın çalışması ile benzerlik göstermektedir. Gelişmiş ve gelişmekte olan ülkelerde kurumlar vergisinin ekonomik büyüme üzerindeki pozitif etkisi; Gemmell, Kneller v& Sanz (2011), Acosta-Ormaechea & Yoo (2012) ve Stoilova (2017)'in çalışmasındaki bulgulara uygundur. Gelişmekte olan ülkelerde sosyal sigorta priminin artışının ekonomik büyümeye pozitif yansıması ise Stoilova (2017)'in çalışmasında bulduğu sonuç ile benzerlik göstermektedir.

İktisadi ve sosyal amaçlı faaliyetlerini yerine getirebilmek için vergi almak durumunda bulunan devlet, toplamış olduğu vergileri kullanmak suretiyle sosyal açıdan iyileşmeler sağlayacağı gibi gelir düzeyine de pozitif katkılar sunabilmektedir. Gelişmiş ülkeler ekonomik birimlerin gelir, servet ve harcama kaynaklarını daha doğru şekilde kullanarak gelir düzeylerini gelişmekte olan ülkelere nazaran daha fazla artırabilmektedirler. Bunun yanında özellikle gelişmekte olan ekonomilerde kayıt dışı ekonomik faaliyetleri azaltma doğrultusunda idari ve hukuki düzenlemelerin yapılması önem arz etmektedir. Öte yandan toplanan vergilerin rasyonaliteden ayrışan politik tercihler doğrultusunda değil, ekonominin öngörüleri çerçevesinde etkin ve verimli kullanılması mukabilinde geliri iyileştirici yönde katkı vereceğini söyleyebiliriz.

Kaynaklar

Acosta-Ormaechea, S. & J. Yoo (2012), "Tax Composition and Growth: A Broad Cross-Country Perspective", *IMF Working Paper*, 12(257), 1-36.

Aktan, C.C. (2009), "Arz-Yönlü İktisat Teorisi ve Haldun-Laffer Etkisi", *Ekonomi Bilimleri Dergisi*, 1(2), 40-54.

Altıner, A. & Ö. Çalcalı (2019), "Türkiye'de Vergi Gelirleri ve Bütçe Harcamalarının Ekonomik Büyüme ile Etkileşimi", *Maliye Dergisi*, 176, 406-427.

Arsan, H.Ü. (1975), *Vergi Yükü Üzerinde Bir İnceleme*, Ankara: Ankara Üniversitesi Basımevi.

Ataç, B. (2013), *Maliye Politikası Gelişimi, Amaçları, Araçları ve Uygulama Sorunları*, Ankara: Turhan Kitabevi.

Bai, J. & S. Ng (2004), "A Panic Attack on Unit Roots and Cointegration", *Econometrica*, 72(4), 1127-1178.

Balestra, P. & M. Nerlove (1966), "Pooling Cross Section and Time Series Data in the Estimation of a Dynamic Model: The Demand for Natural Gas", *Econometrica*, 34(3), 585-612.

Barro, R. & C.J. Redlick (2011), "Macroeconomic Effects of Government Purchases and Taxes", *The Quarterly Journal of Economics*, 126(1), 51-102.

Baumol, W.J. & A.S. Blinder (2009), *Macroeconomics Principles and Policy*, USA: South-Western Cengage Learning.

Breusch, T.S. & A. Pagan (1980), "The Lagrange Multiplier and its Applications to Model Specification in Econometrics", *Review of Economic Research*, 47(1), 239-253.

Chingbu, E.E. & C.O. Njoku (2015), "Taxation and Nigerian Economy: (1994-2012)", *Management Studies and Economic Systems*, 2(2), 111-128.

Demir, C. (2015), *Kamu Maliyesi*, Afyonkarahisar: Limit Yayınları.

Di Sanzo, S. et al. (2017), "Tax Structure and Economic Growth: A Panel Cointegrated VAR Analysis", *Italien Economic Journal: A Continuation of Rivista Italiana degli Economisti and Giornale degli Economist*, 3(2), 239-253.

Driscool, J.C. & A.C. Kraay (1998), "Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data", *Review of Economics and Statistics*, 80, 549-560.

Eker, A. vd. (2007), *Maliye Politikası Teori, İlkeler ve Yöntemler*, İzmir: Birleşik Matbaacılık.

Ferede, E. & B. Dalby (2012), "The Impact of Tax Cuts on Economic Growth: Evidence from the Canadian Provinces", *National Tax Journal*, 65(3), 563-594.

Gemmell, N. et al. (2011), "The Growth Effects of Corporate and Personal Tax Rates in the OECD", *OECD Working Paper Series*, 49, 1-33.

Grunfeld, Y. & Z. Griliches (1960), "Is Aggregation Necessarily Bad?", *Review of Economics and Statistics*, 42(1), 1-13.

Hakim, T.A. et al. (2016), "Does Goods and Servies Tax Stimulate Economic Growth?, International Evidence", *Journal of Business and Retail Management Research*, 10(3), 137-146.

Hallwirth, V. (1998), "Zur Lösung des Beschaeftigungsproblems Keynes Neu Entdecken", *Wirtschaftsdienst*, 11, 654-659.

Hausman, J. (1978), "Specification Tests in Econometrics", *Econometrica*, 46(6), 1251-1271.

Hildreth, C. (1950), "Combining Cross-Section Data and Time Series", *Cowles Commission Discussion* Paper, No. 347, 1-13.

Jahan, S. et al. (2014), "What is Keynesian Economics", *Finance and Development*, 51(3), 53-54.

King, R.E. (1993), "New Classical Macroeconomics", in: D.R. Henderson (ed.), *The Concise Encyclopedia of Economics* (139-144), USA: Liberty Fund, Inc.

Kuh, E. (1959), "The Validity of Cross-Sectionally Estimated Behaviour Equations in Time Series Applications", *Econometrica*, 27, 197-214.

Macek, R. (2015), "The Impact of Taxation on Economic Growth: Case Study of OECD Countries", *Review of Economic Perspectives*, 4(14), 309-328.

McNabb, K. & P. LeMay Boucher (2014), "Tax Structures, Economic Growth and Development", *ICTD Working Paper*, 22, 1-38.

Moon, H.R. & B. Perron (2004), "Testing for a Unit Root in Panels with Dynamic Factors", *Journal of Econometrics*, 1, 81-126.

Musgrave, R.A. (2006), "Public Finance and Three Branch Model", in: A.F. Ott & R.J. Cebula (eds.), *The Elgar Companion to Public Economics- Empirical Public Economics*, Cheltenham: Edward Elgar.

Nadaroğlu, H. (2000), *Kamu Maliyesi Teorisi*, İstanbul: Beta Yayınevi.

Oral-Erbaş, S. (2008), *Olasılık ve İstatistik*, Ankara: Gazi Kitabevi.

Organ, İ. & T.E. Çiftçi (2015), "Türkiye'de Emlak Vergisi Uygulamasından Kaynaklanan Sorunlar ve Çözüm Önerileri", *Niğde Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 8(4), 127-147.

Pesaran M.H. et al. (2008), "A Bias-Adjusted LM Test of Error Cross Section Independence", *Econometrics Journal*, 11, 105-127.

Pesaran, M.H. & T. Yamagata (2008), "Testing Slope Homogeneity in Large Panels", *Journal of Econometrics*, 142, 50-93.

Pesaran, M.H. & Y. Shin (1995), "An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis", *Cambridge Working Papers in Econometrics*, 9514.

Pesaran, M.H. (2004), "General Diagnostic Tests for Cross Section Dependence in Panels", *Cambridge Working Papers in Econometrics*, 435, 1-39.

Pesaran, M.H. (2007), "A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence", *Journal of Applied Econometrics*, 22(2), 265-312.

Pesaran, M.H. et al. (1999), "Pooled Mean Group Estimation of Dynamic Heterogeneous Panels", *Journal of the American Statistical Association*, 94(446), 621-634.

Pesaran, M.H. et al. (2001), "Bounds Testing Approaches to the Analysis of Level Relationships", *Journal of Applied Econometrics*, 16, 289-326.

Philips, P. & D. Sul (2003), "Dynamic Panel Estimation and Homogeneity Testing Under Cross Section Dependence", *Econometrics Journal*, 6(1), 217-259.

Pınar, A. (2011), *Maliye Politikası Teori ve Uygulama*, Ankara: Turhan Kitabevi.

Sangkuhl, E. (2015), "How the Macroeconomic Theories of Keynes influenced the Development of Government Economic Finance Policy after the Great Depression of the 1930's: Using Australia as the Example", *Athens Journal of Law*, 1(1), 32-52.

Solow, R. (1956), "A Contribution to the Theory of Economic Growth", *The Quarterly Journal of Economics*, 70, 65-94.

Spiegel, M.R. & L.J. Stephens (2011), *İstatistik* (Çev. S. Çelebioğlu), Ankara: Nobel Akademik Yayıncılık.

Stoilova, D. & N. Patonov (2013), "An Empirical Evidence for the Impact of Taxation on Economic Growth in the European Union", *Tourism & Management Studies*, 3, 1031-1039.

Stoilova, D. (2017), "Tax Structure and Economic Growth: Evidence from the European Union", *Condaturia y Administracion*, 62, 1041-1057.

Swamy, P.A. (1970), "Efficient Inference in a Random Coefficient Regression Model", *Econometrica*, 38(2), 311-322.

Swan, T. (1956), "Economic Growth and Capital Accumulation", *Economic Record*, 32, 334-361.

Szarowska, I. (2013), "Effects of Taxation by Economic Functions on Economic Growth in European Union", in: E. Jircikowa et al. (eds.), *Proceeding of the 6th International Scientific Conference: Finance and the Performance of Firms in Science, Education and Practice* (746-758), Zlin: Tomas Bata University.

Şen, H. & İ. Sağbaş (2017), *Vergi Teorisi ve Politikası*, Ankara: Barış Arıkan Yayınları.

Takumah, W. & B.N. Iyke (2017), "The Links between Economic Growth and Tax Revenue in Ghana: An Empirical Investigation", *International Journal of Sustainable Economy*, 9(1), 34-55.

Topal, M.H. (2017), "Vergi Yapısının Ekonomik Büyüme Üzerindeki Etkisi: OECD Ülkelerinden Ampirik Bir Kanıt", *Siyaset, Ekonomi ve Yönetim Araştırmaları Dergisi*, 5(3), 183-206.

Tosun, C. (2018), "Türkiye'de ve OECD Ülkelerinde Vergi Yükünün Dağılımı", *Vergi Sorunları Dergisi*, 357, 76-100.

Ulusoy, A. (2007), *Maliye Politikası*, Trabzon: Eflatun Matbaası.

Venkadasalam, S. (2014), "Implementation of Goods and Service Tax (GST): An Analysis on ASEAN States Using Least Squares Dummy Variable Model (LSDVM)", *International Conference on Economics, Education and Humanities (ICEEH'14)*, 10-11, Bali.

Widmalm, F. (2001), "Tax Structure and Growth: Are Same Taxes Better than Others?", *Public Choice*, 107, 199-219.

Wooldridge, J.M. (2010), *Econometric Analysis of Cross Section and Panel Data*, London: MIT Press.

Yamak, R. & H.F. Erdem (2018), "Türkiye Ekonomisinde Armey Eğrisi Geçerli midir?", *International Journal of Economic and Administrative Studies*, (Prof Dr. Harun Terzi Özel Sayısı), 335-346.

Yerdelen-Tatoğlu, F. (2020), *Panel Zaman Serileri Analizi*, İstanbul: Beta Yayınları.

Yerdelen-Tatoğlu, F. (2013), *İleri Panel Veri Analizi Stata Uygulamalı*, İstanbul: Beta Basım Yayım Dağıtım A.Ş.

Yerdelen-Tatoğlu, F. (2018), *Panel Veri Ekonometrisi Stata Uygulamalı*, İstanbul: Beta Basım Yayım Dağıtım A.Ş.

Yıldırım, K. vd. (2014), *Makro Ekonomi*, Ankara: Seçkin Yayıncılık.

Zellner, A. (1962), "An Efficient Method of Estimating Seemingly Unrelated Regressions and Tests for Aggregation Bias", *Journal of American Statistical Association*, 57, 348-368.

Sosyoekonomi

2022, Vol. 30(51), 283-300

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.14
Date Submitted: 22.01.2021
Date Revised: 03.12.2021
Date Accepted: 15.01.2022

Kriptopara Bağlantılılığı ve COVID-19: Diebold-Yılmaz ve Frekans Bağlantılılığı Yöntemleri

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Cryptocurrency Interdependencies and COVID-19: The Diebold-Yilmaz and the Frequency Connectedness Approaches

Abstract

It is well-known that financial connectedness tends to surge during financial/geopolitical turmoils. To this end, this study examines the impact of the COVID-19 pandemic on cryptocurrency connectedness by employing the Diebold-Yilmaz and the frequency connectedness approaches. Total spillover indexes estimated by both methodologies create proper signs to the 2017/2018 cryptocurrency bubble and gradually escalate around March 2020, which coincides with the WHO's official announcement of the COVID-19. The study contributes to the literature by gauging the COVID-19 connectedness among eight major cryptocurrencies on different frequency bands and 200-day moving windows by employing two novel methodologies.

Keywords : COVID-19, Cryptocurrency, Diebold-Yilmaz Connectedness, Frequency Connectedness.

JEL Classification Codes : C58, G15, Q02.

Öz

Finansal/jeopolitik karmaşa dönemlerinde finansal bağlantılılığın yükselme eğiliminde olduğu bilinmektedir. Bu bağlamda çalışma, COVID-19 küresel salgınının finansal sistemin önemli bir bileşeni olan kriptopara piyasası bağlantılılığına olan etkisini Diebold-Yilmaz ve frekans bağlantılılığı yöntemleriyle 02/10/2017-03/01/2021 döneminde incelemektedir. Her iki yöntemle de elde edilen toplam yayılma endeksleri, 2017/2018 kriptopara piyasası balonuna anlamlı bir şekilde tepki vermekte ve yazınla uyumlu olarak COVID-19'un DSÖ tarafından resmi olarak küresel salgın ilan edildiği 2020 Mart döneminde anlamlı bir seviyeye yükselmektedirler. Çalışma en yüksek piyasa işlem hacmine sahip 8 kriptopara arasındaki COVID-19 dönemi bağlantılılığını farklı frekanslarda ve 200-günlük kayan pencerelerde iki yeni metodoloji ile ölçerek literatüre katkı sunmaktadır.

Anahtar Sözcükler : COVID-19, Kriptopara, Diebold-Yılmaz Bağlantılılığı, Frekans Bağlantılılığı.

1. Giriş

Dijital bir para birimi olan Bitcoin'in ilk versiyonu (0.1), Satoshi Nakamoto tarafından 2009 yılında dolaşıma çıkmıştır (Nakamoto, 2008). Kriptopara piyasası 2009'dan bu yana yeni kriptoparaların dolaşıma girmesiyle hızla büyümekte ve yatırımcıların ve araştırmacıların bu piyasaya olan ilgisi artarak devam etmektedir. Kriptoparalar finansal bir aracı olmadan uçtan uca (peer-to-peer) ödeme mekanizması sağlayan para mekanizmalarıdır. Kriptoparaların fiyatı hisse senedi, tahvil, bono gibi geleneksel maddi finansal varlıklardan farklı olarak bir güvenlik algoritmasıyla belirlenmektedir (Corbet et al., 2019: 182). Kriptoparaların yazılımsal mimari yapısı Blokzincir (Blockchain) olarak bilinmektedir (Nofer et al., 2017). Blokzincir, parasal transfer işlemlerinin kaydının tutulduğu, şifrelenmiş işlem takibine izin veren ve yüksek şifreleme ve güvenlik algoritmasına sahip olan bir sistemdir. Blokzincir merkezi olmaması (de-centralized), kalıcılık, anonimlik ve denetlenebilirlik gibi birçok faydaya sahiptir (Zheng et al., 2018). Kriptopara blok zincirinde, elektronik parayı temsil eden bilgiler dijital bir adrese eklenir. Sistem kullanıcıları bu bilgileri dijital olarak imzalayabilir ve bilgilerin haklarını başka bir kullanıcıya aktarabilir. Kriptopara blok zinciri bu aktarımı herkese açık olarak kaydederek ağın tüm katılımcılarının işlemlerin geçerliliğini bağımsız olarak doğrulamasını sağlamaktadır. Kriptopara blok zinciri, dağıtılmış bir katılımcı grubu tarafından depolanmakta, korunmakta ve işbirliği içinde yönetilmektedir. Bu mekanizma, belirli kriptografik mekanizmalarla birlikte, blok zincirini daha sonra değiştirme girişimlerine (blokları değiştirme veya sahte işlemler) karşı dirençli hale getirmektedir (Yaga et al., 2019: iv).

Kriptopara piyasasını düzenleyici ve denetleyici bir mekanizmanın olmaması ve piyasanın zaman zaman siber saldırıların hedefi olması, bu piyasaya olan güveni azaltmaktadır. Ayrıca kriptoparaların çok yüksek fiyat enflasyonuna sahip olması, bu piyasadaki oynaklığı artırmaktadır. Örneğin, Baek & Elbek (2015) Bitcoin'in S&P 500'e göre 26 kat daha fazla oynak olduğunu tespit etmiştir. Ayrıca, çalışmalar geleneksel finansal piyasalardan farklı olarak kriptoparalar için asimetrik oynaklık etkisini tespit etmişlerdir (Baur & Dimphi, 2018; Cheikh et al., 2020). Bu çalışmalara benzer şekilde Hafner (2020) kriptopara piyasasının yapısı gereği aşırı oynaklığa eğilimli olduğunu ve balon-benzeri (bubble-like) davranış gösterdiğini belirtmektedir. Yüksek oynaklık bu piyasayı yüksek getirili ve yüksek riskli hale getirmektedir.

Kriptopara piyasasındaki yüksek riske rağmen kriptoparaların piyasa işlem hacmi, 2013-2020 yılları arasında %8900'den fazla yükselerek 10,6 milyar $'dan 2020 yılında 948,2 milyar $'a çıkmıştır (CoinMarketCap, 2021). En yüksek piyasa hacmine sahip olan Bitcoin'in kapanış (close) fiyatı ise 2016 Ocak - 2020 Ocak döneminde 378 $'dan 34.279 $'a yükselmiştir. Bu artış yıllık olarak yaklaşık %208,5 getiriye karşılık gelmektedir ki başka bir finansal varlıkla böyle bir getirinin elde edilmesi çok zordur. Bu yüksek getiri nedeniyle finansal yatırımcıların kriptopara piyasasındaki işlem hacmi artmaktadır. Kriptoparaların yüksek getiri potansiyelleri, yatırımcıların ve spekülatörlerin kriptopara piyasasına ilgisini artırmakta ve piyasa hacmi gün geçtikçe genişlemektedir (Corbet et al., 2019: 183).

Kriptopara piyasasının işlem hacminin genişlemeye başlaması, araştırmacıları kriptoparaların fiyat dinamiklerini incelemeye ve kriptopara piyasasının diğer finansal piyasalarla olan ilişkilerini araştırmaya yöneltmiştir. Yapılan çalışmalar, kriptopara piyasasının finansal piyasalarla güçlü bir ilişkiye sahip olduğunu ortaya koymaktadır. Örneğin; Ji et al., (2019), Panagioditis et al., (2019) ve Okoria & Lin (2020) tarafından yapılan çalışmalar, kriptopara piyasasının emtia piyasalarıyla; Kostika & Laopodis (2019) ve Conlon et al. (2020) tarafından yapılan çalışmalar, kriptopara piyasasının hisse senedi piyasalarıyla; Akyildirim et al. (2020) tarafından yapılan çalışma, kriptopara piyasasının türev piyasalarla; Wong et al., (2018) ve Corbet et al. (2018) tarafından yapılan çalışmalar ise kriptopara piyasasının döviz ve tahvil piyasaları ile yüksek bağlantılılıklarını tespit etmiştir.

Kriptopara piyasasının finansal piyasalar ile yüksek bağlantılılığının olması, kriptopara piyasasında oluşabilecek beklenmedik bir şokun diğer piyasalara hızlı bir şekilde yayılmasına yol açabilmektedir. Bununla birlikte, finansal türbülans dönemlerinde kriptoparaları da içeren finansal varlıkların birlikte hareket ve korelasyon ilişkisi yükselmektedir. COVID-19 pandemi döneminde de bu korelasyon beklenilen şekilde yükselmiştir (Polat, 2020; So et al., 2020, Adekoya et al., 2021).

Bu çalışmada, COVID-19 pandemisinin kriptopara piyasası bağlantılılığına olan etkisinin incelenmesi amaçlanmış ve bu nedenle COVID-19 pandemisi öncesinde ve sonrasında en yüksek piyasa işlem hacmine sahip 8 kriptopara arasındaki bağlantılılık araştırılmıştır. Bu amaçla, Diebold ve Yilmaz (2012) tarafından oluşturulan Diebold-Yilmaz (DY) ve Barunik ve Krehlik (2018) tarafından oluşturulan Frekans Bağlantılılığı (FC) yöntemleri ampirik analizde kullanılmıştır.

Çalışmamız mevcut yazına iki farklı açıdan katkı sunmaktadır. İlk olarak, COVID-19 küresel salgın döneminde piyasada en yüksek işlem hacmine sahip olan kriptoparalar arasındaki tarihsel oynaklık bağlantılılığını, değişkenler arasındaki yönlü yayılmaları DY yöntemi ile tahmin etmektedir. İkinci olarak, kriptoparaların tarihsel oynaklıkları arasındaki bağlantılılık farklı frekanslarda (kısa, orta ve uzun dönem) FC yöntemi ile incelenmektedir. Böylece çalışmada en yüksek piyasa işlem hacmine sahip kriptoparaların fiyatlarının tarihsel oynaklıklarının bağlantılılık yapısına finansal/jeopolitik durgunluk/karmaşa dönemlerinde odaklanılmış ve kriptoparaların fiyat dinamikleri için önemli bilgiler sunulması amaçlanmıştır.

Çalışmanın izleyen ikinci bölümünde kriptopara piyasasının gelişimi ve özellikleri incelenmiş ve daha sonra üçüncü bölümde finansal bağlantılılık ile ilgili çalışmalara değinilmiştir. Dördüncü bölüm çalışmanın veri seti, DY ve FC yöntemlerini içermektedir. Beşinci bölümde kriptoparalar arasındaki bağlantılılık DY ve FC yöntemleri ile elde edilmekte ve yorumlanmaktadır. Altıncı ve son bölümde çalışmanın bulguları tartışılmakta ve politika önermeleri verilmektedir.

2. Kriptopara Piyasasının Gelişimi

İlk kriptopara olan Bitcoin, Satoshi Nakamoto tarafından 2008 yılında tanımlanmıştır. 2009 yılında dolaşıma çıkan Bitcoin, o tarihten bu yana kriptopara piyasası liderliğini korumaktadır. Nakamoto, Bitcoin'i elektronik paraların dijital imzaların bir zinciri olarak taşınması ve elektronik paranın uçtan uca (peer-to-peer) bir versiyonu olarak tanımlamaktadır (Nakamoto, 2008: 4).

Bitcoin'in kriptopara piyasasında dolaşıma girmesinden itibaren piyasa genişlemeye devam etmiş ve bugün piyasada işlem gören kriptopara sayısı 8222 adete ulaşmıştır. Kriptopara piyasasında işlem gören kriptopara sayısının artması, piyasanın toplam hacminin 1.110.958.649,105 $'a ulaşarak 1 trilyon $'ı aşmasına neden olmuştur (CoinMarketCap, 2021). Bununla birlikte, kriptopara piyasa hacmindeki bu önemli genişlemeye *de-regülasyon* ve *siber saldırı* gibi nedenlerle piyasanın doğası gereği sahip olduğu yüksek oynaklık eşlik etmektedir (Corbet et al., 2019: 183). Ayrıca kriptopara piyasası yapısı gereği spekülatif piyasa balonlarına meyillidir (Fry & Cheah, 2016; Fry, 2018; Kyriazis et al., 2020).

Kriptopara piyasasının esnek yapısı nedeniyle piyasada anlık olarak yeni kriptoparalar işlem görmeye başlamakta ve buna bağlı olarak da kriptopara piyasasında en yüksek piyasa işlem hacmine sahip olan kriptoparalar anlık olarak değişebilmektedir. Tablo 1, çalışmanın yapıldığı tarih itibariyle kriptopara piyasasında en yüksek piyasa işlem hacmine sahip olan sekiz kriptoparayı göstermektedir[1]. Buna göre 3 Ocak 2021 tarihinde en yüksek piyasa işlem hacmine sahip kriptoparalar sırasıyla, Bitcoin, Etherium, Ripple, Litecoin, Bitcoin Cash, Cardona, Chainlink ve Binance Coin'dir. Bitcoin, kriptoparalar arasında en yüksek fiyata (40,234 $) ve en yüksek piyasa işlem hacmine (760,4 milyar $) sahip olan kriptoparadır.

Tablo: 1
En Yüksek İşlem Hacmine Sahip Sekiz Kripto Para

Sıra	İsim	Sembol	Piyasa İşlem Hacmi (Milyar $)	Kapanış Fiyatı ($)	Arz Edilen Miktar (Milyon)	Hacim (Milyar $)
1	Bitcoin	BTC	760,4	40.234	18,5 BTC	65,28
2	Ethereum	ETH	152,8	1318,5	114,8 ETH	36,84
3	Ripple	XRP	15,8	0,32	45.404 XRP	7,9
4	Litecoin	LTC	11,9	172,9	66,2 LTC	12,08
5	Bitcoin Cash	BCH	11,1	566,8	18,6 BCH	16,8
6	Cardona	ADA	10,2	0,31	31.112 ADA	3,4
7	Chainlink	LINK	7	16,92	400 LINK	2,9
8	Binance Coin	BNB	5,1	42,93	144 BNB	0,6

Kaynak: <https://coinmarketcap.com/>, 03.01.2021.

[1] *Çalışmanın yapıldığı tarih itibariyle piyasa hacmi en yüksek olan ve veri erişilebilirliği en eskiye giden sekiz kriptopara bu çalışmada kullanılmıştır.*

Etherium 1318,1 $ fiyat ve 152,8 milyar $ piyasa hacmi ile Bitcoin'i takip etmektedir. Piyasa kapanış fiyatına göre diğer paralar sırasıyla Bitcoin Cash, Litecoin, Binance Coin, Chainlink, Ripple ve Cordano'dır.

3. Finansal Bağlantılılık

Küreselleşme sürecinin sonucu olarak uluslararası para ve sermaye piyasalarının entegrasyonu, bir ülke finansal sisteminde ortaya çıkan bir şokun hızlı bir biçimde dünyanın geri kalanına yayılmasına neden olmaktadır. Bununla birlikte, araştırmacılar, finansal karmaşa dönemlerinde finansal varlıklar arasındaki korelasyon ve birlikte hareket (co-movement) ilişkisinin arttığına dikkat çekmektedir.

Finansal piyasalar arasındaki bağlantılılık ilişkisi farklı ekonometrik yöntemlerle incelenmektedir. Araştırmacılar finansal bağlantılılığı, korelasyon analizi (Chiang et al., 2007; Syllignakis & Kouretas, 2011; Støve et al., 2014; Buchholz & Tonzer, 2016), birlikte hareket (Jokipii & Lucey, 2007; Dewandaru et al., 2014); çoklu GARCH (Liu et al., 2017; Bonga-Bonga, 2018; Ghosh et al., 2021); wawelet analizi (Saiti et al., 2016; Dai et al., 2020) gibi kantitatif yöntemlerle incelemektedir.

Bu yöntemlere ek olarak, Diebold & Yilmaz (2009), N-değişkenli standart VAR modelinin varyans ayrıştırmalarını kullanarak geliştirmiş oldukları ve DY olarak isimlendirilen yöntemle 19 ülkenin hisse senedi piyasaları arasındaki getiri ve oynaklık bağlantılılığını 1992 Ocak 2007 Kasım dönemi için incelemiştir. Çalışma, finansal koşulların kötüleştiği dönemlerde finansal bağlantılılığın arttığını tespit etmiştir (Diebold & Yilmaz, 2009: 167). DY yönteminin VAR modelindeki Cholesky faktör ayrıştırmasına bağlı olması elde edilen sonuçların VAR'daki finansal varlıkların sırasına bağlı (order-variant) olmasına neden olabilmektedir. Bununla birlikte, orjinal DY yönteminde sadece toplam yayılmalar (spillovers) elde edilmektedir. Bu eksikliği gidermek için Diebold & Yilmaz (2012), DY yönteminde genelleştirilmiş VAR modelini kullanmıştır. Böylelikle tahmin edilen bağlantılılık ölçümleri VAR'daki değişkenlerin sırasına bağımlı olmayacaktır. Ek olarak, yeni yöntem değişkenler arasındaki yönlü (directional) yayılmaları da hesaplamaktadır (Diebold & Yilmaz, 2012: 58). Diebold & Yilmaz, finansal piyasalar arasındaki bağlantılılığı DY yöntemiyle tahmin etmiştir (Diebold & Yilmaz, 2014, 2015)[2].

Araştırmacılar finansal piyasalar arasındaki bağlantılılığı tahmin etmek için DY yöntemini kullanmışlardır. Bu çalışmalar farklı finansal piyasalar arasındaki bağlantılılığı DY yöntemiyle hesaplamaktadırlar. Örneğin; hisse senedi piyasaları (Mensi et al., 2018; Umar et al., 2020, Ben Amar et al., 2021; Costa et al., 2021), döviz piyasaları (Antonanakis & Kizys, 2015; Chow, 2020; Fasanya et al., 2021), kriptopara piyasaları (Aslanidis et al., 2020; Bagheri & İbrahimi, 2020; Le et al., 2020), tahvil piyasaları (Fernández-Rodríguez et

[2] *Bkz. <http://financialconnectedness.org>, 03.01.2021.*

al., 2016; Reboredo & Ugolini, 2020) arasındaki bağlantılılığı DY yöntemiyle inceleyen çalışmalar bu kategoride ifade edilebilir.

Son dönemde yapılan çalışmalar, kriptoparaların kendi aralarındaki ve farklı finansal piyasa göstergeleri ile olan bağlantılılığını DY yöntemi ile incelemektedir. Corbet et al. (2018), Bitcoin, Litecoin, Ripple ve 6 finansal piyasa göstergesi (tahvil, altın, döviz, VIX ve S&P 500) arasındaki bağlantılılığı 2013 ve 2017 arasında hesaplamaktadır. Çalışma kriptoparaların finansal piyasalarla olan bağlantılılığının düşük olduğunu, buna karşın kendi aralarındaki bağlantılılığın yüksek olduğunu tespit etmiştir (Corbet et al., 2018: 30). Ji et al. (2019), en yüksek piyasa kapitalizasyonuna sahip 6 kriptopara arasındaki getiri ve oynaklık bağlantılılığını 07/08/2015 ve 22/02/2018 döneminde incelemiştir. Çalışmanın sonuçları, Bitcoin ve Litecoin kriptoparalarının bağlantılılık ağında merkezde yer aldığını ve diğer kriptoparalara doğru olan en yüksek etkinin bu kriptoparalardan kaynaklandığını göstermektedir (Ji et al., 2019: 262-264). Antonanakis et al. (2019) en yüksek piyasa kapitalizasyonuna sahip 9 kriptopara arasındaki bağlantılılığı TVP-FAVAR yöntemine bağlı olan DY yöntemiyle 07/08/2015 ve 31/05/2018 tarihleri arasında incelemiştir. Çalışma, kriptoparalar arasındaki toplam yayılmanın %25 ile %75 arasında değiştiğini tespit etmiştir (Antonanakis et al., 2019). Aslanidis et al. (2020) en yüksek piyasa kapitalizasyonuna sahip olan 17 kriptopara arasındaki getiri ve oynaklık bağlantılılığını incelemiştir. Çalışmanın sonuçları, toplam yayılma endeksinin COVID-19 pandemisi ile bağlantılı olarak 2020 Mart ayında önemli bir seviyede yükseldiğini göstermektedir (Aslanidis et al., 2020).

Baruník & Křehlík (2018) finansal değişkenler arasındaki bağlantılılığı kısa-, orta-, ve uzun- dönemlerde tahmin etmeye olanak sağlayan *frekans bağlantılılığı* yöntemini *VAR* modelinin spektral gösterimine göre tanımlamıştır. Bu yöntem, finansal değişkenler arasındaki bağlantılılığı etki-tepki fonksiyonlarının Fourier dönüşümlerine bağlı olarak farklı frekanslarda hesaplamaktadır. Bu yöntemin mevcut finansal bağlantılılık yöntemlerine göre önemli avantajları bulunmaktadır. İlk olarak, finansal varlıklar arasındaki bağlantılılığı farklı frekans bantlarında tahmin etmekte ve finansal varlıklar arasındaki kısa-, orta-, ve uzun- dönemli bağlantılılığı hesaplamaktadır. İkinci olarak, frekans bağlantılılığı yöntemiyle hesaplanan ölçümler VAR modelindeki değişkenlerin sırasından bağımsız olmaktadır. Üçüncü olarak, bu metodoloji tam spektrali kullanmakta ve değişkenler arasındaki dolaylı nedensellik (indirect causality) zinciri ile ilgili anlamlı bilgi sağlamaktadır (Baruník & Křehlík, 2018: 274). Son dönemde yapılan birçok çalışma, finansal piyasalar arasındaki bağlantılılığı frekans bağlantılılığı yöntemi ile hesaplamaktadır (Polat, 2019, 2020; Maghyereh et al., 2019; Le et al., 2020; Owusu et al., 2020, Fousekis & Tzaferi, 2021).

COVID-19 küresel salgınının kriptopara piyasası bağlantılılığını önemli bir seviyede yükselttiğini tespit eden bir çok çalışma bulunmaktadır. Bu çalışmalar arasında yer alan Bouri et al. (2021), kantil VAR-temelli DY bağlantılılık analizini kullanarak yedi ana kriptopara (Bitcoin, Ethereum, Ripple, Litecoin, Stellar, Monero, Dash) arasındaki bağlantılılığı 8 Ağustos 2015-31 Aralık 2020 dönemi için tahmin etmektedir. Çalışmanın elde ettiği üst ve alt kuyruklardaki (tails) aşırı bağlantılılık ölçümlerine ilişkin bulgular, kripto para birimleri ağ sistemi içinde kuyruk riskinin yayılmasının önemine dair ayrıntılı

bir görüş sunmaktadır. Ayrıca, çalışmanın sonuçları kuyruk-bağımlılık derecesinin zamanla değiştiğini ve COVID-19'un ortaya çıkmasıyla şiddetlendiğini göstermektedir (Bouri et al., 2021). Naeem et al. (2021), 7 kriptopara (Bitcoin, Ethereum, Ripple, Litecoin, Monero, Stellar ve NEM) arasındaki ağ bağlantılığını standart VAR ve kantil VAR yöntemlerini kullanarak 7 Ağustos 2015-31 Ekim 2020 döneminde incelemiştir. Çalışmanın sonuçları kriptoparalar arasındaki bağlantılılığın 2017 ve 2020 dönemlerinde şiddetlendiğini göstermektedir (Naeem et al., 2021). Benzer şekilde Umar et al. (2021), COVID-19 ile ilgili medya kapsamının üç ana kriptopara (Bitcoin, Etherium ve Litecoin) ve üç itibari para (Euro, GBP ve Yuan) getiri ve oynaklık bağlantılıklarına olan etkilerini Antonakakis & Gabauer (2017) tarafından geliştirilen TVP-VAR temelli DY yöntemiyle 1 Ocak-31 Aralık 2020 döneminde incelemektedir (COVID-19 getiri bağlantılılığı analizi kriptoparaların net iletici, itibari paraların ise net alıcı konumda olduklarını tespit etmektedir. COVID-19 oynaklık bağlantılılık sonuçları ise Euro haricinde COVID-19 getiri bağlantılılık analizi ile aynı sonuçları elde etmektedir (Umar et al., 2021).

4. Veri Kümesi ve Ekonometrik Analiz

4.1. Veri Kümesi

Çalışmanın veri kümesinde, 03/01/2021 tarihinde en yüksek piyasa kapitalizasyonuna sahip ve veri erişilebilirliği diğer kriptoparalara göre daha eskiye giden Bitcoin, Etherium, Ripple, Litecoin, Bitcoin Cash, Cardano, Binance Coin, Chainlink bulunmaktadır. 8 kriptoparaya ait veriler 02/10/2017 ve 03/01/2021 tarihleri arasında CoinMarketCap web sitesinden elde edilmiştir. Veri kümesinde yer alan her bir kriptopara 1190 gözlemden oluşmaktadır.

4.2. Ekonometrik Analiz

4.2.1. D-Y Yöntemi

Diebold & Yilmaz (2012), DY yöntemini aşağıdaki kovaryans durağan N-değişkenli genelleştirilmiş $VAR(p)$ modeline bağlı olarak tanımlanmaktadır (Diebold & Yilmaz, 2012: 58):

$$y_t = \sum_{i=1}^{p} \emptyset_i y_{t-1} + \varepsilon_t \tag{1}$$

Eşitlik (1)'de, $\varepsilon_t \sim (0, \Pi)$ birbirinden bağımsız ve aynı dağılıma sahip hata terimleridir. $VAR(p)$ modelinin hareketli ortalama (MA) gösterimi $y_t = \sum_{i=0}^{\infty} A_i \varepsilon_{t-i}$ şeklinde olsun.

$\varphi_{ij}^{g}(H)$, $H = 1,2, \ldots$ şeklinde verilen hata varyans ayrıştımalarının H-adım-ileri tahmini aşağıdaki gibi tanımlanmaktadır:

$$\varphi_{ij}^{g}(H) = \frac{\sigma_{jj}^{-1} \sum_{h=0}^{H-1} \left(e_i' A_h \Pi e_j\right)^2}{\sum_{h=0}^{H-1} \left(e_i' A_h \Pi A_h' e_i\right)} \tag{2}$$

Eşitlik 2'de Π, ε için varyans vektörü; σ_{jj} j. eşitlik için ε_t'nin standart hatası; e_i ise i. bileşen için 1 diğer bileşenler için 0 olan seçim vektörüdür. Varyans ayrıştırma matrisinin her bir bileşeni aşağıdaki gibi normalleştirilebilir:

$$\tilde{\varphi}_{ij}^{g}(H) = \frac{\varphi_{ij}^{g}(H)}{\sum_{j=1}^{N} \varphi_{ij}^{g}(H)} \tag{3}$$

Yukarıdaki tanımlara göre toplam oynaklık yayılması (spillover) aşağıdaki gibi tanımlanmaktadır:

$$S^{g}(H) = \frac{\sum_{i,j=1}^{N} \tilde{\varphi}_{ij}^{g}(H)}{\sum_{i,j=1}^{N} \tilde{\varphi}_{ij}^{g}(H)} \cdot 100 = \frac{\sum_{\substack{i,j=1 \\ i \neq j}}^{N} \tilde{\varphi}_{ij}^{g}(H)}{N} \cdot 100 \tag{4}$$

i. piyasanın tüm j piyasalardan aldığı yönlü (directional) oynaklık yayılması:

$$S_{i.}^{g}(H) = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\varphi}_{ij}^{g}(H)}{\sum_{i,j=1}^{N} \tilde{\varphi}_{ij}^{g}(H)} \cdot 100 = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\varphi}_{ij}^{g}(H)}{N} \cdot 100 \tag{5}$$

i. piyasadan tüm j piyasalarına iletilen yönlü oynaklık yayılması:

$$S_{.i}^{g}(H) = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\varphi}_{ji}^{g}(H)}{\sum_{i,j=1}^{N} \tilde{\varphi}_{ji}^{g}(H)} \cdot 100 = \frac{\sum_{\substack{j=1 \\ j \neq i}}^{N} \tilde{\varphi}_{ji}^{g}(H)}{N} \cdot 100 \tag{6}$$

i. piyasadan tüm j piyasalarına doğru olan net oynaklık yayılması:

$$S_{i}^{g}(H) = S_{.i}^{g}(H) - S_{i.}^{g}(H) \tag{7}$$

Net ikili (pairwise) yayılması:

$$S_{ij}^{g}(H) = \frac{\tilde{\varphi}_{ji}^{g}(H) - \tilde{\varphi}_{ij}^{g}(H)}{N} \cdot 100 \tag{8}$$

4.2.2. Frekans Bağlantılılığı

Barunik & Křehlík (2018), frekans bağlantılılığı yöntemini, aşağıda verilen N-değişkenli $VAR(p)$ modelinin varyans ayrıştırmalarının spektral gösterimine bağlı olarak tanımlamıştır.

$$y_t = \sum_{i=1}^{p} \phi_i y_{t-1} + \varepsilon_t \tag{9}$$

Eşitlik (9)'da y_t, varlıkların $N \times 1$ vektörü, ε_t, $\varepsilon_t \sim N(0, \Omega)$ olmak üzere birbirinden bağımsız ve aynı dağılıma sahip beyaz gürültülerin (white noise) $N \times 1$ vektörüdür.

$VAR(p)$ modelinin MA gösterimi $y_t = \Psi(\mathrm{L})\varepsilon_t$ şeklinde ifade edilmektedir. Burada $\Psi(\mathrm{L})$, sonsuz gecikme polinomunu göstermektedir ve özyineli (recursive) olarak $\phi(L) = [\Psi(\mathrm{L})]^{-1}$ şeklinde verilmektedir.

Yukarıdaki tanımlar çerçevesinde frekans tepki fonksiyonu Ψ_h katsayılarının Fourier dönüşümü olarak $\Psi(e^{-iw}) = \sum_h e^{-iwh}\Psi_h$ şeklinde tanımlanmaktadır.

y_t'nin w frekansındaki spektral yoğunluğu (density), $MA(\infty)$ filtrelenmiş serilerin Fourier dönüşümü olarak aşağıdaki gibi tanımlanmaktadır:

$$S_y(W) = \sum_{h=-\infty}^{\infty} E(y_t y'_{t-h}) e^{-iwh} = \Psi(e^{-iw})\Sigma\,\Psi'(e^{+iw}) \tag{10}$$

$w \in (-\pi, \pi)$ frekanslarındaki genelleştirilmiş nedensellik spektrumu (generalized causation spectrum) eşitlik 11'de verilmektedir.

$$\xi(w)_{j,k} = \frac{\sigma_{kk}^{-1}\left|\Psi(e^{-iw})\Sigma\right|_{j,k}^2}{(\Psi(e^{-iw})\Sigma\,\Psi'(e^{+iw})_{jj}} \tag{11}$$

$d = (a, b): a, b \in (-\pi, \pi), a < b$ frekans bandındaki ölçeklendirilmiş (scaled) varyans ayrıştırmaları $\left(\tilde{\phi}_d\right)_{j,k} = (\phi_d)_{j,k} / \sum_k (\phi_\infty)_{j,k}$ şeklinde tanımlanmaktadır.

d frekans bandındaki iç (within) bağlantılılık eşitlik 12'de tanımlanmaktadır:

$$C_d^w = 100.\left(1 - \frac{Tr(\tilde{\phi}_d)}{\sum \tilde{\phi}_\infty}\right) \tag{12}$$

d frekans bandındaki frekans bağlantılılığı eşitlik 13'de tanımlanmaktadır:

$$C_d^f = 100.\left(\frac{\sum \tilde{\phi}_d}{\sum \tilde{\phi}_\infty} - \frac{Tr(\tilde{\phi}_d)}{\sum \tilde{\phi}_\infty}\right) = C_d^w \frac{\sum \tilde{\phi}_d}{\sum \tilde{\phi}_\infty} \tag{13}$$

Yukarıda $Tr\{.\}$ iz (trace) işlemi, $\sum \tilde{\phi}_d$ ise $\tilde{\phi}_d$'nin tüm elemanlarının toplamıdır.

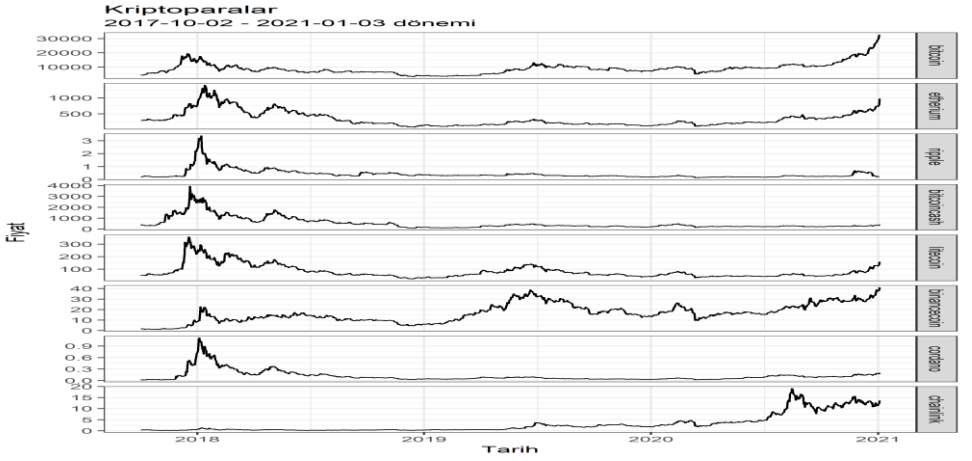
5. Kriptopara Bağlantılılığı ve Toplam Yayılma Endeksleri

Bu bölümde ilk olarak kriptoparaların fiyat dinamikleri ve tarihsel oynaklıkları incelenmektedir. Daha sonra, kriptoparaların bağlantılılığı DY ve FC yöntemleri ile incelenmektedir.

5.1. Kriptoparaların Fiyat Dinamikleri

Şekil 1, 8 kriptoparanın günlük kapanış (close) fiyatlarını 02/10/2017 ile 03/01/2021 tarihleri arasında göstermektedir.

Şekil: 1
Kriptoparaların 02/10/2017 ile 03/01/2021 Arasındaki Kapanış Fiyatları



Kaynak: Yazarların Hesaplamaları.

Şekil 1'den de görülebileceği gibi 2017/2018 yılı kriptopara piyasası balonu (bubble) sonrası piyasada büyük satışlar olmuş ve bunun neticesinde birçok kriptoparanın fiyatı önemli seviyede düşmüştür (Yaya vd., 2019: 2). 2020 Mart'tan başlamak üzere Bitcoin, Etherium, Litecoin, Binance Coin kriptoparalarının fiyatları artış trendi göstermektedir.

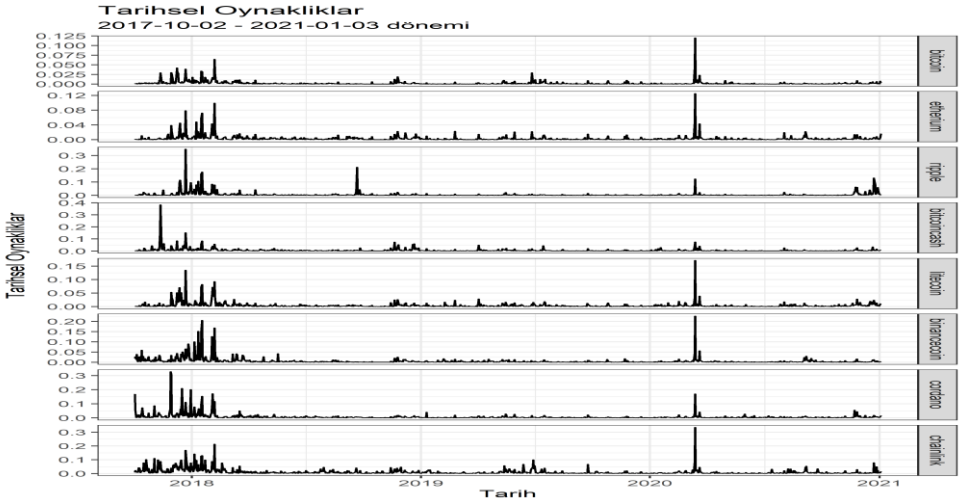
Diebold ve Yilmaz (2015) ve Ji et al. (2019) çalışmaları izlenerek kriptoparaların günlük tarihsel (historical, realized) oynaklıkları aşağıdaki formülle elde edilmektedir:

$$\text{RV} = 0.511(H-L)^2 - 0.019[(C-O)(H+L-2O) - 2(H-0)(L-O)] - 0.383(C-O)^2 \quad (14)$$

Eşitlik 14'te H, L, C ve O sırasıyla günlük en yüksek, en düşük, kapanış ve açılış fiyatlarının logaritmasını göstermektedir.

Şekil 2, kriptoparaların 02/10/2017 ile 03/01/2021 tarihleri arasındaki tarihsel oynaklıklarını (volatility) göstermektedir.

Şekil: 2
Kriptoparaların Tarihsel Oynaklıkları



Kaynak: Yazarların Hesaplamaları.

Kriptoparaların tarihsel oynaklıklarının 2017/2018 kriptopara piyasası balonunda (bubble) yüksek değerler aldığı görülmektedir. Dünya Sağlık Örgütü (DSÖ) tarafından COVID-19'un pandemi olarak tanımlandığı 11/03/2020 tarihi civarında kriptoparaların tarihsel oynaklıklarının önemli bir seviyede yükselmesi, COVID-19'un kriptopara piyasasına olan etkisi ile ilişkilendirilebilir (Aslanidis et al., 2020: 199).

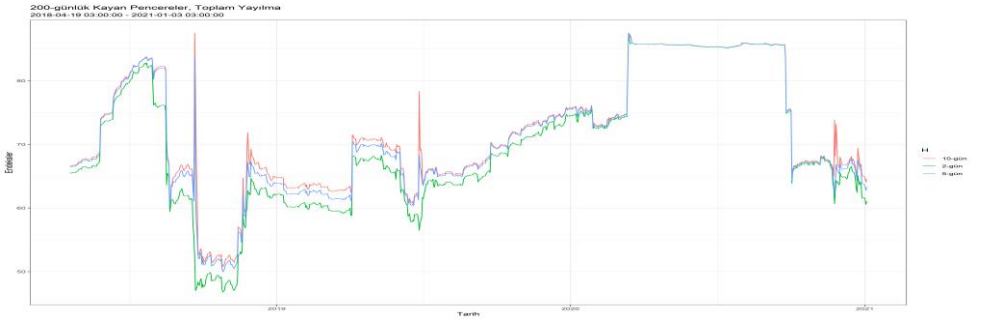
5.3. Finansal Bağlantılılık Analizi, Toplam Yayılma Endeksi

Bu bölümde kriptoparalar arasındaki bağlantılılık sırasıyla DY ve FC yöntemleri ile tahmin edilmektedir. Şekil 3, Diebold & Yilmaz (2012) çalışması takip edilerek DY yöntemiyle $VAR(4)$'ün[3] 2-, 5-, ve 10-günlük[4] ileri adım varyans ayrıştırmalarıyla 200-günlük kayan pencerelerde elde edilen toplam yayılma endeksini göstermektedir.

[3] *VAR modelindeki optimal derece Akeike Bilgi Kriteri'ne (AIC) ve Bayesian Bilgi Kriteri'ne (BIC) göre 4 olarak seçilmektedir.*

[4] *2-, 5, ve 10- günlük ileri adım varyans ayrıştırmaları sonuçlar için duyarlılık analizi yapılması amacıyla DY model tahminlerinde kullanılmaktadır.*

Şekil: 3
Kriptoparaların DY Yöntemi ile Toplam Bağlantılılığı



Kaynak: Yazarların Hesaplamaları.

Şekil 3'ten görülebileceği gibi kriptoparalar arasındaki bağlantılılıklar %45 ile %90 arasında değişmektedir. DY yönteminin 2-, 5, ve 10-günlük ileri adım varyans ayrıştırmaları için uygulanması, tahminlerin duyarlılılık analizi için yapılmıştır. Elde edilen 3 toplam yayılma endeksinin hareketlerinin benzer olması modelin tahmin sonuçlarının tercih edilen H-gün ileri adım varyans ayrıştırmalarına duyarlı olmadığını ve dolayısıyla sonuçların tutarlı olduğunu göstermektedir. Kriptopara bağlantılılıkları en düşük değerlerini 27 Ekim 2018 tarihinde (2-, 5, ve 10- günlük için sırasıyla %46,77, %49,98 ve %50,78) ulaşmaktadır. Kriptopara piyasası 2017 yılında beklenmeyen bir seviyede büyüme göstermiştir. 2018 yılının başından itibaren ise kriptopara piyasasında yüksek hacimli satışlar olmuş ve bu durum kriptoparaların önemli ölçüde değer kaybetmesine neden olmuştur (Bitcoin %65 Ocak-Şubat 2018 döneminde %65 değer kaybetmiştir). Eylül 2018 itibari ile kriptoparalar Ocak 2018'e göre %80 değer kaybetmiştir. Bu durumla paralel kriptopara İşlem hacimleri de aynı dönemde önemli bir miktarda azalma eğilimi göstermiştir. Bu hususların en düşük bağlantılılığın Ekim 2018'de oluşmasına yol açtığı düşünülmektedir. En yüksek değerlerine ise DSÖ'nün COVID-19'u küresel salgın olarak ilan ettiği 11 Mart 2020 tarihinden 2 gün sonra 13/03/2020 tarihinde ulaşmaktadırlar (sırasıyla %87,32, %87,48, ve %87,49). Bu durum COVID-19 küresel salgınının kriptopara piyasası bağlantılılığını önemli bir ölçüde etkilediğini göstermektedir ve Aslanidis et al. (2020) çalışması ile uyumludur.

Tablo: 2
Kriptoparalar Arasındaki Yönlü Yayılmalar

	Bitcoin	**Etherium**	**Ripple**	**Bitcoincash**	**Litecoin**	**Binance Coin**	**Cordano**	**Chainlink**	**FROM**
Bitcoin	23.79	16.46	5.16	5.84	15.68	11.74	7.82	13.51	9.53
Etherium	14.72	22.6	9.25	4.06	17.11	13.53	7.15	11.58	9.67
Ripple	7.65	14.13	32.46	4.56	14.89	10.32	6.3	9.7	8.44
Bitcoincash	10	8.04	6.07	48.23	8.42	4.7	4.73	9.81	6.47
Litecoin	15.3	17.08	9.8	4.24	22.87	11.6	7.91	11.2	9.64
Binance Coin	12.21	16.49	8.15	2.41	13.15	26.45	6.72	14.41	9.19
Cordano	8.19	11.04	8.21	2.61	10.9	10.38	38.63	10.04	7.67
Chainlink	13.34	13.98	7.98	4.23	13.29	12.91	7.68	26.59	9.18
TO	10.18	12.15	6.83	3.49	11.68	9.4	6.04	10.03	Toplam Yayılma Endeksi = %69.8

Kaynak: Yazarların Hesaplamaları.

DY yöntemi kullanılarak ve 10-günlük ileri varyans ayrıştırmalarıyla elde edilen yönlü yayılma tablosu Tablo 2'de görülmektedir. Tablo 2'ye göre kriptoparalar arasındaki toplam yayılma endeksi %69,8'dir. Bu durum kriptoparalar arasındaki yüksek bağlantılılığa işaret etmektedir. Diğer kriptoparalara doğru en yüksek yönlü yayılmaya sahip olan üç kriptopara sırasıyla Etherium (%9,67), Litecoin (%9,64) ve Bitcoin (%9,53)'dir. Bulunan bu sonuç Ji et al. (2019) çalışmasıyla uyumludur. Diğer kriptoparalara doğru en düşük yayılmaya sahip kriptoparalar ise sırasıyla Bitcoincash (%6,47), Cordano (%7,67) ve Ripple (%8,44) dır. Tablo 2'ye göre Bitcoin, Etherium, Litecoin, Binance Coin, Chainlink, Cordano net alıcı (receiver); Ripple, Bitcoincash net verici (transmitter) konumundadır.

Şekil: 4
Kriptoparaların FC Yöntemiyle Toplam Yayılmaları

Kaynak: Yazarların Hesaplamaları.

Çalışmanın bir sonraki aşamasında kriptoparalar arasındaki bağlantılılık, Baruník & Křehlík (2018) çalışması takip edilerek $VAR(4)$'ün 100-günlük ileri adım varyans ayrıştırmaları ile 300-günlük kayan pencerelerde ve $(\pi, \pi/4)$, $(\pi/4, \pi/10)$ ve $(\pi/10, 0)$[5] frekans bantlarında tahmin edilmektedir. Tahminler, Baruník & Křehlík (2018) çalışması

[5] $(\pi, \pi/4)$, $(\pi/4, \pi/10)$ *ve* $(\pi/10, 0)$ *frekans bantları yaklaşık olarak sırasıyla 1 günden 4 güne, 4 günden 10 güne ve 10 günden* ∞ *güne kadar olan bağlantılıkları göstermekte ve kısa-, orta- ve uzun- dönemli bağlantılılığı temsil etmektedir.*

izlenerek $LASSO$ kaybını (penalty) çapraz doğrulama ile otomatik olarak seçen $VAR-LASSO(50{,}50)$ modeli çalıştırılarak elde edilmektedir. Şekil 4, $VAR(4)$'ün 100-günlük ileri adım varyans ayrıştırmaları ile 300-günlük kayan pencerelerde ve $(\pi, \pi/4)$, $(\pi/4, \pi/10)$ ve $(\pi/10, 0)$ frekans bantlarında frekans bağlantılılığı yöntemiyle elde edilen kriptoparaların toplam yayılmaları göstermektedir.

Frekans bağlantılılığı yöntemi ile farklı frekans bantlarında tahmin edilen toplam yayılmalar %50 ile %90 arasında değişmektedir. Kriptoparalar arasındaki kısa-, orta ve uzun-dönemli frekans bağlantılılıkları 11 Mart 2020 tarihinde önemli bir seviyede yükselmeye başlamışlar ve 13 Mart 2020 tarihinde %87,5 ile maksimum değerlerine ulaşmışlardır. Bu dönemde toplam yayılma endeksleri arasındaki birlikte hareket ilişkisinin yükselmesi ve endekslerin 31 Aralık 2020 tarihine kadar %80'in üzerinde değerler almaları COVİD 19 küresel salgınının kriptopara piyasalarını önemli ölçüde etkilediğini göstermektedir. Aşı çalışmalarının yaygınlık kazanmasının 31 Aralık 2020 sonrasında endekslerin ortalama seviyelerine düşmelerine neden olduğu düşünülmektedir.

6. Sonuç

2008 Küresel Finansal Krizi sonrasında yeni bir parasal sisteme ihtiyaç duyulmuş ve bu durum kriptoparaların ortaya çıkmasına neden olmuştur. Kriptoparalar, yüksek getiri potansiyellerinin olması ve uçtan uca (peer-to-peer) parasal aktarım mekanizmasında finansal aracılara ihtiyaç duymamaları gibi nedenlerle finansal yatırımcılar tarafından tercih edilmektedirler. Öte yandan, piyasa regülasyonunun olmaması ve siber güvenlik gibi nedenler dolayısıyla kriptoparalar yüksek oynaklıklara ve spekülatif balonlara maruz kalmaktadır.

Kriptopara piyasalarının finansal sistemin önemli bir bileşeni haline gelmesi ve bu piyasada ortaya çıkabilecek olan şokların diğer finansal piyasaları etkileme potansiyelinin olması nedeniyle çalışmamız kriptopara piyasası oynaklık (volatility) bağlantılılığını incelemektedir. Bu bağlamda; Diebold-Yilmaz ve frekans bağlantılılık yöntemleri ampirik analizde kullanılarak en yüksek piyasa kapitalizasyonuna sahip 8 kriptopara arasındaki oynaklık bağlantılılığı, 02/10/2017 ve 03/01/2021 tarihleri arasında incelenmektedir.

DY yöntemi ile elde edilen toplam yayılma endeksi 2018 kriptopara piyasası krizi ve COVID-19 pandemisinin DSÖ tarafından resmi olarak ilan edilmesi gibi olaylara etkili bir şekilde tepki vermektedir. Aslanidis et al. (2020) çalışması ile uyumlu olarak kriptoparalar arasındaki bağlantılılık 2020 Mart döneminde yükselmekte, %80 seviyesinin üzerine çıkarak maksimum seviyelerine ulaşmaktadır. DY yöntemi ile 2-, 5, ve 10-gün ileri adım varyans ayrıştırmaları ile tahmin edilen endekslerin benzer patikada hareket etmeleri sonuçların tutarlı olduğunu göstermektedir. DY yöntemi ile tahmin edilen yönlü yayılma tablosuna göre diğer kriptoparalara doğru en yüksek yönlü yayılmaya sahip olan üç kriptopara Etherium, Litecoin ve Bitcoin olarak tespit edilmektedir. Diğer taraftan, Bitcoincash, Cordano ve Ripple ise en düşük yönlü yayılmaya sahip olan kriptoparalardır.

Çalışmanın ikinci aşamasında FC yöntemi ile $(\pi, \pi/4)$, $(\pi/4, \pi/10)$ ve $(\pi/10, 0)$ frekans bantlarında kriptoparalar arasındaki kısa-, orta- ve uzun- dönemli bağlantılılık tahmin edilmektedir. DY analizi ile benzer şekilde kriptopara bağlantılılıkları, 2020 Mart döneminde önemli seviyede yükselmiş ve 13 Mart 2020 tarihinde %87,5 ile maksimum değerlerine ulaşmışlardır.

2020 Mart ayında bağlantılılığın en yüksek değerine ulaşması, bu piyasadaki oynaklığın önemli bir düzeyde yükseldiğini göstermektedir. Bu durumun sürü psikolojisinden kaynaklanmış olabileceği düşünülmektedir. Ayrıca 2020 Ocak Şubat döneminde küresel finansal piyasalarda yaşanan kırılganlık artışı, bu piyasaya yönelimi artırmış olabilir.

Kriptoparalar arasındaki bağlantılılığın özellikle finansal/jeopolitik kırılganlık dönemlerinde önemli bir seviyede yükselmesi yatırımcıların, politika yapıcıların ve araştırmacıların kararlarını etkilemektedir. Çalışmamızın sonuçlarına göre ve yazınla tutarlı olarak COVID-19 küresel salgınının kriptopara bağlantılılığını önemli bir seviyede yükselttiği tespit edilmektedir. Bu durumun kısa vadede yatırımcılar için kâr olanağı sağlama potansiyeli vardır. Diğer taraftan, en yüksek piyasa işlem hacmine sahip olan kriptoparaların yönlü yayılma tablosu sonuçlarına göre net alıcı olarak bulunması yazındaki bazı çalışmalardan ayrılmaktadır. Buna ek olarak, uzun-dönemli bağlantılılığın COVID-19 dönemi haricinde kısa- ve orta vadeli bağlantılılıktan daha yüksek değerler alması bulgusu da çalışmanın özgün sonuçlarından biri olarak değerlendirilmektedir. Orta ve uzun vadede bu piyasadaki yüksek oynaklığın diğer piyasalara farklı iletim kanalları ile yansıma olasılığı olması nedeniyle otoriteler tarafından kriptopara piyasası fiyat gelişmeleri yakından izlenmelidir. Bu bağlamda, regülasyon mekanizmasının oluşturulması faydalı olabilir.

Kaynaklar

Adekoya, O.B. & J.A. Oliyide (2021), "How COVID-19 drives connectedness among commodity and financial markets: Evidence from TVP-VAR and causality-in-quantiles techniques", *Resources Policy*, 70(101898), 1-17.

Akyildirim, E. et al. (2020), "The development of bitcoin futures: Exploring the interactions between cryptocurrency derivatives", *Finance Research Letters*, 34(101234), 1-9.

Antonakakis, N. & D. Gabauer (2017), "Refined Measures of Dynamic Connectedness based on TVP-VAR", *Munich Personal RePEc Archive*, No. 78282, University Library of Munich, Almanya.

Antonakakis, N. & R. Kizys (2015), "Dynamic spillovers between commodity and currency markets", *International Review of Financial Analysis*, 41, 303-319.

Antonakakis, N. et al. (2019), "Cryptocurrency market contagion: Market uncertainty, market complexity, and dynamic portfolios", *Journal of International Financial Markets, Institutions and Money*, 61, 37-51.

Aslanidis, N. et al. (2020), "Are cryptocurrencies becoming more interconnected?", *Economics Letters*, 199, 109725.

Baek, C. & M. Elbeck (2015), "Bitcoins as an investment or speculative vehicle? A first look", *Applied Economics Letters*, 22(1), 30-34.

Bagheri, E. & S.B. Ebrahimi (2020), "Estimating Network Connectedness of Financial Markets and Commodities", *Journal of Systems Science and Systems Engineering*, 29(5), 572-589.

Baruník, J. & T. Křehlík (2018), "Measuring the frequency dynamics of financial connectedness and systemic risk", *Journal of Financial Econometrics*, 16(2), 271-296.

Baur, D.G. & T. Dimpfl (2018), "Asymmetric volatility in cryptocurrencies", *Economics Letters*, 173, 148-151.

Ben Amar, A. et al. (2021), "Connectedness among regional financial markets in the context of the COVID-19", *Applied Economics Letters*, 28(20), 1789-1796.

Bonga-Bonga, L. (2018), "Uncovering equity market contagion among BRICS countries: an application of the multivariate GARCH model", *The Quarterly Review of Economics and Finance*, 67, 36-44.

Bouri, E. et al. (2021), "Quantile connectedness in the cryptocurrency market", *Journal of International Financial Markets, Institutions and Money*, 71(101302), 1-16.

Buchholz, M. & L. Tonzer (2016), "Sovereign Credit Risk Co-Movements in the Eurozone: Simple Interdependence or Contagion?", *International Finance*, 19(3), 246-268.

Cheikh, N.B. et al. (2020), "Asymmetric volatility in cryptocurrency markets: New evidence from smooth transition GARCH models", *Finance Research Letters*, 35(101293), 1-9.

Chiang, T.C. et al. (2007), "Dynamic correlation analysis of financial contagion: Evidence from Asian markets", *Journal of International Money and Finance*, 26(7), 1206-1228.

Chow, H.K. (2020), "Connectedness of Asia Pacific forex markets: China's growing influence", *International Journal of Finance & Economics*, 26(3), 3807-3817.

CoinMarketCap (2021), <https://coinmarketcap.com/all/views/all/>, 06.01.2021.

Conlon, T. et al. (2020), "Are Cryptocurrencies a Safe Haven for Equity Markets? An International Perspective from the COVID-19 Pandemic", *Research in International Business and Finance*, 54(101248), 1-10.

Corbet, S. et al. (2018), "Exploring the dynamic relationships between cryptocurrencies and other financial assets", *Economics Letters*, 165, 28-34.

Corbet, S. et al. (2019), "Cryptocurrencies as a financial asset: A systematic analysis", *International Review of Financial Analysis*, 62, 182-199.

Costa, A. et al. (2021), "Sectoral connectedness: New evidence from US stock market during COVID-19 pandemics", *Finance Research Letters*, (102124), 1-14.

Dai, X. et al. (2020), "Multi-scale dependence structure and risk contagion between oil, gold, and US exchange rate: A wavelet-based vine-copula approach", *Energy Economics*, 88(104774), 1-20.

Dewandaru, G. et al. (2014), "Stock market co-movements: Islamic versus conventional equity indices with multi-timescales analysis", *Economic Systems*, 38(4), 553-571.

Diebold, F.X. & K. Yilmaz (2009), "Measuring financial asset return and volatility spillovers, with application to global equity markets", *The Economic Journal*, 119(534), 158-171.

Diebold, F.X. & K. Yilmaz (2012), "Better to give than to receive: Predictive directional measurement of volatility spillovers", *International Journal of Forecasting*, 28(1), 57-66.

Diebold, F.X. & K. Yilmaz (2014), "On the network topology of variance decompositions: Measuring the connectedness of financial firms", *Journal of Econometrics*, 182(1), 119-134.

Diebold, F.X. & K. Yilmaz (2015), "Trans-Atlantic equity volatility connectedness: US and European financial institutions, 2004-2014", *Journal of Financial Econometrics*, 14(1), 81-127.

Fasanya, I.O. et al. (2021), "Dynamic spillovers and connectedness between COVID-19 pandemic and global foreign exchange markets", *Economic Research-Ekonomska Istraživanja*, 34(1), 2059-2084.

Fernández-Rodríguez, F. et al. (2016), "Using connectedness analysis to assess financial stress transmission in EMU sovereign bond market volatility", *Journal of International Financial Markets, Institutions and Money*, 43, 126-145.

Fousekis, P. & D. Tzaferi (2021), "Returns and volume: Frequency connectedness in cryptocurrency markets", *Economic Modelling*, 95, 13-20.

Fry, J. & E.T. Cheah (2016), "Negative bubbles and shocks in cryptocurrency markets", *International Review of Financial Analysis*, 47, 343-352.

Fry, J. (2018), "Booms, busts and heavy-tails: The story of Bitcoin and cryptocurrency markets?", *Economics Letters*, 171, 225-229.

Ghosh, I. et al. (2021), "Co-movement and Dynamic Correlation of Financial and Energy Markets: An Integrated Framework of Nonlinear Dynamics, Wavelet Analysis and DCC-GARCH", *Computational Economics*, 57, 503-527.

Hafner, C.M. (2020), "Testing for bubbles in cryptocurrencies with time-varying volatility", *Journal of Financial Econometrics*, 18(2), 233-249.

Ji, Q. et al. (2019), "Dynamic connectedness and integration in cryptocurrency markets", *International Review of Financial Analysis*, 63, 257-272.

Jokipii, T. & B. Lucey (2007), "Contagion and interdependence: measuring CEE banking sector co-movements", *Economic Systems*, 31(1), 71-96.

Kostika, E. & N.T. Laopodis (2019), "Dynamic linkages among cryptocurrencies, Exchange rates and global equity markets", *Studies in Economics and Finance*, 37(2), 243-265.

Kyriazis, N. et al. (2020), "A Systematic Review of the Bubble Dynamics of Cryptocurrency Prices", *Research in International Business and Finance*, 54, 101254.

Le, T.L. et al. (2020), "Time and frequency domain connectedness and spill-over among fintech, green bonds and cryptocurrencies in the age of the fourth industrial revolution", *Technological Forecasting and Social Change*, 162(120382), 1-16.

Liu, X. et al. (2017), "The evolution of spillover effects between oil and stock markets across multi-scales using a wavelet-based GARCH-BEKK model", *Physica A: Statistical Mechanics and its Applications*, 465, 374-383.

Maghyereh, A.I. et al. (2019), "Connectedness and hedging between gold and Islamic securities: A new evidence from time-frequency domain approaches", *Pacific-Basin Finance Journal*, 54, 13-28.

Mensi, W. et al. (2018), "Dynamic volatility spillovers and connectedness between global, regional, and GIPSI stock markets", *Finance Research Letters*, 25, 230-238.

Naeem, M.A. et al. (2021), "COVID-19 and cryptocurrency market: Evidence from quantile connectedness", *Applied Economics*, 1-27.

Nakamoto, S. (2008), *Bitcoin: A peer-to-peer electronic cash system*, <https://Bitcoin.org/Bitcoin.pdf/>, 02.01.2020.

Nofer, M. et al. (2017), "Blockchain", *Business & Information Systems Engineering*, 59(3), 183-187.

Owusu-Junior, P. et al. (2020), "Connectedness of cryptocurrencies and gold returns: Evidence from frequency-dependent quantile regressions", *Cogent Economics & Finance*, 8(1), 1804037.

Polat, O. (2019), "Systemic risk contagion in FX market: A frequency connectedness and network analysis", *Bulletin of Economic Research*, 71(4), 585-598.

Polat, O. (2020), "COVID-19 ve Küresel Finansal Krizi Finansal Risk Bağlantılılığı: Frekans Bağlantılılığı Yöntemi Uygulaması", *İzmir İktisat Dergisi*, 35(3), 623-634.

Reboredo, J.C. & A. Ugolini (2020), "Price connectedness between green bond and financial markets", *Economic Modeling*, 88, 25-38.

Saiti, B. et al. (2016), "Testing the conventional and Islamic financial market contagion: evidence from wavelet analysis", *Emerging Markets Finance and Trade*, 52(8), 1832-1849.

So, M.K. et al. (2020), "Impacts of the COVID-19 pandemic on financial market connectedness", *Finance Research Letters*, 101864, 1-8.

Støve, B. et al. (2014), "Using local Gaussian correlation in a nonlinear re-examination of financial contagion", *Journal of Empirical Finance*, 25, 62-82.

Syllignakis, M.N. & G.P. Kouretas (2011), "Dynamic correlation analysis of financial contagion: Evidence from the Central and Eastern European markets", *International Review of Economics & Finance*, 20(4), 717-732.

Umar, Z. et al. (2020), "The static and dynamic connectedness of environmental, social, and governance investments: International evidence", *Economic Modelling*, 93, 112-124.

Wong, W.S. et al. (2018), *Cryptocurrency: A new investment opportunity? An investigation of the hedging capability of cryptocurrencies and their influence on stock, bond and gold portfolios. An Investigation of the Hedging Capability of Cryptocurrencies and Their Influence on Stock, Bond and Gold Portfolios*, <https://papers.ssrn.com/sol3/papers.cfm?abstract_id=312737/>, 10.01.2021.

Yaga, D. et al. (2019), *Blockchain technology overview*, arXiv preprint arXiv:1906.11078.

Zheng, Z. et al. (2018), "Blockchain challenges and opportunities: A survey", *International Journal of Web and Grid Services*, 14(4), 352-375.

Sosyoekonomi

2022, Vol. 30(51), 301-318

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.15
Date Submitted: 15.06.2020
Date Revised: 12.12.2021
Date Accepted: 16.01.2022

Turizm ve Gelir Eşitsizliği İlişkisinde Kuznets Eğrisi Hipotezinin Geçerliliği

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Investigating the Validity of Kuznets Curve Hypothesis on Tourism and Income Inequality Relations

Abstract

The decline of social welfare policies in both developed and developing countries in the late the last century has led to the issue of fair and equal distribution of income among all citizens being pushed into the background. When injustices in income distribution have become the biggest threat to social peace in today's world, in terms of economic and social benefits, tourism is considered one of the sectors supporting social and economic welfare with significant positive effects on employment generation and economic growth. However, controversy in the literature remains regarding the impacts of tourism on income distribution. We decided to analyse this impact by controlling the level of financial development and trade openness in both developed and developing countries, where the ratio of tourism revenues to national income is the highest. Using annual data from 1995-2018, the cointegration and causality analysis show the evidence that tourism impact on income distribution is dissimilar across developing and developed countries and the impact changes in different stages of sector development. The findings validate that the involvement of low- and mid-income countries' governments are crucial for fair distribution of tourism revenues through the community and coping with the issue.

Keywords : Tourism, Income Inequality, Panel Data Analysis.

JEL Classification Codes : L83, D63, C33.

Öz

Geçtiğimiz yüzyılın sonlarına doğru hem gelişmiş hem de gelişmekte olan ülkelerde sosyal refah uygulamalarının azalması, ekonomik büyüme sonucunda ortaya çıkan gelir artışının tüm bireyler arasında adil ve eşit bir şekilde dağıtımı konusunun geri plana itilmesine neden olmuştur. Gelir dağılımındaki adaletsizliğin toplumsal barışın en büyük tehdit unsuru haline geldiği günümüz dünyasında, ekonomik getiriler açısından, turizmin özellikle istihdam yaratma potansiyeli ve ekonomik büyümeye katkıları yönünden, önemli pozitif etkilere sahip olduğu kabul edilmektedir. Ancak turizmin gelir eşitsizliğine etkileri konusundaki tartışmalar günümüzde de devam etmektedir. Çalışmanın temel amacı, turizm gelirlerinin milli gelire oranının, en yüksek olduğu 50 gelişmiş ve gelişmekte olan ülkede turizm gelirlerindeki değişimin, finansal gelişme ve ticari açıklık kontrol değişkenlerini de dikkate alarak, gelir eşitsizliğine etkilerini, eş-bütünleşme ve Granger nedensellik testleri ile incelemektir. 1995-2018 dönemine ait yıllık veriler kullanılarak yapılan ekonometrik tahminler, turizm gelirlerinin gelir eşitsizliğine etkisinin uzun dönemde hem gelişmiş ve gelişmekte olan ülkeler arasında, hem de sektörün farklı gelişim evrelerinde değişiklik gösterebileceğini ortaya

koymuştur. Elde edilen sonuçlar özellikle az gelişmiş ve gelişmekte olan ülkelerde turizm gelirlerinin farklı gruplar arasında daha adil paylaşımı için kamu politikaları ve uygulamalarının önemli olduğuna işaret etmektedir.

Anahtar Sözcükler : Turizm, Gelir Eşitsizliği, Panel Veri Analizi.

1. Giriş

Küreselleşmenin etkisiyle ulaşım ve iletişim teknolojilerinde ortaya çıkan gelişmelerin küresel ilişkiler ağını yoğunlaştırması, harcanabilir gelir ve boş zamanın artması ile yaşam kalitesinin iyileşmesi durumu 20. yüzyılın başlarından itibaren uluslararası seyahatlerde hızlı artışların yaşanması ile sonuçlanmıştır (Kelly & Freysinger, 2000: 14). Bu ilerlemelerin olumlu bir sonucu olarak turizm, hızlı bir gelişme ve istikrarlı bir şekilde büyüme gösteren sektörlerden biri haline gelmiştir. Turizm sektörünün üretim ve tüketim boyutuyla toplumsal ve ekonomik yaşantıyı hem olumsuz hem de olumlu yönde etkilediği de bilinmektedir. Özellikle II. Dünya Savaşı'ndan sonra kitle turizminin gelişmesi ile turizmin istihdam, ödemeler dengesi ve milli gelir üzerindeki etkilerinin artmaya başladığı, dolayısı ile turizmin ekonomik yönünün ön plana çıktığı görülmektedir (Çakır & Bostan, 2000: 35). Bu süreçte Uluslararası Para Fonu (IMF) ve Dünya Bankası gibi önemli kuruluşların, "*bırakınız yapsınlar, bırakınız geçsinler"* görüşü ile ticaret engelleri kaldırılmaya başlanmış, uluslararası ticaret dış rekabet ortamına açılmış ve finansal serbestleşmeye yönelik ataklar ortaya çıkmıştır. Bu durumun turizm yatırımlarının artmasına neden olduğu, uygun ekonomik ortamın oluşmasına zemin hazırladığı ve turizm sektörünün de gelişmesine önemli katkılar sağladığı düşünülmektedir.

20. yüzyılın ortalarında 2,1 milyar dolar olan uluslararası turizm gelirleri 2018 yılına gelindiğinde 1448 milyar dolara yükselmiş, aynı dönemde uluslararası düzeyde turizm hareketleri ise 25,3 milyon kişiden 1,4 milyar kişiye ulaşmıştır. Bu süreçte turizmin ekonomi içindeki payının önemli ölçüde artış gösterdiği, bu kapsamda 2018 yılında seyahat ve turizmin küresel milli gelire toplam katkısının 8.8 trilyon dolara, küresel düzeyde istihdama katkısının ise 319 milyon kişiye yükseldiği görülmektedir (Travel & Council, 2018). Dünya Turizm Örgütü'nün tahminlerine bakıldığında ise uluslararası turizm varışlarının yıllık olarak ortalama %3,3 artış göstererek 2030 yılına kadar 1,8 milyar kişiye ulaşacağı ve bu hareketlerin özellikle Asya ve Pasifik, Afrika ve Ortadoğu ülkeleri gibi ekonomik açıdan gelişmekte olan turizm destinasyonlarına yönelik hayata geçirileceği öngörülmektedir. Ayrıca, 2030 yılında turizmin 421 milyon kişiye istihdam sağlayacağı ve küresel gayri safi milli hasıladaki toplam katkısının da %12'ye ulaşacağı tahmin edilmektedir (<www.unwto.org>).

Büyüme hedeflerini gerçekleştirmeye çalışan gelişmekte olan ülkeler özellikle turizm sektöründen elde ettikleri gelirler ile ödemeler dengesine katkı sağlayarak büyük ölçüde cari açığın kapatılmasına yardımcı olmaktadırlar (Zengin, 2010: 113). Günümüzde uluslararası turizm gelirlerinden en yüksek payı Avrupa ve Kuzey Amerika ülkelerinin almış olduğu görülmekte olup, uluslararası turizm hareketlerine bakıldığında ise az gelişmiş ve gelişmekte

olan ülkelere doğru seyahat eğiliminin sürdüğü görülmektedir. Bu durumla birlikte yakın gelecekte zengin ve fakir ülkeler arasında gelir farkının azalacağı öngörülmektedir (Proença & Soukiazis, 2008: 792). Diğer yandan bu tür hareketlerin, ülkelerin ekonomileri açısından tam anlamıyla olumlu etkiler meydana getirdiğini de söylemek mümkün değildir. Örneğin, ithal mala olan talebi arttırması, ulus ötesi şirketlerin karlarını ülke içerisinde kullanmayıp yurtdışına transfer etmesi, mevsimlik talepte dalgalanmalara yol açması ve enflasyona olan etkisi turizmin başlıca olumsuz ekonomik etkileri arasında gösterilmektedir (Holloway & Taylor, 2006).

Turizmin bölgelerarası dengeli kalkınma, refah düzeyini iyileştirme ve gelirlerin eşit dağılımına etkisi konuları son yıllarda oldukça önem kazansa da literatür incelendiğinde yapılan çalışmalarda ortak görüş birliğine varılmadığı görülmektedir. Gelişmiş ve gelişmekte olan ülkeler arasındaki gelir farkının İkinci Dünya Savaşı'nın bitimiyle başlayan "*Altın Çağ*" (1945-1975) döneminde uygulanan sosyal devlet politikalarıyla belirli bir ölçüde azaldığı ancak 1980'li yıllardan itibaren neo-liberal iktisat politikalarının da yaygınlaşması ile ülkeler arasındaki farkın daha da derinleştiği ve 21. yüzyıla girildiğinde bu farkın 20 katına çıktığı görülmektedir (Temiz, 2004: 126). Bu bağlamda özellikle düşük gelirli grupların turizme katılım sağlaması ve yoksul yanlı olma özelliği bakımından turizmin gelir eşitsizliğinin azaltılmasına ve yoksulların yaşam koşullarının iyileştirilmesine olumlu etki yapacağı düşünülmektedir (Harrison, 2008: 852). Diğer yandan bazı araştırmacılar ise, turizm gelişiminin enflasyonist baskıyı da beraberinde getireceğine, sektördeki büyük işletmelerin emek ve kaynakları sömürdüğüne ve bunların bir sonucu olarak turizmin yoksulluk ve eşitsizliği derinleştirdiğine dikkat çekmişlerdir (Scheyvens, 2001: 18). Bu görüşler göz önünde bulundurulduğunda turizmin gelir eşitsizliği konusunda olumsuz etkiler yaratmaması adına yapılabilecek uygulamalar düşünülmeli ve bu konuda özellikle bölgeler arasındaki gelir dağılımı dengesizliklerinin minimuma indirilmesi gerekmektedir. Turizmden elde edilen gelirlerin farklı gruplar arasında eşit bir şekilde dağıtılıp dağıtılmadığı ve gelir eşitsizliğini azaltmada sektörün etkin bir role sahip olup olmadığına yönelik tartışmalar günümüzde de devam etmektedir. Bu çalışmada, turizm gelirlerinin milli gelire oranının en yüksek olduğu 50 ülkenin verilerinden faydalanarak turizm gelirleri ile gelir eşitsizliği arasındaki ilişki, panel nedensellik ve panel eşbütünleşme yöntemleri ile analiz edilmeye çalışılmıştır.

2. Turizm ve Gelir Eşitsizliği İlişkisi

Turizm, ekonomik olarak incelendiğinde hızla büyüyen bir sektör olarak tanımlanmaktadır (Bahar & Kozak, 2013: 6). Gelişmekte olan ve gelişmiş ülkeler açısından değerlendirildiğinde turizmin ekonomik açıdan ülkeleri desteklediği veya denge sağladığı görülmektedir (Şahin, 2017: 116). Ayrıca turizm sektörünün istihdam arttırıcı ve döviz girdisi sağlayıcı özelliği ile ülkelerin ekonomilerini desteklediği bilinmektedir. Turizm sektörünün ekonomik etkilerinin yanında aynı zamanda kentsel ve kırsal bölgelerin de gelişip büyümesine ve bununla birlikte bu bölgelerde sosyal ve çevresel olarak iyileşmeye katkı sağladığı da görülmektedir. Bu konudaki literatür incelendiğinde, turizmin bazı

olumsuz etkilere de neden olabileceğine yönelik görüşlerin dile getirildiği ve bu çalışmalarda gelir eşitsizliğini artırmadaki rolüne dikkat çekildiği görülmektedir.

Gelir kavramı incelendiğinde, bir zaman dilimi içerisinde kişi veya kişiler tarafından elde edilen para ve diğer farklı kaynakların miktarı olarak tanımlanabilmektedir (Şentürk, 2002: 1). Gelir eşitsizliği kavramı ise tüm dünyada yaşanan bir problem olarak karşımıza çıkmaktadır (Çalışkan, 2010: 89). Aynı zamanda gelir eşitsizliği kavramı literatürde farklı tanımlamaları olan bir kavram olup, genel olarak gelir miktarlarının dağılımındaki farklılıklar olarak ifade edilmektedir. Aynı zamanda gelirin adil şekilde dağıtılması konusu iktisatçılar tarafından ekonominin temel amaçları arasında yer almaktadır (Parasız, 2010: 6). Gelir eşitsizliği, her dönemde toplumların gündem maddesi olarak yer almasına karşın; sanayi devrimi sonrasında ortaya çıkan kapitalizm döneminde daha fazla önem kazanan bir olgu haline geldiği de görülmektedir (Çelik, 2004: 53). Gelir miktarlarının dağılımı konusu genel olarak incelendiğinde tüketim kalıplarını, işgücü piyasalarını, girişimcilik faaliyetlerini ve vergilendirmeyi etkilemesi sebebi ile toplumun ekonomik ve sosyal yapılarını aktif bir halde tutan kritik bir konu olarak da tanımlanmaktadır. Bu nedenle gelir dağılımındaki eşitsizlikler ülkeler açısından ekonomik büyüme, siyasi yapı, sosyal hareketlilik, fiziksel ve zihinsel sağlık, aile yapısı ve suç oranları gibi kaygıları peşinde getirmektedir (Wilkinson & Pickett, 2009; Hacker & Pierson, 2010).

Küreselleşen dünyada artan gelir eşitsizliği ciddi bir endişe kaynağı olarak ifade edilmektedir. Gelişmekte olan ülkeler incelendiğinde son otuz yılda gelir eşitsizliğinde büyük bir artış yaşamıştır. Son 15 yıla bakıldığında İngiltere ve Amerika Birleşik Devletleri gibi ülkelerin gelir eşitsizliğinde artış yaşayan ülkeler arasında yer aldığı görülmektedir. Gelişmiş ve gelişmekte olan piyasalarda bile bu durum ciddi seviyelere uzanmış olup, bu konuda ABD eski başkanı Barack Obama, artan gelir eşitsizliğini *"zamanın zorluğu"* olarak adlandırdığı bilinmektedir (Dabla-Norris et al., 2015). Literatür incelendiğinde de birçok çalışma, finansal anlamda yüksek gelişme seviyelerine sahip ülkelerin daha az gelir eşitsizliğine sahip olduklarını savunmaktadır (Li et al., 1998; Hamori & Hashiguchi, 2012; Naceur & Zhang, 2016).

İktisatçılar açısından bakıldığında sadece sosyal sorunların gelir eşitsizliğinin gerçek belirleyicisi olmadığını, bunun yerine vergilerin, uluslararası rekabetin, teknolojideki değişimlerin ve endüstrinin ihtiyaç duyduğu becerilerin tamamının gelir eşitsizliğine sebep olduğu savunulmaktadır. Gelir eşitsizliğinin altında yatan nedenler literatürde birçok farklı neden ile sunulmaktadır. Örneğin, Wilkinson ve Pickett (2009) gelir farklılıklarının daha büyük olduğu yerlerde özellikle sosyal tabakalaşma konusunun çok derin olduğunu savunmaktadır. Law et al. (2014) finansal gelişmenin gelir eşitsizliğini belirli bir seviyeye ulaşıldıktan sonra azalttığı sonucuna varmıştır. Bahmani-Oskooee ve Zhang (2015) finansmanın gelir dağılımı üzerinde daha kısa sürede eşitleyici bir etkisi olduğunu öne sürmüştür.

Turizmin gelir eşitsizliği üzerindeki etkileri hakkında literatür incelendiğinde, Bartik (1991)'in, turizmin ekonomik faaliyetlerin artmasına katkı sağladığını, ancak bunun aynı

zamanda gelir dağılımını bozucu bir etkisi bulunduğunu vurgulamaktadır. Bu görüşün temel dayanağı olarak ise özellikle turizm yoluyla elde edilen döviz gelirlerinin döviz giderlerinden daha fazla olduğu gelişmekte olan ülkelerde turizmde ortaya çıkan canlanmanın ürün ve üretim mallarına olan talebi artırmasından kaynaklanmaktadır. Talepteki artışın hemen karşılanması mümkün olmadığından turistlere satılan ürünlerin fiyatları yükseltilerek elde edilen kar oranları artırılmaya çalışılacaktır. Turizm talebindeki artışlar üretim maliyetlerinin de yükselmesine neden olacak ve bu durum fiyatlar genel düzeyinin artış eğilimine girmesi ile sonuçlanacaktır (Öztaş, 2002: 63). Literatürde turizm ve gelir eşitsizliği arasındaki ilişkiyi ortaya koyan çalışmalarda ele alınan bir diğer bir görüş ise, turizmin yoksulluğun azaltılmasındaki etkileri sayesinde gelir dengesizliğinin ortadan kaldırılmasına yardımcı olacağına yöneliktir. Bu kapsamda yoksul yanlı turizm, az gelişmiş ve gelişmekte olan ülkelerde yoksullukla mücadele etme konusunda turizmi etkili araçlardan biri olarak konumlandırmaktadır (Bahar & Kozak, 2007: 61). Literatürde özellikle bu konu ile ilgili olarak gelir eşitsizliğini azaltmak için turizmin yoksul yanlısı olması gerektiği savunulmakta olup yoksul yanlısı büyüme ile turizmi bu insanlara daha iyi bir biçimde sunmak hedeflenmektedir (Alam & Paramati, 2016: 113). Farklı bir açıdan bakıldığında ise Li et al. (2016) tarafından yapılan çalışmada Çin'de bölgesel olarak gelir eşitsizliğinin azaltması yönü ile turizm gelişimi konusu incelenmiş olup sonuçların önemli oranda olumlu etki yarattığı sonucuna varılmıştır.

1980'li yıllar sonrasında ülkeler arasında meydana gelen ekonomik faaliyetlerle ilgili kısıtlamaların ve engellerin azaltılması durumu ile birlikte ülkelerin dış ticarete ağırlık vermiş olmaları ve bu durumla bağlantılı olarak uluslararası turizm hareketlerinde önemli derecede hareketlilik meydana gelmiştir. Turistlerin gittikleri ülkelerde harcama yapması, turizmden elde edilen geliri ifade etmekte olup, ülkelere önemli ölçüde döviz girdisi sağlamaktadır. Bu harcamalar turizmin görünmeyen bir ihracat kalemi olarak değerlendirilmesine sebep olmaktadır (Kozak et al., 2001: 78-79). Özellikle turizm arzına sahip olan ülkeler dış ticaret açıklarını kapatmak amacıyla turizmden elde ettikleri gelirleri kullanmaktadırlar. Diğer bir taraftan, ülkelerin kendi aralarındaki alışverişleri, tüketicilerin ürünlere ilgisinin artmasına ve bu alışverişlerdeki ülkelerden pek çok yönden haberdar olmasını sağlamaktadır. Aynı zamanda ülkeler arasında bulunan ticaret ilişkileri, daha sonraki dönemlerde tüketicilerin turistik amaçlı gezi yapmalarına da neden olmaktadır (Kulendran & Wilson, 2000: 1002). Dış ticaretteki gelişmeler ülkelerin refah düzeyini önemli ölçüde etkilemekle beraber gelir dağılımı üzerinde de belirleyici etkiye sahiptir. Literatür incelendiğinde dış ticaretin gelir dağılımına etkisini inceleyen çalışmalarda farklı sonuçların elde edildiği de gözden kaçmamaktadır. Örneğin klasik ticaret teorisi dış ticaretteki artışın emek faktörü bakımından zengin gelişmekte olan ülkelerde ücretlerin artmasına katkı sağlayacağını ve böylece yoksulluğu azaltıcı bir etkiye sahip olacağını öngörmektedir. Diğer yandan yapılan bazı çalışmalarda ticaretin serbestleşmesi sonucunda ihracata yönelen firmalarda gelirlerin artacağı ve marjinal maliyetlerin düşeceği belirtilmektedir. Sonuç olarak bu sektörlerdeki işgücü ücretlerinin artacağı, bunun aksine dış rekabete kapalı sektörlerde çalışanların ise ücretlerinin düşeceğine dikkat çeken bu

çalışmalarda artan uluslararası ticaretin uzun dönemde ülke genelinde gelir eşitsizliğinin artmasına neden olacağı savunulmaktadır (Goldberg & Pavcnik, 2004: 23).

Son yıllarda literatürde hem turizm hem de gelir dağılımı üzerindeki etkileri bakımından finansal gelişmenin önemini ortaya çıkaran çalışma sayısında artış yaşandığı görülmektedir. Greenwood ve Jovanovic (1990) gelir eşitsizliğinin temel belirleyicilerinden bahsederken finansal gelişmenin önemine dikkat çekerek aradaki ilişkiyi Ters U hipotezi ile açıklamaya çalışmış, Galor ve Zeira (1993) ise bu ilişkinin ters yönlü ve doğrusal olduğunu kaydetmiştir. Bu bakımdan Ters U hipotezinin geçerliliğinin sınandığı çalışmalarda, kalkınmanın ilk evresinde yüksek işlem maliyetlerinden dolayı finansal piyasalara erişimin sadece zenginler için ulaşılabilir olabileceği, bu durumun ise gelir eşitsizliğini daha da artıracağına vurgu yapılmaktadır. Ancak büyüme devam ettikçe finansal derinlikte yaşanan artışlar daha çok bireyin finansal sisteme katılım sağlamasına imkân tanıyacak, böylece krediye erişimlerin kolaylaşması ile gelir dağılımındaki adaletsizlik de ortadan kalkmaya başlayacaktır (Naceur & Zhang, 2016). Turizm ile finansal gelişme arasındaki ilişkiyi inceleyen Kumar (2014), Vietnam üzerine yaptığı çalışmasında finansal gelişmeden turizme doğru tek yönlü nedensellik ilişkisinin olduğuna işaret etmektedir. Diğer yandan Başarır ve Çakır (2015)'in Türkiye ve dört Avrupa Birliği ülkesini (Fransa, İspanya, İtalya ve Yunanistan), Shahbaz et al. (2019)'un Malezya'yı incelediği çalışmalarda ise turizm ve finansal gelişme arasındaki nedensellik ilişkisinin iki yönlü olduğuna vurgu yaptığı görülmektedir. Yapılan çalışmalardan yola çıkarak bu çalışmada da finansal gelişme ve ticaretteki serbestleşmenin yoksul kesimlerin gelirlerini artırmaya yardımcı olup olmadığı ve gelir eşitsizliği üzerindeki etkisini belirleme amacıyla modele aracı değişkenler olarak dahil edilmesi uygun görülmüştür. Ayrıca turizm ve gelir eşitsizliği arasındaki ilişkiyi gelişmiş ve gelişmekte olan ülkelerde inceleyen literatürde kısıtlı çalışma olmasından ve incelenen dönem açısından daha önce yapılmış olan çalışmalardan farklılık göstermektedir. Bu nedenle elde edilen sonuçların literatüre katkı sağlayacağı düşünülmektedir.

3. Veri ve Metodoloji

Bu çalışma kapsamında turizm gelirlerinin GSYH içindeki payının en yüksek olduğu 50 gelişmiş ve gelişmekte olan ülkede turizmin gelir eşitsizliği üzerindeki etkisi 1995-2018 dönemini kapsayan yıllık verilerden yararlanılarak analiz edilmeye çalışılacaktır. Turizm gelirleri ve gelir eşitsizliği arasındaki ilişkiler tahmin edilirken aşağıda yer alan panel regresyon modeli temel alınmış olup, ilgili modelde t zaman periyodunu, i ise yatay kesit (ülke) birimlerini temsil etmektedir. Ayrıca modelde yer alan a_i ülkelere özel sabit etkileri, $\mathcal{E}_{it}$ ise bağımsız ve aynı dağılımlı hata terimlerini göstermektedir.

$$GINI_{it} = a_i + b_1 TR_{it} + b_2 TR_{it}^2 + b_3 GDP.p.c_{it} + b_4 GDP.p.c_{it}^2 + b_j X_{it} + \varepsilon_{it}$$

Gelir eşitsizliğini ölçmede yaygın olarak kullanılan Gini katsayısı modelde bağımlı değişken olarak yer alan gelir eşitsizliğinin göstergesi olarak kullanılmıştır. Gelir dağılımındaki adaletsizliğin artması durumunda yükselen, azalması durumunda ise düşen katsayı 0 ile 1 arasında değerler almakta olup, ilgili veriler Dünya Bankası'na ait WDI ve

Standart Dünya Gelir Eşitsizliği Veri Tabanın'dan (SWIID) elde edilmiştir. Bir yıl içerisinde ülkeyi ziyaret eden turistlerden elde edilen toplam turizm gelirlerin milli gelire oranı (TR) ve turizm ve gelir eşitsizliği arasındaki ilişkinin doğrusallığının test edilmesi amacıyla ilgili değişkenin karesi, ayrıca seçili ülkelerde Kuznets eğrisinin etkilerini belirleme amacıyla kişi başına düşen GSYH ve karesi temel bağımsız değişkenler olarak modelde yerini almıştır. Bunların yanında kontrol değişkenleri (X_{it}) olarak toplam ihracat ve ithalatın GSYH içindeki payı (TO) ve özel sektör kredilerinin GSYH içindeki payı (FO) gibi değişkenler Alam ve Paramati (2016) ve Shahbaz et al. (2019)'un çalışmasından hareketle gelir eşitsizliğini etkileyen kontrol değişkenleri olarak modelde yerini almıştır. Analizde kullanılan kişi başına GSYH (2005 yılı sabit Amerikan doları), ticari açıklık ve özel sektör kredilerine ilişkin veriler Dünya Bankası tarafından yayımlanan Dünya Kalkınma Endeksi veri tabanından (World Development Index), turizm gelirleri verileri ise Dünya Seyahat ve Turizm Konseyi (WTTC) veri tabanından temin edilmiştir. Kullanılan bütün veriler yıllık frekansta olup, değişen varyans ve otokorelasyon gibi istatistiksel risklerden kaçınmak ve esneklik yorumlamaları açısından da kolaylık sağlaması amacıyla analizde gelir eşitsizliğinin göstergesi olan GINI endeksi dışındaki diğer tüm değişkenlerin doğal logaritmik değerleri kullanılmıştır.

3.1. Ekonometrik Yöntem

Yatay kesit gözlemleri ve zaman serilerinin tek bir havuzda toplanması ile elde edilen panel veri yönteminin son yıllarda akademik çalışmalarda yaygın bir şekilde kullanıldığı görülmektedir. Bu bakımdan panel veri yönteminin N sayıda birim ve her bir birime karşılık T adet gözlemin analize dahil edilmesine, böylece birimler ve zamanlar arası farklılıkların bir arada incelenmesine olanak sağlaması daha güvenilir ve sağlıklı tahminlerin elde edilebilmesine olanak sağlamaktadır (Cameron & Trivedi, 2005: 695). Panel verilerin kesitler arasındaki değişimleri ve yapısal farkları izleyebilme imkânı sunması açısından yatay-kesit yöntemine göre, dönem içerisinde oluşan değişimleri birleştirerek çoklu doğrusal bağıntı düzeyini azaltması bakımından ise zaman serilerine göre önemli avantajlar sunduğu da bilinmektedir. Bunun yanında panel veri yöntemi her birime özgü özelliklerin analize dahil edilmesine olanak tanıması ile veri seti içerisindeki heterojenliğin kontrol edilmesine büyük ölçüde izin vermesi ve model tahmininde kontrol edilemeyen bireysel etkilerden kaynaklı yanlılığın minimum düzeye indirilmesinde de son derece başarılı yöntemlerden biri olarak kabul edilmektedir (Baltagi, 2008).

3.2.Ampirik Yöntem

Panel veri modellerinde t anında birimlere ait hata terimlerinin birbirinden bağımsız olması durumu yatay kesit bağımsızlığı olarak adlandırılmaktadır. Yayılma etkisi veya mekânsal özelliklerden kaynaklanan sebepler, ayrıca gözlenemeyen ortak etkiler yatay kesit bağımlılığının ortaya çıkmasının temel nedenleri arasında gösterilmektedir (Cerrato, 2002: 2). Küreselleşmenin etkisi ile uluslararası ticarette yaşanan artışlar ve sermaye hareketlerinin de hızlanması ile dünyanın herhangi bir yerinde ortaya çıkan ekonomik şok kısa sürede diğer ülkeleri de etkiler hale gelmiştir. Nitekim 2008 yılında ortaya çıkan mali krizin kısa sürede

küresel boyutlara ulaşması da bu fikri desteklemektedir. Bu sebepledir ki, analiz sonucunda birimler arasında bağımlılığın varlığının kabul edilmesi ülkelerin herhangi birinde ortaya çıkacak ekonomik şoktan diğer ülkelerin de etkileneceğini göstermektedir (Menyah et al., 2014: 389). Yatay kesit bağımsızlığı aşağıdaki şekilde tanımlanabilir:

Kov(u_{it}, u_{jt})=0 $\forall i \neq$j; i,j=1,…..N; t=1,…..T

Yatay-kesit bağımlılığının test edilmesi çalışmanın ilerleyen aşamalarında tercih edilecek test yöntemlerinin belirlenmesi açısından da önem taşımaktadır. Birimler arasında yatay kesit bağımlılığının olduğu durumlarda birim kök ve eşbütünleşme testlerinin sonuçları önemli ölçüde farklılık gösterebilecektir (Alam & Paramati, 2016). Nitekim Breusch ve Pagan (1979) da analizlerde yatay kesit bağımlılığının dikkate alınmadığı durumlarda elde edilecek sonuçların sapmalı ve tutarsız olabileceğine dikkat çekmiştir.

Yatay-kesit bağımlılığının test edilmesinde farklı yöntemler kullanılabilmektedir ki, Breusch-Pagan'ın Lagrange Çarpanı (LM) testi, Pesaran (2004) tarafından geliştirilen CD_{LM} ve Pesaran (2004)'ın CD testi bunlar arasında gösterilebilir. Bu bakımdan Berusch-Pagan (1980) LM testi panelin zaman boyutunun yatay kesit boyutundan büyük olduğu (T>N) durumlarda kullanılmakta iken, çalışmada kullanılan panelin zaman boyutu yatay kesit boyutundan küçük olduğundan aşağıdaki eşitlikte görülen (T<N) Pesaran'ın CD testinin kullanılmasına karar verilmiştir.

$$CD= \sqrt{\frac{2T}{N(N-1)}} \Sigma_{i=1}^{N-1}\Sigma_{j=i+1}^{N-N1} p_{ij}$$

Test için oluşturulan hipotezler aşağıdaki şekilde kurulmuştur:

H_0 : Yatay kesit bağımlılığı yoktur,

H_1: Yatay kesit bağımlılığı vardır.

Tablo: 1
Yatay Kesit Bağımlılığı (CD) ve Birim Kök Test Sonuçları

Değişkenler	**Gini**	**GDP**	**TO**	**TR**	**FO**
Yatay kesit bağımlılığı sonuçları	1.753*	149.125***	34.637 ***	150.252***	47.499***
CIPS (2007) Birim Kök testi sonuçları / düzey	-2.354	-2.168	-2.268	-1.996	-2.027
CIPS (2007) Birim Kök testi sonuçları / birinci fark	-2.438 ***	-2.507***	-2.275 ***	-2.221 ***	-2.259 ***

*Not: *** ve * sırasıyla %1 ve %10 anlamlılık düzeyini göstermektedir. Birim kök testi zamanı düzeyde sabitli ve trendli değerler, birinci farkta ise sadece sabitli değerler kullanılmıştır. Değişkenler için optimal gecikme uzunluğu Schwarz-Bayesian bilgi kriterine göre belirlenmiştir.*

Değişkenler arasında yatay kesit bağımlılığının varlığına ilişkin test istatistikleri Tablo 1'de sunulmuştur. Test istatistikleri incelendiğinde, kişi başına GSYH (GDPPC), ticari açıklık (TO), özel sektör kredileri (FO) ve turizm gelirleri (TR) değişkenlerine ait olasılık değerlerinin, değişkenler arasında yatay kesit bağımlılığı yoktur şeklinde kurulan H_0 hipotezini %1 anlamlılık düzeyinde, gelir eşitsizliği değişkeninde ise %10 anlamlılık düzeyinde güçlü bir şekilde reddettiği ve paneldeki ülkeler arasında yatay kesit

bağımlılığının varlığını ortaya koyduğu görülmektedir. Bu durum araştırmada yer alan ülkelerin herhangi birinde gelir eşitsizliği, büyüme, özel sektör kredileri, turizm gelirleri ve dış ticaret şokunun diğer ülkeleri de etkileyeceğini ve bunun da politikaların belirlenmesi sürecinde karar vericilerin diğer ülkelerdeki durumu da göz önünde bulundurmaları gerektiğine işaret etmektedir.

3.3. Panel Birim Kök Testi

Panel verilerin zaman boyutu da içermesi, serilerin zaman içinde durağan olup olmadıklarının test edilmesini gerektirmektedir. Durağanlığı analiz ederken paneli oluşturan yatay kesit birimleri arasında bağımlılık sonuçları önemli olup, bağımlılığın varlığı reddedilirse birinci nesil birim kök testleri, bağımlılığın varlığı durumunda ise tutarlı ve güvenilir sonuçların elde edilmesi için ikinci kuşak birim kök testlerinin uygulanması önerilmektedir. Bu bakımdan Taylor ve Sarno'nun (1998) MADF, Pesaran'ın (2007) CADF ve CIPS, Breuer et al. tarafından geliştirilen SURADF (2001) ve Carrion-i Silvestre et al.'in geliştirdiği PANKPSS (2005) testleri ikinci kuşak birim kök testlerine örnek olarak gösterilebilir.

Çalışmada kullanılan serilerde yatay kesit bağımlılığının varlığı tespit edildiğinden, ilgili serilerin durağanlığını test ederken ikinci kuşak birim kök testlerinden (2007) CADF (Cross-Sectionally Augmented Dickey Fuller) testinin kullanılması uygun görülmüştür. Pesaran tarafından geliştirilen CADF testi panelde yer alan her bir yatay kesit (ülke) için ayrı-ayrı durağanlığın test edilmesine imkân tanır.

$$\boldsymbol{\Delta y_{it} = a_i + \beta_i y_{it-1} + \varepsilon_{it}}$$

şeklinde hesaplanan CADF test istatistiklerinin aritmetik ortalamalarından yararlanarak panelin genelinin durağanlık özelliklerini gösteren CIPS test istatistiği de hesaplanabilmektedir.

$$\textbf{CIPS}=\boldsymbol{N^{-1}\sum_{t=1}^{N} CADFi}$$

Hem yatay kesit hem de zaman boyutunun büyük olduğu durumlarda kullanılabilen CIPS testinden elde edilen değerler Pesaran'ın Monte Carlo simülasyonu ile oluşturduğu kritik tablo değerleri ile karşılaştırılmakta ve istatistik değerinin tablo değerinden küçük, mutlak değer olarak ise büyük olması durumunda seri için "Birim kök vardır" şeklinde kurulan temel hipotez reddedilmektedir (Pesaran, 2007: 286-293). CIPS istatistiği aşağıdaki şekilde ifade edilmekte olup, panelin geneli için hesaplanan CIPS istatistikleri Tablo 1'de sunulmuştur.

Tablo 1'deki CIPS test istatistik değerleri incelendiğinde, gelir eşitsizliği (GINI), kişi başına gelir (GDPPC), ticari açıklık (TO), özel sektör kredileri (FO) ve turizm gelirleri (TR) değişkenlerinin sabitli ve trendli formda panelin geneli için düzey değerlerinde [I (0)] durağan olmadığı görülmektedir. Ancak değişkenlerin birinci farkları alındığında %1 anlamlılık düzeyinde durağanlaştıkları ve H_0 hipotezinin reddedildiği sonucuna ulaşılmıştır.

Bu sonuç seriler arasındaki eşbütünleşme ilişkisinin varlığının test edilmesine geçilebileceğini göstermektedir.

3.4. Eşbütünleşme Testi

Tüm değişkenlerin I (1) seviyesinde durağan oldukları tespit edildikten sonra, bu seriler arasındaki uzun dönemli ilişkinin varlığını inceleme amacıyla eşbütünleşme analizine geçilmiştir. Bu bakımdan çalışmada gelişmiş ve gelişmekte olan 50 turizm ülkesinde gelir eşitsizliği, turizm gelirleri, ticari açıklık, finansal açıklık ve kişi başı GSYH arasındaki uzun dönemli ilişki Pedroni (2000) eşbütünleşme analizi ve Westerlund eşbütünleşme analizi olmak üzere iki eşbütünleşme analiz yöntemi kullanılarak tahmin edilmeye çalışılmıştır.

Pedroni testi (1999) serilerde yatay kesit bağımlılığının olmadığı varsayımı altında yapılmakta olup, eşbütünleşme vektörünün panel boyunca farklı olmasına, kesit birimlerinde hataların heterojenliğine ve panellerde birden fazla açıklayıcı değişkenin kullanımına izin vermesi açısından diğer testlere göre avantaj sağlamaktadır. Küçük örneklemlerle de başarılı sonuçlar veren yöntem, uzun dönemli ilişkinin varlığını belirlemek için iki grupta dördü grup-içi (within) ve diğer üçü gruplar arası (between) olmak üzere toplamda yedi farklı eşbütünleşme testi ile tahmin yapmaya imkân tanımaktadır (Asteriou & Hall, 2007: 375).

Hata teriminin uzun dönem varyansını hesaplamada Newey-West tahmincisi, gecikme uzunluğunun belirlenmesinde ise Schwarz kriteri göz önünde bulundurularak, bireysel sabit ve trend varsayımı altında yapılan Pedroni testi sonucunda Tablo 2'deki değerler elde edilmiştir.

Tablo 2'den görüldüğü üzere yedi test istatistiği arasında group rho, panel rho ve panel variance istatistiklerinden başka diğer dördünün %1 seviyesinde istatistiksel olarak anlamlı çıktığı görülmektedir. Bu sonuç, değişkenler arasında eşbütünleşme yoktur şeklinde kurulan boş hipotezini (H_0) reddetmekte ve değişkenlerin uzun dönemde eşbütünleşik olduğuna işaret etmektedir.

Tablo: 2
Pedroni ve Westerlund Eşbütünleşme Testi Sonuçları

Pedroni (1999)			
Panel	***t-istatistiği***	**Grup**	***t-istatistiği***
Panel v	-1.993291	Group rho	3.495684
Panel rho	0.899374	Group PP	-8.674022**
Panel PP	-9.023435**	Group ADF	-10.09666**
Panel ADF	-11.78156**		

Westerlund (2007)	
	t-istatistiği
G_τ	**-1.480**
G_α	**-4.838**
P_τ	**-10.850****
P_α	**-4.765 ****

*Not: ** %1 istatistiksel anlamlılık düzeyinde eşbütünleşme yoktur şeklide kurulan temel hipotezin reddedildiğini göstermektedir. Westerlund testinde gecikme kriteri 3, öncü kriteri 1, bootstrap döngüsü ise 1000 olarak alınmıştır.*

Aynı şekilde seriler arasında yatay kesit bağımlılığının varlığı tespit edildiğinden, turizm gelirleri ve gelir eşitsizliğinin uzun dönemde birlikte hareket edip etmediklerinin saptanmasında yatay kesit bağımlılığını dikkate alan Westerlund'un (2007: 710-718) hata düzeltme yöntemine (ECM) dayalı eşbütünleşme analizine de çalışmada yer verilmiştir. Westerlund (2007), panellerde heterojenliği de dikkate alan ECM testinde eşbütünleşme ilişkisini tahmin etmek için dört ayrı istatistik önermiştir. Bunlardan ikisi tüm yatay kesit birimleri için eşbütünleşmenin varlığını gösteren panel istatistikleri (P_τ, P_a) diğer ikisi ise bazı birimlerde eşbütünleşmenin varlığına işaret eden grup istatistikleridir (G_τ, G_a).

Yapılan Westerlund eşbütünleşme testi sonuçlarına Tablo 2'de yer verilmiştir. Yatay kesit bağımlılığı durumunda asimptotik olasılık değerleri yerine bootstrap değerler göz önünde bulundurularak yorumlanan panel istatistikleri (P_τ, P_a) eşbütünleşmenin olmadığını gösteren H_0 hipotezinin reddine ve alternatif hipotezin kabulüne işaret etmektedir. Bununla da hem Westerlund hem de Pedroni test sonuçları, gelir eşitsizliği ve turizm gelirlerinin uzun dönemde birlikte hareket ettiklerini ortaya koymaktadır.

3.5. Eşbütünleşme Katsayılarının FMOLS ile Tahmini

Eşbütünleşme testinden sonra değişkenler arasında uzun dönem ilişkisinin nihai parametrelerini saptama amacıyla Tam Düzeltilmiş En Küçük Kareler Yönteminden (FMOLS) yararlanılmıştır. İlgili yöntem Phillips ve Hansen tarafından literatüre kazandırılmış (1990), daha sonra Pedroni tarafından (2000) geliştirilmiştir. FMOLS yöntemi, ardışık bağımlılığı ve içsellik (endojenlik) problemini göz önünde bulundurması ve daha tutarlı sonuçlar ortaya çıkarması açısından son derece başarılı yöntemlerden biri olarak kabul edilmektedir. Aşağıdaki regresyon modeline dayanan yöntemde, y_{it} bağımlı, x_{it} bağımsız değişkeni gösterirken, modelin en temel varsayımlarından biri paneli oluşturan birimler arasında herhangi bir bağımlılığın olmadığı yönündedir. Ayrıca b uzun dönem eşbütünleşme vektörünü göstermekte olup, tahmin yapılırken ilk olarak her bir yatay kesit için FMOLS tahmincileri belirlenmekte, ardından bunların ortalamaları alınarak panelin geneli için eşbütünleşme vektörü hesaplanmaktadır (Pedroni, 2000: 98-100).

$$\boldsymbol{y_{it}} = \mathbf{a}_i + \boldsymbol{bx_{it}} + \boldsymbol{\mu_{it}}$$

$$\boldsymbol{x_{it}} = \mathbf{x}_{it-1} + \boldsymbol{e_{it}}$$

FMOLS test sonuçları Tablo 3'te özetlenmiş olup, çıkan sonuçlarda turizm gelirleri ile gelir eşitsizliği arasındaki ilişkinin gelişmiş ve gelişmekte olan ülkelere göre değişiklik gösterdiği belirlenmiştir. Elde edilen sonuçlar turizm ile gelir eşitsizliği arasındaki ilişkinin hem gelişmekte olan hem de gelişmiş ülkelerde non-lineer olduğunu göstermektedir. Gelişmekte olan ülkelerde belirli bir düzeye kadar turizm gelirlerinin milli hasıla içerisindeki payı arttıkça gelir eşitsizliğini azaltmaya yardımcı olduğu görülmektedir. Ancak bu etkinin sınırlı kalacağı, belirli bir eşik düzeyine erişildikten sonra turizmin gelir eşitsizliğini daha da artıracağı ortaya çıkmıştır. Bu bakımdan gelişmekte olan ülkelerde başlangıçta turizm gelirlerindeki %10'luk artışın gelir eşitsizliğinde 0,2 puan azalışa neden olacağı, ancak zamanla bu etkinin tersine döneceği ortaya çıkmıştır. Diğer yandan gelişmiş ülkelerde bu

durumun tersine turizm gelirlerindeki artışın başlangıçta gelir eşitsizliğini artırıcı, devamında ise azaltıcı etki yaratacağı görülmektedir. Analiz sonuçları gelişmiş ülkelerde kişi başına düşen gelir ve turizm gelirlerinin, gelişmekte olan ülkelerde ise kişi başına milli gelirin gelir dağılımı üzerindeki etkisinin Kuznets'in Ters U hipotezini desteklediğini, gelişmekte olan ülkelerde ise turizm gelirlerinin gelir eşitsizliğine etkisinin uzun dönemde U şeklinde olacağını ortaya koymaktadır. Ayrıca modele dahil edilen kontrol değişkenlerinin gelir eşitsizliği üzerindeki etkileri bakımından da gelişmiş ve gelişmekte olan ülkeler arasında anlamlı bir farklılığın ortaya çıktığı görülmektedir. Bu bağlamda uzun dönemde gelişmiş ülkelerde dış ticarette, gelişmekte olan ülkelerde ise finansal gelişmişlik düzeyindeki artışın gelir dağılımı üzerindeki etkilerinin olumlu olacağı ortaya çıkmıştır.

Tablo: 3
FMOLS Tahmin Sonuçları

Bağımlı değişken: GINI	**Model-a (Gelişmekte olan ülkeler)**	**Model-b (Gelişmiş ülkeler)**
$lnTR$	-2.3971 (1.4913)*	2.326946 (1.2951)*
$lnTR^2$	0.1921 (0.1286)**	-0.2312 (0.1267)**
$lnGDPPC$	10.7399 (1.8890)***	12.8125 (1.1147)***
$lnGDPPC^2$	-0.498445 (0.1512)***	-0.9440 (0.085)***
$lnTO$	-0.1576(1.5305)	-0.0569 (0.011) ***
$lnFO$	-0.3420(0.1811) **	0.0175 (0.016)

*Not: ***, **, * sırasıyla %1, %5 ve %10 düzeyinde istatistiki anlamlılığı göstermektedir.*

3.6. Nedensellik Analizi

Panel verilerin çok sayıda gözlem barındırması iktisadi olgular arasında ortaya çıkan nedensellik ilişkilerinin daha başarılı bir şekilde belirlenmesine imkân sağlamaktadır. Bu bakımdan herhangi bir ülke açısından geçerli olacak nedensellik ilişkisinin diğer ülkeler için de geçerli olabilme ihtimalinin yüksek olduğu düşünülmektedir (Dumitrescu & Hurlin, 2012). Bundan hareketle bu çalışmada yatay kesit bağımlılığını ve heterojenliği göz önünde bulunduran, yatay kesit boyutunun zaman boyutundan daha yüksek olduğu durumlarda da kullanılabilen Dumitrescu ve Hurlin Panel Nedensellik Yöntemi kullanılarak turizm gelirleri ile gelir eşitsizliği arasındaki nedensellik ilişkisi ortaya koyulmaya çalışılmıştır. Kullanılan yöntemde H_0 hipotezinin reddedilmesi durumunda değişkenlerin yerleri değiştirilmekte böylece çift yönlü nedensellik ilişkisinin varlığı test edilebilmektedir (Lopez & Weber, 2017).

Bu yöntemde alternatif hipotez altında panelde yer alan en az bir yatay kesitte ilgili değişkenler arasında ilişkinin olduğu ifade edilmektedir. Buna karşılık temel hipotez ise paneldeki tüm birimlerde ilgili değişkenler arasında herhangi bir Granger nedensellik ilişkisinin olmadığı şeklinde kurulmuştur.

Çalışmadaki tüm değişkenler düzey değerlerinde birim kök içerdiklerinden birinci farkları alınarak teste dahil edilmiş ve test sonuçları Tablo 4'te sunulmuştur.

Tablo: 4
Dumitrescu ve Hurlin (2012) Panel Nedensellik Testi

	Z Test İstatistiği	Anlamlılık Değeri	Karar
(Gelişmiş ülkeler)	0.5011	0.6817	Turizm gelirleri ≠> Gelir eşitsizliği
	0.855	0.4642	Gelir eşitsizliği ≠> Turizm gelirleri
(Gelişmekte olan ülkeler)	2.5076	0.05	Turizm gelirleri => Gelir eşitsizliği
	0.2900	0.832	Gelir eşitsizliği ≠> Turizm gelirleri

Tablo 4'te yer alan Dumitrescu-Hurlin panel nedensellik testi sonuçları, gelişmiş ülkelerde turizm gelirlerinden gelir eşitsizliğine doğru istatistiksel olarak anlamlı bir Granger nedenselliği olduğunu ortaya çıkarmıştır. Diğer yandan test sonuçları gelişmiş ülkelerde turizmin gelir eşitsizliğinin Granger nedenselliği olmadığı yönündeki boş hipotezi reddetmediğini ortaya koymakta, böylece bu ülkelerde turizm gelirlerinin gelir eşitsizliğini etkilemediğini göstermektedir.

4. Sonuç

Hizmet sektörleri arasında son yıllarda en hızlı büyümeye imza atan turizm sektörünün doğrudan ve dolaylı ekonomik getirilerin yanı sıra çevresel, sosyal ve kültürel faydalara sahip olmasından dolayı günümüzde birçok ülkede büyüme ve kalkınmayı sağlayacak temel araçlardan biri haline gelmiştir (Bahar & Kozak, 2013: 5). Ülkelerin ekonomilerinin çeşitlendirilmesine katkı sağlamanın dışında çarpan etkisi ile birlikte farklı sektörlerde de ekonomik açıdan canlanma yaratabildiğinden birçok ülkede sektörün geliştirilmesine yönelik uygulamalara ve politikalara ağırlık verilmeye başlandığı görülmektedir. Özellikle gelişmekte olan ülkelerde büyüme hedeflerini gerçekleştirmek amacıyla döviz ihtiyacını karşılama ve dış ödemeler dengesi açığını kapatma, emek yoğun sektör olma özelliği bakımından istihdamı destekleme, gümrük, vize ücretleri ile turistik mal ve hizmetlerden alınan vergiler ile kamuya gelir kaynağı olma, tarım, sanayi ve diğer ekonomik sektörleri destekleme konuları bu sektörün öneminin her geçen gün daha fazla arttığını göstermektedir (Unur, 2004: 114).

Bu çalışmada milli gelir içinde turizm payının en yüksek olduğu ve ilgili verilerine ulaşılabilen gelişmiş ve gelişmekte olan 50 ülkede turizm gelirlerinin gelir eşitsizliği üzerindeki etkisi 1995-2018 dönemi için yıllık veriler kullanılarak incelenmiştir. Araştırma sonuçları uzun dönemde turizm gelirleri ve gelir eşitsizliğinin birlikte hareket ettiğini, ancak katsayılar bakımından yorumlandığında bu etkinin gelişmiş ve gelişmekte olan ülkeler arasında anlamlı şekilde farklılaştığını ortaya çıkarmaktadır. Bu bakımdan özellikle gelişmekte olan ülkeler açısından elde edilen bulgular literatür incelendiğinde Sharpley ve Naidoo (2010) ve Kinyondo ve Pelizzo (2015) 'nun çalışmaları ile benzerlik göstermekte olup, kısa dönemli getirilere rağmen uzun dönemde turizm gelirlerindeki artış ile birlikte gelir dağılımında adaleti sağlamadaki rolünün sınırlı düzeyde kalacağını göstermektedir. Araştırma sonuçları incelendiğinde gelişmiş ülkelerde turizm gelirlerinin ilk olarak sermaye sahipleri gibi gruplar üzerinde olumlu etkiler yaratırken, zaman içinde ortaya çıkacak pozitif yayılma (spillover) etkisi sonucunda toplumdaki az gelirli grupların da bundan faydalanacağını, bunun da gelir adaleti sağlamaya yardımcı olacağını göstermektedir.

Gelişmekte olan ülkelerde ise bunun aksine bir durum gözlenmekte olup, turizmden elde edilen ilk kazanımların özellikle istihdama sağladığı katkılar ile düşük gelirli ve az vasıflı grupların istihdama kazandırılmasına yardımcı olması açısından gelir eşitsizliğinde azalmaya neden olacağı düşünülmektedir. Ancak bu durum zaman içinde çokuluslu şirketlerin gelişmekte olan pazarlara daha fazla girmeye başlaması, finansal kaynaklara erişmede güçlük yaşayan küçük işletmelerin pazar kaybı yaşaması ile birlikte gelir dağılımında dengesizliklere yol açacaktır. Elde edilen sonuçlar, özellikle gelişmekte olan ülkelerde ekonomi içindeki payı arttıkça turizmden elde edilen faydaların tüm gelir grupları arasında eşit ve adaletli bir şekilde dağılmadığını ve bazı grupların turizm gelirlerindeki artıştan daha fazla faydalanmaya başlayacağı şeklinde de yorumlanabilir.

Son yıllarda özellikle yüksek sezonda turizmde her şey dahil sistemin yaygınlaşması ile birlikte yerel halk ile işletmeler arasındaki etkileşimin oldukça azaldığı gözlenmektedir. Özellikle turistlerin tatil boyunca ihtiyaç duyduğu ürün ve hizmetlerin konaklama tesisleri içerisinde tedarik edilmesine imkân veren "anklav" turlar turistlerin destinasyondaki harcamalarının önemli düzeyde azalmasına neden olmuştur (Duffy et al., 2016: 2). Bu durum yerel halkın turizmin sosyoekonomik etkilerinden daha az faydalanmasına ve sektörden beklenen faydaları elde edememesi ile sonuçlanmaktadır. Buradan yola çıkarak araştırma sonuçları ile uyumlu olacak şekilde turizmin bölgeler arası kalkınmışlık farkını azaltmasını ya da refah düzeyini iyileştirmesini beklemek doğru olmayacaktır. Özellikle gelişmekte olan ülkelerde turizmin ekonomik faydalarının toplumdaki farklı gruplar arasında eşit şekilde paylaşılmaması konusu gelecekte sosyal problemlerin artmasına neden olmakta ve aynı zamanda turizmin sürdürülebilir gelişimini de engelleyebilmektedir (Dixey, 2005). Bu sebeple, kaynaklara erişmede, sosyal ve kültürel hayata katılmada güçlük çeken grupların turizm sektöründe ve sektöre kaynak sağlayan diğer sektörlerde istihdamının sağlanması, özel sektör ile bu gruplar arasında güçlü bağlantıların oluşturulması ve turizmin geliştirilmesine yönelik projelere öncelikle yoksul kesimlerin katılımının sağlanması özellikle sektörün ekonomik, sosyal ve kültürel yararlarından sadece belirli grupların değil, tüm ilgili kesimlerin daha fazla faydalanmasına yardımcı olacağı düşünülmektedir. Buna ek olarak, turizm işletmelerinin kurulum aşamasında az gelirli girişimcilere gerekli desteklerin sağlanması, kaynak ve pazara erişimde karşılaşılabilecek engellerin azaltılmasına destek olunması ve son yıllarda ekonomik kalkınma açısından etkin araçlardan biri olarak kabul edilen destek kredisi uygulamalarının turizmde yaygınlaştırılması gelir eşitsizliği konusunda sektörü desteklemek için yapılabilecek öneriler arasındadır. Ayrıca tüm gelir gruplarını kapsayacak şekilde turizm yapısının geliştirilmesi için yapılacak olan plan ve projeler ile turizm gelirlerinin gruplar arası daha adil bir şekilde paylaşılacağına yardımcı olacağı ve böylece daha sürdürülebilir bir büyümeye hizmet edeceği düşünülmektedir.

Kaynaklar

Alam, M.S. & S.R. Paramati (2016), "The Impact of Tourism on Income Inequality in Developing Economies: Does Kuznets Curve Hypothesis Exist?", *Annals of Tourism Research*, 61, 111-126.

Asteriou, D. & S.G. Hall (2007), *Applied Econometrics* (Rev. ed.), New York: Palgrave Macmillan.

Bahar, O. & M. Kozak (2007), "Advancing Destination Competitiveness Research: Comparison Between Tourists and Service Providers", *Journal of Travel & Tourism Marketing*, 22(2), 61-71.

Bahmani-Oskooee, M. & R. Zhang (2015), "On The Impact of Financial Development on Income Distribution: Time-Series Evidence", *Applied Economics*, 47(12), 1248-1271.

Baltagi, B.H. (2008), "Forecasting with Panel Data", *Journal of Forecasting*, 27(2), 153-173.

Bartik, T.J. (1991), *Who Benefits From State And Local Economic Development Policies?*, Upjohn Press.

Başarır, Ç. & Y.N. Çakır (2015), "Causal Interactions Between CO2 Emissions, Financial Development, Energy and Tourism", *Asian Economic and Financial Review*, 5(11), 1227-1238.

Breuer, J.B. et al. (2001), "Misleading Inferences from Panel Unit-Root Tests with an Illustration from Purchasing Power Parity", *Review of International Economics*, 9(3), 482-493.

Breusch, T.S. & A.R. Pagan (1979), "A Simple Test for Heteroscedasticity and Random Coefficient Variation", *Econometrica: Journal of the Econometric Society*, 1287-1294.

Cameron, A.C. & P.K. Trivedi (2005), *Microeconometrics: Methods and Applications*, Cambridge Univ Pr.

Carrion-i-Silvestre, J. et al. (2005), "Breaking The Panels: An Application to the GDP Per Capita", *The Econometrics Journal*, 8(2), 159-175.

Cerrato, M. & N. Sarantis (2002), *The Cross Sectional Dependence Puzzle*, London Guildhall University.

Çakır, M. & A. Bostan (2000), "Turizm Sektörünün Ekonominin Diğer Sektörleri ile Bağlantılarının Girdi-Çıktı Analizi ile Değerlendirilmesi", *Anatolia: Turizm Araştırmaları Dergisi*, 11, 35-44.

Çalışkan, Ş. (2010), "Türkiye'de Gelir Eşitsizliği ve Yoksulluk", *In Journal of Social Policy Conferences*, 59, 89-132.

Çelik, A. (2004), "AB Ülkeleri ve Türkiye'de Gelir Eşitsizliği: Piyasa Dağılımı-Yeniden Dağılım", *Çalışma ve Toplum*, 3, 53-91.

Dabla-Norris, M.E. et al. (2015), *Causes and Consequences of Income Inequality: A Global Perspective*, International Monetary Fund.

Dixey, L. (2005), *Inventory and Analysis of Community Based Tourism in Zambia*, Production, Finance and Technology (PROFIT), Private Sector Development Programme, USAID.

Duffy, L.N. et al. (2016), "Tourism Development in the Dominican Republic: An Examination of the Economic Impact to Coastal Households", *Tourism and Hospitality Research*, 16(1), 35-49.

Dumitrescu, E.I. & C. Hurlin (2012), "Testing for Granger Non-Causality in Heterogeneous Panels", *Economic Modelling*, 29(4), 1450-1460.

Galor, O. & J. Zeira (1993), "Income Distribution and Macroeconomics", *The Review of Economic Studies*, 60(1), 35-52.

Goldberg, P.K. & N. Pavcnik (2004), "*Trade, Inequality, and Poverty: What Do We Know? Evidence From Recent Trade Liberalization Episodes in Developing Countries*", National Bureau of Economic Research, 1-50.

Greenwood, J. & B. Jovanovic (1990), "Financial Development, Growth, and the Distribution of Income", *Journal of Political Economy*, 98(5-1), 1076-1107.

Hacker, J.S. & P. Pierson (2010), *Winner-Take-All Politics: How Washington Made the Rich Richer--and Turned its Back on the Middle Class*, Simon and Schuster.

Hamori, S. & Y. Hashiguchi (2012), "The Effect of Financial Deepening on Inequality: Some International Evidence", *Journal of Asian Economics*, 23(4), 353-359.

Harrison, D. (2008), "Pro-Poor Tourism: A Critique", *Third World Quarterly*, 29(5), 851-868.

Holloway, J.C. & N. Taylor (2006), *The Business of Tourism*, Pearson Education.

Kelly, J.R. & V.J. Freysinger (2000), *21st Century Leisure: Current Issues*, Allyn & Bacon.

Kinyondo, A. & R. Pelizzo (2015), "Tourism, Development and Inequality: The Case of Tanzania", *Poverty & Public Policy*, 7(1), 64-79.

Kozak, M. & O. Bahar (2013), *Turizm Ekonomisi*, Detay Yayıncılık, Ankara.

Kozak, N. vd. (2001), *Genel Turizm İlkeler-Kavramlar*, Detay Yayıncılık, Ankara.

Kulendran, N. & K. Wilson (2000), "Is There a Relationship Between International Trade and International Travel?", *Applied Economics*, 32(8), 1001-1009.

Kumar, R.R. (2014), "Exploring the role of Technology, Tourism and Financial Development: An Empirical Study of Vietnam", *Quality & Quantity*, 48(5), 2881-2898.

Law, S.H. et al. (2014), "Financial Development and Income Inequality at Different Levels of Institutional Quality", *Emerging Markets Finance and Trade*, 50(1), 21-33.

Lee, S. & J.T. O'Leary (2008), "Determinants of Income Inequality in US Nonmetropolitan Tourism-and Recreation-Dependent Communities", *Journal of Travel Research*, 46(4), 456-468.

Li, H. et al. (1998), "Explaining International and Intertemporal Variations in Income Distribution", *The Economic Journal*, 108, 26-43.

Li, H. et al. (2016), "Tourism and Regional Income Inequality: Evidence from China", *Annals of Tourism Research*, 58, 81-99.

Lopez, L. & S. Weber (2017), "Testing for Granger Causality in Panel Data", *The Stata Journal*, 17(4), 972-984.

Menyah, K. et al. (2014), "Financial Development, Trade Openness and Economic Growth in African Countries: New Insights From A Panel Causality Approach", *Economic Modelling*, 37, 386-394.

Naceur, S.B. & R. Zhang (2016), "Financial Development, Inequality and Poverty: Some International Evidence", *International Review of Economics & Finance*, 61, 1-16.

Oviedo-Garcia, M.A. et al. (2019), "Does Sun-and-Sea All-Inclusive Tourism Contribute to Poverty Alleviation and/or Income Inequality Reduction? The Case of the Dominican Republic", *Journal of Travel Research*, 58(6), 995-1013.

Öztaş, K. (2002), *Turizm Ekonomisi: Genel Turizm Bilgileri*, Nobel Yayın Dağıtım, Ankara.

Parasız, İ. (2010), *İktisada Giriş*, Ezgi Kitabevi, İstanbul.

Pedroni, P. (2000), "Fully Modified OLS for Heterogeneous Cointegrated Panels", *Advances in Econometrics*, 15, 93-130.

Pesaran, M.H. (2004), *General Diagnostic Tests for Cross Section Dependence in Panels*.

Pesaran, M.H. (2007), "A Simple Panel Unit Root Test in the Presence of Cross-Section Dependence", *Journal of Applied Econometrics*, 22(2), 265-312.

Phillips, P.C. & B.E. Hansen (1990), Statistical Inference in Instrumental Variables Regression with I (1) Processes", *The Review of Economic Studies*, 57(1), 99-125.

Proença, S. & E. Soukiazis (2008), "Tourism as an Economic Growth Factor: A Case Study for Southern European Countries", *Tourism Economics*, 14(4), 791-806.

Scheyvens, R. (2001), "Poverty Tourism", *Development Bulletin*, 55, 18-21.

Shahbaz, M. et al. (2019), "Tourism-Induced Financial Development in Malaysia: New Evidence from the Tourism Development Index", *Tourism Economics*, 25(5), 757-778.

Sharpley, R. & P. Naidoo (2010), "Tourism and Poverty Reduction: The Case of Mauritius", *Tourism and Hospitality Planning & Development*, 7(2), 145-162.

Şahin, D. (2017), "Akdeniz Ülkelerinde Turizm ve Ekonomik Büyüme İlişkisinin Analizi", *Bingöl Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (BUSBED)*, 7(14), 115-124.

Şentürk, H.S. (2002), "Türk Gelir Vergi Sisteminde Gelir Kavramı", *Yüksek Lisans Tezi*, Karadeniz Teknik Üniversitesi Sosyal Bilimler Enstitüsü, Trabzon.

Travel and Council (2018), <https://wttc.org/>, 15.02.2020.

Unur, K. (2004), "Turizmin Ekonomik Etkilerinin Ölçülmesi", *Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 6(4), 114-142.

Wilkinson, R.G. & K.E. Pickett (2009), "Income Inequality and Social Dysfunction", *Annual Review of Sociology*, 35, 493-511.

World Tourism Organization (2020), <https://www.unwto.org/>, 07.02.2020.

Zengin, B. (2010), "Turizm Sektörünün Türkiye Ekonomisine Reel ve Moneter Etkileri", *Akademik İncelemeler Dergisi*, 5(1), 102-126.

Ek: 1
Seçilen 50 Ülkenin Ortalama İstatistikleri (1995-2018)

		GELİR EŞİTSİZLİĞİ (GİNİ)	KİŞİ BAŞI GSYH	DIŞ TİCARET / GSYH	TURİZM GELİRLERİ / GSYH	ÖZEL SK. KREDİLERİ / GSYH
1	Arnavutluk	29.12	2905.78	68.06	6.48	22.41
2	Arjantin	46.42	8942.55	30.67	4.05	15.98
3	Ermenistan	33.13	2268.13	73.42	2.36	22.64
4	Avusturya	30.04	39537.47	92.39	7.33	90.56
5	Brezilya	55.71	7220.97	24.01	3.33	45.28
6	Şili	50.4	9657.89	63.84	3.04	85.41
7	Kosta Rika	48.42	6742.43	78.04	5.32	38.72
8	Fildişi Sahili	41.41	1082.75	79.88	3.07	17.76
9	Hırvatistan	32.27	10369.45	81.94	8.94	51.66
10	Güney Kıbrıs	31.84	23472.38	122.30	7.39	184.47
11	Dominik	48.34	4498.20	64.94	5.17	24.53
12	Mısır	31.09	2007.85	47.18	6.54	39.99
13	El Salvador	46.42	2726.35	70.69	3.28	47.61
14	Estonya	34.49	12001.46	142.91	3.91	60.50
15	Fransa	31.93	34340.35	54.95	3.85	86.91
16	Gürcistan	38.28	2362.12	83.01	5.29	25.77
17	Almanya	30.42	36877.26	70.64	3.81	97.75
18	Yunanistan	34.19	19919.61	54.22	5.98	80.04
19	Honduras	54.50	1590.33	117.54	4.94	43.38
20	İzlanda	27.58	46025.50	81.79	4.28	125.03
21	Hindistan	32.71	993.76	38.70	4.13	40.02
22	İtalya	34.67	29946.73	51.37	4.68	75.31
23	Ürdün	34.92	2788.36	117.55	5.73	74.00
24	Letonya	34.08	9462.47	100.55	3.12	81.33
25	Madagaskar	41.97	349.23	60.56	3.29	10.19
26	Malezya	45.8	7093.30	176.02	5.87	121.74
27	Malta	28.63	17847.56	261.24	4.39	100.72
28	Meksika	50.35	8159.15	58.93	7.95	22.33
29	Moğolistan	32.80	2004.30	110.25	3.79	31.52
30	Fas	40.12	2278.75	69.14	7.57	61.29
31	Nikaragua	47.29	1393.11	80.78	3.88	26.16
32	Norveç	27.4	66831	70.18	3.61	106.34
33	Pakistan	33.21	870.83	32.12	2.83	22.25
34	Peru	48.82	4008.57	43.86	3.45	28.37
35	Filipin	46.62	1791.57	83.58	6.97	38.84
36	Portekiz	37.91	18045.72	69.39	3.89	126.94
37	Ruanda	47.64	452.06	38.97	3.35	13.68
38	Slovenya	25.06	18490.78	122.26	3.58	37.32
39	Güney Afrika	61.72	5088.41	56.33	2.67	136.22
40	İspanya	33.83	24475.27	56.40	4.96	125.17
41	Sri Lanka	38.25	2073.16	65.81	3.56	33.46
42	Tacikistan	31.44	530.98	112.35	2.98	15.79
43	Tayland	40.33	4012.63	120.69	7.17	124.04
44	Tunus	38.66	3250.81	94	8.77	66.72
45	Türkiye	40.87	7687.11	48.28	3.92	36.24
46	Uganda	41.56	448.08	42.17	2.70	10.73
47	Birleşik Krallık	34.70	37168	54.53	3.91	138.38
48	Vietnam	36.01	1098.30	138.72	5.42	72.32
49	Zambiya	50.38	988.12	67.42	2.81	10.38
50	Avustralya	34.04	39891.22	41.07	3.17	87.74

Sosyoekonomi

2022, Vol. 30(51), 319-352

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.16
Date Submitted: 24.02.2021
Date Revised: 22.10.2021
Date Accepted: 17.01.2022

Dış Ticaretin Serbestleşmesi ve İşsizlik Arasındaki İlişkinin Heterojen Firma Modeli Çerçevesinde Değerlendirilmesi[1]

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Evaluation of the Relationship Between Foreign Trade Liberalization and Unemployment within the Framework of the Heterogeneous Firm Model[2]

Abstract

This study investigates how foreign trade liberalization affects unemployment by using the Melitz model (2003), which is one of the intra-industry trade models expressing trade between countries with similar technologies, preferences, and cost structures that make up a large part of international trade. The Melitz model (2003) is remodelled by efficiency wage theory to endogenize unemployment. The model is solved by numerical method. It is assumed that market expansion and competition in the market occur simultaneously. The effect of liberalization on unemployment varies depending on which of two factors, market expansion or competition, dominates the other. According to the results, unemployment decreases when market expansion dominates the competition, while unemployment increases if competition dominates market expansion. In addition, it has been observed that there is an increase in the total amount of production, productivity, and unemployment insurance when market expansion is dominant. Also, it has been observed that there is a decrease in the total amount of production, productivity level, and unemployment insurance when competition in the market is dominant.

Keywords : General Equilibrium Model, Efficiency Wage Theory, Heterogeneous Firms Model, Unemployment.

JEL Classification Codes : F10, F11, F12, F13, F16.

Öz

Bu çalışmanın amacı, uluslararası ticaretin büyük bir kısmını oluşturan benzer teknoloji, tercih ve maliyet yapılarına sahip ülkeler arasındaki ticareti ifade eden endüstri içi ticaret modellerinden olan Melitz (2003) modelini, işsizlik varsayımı altında ele alarak dış ticaret liberalizasyonun işsizliği nasıl etkilediğini araştırmaktır. Bu çalışmada analiz edilen model etkin ücreti varsayımı ile yeniden modellenmiş ve işsizlik içsel olarak hesaplanmıştır. Model nümerik yöntemle çözülmüştür. Modelde piyasa genişlemesinin ve piyasadaki rekabetin eş anlı olarak ortaya çıktığı varsayılmıştır. Elde edilen sonuçlara göre piyasa genişlemesinin rekabeti domine etmesi durumunda işsizlik azalırken, rekabetin piyasa genişlemesini domine etmesi halinde işsizlik artmaktadır. Ayrıca yapılan analiz sonucunda

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[1] *Bu çalışma Prof.Dr. Türkmen GÖKSEL danışmanlığında Zeynep ÇİRKİN tarafından hazırlanan ve Ankara Üniversitesi Sosyal Bilimler Enstitüsü İktisat Anabilim Dalında 2020 yılında savunulan "Yeni Nesil Dış Ticaret Modelleri ve İşsizlik Üzerine İncelemeler" başlıklı doktora tezinden türetilmiştir.*

[2] *This article is reproduced from the PhD dissertation titled "Reviews on New Generation Foreign Trade Models and Unemployment" that was prepared by Zeynep ÇİRKİN, supervised by Prof.Dr. Türkmen GÖKSEL and presented to the Department of Economics, Institute of Social Sciences, Ankara University in 2020.*

piyasa genişlemesinin baskın olması durumunda toplam üretim miktarında, verimlilikte ve işsizlik sigortasında da artış olduğu gözlemlenmiştir. Piyasadaki rekabetin baskın olması durumunda ise toplam üretim miktarında, verimlilik seviyesinde ve işsizlik sigortasında azalma meydana geldiği görülmüştür.

Anahtar Sözcükler : Genel Denge Modeli, Etkin Ücret Teorisi, Heterojen Firma Modeli, İşsizlik.

1. Giriş

İşsizlik neredeyse dünya üzerindeki bütün ekonomilerde önemli bir problemdir. Buna rağmen dış ticaret modellerinin oluşturduğu literatür incelendiğinde dış ticaret modelleri üzerinde çalışan ekonomistlerin modellerini işsizlikten soyutlayarak kurguladığı gözlemlenmektedir (Dutt et al., 2009: 32). Janiak (2007) çalışmasıyla bu soyutlama geleneğinin dışına çıkmıştır ve bu çalışmanın yürütülmesinde yazarlara ilham vermiştir. Janiak (2007) yaptığı çalışmada işgücü piyasasında aksaklıklar olduğunu varsayarak Melitz (2003) modelini genişletmiştir ve işsizliğin liberalleşmeden nasıl etkilendiğini incelemiştir. İşsizlik seviyesi üzerine karşılaştırmalı istatistikler yapan Janiak işgücü piyasasında arama aksaklığı olması durumunda ticari serbestleşmenin denge işsizlik seviyesinin yükselmesine sebep olacağını belirtmiştir (Janiak, 2007: 3). Janiak (2007) çalışmasını ekonomideki işsizliği açıklamak için kullanılan modellerden biri olan arama aksaklığı modeliyle genişletirken bu çalışmada işsizliği açıklamak için etkin ücret varsayımı kullanılmıştır. Janiak (2007)'de Melitz (2003) modelinin en önemli varsayımlarından biri olan yeniden tahsis mekanizmasının aksadığı varsayılmıştır. Sonuç olarak Janiak'ın (2007) genişletmiş olduğu Melitz (2003) modelinde işgücü piyasasında aksaklık olması durumunda ticari liberalizasyon toplam refahın ve denge işsizlik oranının artmasına sebep olacaktır (Janiak, 2007: 3).

Bu makale çalışmasında tam istihdam varsayımı ile kurgulanmış olan heterojen firma modeli olarak da bilinen Melitz (2003) modeli etkin ücret varsayımı gereği eksik istihdam altında yeniden kurgulanmıştır. Bu sayede dış ticaretin ülke ekonomisi üzerinde yarattığı pazar genişlemesi etkisi ve piyasa rekabeti etkisi analiz edilmiştir. Dış ticaretin işgücü piyasası üzerindeki etkilerini görmek sağlıklı politika önerileri yapabilmek açısından oldukça önemlidir. Diğer taraftan dış ticaretin işgücü piyasası üzerindeki etkileri kısa ve uzun dönemde farklılık göstermektedir. Bu da işsizlik kavramının modellerden çıkarılması durumunda meydana gelen değişikliklerin doğru yorumlanamamasına neden olabilir. Bu nedenle dış ticaret modellerinde işsizlik faktörünün modele dâhil edilmesi modellerin daha sağlıklı sonuçlar ortaya çıkarmasını mümkün kılar. Korumacılık yanlılarına göre ticaret bariyerlerinin düşmesi eğer ülke yeterince güçlü değilse ülke ekonomisine zarar verecektir ve yerel firmalar pazar payını kaybedecek ya da endüstriden çekilecektir. Serbestleşme yanlılarına göre ise ticaret bariyerlerinin düşmesi pazar genişlemesine ve tüketim çeşitliliğine sebep olarak ülke refahını artıracaktır. Yukarıda bahsedilen iki farklı görüş kurulan teorik modelde iki farklı değişken ile modele dâhil edilmiştir. Korumacılık yanlılarının görüşü artan piyasa rekabetini temsil eden değişkenle (δ) modele dâhil edilirken, serbestleşme yanlılarının görüşü ise pazar genişlemesini (β) temsil eden değişken ile modele

dâhil edilmiştir. Bu çalışma ile literatüre yapılan en önemli katkı, ticaretin hem olumlu yanı olan piyasa genişlemesi hem de olumsuz yanı olan piyasadaki rekabetin aynı matematiksel model içinde ele alınıp eş zamanlı olarak değerlendirilmiş olmasıdır. Buna göre ticaret bariyerinin (τ) değişmesiyle piyasa genişlemesi ($\beta(\tau)$) ve piyasadaki rekabet ($\delta(\tau)$) de değiştirecektir. Dolayısıyla dış ticaretin etkilerinin hem işsizliği artırabileceği hem de azaltabileceği aynı matematiksel model aracılığı ile gösterilmiştir. Pazar genişlemesinin ve piyasa rekabetinin işsizlik ve diğer değişkenler üzerindeki etkileri seçilen fonksiyonel forma ve ticaret bariyerine bağlı olarak değişiklik göstermektedir. Ticaret bariyerinde meydana gelen değişim modelleri doğrudan etkilerken piyasa genişlemesinde ve piyasa rekabetinde ticaret bariyerinde meydana gelen değişime bağlı olarak ortaya çıkan etki modeli dolaylı olarak etkilemektedir. Bu çalışmada esas modelin aksine işgücü piyasasındaki yeniden tahsis süreci mekanizmasının kusursuz şekilde işlemediği varsayılmıştır. Bu nedenle ticaretin etkilerinin orijinal modelin sonuçlarından farklı olması beklenmektedir. Bu farklı sonuçları görmemize imkân vermesi bu makale çalışmasının literatüre yapmış olduğu katkılardan biridir.

Bu çalışma ile literatüre yapılan bir diğer katkı ticaretin hem olumlu yanı olan pazar genişlemesi hem de olumsuz yanı olan piyasadaki artan rekabet aynı matematiksel model içinde ele alınmış olmasıdır. Bu çalışmaya ilişkin vurgulanması gereken önemli noktalardan bir diğeri de yeniden tahsis sürecinde yaşanan aksaklıkların göz önünde bulundurulmuş olmasıdır. Yeniden tahsis mekanizması yeni nesil ticaret modellerinde kusursuz bir şekilde işlerken bu çalışmada çözümü yapılan modelde yeniden tahsis sürecinde aksaklıklar bulunmaktadır. Bu çalışmada işgücü piyasasındaki yeniden tahsis süreci mekanizmasının kusursuz şekilde işlemediği varsayılmıştır. Bu nedenle ticaretin etkilerinin Melitz'in (2003) çalışmasındaki sonuçlardan farklı olması beklenmektedir. Bu farklı sonuçları görmemize imkân vermesi bu çalışmanın literatüre yapmış olduğu katkılardan biridir.

Model lineer olmayan denklem sistemi tarafından karakterize edilmektedir ve nümerik analiz yöntemleri ile çözülmüştür. Model sonuçları da bu doğrultuda yorumlanmıştır. Modelde piyasa genişlemesi ve piyasadaki rekabet ticaret bariyerinin birer fonksiyonu olarak kabul edilmiştir. Ticaret bariyerinde meydana gelen değişimin eş zamanlı olarak piyasa genişlemesini ve piyasa rekabetini de değiştirdiği varsayılmıştır. Bu faktörlerin fonksiyonel formlarına ve ticaret bariyerine göre bazen piyasa genişlemesi piyasadaki rekabeti baskılayarak işsizliğin azalmasına sebep olurken parametre değerine bağlı olarak belli bir noktadan sonra da piyasadaki rekabet piyasa genişlemesini baskılayarak işsizliğin artmasına sebep olmaktadır.

Makale çalışması altı bölümden oluşmaktadır. İlk bölümde çalışmayla ilgili genel bilgilere yer verilmiştir. İkinci bölümde kavramsal çerçeveye değinilmiştir. Üçüncü bölümde dış ticaret ve işsizlik arasındaki ilişkiyi ele alan teorik çalışmalar incelenmiştir. Dördüncü bölümde kullanılan model ayrıntılı olarak ele alınmış ve model çözümleri yapılmıştır. Beşinci bölümde model sonuçlarına ve modele ilişkin grafiklere yer verilirken son bölüm olan altıncı bölümde ise kısa bir sonuç değerlendirilmesi yapılmıştır.

2. Kavramsal Çerçeve

Uluslararası ticaretteki teorik araştırmalar, toplam ticaretin sebeplerini ve sonuçlarını anlamada firma düzeyinde kararların önemini gitgide artan bir şekilde vurgulamaktadır. Firmalar üzerinde mikro düzeyde veri kullanan ampirik bulgular ile genişleyen teorik literatür, dar tanımlanmış endüstrilerde bile verimlilik, büyüklük ve diğer özelliklerde heterojenliği vurgulamaktadır. Çünkü ne eski ne de yeni ticaret teorileri, ihracatçı firmaların sadece çok azının üretken şirketlerden oluşmasını açıklayamamaktadır. Yani yeni ticaret teorileri ve geleneksel ticaret teorileri aynı endüstride faaliyet gösteren A firmasının ihracat yapmasını ama B firmasının ihracat yapmamasını teorik olarak açıklamamaktadır. Fakat firmalar arasındaki heterojenlik varsayımı bu duruma açıklık getirmektedir.

İhracatçılar ihracatçı olmayanlara göre ihracat pazarlarına girmeden önce bile daha büyük ve daha üretkendir. Ticaretin serbestleştirilmesi, ortalama endüstri verimlilik seviyesini artırarak düşük verimlilikli firmaların sektörden dışlanmasına sebep olur. Ayrıca yüksek verimliliğe sahip firmaların da büyümesine ve ihracat pazarına girmesine vesile olarak endüstri içi kaynakların yeniden tahsis edilmesine yol açar. İhracat pazarına girişin yarattığı firma ölçeğindeki artış, teknolojinin benimsenmesi ve yenilikçiliğinde tamamlayıcı etkisiyle üretkenliği artırır. Melitz tipi modellerdeki bakış açısıyla düşünürsek liberalleşmenin verimliliği artırdığını söylemek mümkündür; çünkü bu modellerde kaynak tahsisinde herhangi bir aksaklık olmadığı varsayılmıştır. Firma heterojenliğini içeren ticaret teorileri, ticaret durumunda ortaya çıkan değişimleri yorumlama noktasındaki anlayışımızı geliştirmiştir. Örneğin, ticaretin serbestleşmesinden potansiyel kazananlar ve kaybedenlerin belirlenmesi ve ticaretle ilgili politikalardaki değişiklikler için fiili öngörüler oluşturulması noktasında bu modeller politika yapıcılara oldukça yardımcı olmaktadır. Son olarak, normatif bir bakış açısıyla, bir ekonominin ticarete ayak uydurmak için tolere ettiği değişkenlerin ve durumların tümünü anlamak, ticaretten elde edilen genel refah kazanımlarını değerlendirmek için önemlidir (Melitz & Redding, 2012: 2).

Melitz'in (2003) çalışması yeni bir ticaret kazancı olan verimliliğin önemine vurgu yapmaktadır. Melitz (2003) modelinde verimliğin belirleyicisi olan batık maliyet modeli (sunk cost model) dış ticareti anlamlandırmak, dış ticarette firmaların davranışlarını açıklamak adına bir başka teorik gelişme olarak karşımıza çıkmaktadır (Pişkin, 2017: 18). Melitz (2003) yaptığı çalışmada ihracat yapacak olan firmaların çeşitli maliyetlere (gümrük tarifeleri, ulaştırma maliyetleri, reklam ve tanıtım giderleri vb. gibi batık maliyetlere) katlandığını ve bu maliyetler doğrultusunda ihracat yapıp yapmama kararı aldığını belirtmiştir (Melitz, 2003: 1706-1707).

Batık maliyet modelinin öncü çalışmaları ise Baldwin (1990) tarafından yapılmıştır. Baldwin ve Krugman (1989) yaptıkları çalışmada döviz kuru şoklarının dış ticaretin sürdürülebilirliği üzerindeki etkisini incelemişlerdir. Bu çalışmayı yaparken ise bir firmanın piyasaya girmesi için batık maliyete (pazarlama, reklam ve dağıtım maliyetleri) katlanması gerektiğini ve piyasada kalmaya devam etmesi için de batık maliyetten daha düşük olan ama her dönem ödenmesi gereken piyasada kalma maliyeti olduğunu ifade etmiştir. Firmalar için

piyasaya giriş piyasada kalmaktan daha maliyetlidir. Piyasaya girerken katlanılan batık maliyet piyasada meydana gelen döviz kuru vb. şoklar sebebiyle piyasadan çıkmayı zorlaştırmaktadır (Baldwin & Krugman, 1989: 636). Ayrıca piyasaya giriş maliyetinin yüksek olması ticari ilişkilerin sürdürülebilirliği üzerinde negatif etkiye sahiptir (Fugazza & Molina, 2009: 15). Melitz (2003) farklı üretkenlik düzeyindeki firmaların var olduğu varsayımı altında Pareto dağılımını kullanarak sadece verimliliği yüksek birkaç firmanın ihracatla uğraştığı bir model oluşturmuştur. Melitz'in (2003) modelinin altında yatan fikir, yalnızca verimliliği yüksek firmaların ihracat işlemleri için gereken yüksek sabit maliyetleri karşılamak için yeterli kâr elde edebilecek olmalarıdır. Firma verimliliğinin Pareto dağılıma sahip olduğu varsayımı güçlü olmakla birlikte, bu varsayım firma heterojenliği ve ticaret literatürde standart bir varsayımdır (bkz. Axtell, 2001; Saez, 2001). Pareto dağılımının işçilerin ücretleri ve firma boyutları göz önünde bulundurulduğunda makul bir varsayım olduğu görülmektedir (Helpman et al., 2010: 2). Pareto dağılımda etkinin büyük kısmı, onu etkileyen faktörlerin yalnızca küçük bir oranı tarafından belirlenmektedir. Bu durum heterojen firmaların verimliliklerinin Pareto dağılıma sahip olduğu varsayımı ile uyumludur.

Melitz (2003) çalışmasında, bir endüstrideki kaynakların şirketler arasında yeniden dağılım sürecinde katalizör görevi gören uluslararası ticaretin rolünü analiz etmek için heterojen firmalarla dinamik bir endüstri modeli geliştirmiştir. Model ticaretin daha verimli firmayı ihracata nasıl yönlendirdiğini ve aynı zamanda verimliliği en düşük olan firmaların endüstriden çıkmaya nasıl zorladığını göstermektedir. Hem verimliliği düşük olan firmaların endüstriden çıkışları hem de daha üretken firmaların kazandığı ek ihracat gelirleri, verimsiz firmaların pazar paylarının ve dolayısıyla kârlarının verimli firmalara yeniden aktarılmasına neden olarak toplam verimlilik artışına katkıda bulunur (Melitz, 2003: 1695). Pazar payının ve dolayısıyla kârların daha üretken firmalara yeniden tahsisi ticaret yapılması durumunda bazı firmaların büyüme fırsatlarını nasıl artırdığını anlatırken aynı zamanda sektördeki diğer firmaların çöküşüne veya "küçülmesine" sebep olduğu gibi popüler mitler ile de uyumludur (Melitz, 2003: 1696).

Yapılan bazı çalışmalar (Amerika için Bernard & Jensen, 1999; Tayvan için Aw et al. 2000; Kolombiya, Meksika ve Fas için Clerides et al. 1998) verimli firmaların dış pazarlara girme konusunda verimsiz firmalara göre daha çok inisiyatif kullandığını söylerken Aw et al. (2000) verimsiz firmaların piyasa dışına itildiğini öne sürmüştür. Melitz (2003) çalışmasında bu ampirik kalıpların firma heterojenliğini içeren bir ticaret modeline başvurmadan aydınlatılamayacağını ileri sürmüştür. Melitz (2003) firma heterojenliğini Krugman'ın (1980) homojen firmalardan oluşan ticaret modeline dâhil ederken tekelci rekabet ve artan getiriler altında güçlü bir verimlilik heterojenliğine vurgu yapmaktadır (Melitz, 2003: 1696).

Ticaret yapmanın herhangi bir ek maliyeti olmaması durumunda her bir ülkede dünya piyasalarındaki herhangi bir ürünü kopyalama imkânı bulunabilir. Böyle bir durumda ticaretin kapalı ekonomide yarattığı refah artışı açık bir ekonomide de gözlenebilir. Ülke ekonomisinin büyüklüğünün firma çıktı seviyeleri üzerinde bir etkisi yoktur. Ticaret maliyetinin olmaması durumunda tıpkı kapalı bir ekonomide olduğu gibi her ülkedeki firma

aynı çıktı seviyesinde üretim yapar ve aynı kârı elde eder. Ticaret yapmanın önünde herhangi bir maliyetin olmaması durumunda, firma heterojenliğinin varlığı ticaret üzerinde etkili değildir. Bu yaklaşım, Krugman (1980) tarafından tarif edilen temsili firmaların birebir aynı olduğu varsayımıyla modellenmiştir denilebilir (Melitz, 2003: 1706).

Firmaların ihracat yapma motivasyonun altında ürün başına düşen maliyetin yanında ihracat miktarından etkilenmeyen sabit (batık) maliyetlerin de etkisi bulunmaktadır. İhracat durumu ve verimlilik arasında firma düzeyindeki güçlü ampirik korelasyonlara göre, ihracat pazarına giriş kararı, firma, üretkenliği hakkında bilgi edindikten sonra gerçekleşir ve ihracat pazarlarındaki belirsizlik de büyük ölçüde verimlilikten bağımsızdır. Bu nedenle, ihracat yapmak isteyen bir firmanın ilk olarak sabit yatırım yapması gerektiği varsayılmıştır. Sadelik ve analiz kolaylığı sağlaması açısından da ihracat pazarlarıyla ilgili herhangi bir belirsizlik olmadığını varsaymıştır. Birim başına ticaret maliyetleri ise buz dağı taşıma maliyeti ile modellenmiştir. Buz dağı taşıma maliyetine göre 1 birim mal ihraç etmek için $\tau>1$ olmak üzere τ kadar mal ihraç edilir. $(\tau-1)$ kadarlık mal ise taşıma maliyeti olarak adlandırılır. Firma piyasaya girmeden önce batık maliyet öder ve batık maliyetine bağlı olarak bir verimlilik seviyesi elde eder. Verimlilik seviyesine bağlı olarak ise firmanın endüstrideki konumu belirlenir. Son olarak bu modelde dünyanın özdeş ülkelerden oluştuğu varsayılmıştır (Melitz, 2003: 1707).

Melitz'in (2003) makalesi de ihracat pazarına giriş maliyetlerinin varlığının hem firmaların ticaretten nasıl etkilendikleri noktasında hem de farklı firmalar üzerinde farklı etkiler yaratma noktasında belirleyici olduğuna değinilmiştir. Bu farklı firmalar arasında ortaya çıkan yeniden tahsisler, birbirinin aynısı olan temsili firma modeli ile açıklanamaz. Melitz (2003) çalışmanın en önemli noktalarından biri ticaret yapma maliyetinin olmasının ticaretin refahı artıran özellikleri üzerinde etkili olmadığının gösterilmesi ve ülkenin ticaret yapma zorunluluğu ile karşı karşıya kalmasının yeniden tahsis mekanizması ile refah artışına yol açmasıdır (Melitz, 2003: 1718).

Ayrıca Melitz'in (2003) çalışması ihracat maliyetlerinin, ticaretten elde edilen kazançların firmalar arasındaki dağılımını nasıl bu derece büyük bir şekilde değiştirdiğini de göstermektedir. Aslında, firmaların sadece daha verimli olan kısmı, ticaretin pazar payında ve kârlarda yarattığı değişimden faydalanmaktadır. Daha az verimli firmalar pazar payını ve kârlarını kaybetme riskiyle karşı karşıya kalır. Ticaret yapılması durumunda ortaya çıkan riskler ve maliyet verimli firmaları daha az zorlamaktadır. Daha verimli firmalara yönelik ticaret kaynaklı yeniden tahsisler, toplam verimliliği artırarak firmaların neden bireysel olarak verimliliğini artırmak zorunda kalmadığını açıklamaktadır. Bu model esas olarak bir endüstrideki ticaret kaynaklı yeniden tahsislerle ilişkili uzun vadeli faydalara vurgu yapsa da bu kaynakların yeniden tahsisi bazı kısa vadeli maliyetleri de beraberinde getirmektedir. Bu nedenle, yeni bir rejime geçişle ilgili konuları ele alacak politikalar tasarlamak için ticaret politikasının şirketler arası yeniden tahsisler üzerindeki etkisini tahmin edebilecek bir modele sahip olmak analiz noktasında oldukça önemlidir. Uygulanacak politikalar ile, geçiş maliyetlerini hafifletirken yeniden tahsis sürecini engellememeye özen gösterilmelidir. Melitz'in (2003) çalışmasında kullandığı model aynı

zamanda yeniden tahsis sürecini engelleyen veya faktör piyasalarının esnekliğine başka bir şekilde müdahale eden politikaların bir ülkenin ticaretten tam fayda elde etmesini geciktirebileceğini veya engelleyebileceğini açıkça göstermektedir (Melitz, 2003: 1719).

Melitz (2003) tipi modellerde yeniden tahsis mekanizması kusursuz bir şekilde işlerken bu makalede çözümü yapılan modelde yeniden tahsis sürecinde aksaklıklar bulunmakta ve yeniden tahsis mekanizması kusursuz şekilde işlememektedir.

Sektörlerdeki üretimi baz alarak yapılan ampirik çalışmalar çeşitli performans ölçümlerinde (en önemlisi, büyüklük ve verimlilik) büyük miktarda heterojenlik olduğunu göstermiştir. Sektördeki bu heterojenlik, teorik ve ampirik ticaret modelleri için önemlidir. Ticaret veya ticaretin serbestleştirilmesi heterojen üreticiler arasında yeniden tahsislere neden olmaktadır. En küçük olan veya en az üretim yapan firmalar sektörden çıkmaya zorlanırken pazar payları da daha büyük ve daha verimli firmalar arasında yeniden tahsis edilir. Bu yeniden tahsisler, üretkenlik ve ticaretten gelen refah kazanımları için yeni bir kanal oluşturmaktadır (Melitz, 2008: 1).

Bernard et al. (2003) Amerika'da faaliyet gösteren üretim tesislerinin 1992 yılına ait verileriyle yaptıkları araştırmada ortalamadan %167 oranında daha büyük olan bir firmanın verimlilik seviyesinin %75 daha fazla olduğu gözlemlemişlerdir. Bu çalışma ile büyük firmalar ve küçük firmalar arasında ciddi farklılıkların olduğu ve bunun firmalar arasındaki heterojenlikten kaynaklandığı tespit edilmiştir (Bernard et al., 2003). Bu durum performans çıktıları üzerinde büyük fark yaratmaktadır. Bu farklılık ayrıca diğer temel tesis özelliklerindeki farklılıklara da yansımaktadır. Firma performansındaki bu büyük farklılıklar, uluslararası işlemlerde (örneğin, ihracatçıları dış tedarikçilerden ithal etmek veya yabancı iştiraklere yatırım yapmak gibi) bulunma noktasında da önemlidir. Uluslararası temasları olan firmalar olmayanlara göre daha büyük ve daha üretkendir (Melitz, 2008: 1).

Örneğin, Bernard et al. (2007) yaptıkları çalışmada ihracat yapan firmaların yapmayan firmalara göre %119 daha fazla istihdamı %148 daha fazla mal sevkiyatı bulunmaktadır. Aynı zamanda işçilerin %26 daha fazla katma değer yarattığı gözlemlenmiştir. Son olarak, ihracatçılar ihracatçı olmayanlara göre sırasıyla %12 ve %11 oranında daha fazla sermaye ve beceri yoğunluğuna sahiptir. (Bernard et al., 2007: 110). Bu alanda yapılan çalışmalardan elde edilen sonuçlar açıkça göstermiştir ki başlangıçta daha başarılı firmaların inovasyon (veya "daha yüksek" teknoloji kullanımı) ve ihracat durumuna ilişkin benzer kararlar verdikleri gözlenmiştir. Başka bir deyişle, en az başarılı olan firmalar ezici bir şekilde, hiçbir faaliyette bulunma eğiliminde değilken verimliliği yüksek firmalar da dış pazara açılma eğilimdedir. Mikro düzeydeki verileri kullanan son dönemdeki ampirik literatürün bir diğer bölümü de ticaretin ortaya çıkması durumunda (çoğunlukla ticaret maliyetleri zamanla azaldığı için) verimlilik değiştiği için ihracat durumu ile verimlilik arasındaki bağlantıyı ele almıştır (Melitz, 2008: 2). Helpman et al. (2004) Melitz (2003) modelini, ihracatçı firmaların verimliliğinin yurt dışına doğrudan yabancı yatırımlar yapan firmalardan daha düşük olduğu bir model geliştirmişlerdir. Helpman et al. (2004) çalışmasındaki bir diğer önemli nokta ise sadece verimliliği yüksek firmaların yüksek sabit

maliyetleri karşılayabildiği varsayımının yapılmasıdır. Bu vb. çalışmalar sonucunda ortaya çıkan "Melitz tipi modeller", özellikle firma düzeyinde verilere dayanan ampirik araştırmaların teorik temellerini de oluşturmuşlardır. Böyle bir durumda, ticaretin serbestleştirilmesi, ihracatçılar ile aynı sektörde rekabet eden ihracatçı olmayanlar arasında kaynak (emek sermaye, toprak, teknoloji vb.) tahsisine neden olmaktadır (Melitz, 2008: 3). Makalede ele alınan model yeniden tahsisin işgücü piyasasında aksadığı varsayılarak kurgulanmıştır.

3. Uluslararası Ticaret ve İşsizlik Arsındaki İlişkiyi İnceleyen Teorik Modeller

Küreselleşme sürecinin de etkisiyle artan dış ticaretin istihdam yaratıcı ve/veya yok edici etkisi geleneksel ticaret teorilerinin dayandığı bu basitleştirici varsayımlar nedeniyle irdelenememektedir. Uluslararası ticaretin iş kaybına yol açtığına inanan ekonomistler serbestleşmenin rekabet yanlısı tarafına vurgu yapmaktadır. Rekabet yanlısı etki uluslararası ticaretin önemli etkilerinden biri olmasına rağmen uluslararası ticaret literatürünün çoğu, işsizlik oranı ile ticarete bağlı rekabet yanlısı etki arasındaki ilişkiyi göz ardı etmektedir. Son on yılda, tarife değişikliklerine bağlı olarak ortaya çıkan refah etkilerinin ölçülmesi, uluslararası ticaret ekonomistleri arasında oldukça zorlayıcı çalışma alanlarından biri olmuştur. Günümüze kadar geliştirilen pek çok kantitatif model tarife değişikliklerinden kaynaklanan refah etkilerini değerlendirirken işgücü piyasasındaki aksaklıkları dikkate almayıp tam istihdam varsayımında bulunmuştur (Lee, 2018: 3). Fakat son yıllarda geliştirilen modeller ticaretin refah üzerindeki etkilerini işgücü piyasası aksaklıklarını da dikkate alarak daha gerçekçi bir perspektiften ele almıştır. Aşağıda işgücü piyasası aksaklıklarını dikkate alarak ticaretin işsizlik üzerindeki etkisine ele alan çalışmalardan bazılarına yer verilmiştir.

Bu alandaki ilk çalışma 1974 yılında Brecher tarafından yapılmıştır. Brecher (1974) çalışmasında Hecskscher-Ohlin modelini kullandığı küçük dışa açık bir ekonomi ve asgari ücret varsayımı yapmıştır. Brecher'e (1974) göre işsizliğin olmasının nedeni dışsal olarak belirlenen asgari ücretin tam istihdam için aşılması gereken asıl ücret düzeyinin üstünde olmasıdır (Brecher, 1974: 98). Çalışmaya göre ülke sermaye yoğun mallar ihraç ediyorsa ve uzmanlaşma süreci tamamlanmamışsa istihdam ve refah otarki (ticaret yapılmayan durum) durumunda oluşacak seviyenin altında olabilir. Böyle bir durumda ticareti engelleyen tarife uygulamaları ülkedeki istihdamı ve refahı artırabilir (Brecher, 1974: 115).

Matusz (1986) yaptığı çalışmada birbirinden farklı ama yakından ilişkili iki önemli konuyu ele almıştır. Birincisi işgücü piyasasında zımni sözleşmeler söz konusu olduğunda teknolojik belirsizliğin uluslararası ticaret üzerindeki etkisi ikincisi ise uluslararası ticaretin işsizlik üzerindeki etkisidir. Çalışmada serbest ticaretin işsizliği iki kanaldan değiştirebileceği gösterilmiştir. Birincisi, serbest ticarette meydana gelen artış ya da ticaret şartlarındaki bir değişiklik, yüksek istihdam güvenliği ile karakterize edilen sektörler ile düşük istihdam güvenliği ile karakterize edilen sektörler arasında işgücünde uzun vadeli değişimlere neden olabilir. Eğer emek hareketliliği yüksek işsizlik sergileyen sektörlerin lehine ise toplam işsizlik oranı artacaktır; aksi takdirde azalacaktır (Matusz, 1986: 320).

Bentivogli ve Pagano (1999) tarafından yapılan araştırmada 1960-1990 arasında çift haneli büyüme rakamları ile dikkat çeken "Asya Kaplanları" diye nitelenen dört ülke Singapur, Hong Kong, Güney Kore ve Tayvan ile yapılan ticaretin Almanya, Fransa, İtalya ve Birleşik Krallıktaki işgücü piyasaları üzerindeki etkisi incelenmiştir. Gelişmiş ülkelerin gelişmekte olan ülkelerden yapmış olduğu imalat sektörü ithalatı gelişmiş ülkelerde kötüleşen işgücü piyasasının nedenlerinden biri olarak kabul edilmiştir. Bu görüşü desteklemek için öne sürülen argüman, işgücü maliyetlerinin düşük olduğu ülkelerle yapılan ticaretin sanayileşmiş ülkelerdeki firmalar üzerinde dışlama etkisi yaratacağı yönündedir. Bu durumda sanayileşmiş ülkelerdeki bazı firmalar üretimlerini yurt dışına taşıyacaklardır. Bu yeni ticaret modelinin bir başka sonucu da sanayileşmiş ülkelerdeki vasıfsız işçilerin göreli ücretlerinde bir azalma meydana gelmesi veya ücretlerin esnek olmaması durumunda vasıfsız işgücünün göreli istihdamında bir azalma meydana gelmesidir. Yapılan analiz ile Avrupa işgücü piyasasının sorunlarının bu dört ülkeden yapılan imalat sektöründeki artışla açıklanamayacağı sonucuna ulaşılmıştır. İşgücü piyasasındaki çalışılacak pozisyonlarda meydana gelen azalmanın ("job destruction" "işgücü yıkımı") Asya Kaplanları ile yapılan ticaretten bağımsız gibi görünmekle beraber bu ekonomiler ile yapılan ticaretin yeni pozisyon yaratma üzerindeki etkisi ile ilgili kesin bilgilere ulaşılamamıştır (Bentivogli & Pagano, 1999: 165). Modelden elde edilen en çarpıcı sonuç sektöre özgü özellikler, kişinin en son çalıştığı sektör, cinsiyet, eğitim vb. kişisel özelliklerin etkisinin ticaretin yarattığı etkiden çok daha güçlü olmasıdır (Bentivogli & Pagano, 1999: 182).

Cote 2007'de Kanada için yaptığı çalışmada firma düzeyinde vergi oranı verilerini kullanmıştır. 1988-1994 yılları arasındaki verilere göre tarife değişiklikleri ve imalat sektöründeki istihdam arasındaki bağlantı verimlilik ve kaldıraç özelliklerine (işletme varlıklarının yüzde kaçının borç ile finanse edildiğini gösteren oran) göre değişiklik göstermektedir. Sonuçlar, yerel tarifelerdeki azalmaların istihdam üzerindeki etkisinin küçük olduğunu ancak verimliliği düşük olan firmalar üzerinde yarattığı etkinin daha büyük olduğunu göstermektedir. Örneğin, 1988'de ortalama verimliliğe sahip bir firma yurt içi tarife değişikliklerine istihdamını %11,3 oranında azaltarak cevap verirken, daha düşük verimliliğe sahip bir firma %20,8 azaltmaya gitmek durumunda kalmıştır. Bu sonuçlar, yüksek üretkenliğe ve daha iyi finansal koşullara sahip firmaların ticaretin serbestleşmesinin getirdiği zorluklarla yüzleşmek noktasında daha iyi konumlandığını göstermektedir (Cote, 2007: 843). Yapılan bu çalışmada uzun vadede, genellikle serbest ticaretten elde edilen dinamik kazanımların en azından rekabetçi endüstrilerdeki iş kayıplarını telafi ettiği fikri üzerinde durulmaktadır çünkü daha ucuz malların ithalatı herkesi zenginleştirir, tüketicilere daha az para ile daha çok tüketim yapma imkânı verir ve yerel verimliliği artırır (Cote, 2007: 846). Bu nedenle serbest ticaret kaynakların, karşılaştırmalı dezavantajlı olan sektörlerden karşılaştırmalı üstünlüğü olan sektörlere tahsis edilmesi aracılığı ile güçlü bir kaldıraç rolü görüyormuş gibi davranır. Ticari serbestleşmenin uzmanlaşma, ticaret yaratma ve verimlilik kazanımlarına sebep olması ve bu kazanımların nihayetinde, karşılaştırmalı üstünlüğe sahip sektörde artan ekonomik faaliyet ve iş fırsatlarına dönüşmesi beklenmektedir (Cote, 2007: 846). Cote'nin (2007) çalışmasına göre verimlilik bir firmada değişen tarifeler sonucunda istihdamda meydana gelecek değişiklikleri etkileyen önemli bir faktördür. Dolayısıyla

başlangıçtaki verimlilik seviyeleri yüksek olan firmalar, tarifelerde ortaya çıkan olumsuz şoklara daha iyi göğüs germekte ve yarattığı istihdam olanaklarından yararlanacak şekilde pozisyon almaktadırlar. Verimliliği düşük olan firmalar olumsuz tarife şoklarına karşı daha savunmasızdır.

Son yıllarda yapılan bazı ampirik çalışmalar ise daha az verimli firmaların değişen yerel tarifelere diğer firmalardan daha duyarlı olduğunu göstermiştir. Bunlar arasında ticaretin serbestleştirilmesinin düşük verimliliği olan firmaların endüstriden çıkış oranını artırdığı sonucuna varan Baldwin ve Gu (2003)'nun çalışması da yer almaktadır. Baldwin ve Gu (2003) yaptıkları çalışmada bir üretim tesisinin verimliliği ile ihracat pazarlarına katılımı arasındaki ilişkiyi incelemiştir. Çalışmadan elde edilen sonuçlara göre daha verimli tesislerin ihracat pazarlarına girdiği gözlemlenmiştir. İhracat yapmayanlar arasında verimliliği yüksek olanlar ve verimliliği son zamanlarda hızla büyüyenler ihracat pazarlarına açılmaktadır. Verimliliği düşük olanlar ise ihracat pazarlarına açılmamayı tercih etmektedir (Baldwin & Gu, 2003: 654). Aynı zamanda ihracat pazarına giriş yapan firmaların verimliliğinde artış olduğu görülmüştür. İşçi verimliliğinde de ihracat pazarına girmeden önceki durumla karşılaştırıldığında artış olduğu gözlemlenmiştir (Baldwin & Gu, 2003: 655).

Egger ve Kreickemeier (2009) yaptıkları çalışmada ticaretin serbestleşmesinin firma heterojenliği ve işgücü piyasaları üzerindeki etkisini incelemiştir. Bu çalışmada firmaların heterojen olduğu ve işçilerin adil ücret ile çalıştıkları bir genel denge modeli kurulmuştur. Egger ve Kreickemeier (2009) işçiler tarafından kabul gören ücret seviyesinin firma verimliliğine bağlı olduğu bu modelde küreselleşmenin kârın belirleyicileri, gönülsüz işsizlik ve grup içindeki ücret eşitsizlikleri üzerindeki etkilerine odaklanmışlardır. Egger ve Kreickemeier (2009) firma performansının işçiler için önemli olduğu bir model geliştirmişlerdir; çünkü işçinin alacağı ücret seviyesinin belirleyicisi firma performansıdır. İşgücü piyasasında eksik rekabet vardır. Firma heterojenliği ve işgücü piyasası aksaklıkları arasında kurulan bu ilişki politika yapıcılar ve kamuoyu için önem arz eden uluslararası rekabetin yurt içi işgücü piyasaları üzerindeki etkisini analiz etme imkânı sunar. Kapalı ekonomi modelinde ortalama verimliliğin azalması toplam çıktıyı, ortalama kârı ve istihdamı olumsuz etkilemektedir. Ortalama kârın, gönülsüz işsizliğin ve ücret eşitsizliğinin aynı anda yükseldiği tespit edilmiştir (Egger & Kreickemeier, 2009: 188). İhracatın sabit maliyetinin olması durumunda verimliliği yüksek firmalar ihracat yaparken verimliliği düşük firmalar sektörden dışlanmaktadır. Firmaların verimlilik dolayısıyla maruz kaldıkları seçilim sürecinin ardından ortalama verimlilik artmaktadır. Seçilim süreci dolayısıyla üretime devam edebilmiş firmaların ortalama verimliliği artar ve ticaretten kazanç sağlanır. Diğer taraftan ticaretin serbestleşmesinden sonra yeniden tahsis sürecinin layıkıyla işlememesi hem ücret eşitsizliğinin hem de işsizlik oranının artmasına sebep olur. Küreselleşmenin bir sonucu olarak bir tarafta artan kârlar dururken diğer tarafta artan işsizlik dikkat çekmektedir (Egger & Kreickemeier, 2009: 189). Modelde aynı zamanda işçilerin kârdan pay aldığı varsayılmaktadır. Bu durum işçilerin adil ücret tercihlerinin belirleyicisi olup bu varsayım aracılığı ile ticaretin bir sonucu olarak artış gösteren ücret eşitsizliği durumu da açıklanmaktadır. Bu varsayımlar grup içi ücret eşitsizliği ve işsizliğin aynı anda

belirlendiği teorik bir çerçeve oluşturulmasına aracılık eder. Uluslararası ticaretin serbestleşmesi ve artan entegrasyon süreci de firma verimlilik dağılımını etkileyen önemli bir faktördür. Faaliyet gösteren firmaların verimlilik dağılımı ise işgücü piyasası sonuçları üzerinde etkilidir (Egger & Kreickemeier, 2009: 212).

Hung ve Peng (2019) yaptıkları çalışmada işgücü piyasası aksaklıkları, dolaşımda serbest sermayenin varlığı ve firma heterojenliği durumunda ticaretin serbestleşmesinin işsizlik üzerindeki etkilerini incelemişlerdir. Ticaret literatüründe işsizliğin yeterince üzerinde çalışılan bir konu olmadığını düşünen Hung ve Peng (2019) ticaret ve işsizlik ilişkisini dolaşımdaki serbest sermaye üzerinden kurdukları iki farklı senaryo üzerinden ele almıştır. Bunlardan birincisi arama aksaklıkları mekanizmasının olduğu durum iken ikincisi adil ücret sistemidir (Hung & Peng, 2019: 27). İlk senaryoda daha az nüfusa sahip ülke eğer yüksek arama teknolojisi ile donatılmış ise beklenen ücretin daha yüksek olacağı kanıtlanmıştır. Ayrıca arama teknolojisi serbest ticaretin yapılması durumunda beklenen ücretin küçük ülkede daha yüksek seviyede ortaya çıkmasına sebep olur. Arama teknolojisinde yaşanan gelişme beklenen ücreti artırır; ancak istihdam da artar ve bu durumda işçinin aldığı nominal ücret zarar görür. Ticari serbestleşme düzeyi yükseldikçe beklenen ücret önce artış gösterir daha sonra ise azalır. Ancak arama teknolojisini ele aldığımızda ticaretin serbestleşmesi durumunda beklenen ücret düşmeyebilir. Her iki senaryoda da serbest ticaretin artması durumunda işsizlik artmaktadır (Hung & Peng, 2019: 28).

4. Metodoloji

Melitz (2003) modelinde olduğu gibi firmaların heterojen olduğu yani farklı verimlilik seviyelerine sahip olduğu varsayılmıştır. Orijinal modelden[3] farklı olarak bu modelde firmaların kullandığı üretim fonksiyonu $q_{ij} = \phi_{ij}\Phi^{w}(l_{ij} - f_{ij})$ şeklindedir. Firmanın sabit maliyeti emek cinsindendir ve f ile gösterilmektedir. Aynı zamanda firmanın emek cinsinden batık maliyeti vardır ve batık maliyet f_e ile gösterilmektedir. Firma verimliliklerinin Pareto dağılıma sahip olduğu varsayılmıştır. Buna göre ev sahibi ekonomide gerçekleştirilen ihracat az sayıdaki fakat yüksek verimliliğe sahip güçlü firmalar tarafından yapılmaktadır. Melitz (2003) yaptığı çalışmada kullanıcıya kontrol kolaylığı sağlaması nedeniyle verimliliğin Pareto dağılıma sahip olduğu varsayımını yapmıştır ve yapılan teorik çalışmalarda Pareto dağılım varsayımı kullanılmaya devam etmiştir (Amand & Pelgrin, 2016: 2). Modelde fayda fonksiyonunun CES tipi formunda olduğu ve piyasadaki ücret düzeyinin etkin ücret teorisine göre belirlendiği, iki simetrik ülke olduğu ve sonsuz sayıda mal olduğu varsayımları yapılmıştır. İşsizlerin tüketim için ihtiyaç duydukları gelir, çalışanlardan toplanan vergilerin işçilere işsizlik sigortası altında eşit olarak dağıtılması ile elde edilmektedir. Model çözümü iki aşamada gerçekleşmektedir. Öncelikle tam istihdam durumunda denge ücreti tespit edilecek daha sonra bu ücret seviyesi veri olarak alınıp asıl

[3] *Orijinal modelde kullanılan üretim fonksiyonu* $q_{ij} = \Phi_{ij}(l_{ij} - f_{ij})$ *şeklindedir.*

modelin çözümüne geçilecektir. Model lineer olmayan denklem sisteminden oluşmaktadır ve nümerik olarak analiz edilmiştir.

4.1. Model

Bu model Melitz (2003) modeli temel alınarak geliştirilmiş olan alternatif bir modeldir. Bu modelde kullandığımız işçi verimliliği denklemi aşağıda (1) numaralı denklem ile ifade edilmiştir. Dış ticaretin işsizlik üzerindeki etkisi ile ilgili birbirine zıt iki görüşün olduğuna daha önce değinmiştik. Korumacılık yanlısı olanlara göre ticaret yapılan ülkede eğer düşük üretim maliyetleri söz konusu ise ve herhangi bir engelle karşılaşmadan ev sahibi ülkeye (domestic country) girebiliyorsa bu durumda yerli üretici piyasa dışına itilebilir ya da yerli firmalar pazar payını kaybedebilir. Bu görüş rekabet faktörü (δ) dediğimiz değişkenle ifade edilmiştir. Serbestleşme yanlıları ise serbest ticaretin ihracat pazarını genişleteceği dolayısıyla yerli mala olan dış talebin artacağını ve daha fazla iş imkânı olacağını savunmaktadır. Bu görüş pazar genişlemesi (β) adını verdiğimiz değişkenle ifade edilmiştir. Rekabet faktörü ve pazar genişlemesi ticaret bariyerinin (τ) bir fonksiyonudur. Rekabet faktörünün ticaret bariyerine göre birinci türevi negatiftir ($\delta'(\tau)<0$). Bu ilişki ticaret maliyeti arttıkça rekabet edilecek firma sayının azalması ya da ticaret maliyeti azaldıkça rekabet edilecek firma sayısının artması anlamına gelmektedir. Özetle liberalizasyonda meydana gelen artış piyasadaki rekabetin artmasına sebep olmaktadır. Pazar genişlemesinin ticaret bariyerine göre birinci türevi negatiftir ($\beta'(\tau)<0$). Bu ilişki ticaret bariyeri arttıkça pazar genişlemesinin azalması ya da ticaret bariyeri azaldıkça pazar genişlemesinin artması anlamına gelmektedir. Özetle liberalizasyonda meydana gelen artış pazar genişlemesinin artmasına sebep olmaktadır. Aşağıda bu modelde nümerik çözümleme yapılırken β ve δ için kullanılan fonksiyonel formlar gösterilmektedir.

$$\beta = \tau^{-\alpha}, \delta = \tau^{-2(1-\alpha)}$$

$$\Phi^w = (w_i(1-t_i) - \overline{w}_i \frac{\beta}{\delta})^{\forall} \quad (1)$$

Φ^w: İşçinin verimlilik fonksiyonunu göstermektedir ve işçi verimliliği ücret seviyesinin bir fonksiyonudur.

w_i: i ülkesindeki nominal ücreti göstermektedir.

$\overline{w}_i$: i ülkesinde piyasayı temizleyen denge ücret düzeyini yani işsizliğin olmadığı durumdaki ücret düzeyini göstermektedir.

t_i: i ülkesinde tüketicinin ücret geliri üzerinden alınan gelir vergisi oranını göstermektedir.

τ: Ticaret bariyerini göstermektedir.

$\beta(\tau)$:Ticaret bariyerinin bir fonksiyonu olan pazar genişlemesini göstermektedir.

$\delta(\tau)$: Ticaret bariyerinin bir fonksiyonu olan artan rekabet unsurunu göstermektedir.

$\beta'(\tau) < 0$: Ticaret bariyerinde (τ) meydana gelen azalış pazar genişlemesine sebep olmaktadır.

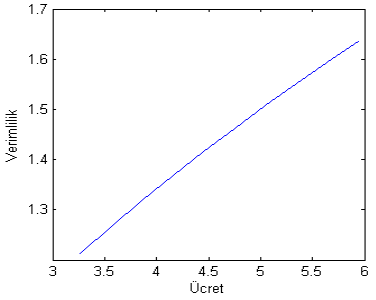
$\delta'(\tau) < 0$: Ticaret bariyerinde (τ) meydana gelen azalış rekabetin artmasına sebep olmaktadır.

$0 < t < 1$: Vergi oranı 0 ile 1 arasındadır.

$\bar{w}_i < w_i$: Piyasadaki işsizliği yok eden denge ücret düzeyi, piyasa ücretinden daha küçüktür.

Bu çalışmada bu iki farklı etkinin (β ve δ) işsizlik ve modeldeki diğer değişkenler (vergi, fiyat seviyeleri, firma sayısı, tüketim miktarı, işsizlik sigortası, verimlilik, ücret) üzerindeki etkisi incelenecektir. Etkinlik ücreti varsayımı gereği ücretlerde meydana gelen bir artış işçi verimliliğinin de artmasına sebep olmalıdır. (1) numaralı denklemden elde edilen ücret ve verimlilik arasındaki ilişki Şekil 1'de gösterilmiştir. Grafik incelendiğinde ücrette meydana gelen artışın işçi verimliliğinin artmasına sebep olduğu görülmektedir. Bu ilişki model geliştirilirken kullanılan işçi verimliliği denkleminin etkin ücret varsayımını doğruladığını göstermektedir.

Şekil: 1
Ücret ve İşçi Verimliliği Arasındaki İlişki



4.1.1. Tüketici Problemi

Aşağıda yer alan (2) numaralı denklem ile hanehalkı fayda fonksiyonu gösterilmektedir. Tüketicinin fayda fonksiyonu CES tipi (Constant Elasticity of Substitution) yani sabit ikame esnekliğine sahip fonksiyon formundadır. CES fonksiyonu Dixit-Stiglitz'in monopolistik rekabet modeline uyarlanmıştır. Bu fayda fonksiyonu tüketicilerin çeşitlilikten fayda sağladığını göstermektedir. CES tipi fayda fonksiyonuna göre tüketici bütçe kısıtı dâhilinde tüm mallardan epsilon kadar dahi olsa tüketmek isteyecektir. İki ülkeli model kurulduğu için fayda fonksiyonu $i = 1$ ve $i = 2$ için toplam şeklinde ifade edilmiştir.

$$\underset{q_{ij}(z)}{Max} \left(\sum_{i=1}^{2} \int_{z\in\Omega} q_{ij\,(z)}^{\frac{\sigma-1}{\sigma}} dz\right)^{\frac{\sigma}{\sigma-1}} \quad (2)$$

$q_{ij}(z)$: j ülkesindeki hanehalklarının yani tüketicilerin i ülkesinin ürettiği z malına olan toplam talebinin göstermektedir. Başka bir ifade ile i ülkesinin j ülkesine ihraç ettiği z malı miktarını göstermektedir.

$q_{jj}(z)$: j ülkesindeki hanehalklarının yerli mala olan toplam talebini göstermektedir.

σ: İkame esnekliğini göstermektedir.

Tüketici problemi kısıtı (3) numaralı eşitlik ile gösterilmektedir.

$$\sum_{i=1}^{2} \int_{z\in\Omega} p_{ij}(z) q_{ij}(z) dz = \left(L_j - U_j\right)\left(1 - t_j\right) w_j + U_j \theta_j \quad (3)$$

Denklemin sol tarafındaki ifade $\left[\sum_{j=1}^{2} \int_{z\in\Omega} p_{ij(z)} q_{ij(z)} dz\right]$ j ülkesindeki toplam nüfusun tüm tüketim mallarına yaptığı harcamayı göstermektedir. Eşitliğin sağındaki ifade ise $\left[\left(L_j - U_j\right)\left(1 - t_j\right) w_j + U_j \theta_j\right]$ toplam nüfusun sahip olduğu geliri göstermektedir.

p_{ij}: i ülkesinden j ülkesine ihraç edilen malın fiyatını göstermektedir.

$L_{j:}$: j ülkesinin toplam nüfusunu göstermektedir.

U_j: j ülkesindeki işsiz kişi sayısını göstermektedir.

θ_j: j ülkesindeki işsiz kişilere ödenen işsizlik sigortasını göstermektedir.

Tanım: $P_j^{1-\sigma} = \sum_{j=1}^{2} \int_{z\in\Omega} p_{ij(z)}^{1-\sigma} \mathrm{dz}$

P_j: j ülkesindeki fiyat endeksini göstermektedir.

Tüketici Problemi Çözümü:

$$q_{ij}(z) = \frac{\left(L_j - U_j\right)\left(1 - t_j\right) w_j + U_j \theta_j}{P_j^{1-\sigma} p_{ij(z)}^{\sigma}} \quad (4)$$

$$q_{ii}(z) = \frac{\left(L_i - U_i\right)\left(1 - t_i\right) w_i + U_i \theta_i}{P_j^{1-\sigma} p_{ii(z)}^{\sigma}} \quad (5)$$

(4) ve (5) numaralı denklemler tüketici problemi çözümünü göstermektedir.

4.1.2. Firma Problemi

Firma problemi çözümü yapılırken (z) notasyonundan (ϕ) notasyonuna geçebiliriz. Bunu yapabilmemizin nedeni her firmanın sadece kendine özgü bir verimlilik seviyesinin olmasıdır. Tüketici problemi çözümü yapılırken her firma farklılaştırılmış bir mal ürettiği için (z) notasyonu kullanılmıştır bu aşamada ise her firmanın kendine özgü bir verimlilik seviyesi olduğu için (ϕ) notasyonu kullanılacaktır. Bu kısımda i ülkesindeki ϕ_{ij} firma verimliliğine ve Φ^w işçi verimliliğine sahip bir firmanın kâr maksimizasyonu problemi çözülecektir. Firmanın üretim fonksiyonu (6) numaralı denklem ile gösterilmektedir.

$$q_{ij} = \phi_{ij} \Phi^w \left(l_{ij} - f_{ij}\right) \quad (6)$$

(7) numaralı denklem firma problemini göstermektedir.

$$Max_{p_{ij}}\ p_{ij} q_{ij} - \frac{q_{ij} w_i \tau_{ij}}{\phi_{ij} \Phi^w} - f_{ij} w_i \quad (7)$$

Kısıt:

$$q_{ij}(\phi) = \frac{(L_j - U_j)(1-t_j)w_j + U_j\theta_j}{p_j^{1-\sigma} p_{ij(\phi)}^{\sigma}} \quad (4)$$

f_{ij}: i ülkesinde üretim yapmayı planlayan bir firmanın emek cinsinden yapmış olduğu sabit yatırımı göstermektedir.

τ_{ij}: Buz dağı taşıma maliyeti i ülkesinden j ülkesine İhracat yaparken karşılaşılan maliyeti göstermektedir. Bu oran 1'e eşit ise i=j demektir. Bu nedenle τ_{ij}, 1'den büyüktür.

Firma Problemi Çözümü:

$$p_{ij}(\phi_{ij}) = \frac{\sigma}{\sigma-1}\frac{w_i\tau_{ij}}{\phi_{ij}\Phi^w} \quad (8)$$

$$p_{ii}(\phi_{ii}) = \frac{\sigma}{\sigma-1}\frac{w_i}{\phi_{ii}\Phi^w} \quad (9)$$

Firma problemi çözümü (8) ve (9) numaralı eşitlikler ile gösterilmiştir. (8) numaralı denklem i ülkesinde üretilip j ülkesine satılan malın fiyatını gösterirken (10) numaralı denklemde i ülkesinde üretilip yine i ülkesinde tüketilen malın fiyatını göstermektedir. Ülkeler simetrik ülkeler olduğu için ithal mal ve ihraç malı fiyatları birbirine eşittir. Bu durumu notasyon ile $p_{ij} = p_{ji}$ şeklinde gösteririz. Diğer taraftan yerli malı fiyatları da her iki ülkede aynıdır. Bu durum da notasyon ile $p_{ii} = p_{jj}$ olacak şekilde gösterilir.

4.1.3. Firmanın Optimal Ücret Seçimi

Modeli karakterize eden denklemlerden biri de firmanın mevcut verimlilik seviyesine göre seçeceği optimal ücret seviyesidir. İşçi verimliliği (1) numaralı denklem ile gösterilmiştir. Firmanın amacı bu verimlilik denklemini baz alarak kârını optimize etmektir. Bu nedenle daha önce de belirtildiği gibi firma verimli işçi başına düşen toplam işgücü maliyetini minimize edecektir.

Modelde kullanılan verimlilik denklemi (1) numaralı denklem ile gösterilmiştir.

$$\Phi^w(w_i) = \left(w_i(1-t_i) - \bar{w}_i\frac{\beta}{\delta}\right)^{\gamma} \quad (1)$$

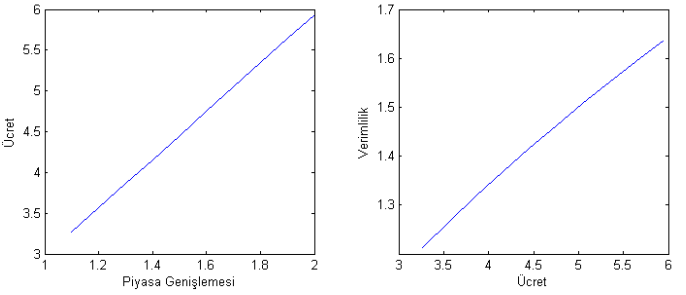
$$\underset{w_i}{\text{Min}}\ \frac{l_i w_i}{\Phi^w(w_i) l_i} = \frac{w_i}{(w_i(1-t_i) - \bar{w}_i\frac{\beta}{\delta})^{\gamma}} \quad (10)$$

Firmanın seçeceği optimal ücret düzeyi (11) numaralı denklem ile gösterilmiştir.

$$w_i = \frac{\beta\,\bar{w}_i}{\delta(1-t_i)(1-\gamma)} \quad (11)$$

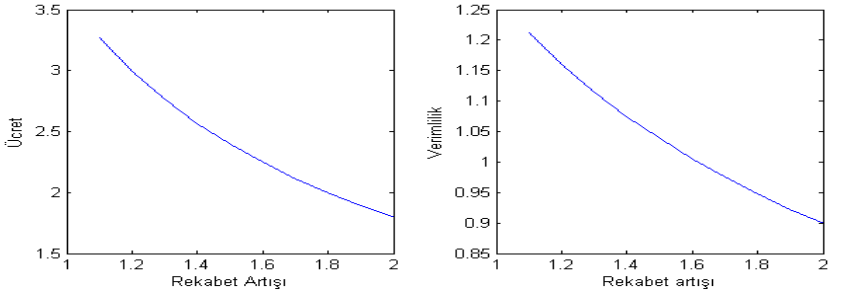
Bu denkleme göre ücret pazar genişlemesi ve rekabet artışı arasındaki ilişki Şekil 2 ve Şekil 3'te gösterilmiştir.

Şekil: 2
Piyasa Genişlemesi, Ücret ve Verimlilik Arasındaki İlişki



Şekil 2'de görüldüğü üzere piyasada bir genişlemenin olması ücret artışına yol açmaktadır. Ücret artışı ise verimlilik artışıyla sonuçlanmaktadır. Verimlilik artışı firma için ölçek ekonomilerine yönelmeye ve üretim maliyetlerinin azalmasına yol açmaktadır. Bu durum firmanın pazar payını artırmasına sebep olabilir. Şekil 3'te ise buradaki ilişkinin tam tersi ortaya çıkmıştır.

Şekil: 3
Rekabet Artışı, Ücret ve Verimlilik Arasındaki İlişki



Şekil 3'te görüldüğü üzere rekabet artışı ücretlerin azalmasına yol açmıştır. Ücretlerde meydana gelen azalma ise verimliliğin azalmasına yol açmıştır. Azalan verimlilik firmaların piyasada tutunmasını zorlaştırarak pazar payını kaybetmelerine ya da piyasa dışına itilmelerine sebep olabilir.

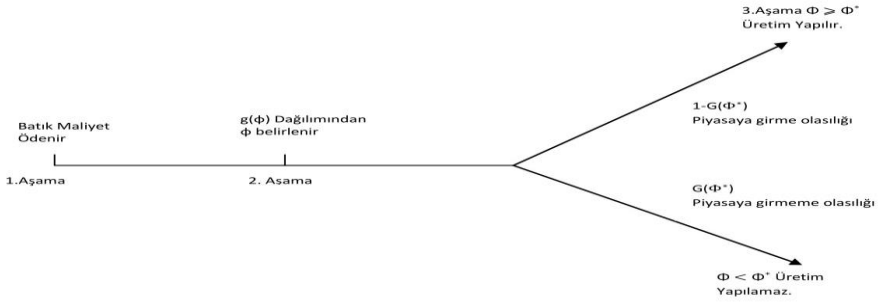
4.1.4. Firma Verimliliği

Melitz (2003) modelinde firmaların heterojen bir yapıya sahip olduğuna daha önce değinilmiştir. Firmaların heterojen yapıda olması Krugman (1980) modelinin (homojen firmalar) aksine aynı kararları almak zorunda oldukları varsayımını esnetir. Krugman (1980) modelinde bütün firmalar endüstriye dâhil olurken Melitz (2003) modelinde firmalar

verimliliklerine göre piyasaya girip girmeme kararı alırlar. Ayrıca Melitz (2003) modelinde firmalar bütün kararlarını verimlilik seviyelerine göre verdikleri için birbirinden farklı fiyatlarda, farklı miktarlarda ve farklı piyasalarda ürün sunarlar. Bu bölümde endüstriye dâhil olma kararı ve hangi pazara ürün sunulacağı kararı alınırken karşılaşılan sürecin nasıl şekillendiğine değinilecektir.

Öncelikle t=0 anında bütün firmalar (f_e) ile tanımladığımız batık maliyeti öder. t=1 anında ise batık maliyet ödenerek ortaya çıkan verimlilik seviyesi gözlemlenir. Verimlilik seviyesini gören firmaların önünde üç seçenek bulunmaktadır. Firmalar endüstriye girmeme kararı alabilir; yerli piyasaya üretim yapma kararı alabilir ya da dış pazara üretim yapma kararı alabilir.

Şekil: 4
Firmaların Karar Alma Süreci



Firmaların verimlilikleri Pareto dağılımdan gelmektedir; firmalar $1 - G(\phi^*)$ olasılıkla piyasaya girerken $G(\phi^*)$ olasılıkla piyasaya girmeme kararı alırlar. Bu noktada önemle bahsedilmesi gereken dört verimlilik seviyesi bulunmaktadır.

ϕ_{ii}: İç pazara üretim yapan firmanın verimlilik seviyesini göstermektedir.

ϕ_{ij}: Dış pazara üretim yapan firmanın verimlilik seviyesini göstermektedir.

ϕ_{ii}^*: İç pazara üretim yapabilmek için gereken minimum verimlilik seviyesini göstermektedir. Bu verimlilik seviyesinde iç pazara üretim yapmaktan elde edilen kâr sıfırdır.

ϕ_{ij}^*: Dış pazara üretim yapabilmek için gereken minimum verimlilik seviyesini göstermektedir. Bu verimlilik seviyesinde dış pazara üretim yapmaktan elde edilen kâr sıfırdır.

Üretim yapabilmek için şu iki koşuldan biri sağlanmalıdır.

$\phi_{ii} \geqslant \phi_{ii}^*$

$\phi_{ij} \geqslant \phi_{ij}^*$

Modelde Pareto dağılımı varsayımı yapıldığından daha önce bahsedilmiştir. Pareto dağılımına ait kümülatif yoğunluk fonksiyonu ve olasılık yoğunluk fonksiyonu aşağıda gösterilmiştir.

Pareto Dağılımı Kümülatif Yoğunluk Fonksiyonu (c.d.f):$1 - G\left(\phi_{ij}^{*}\right) = \frac{b^{k}}{\Phi_{ij}^{*\,k}}\ b > 0, k \geqslant 1$

Pareto Dağılımı Olasılık Yoğunluk Fonksiyonu (p.d.f): $g(\phi) = k\frac{b^{k}}{\phi^{k+1}}\ b > 0, k \geqslant 1$

(12) numaralı denklem ihracat yapan firma sayısını göstermektedir. (13) numaralı denklem ise iç piyasaya üretim yapan firma sayısını göstermektedir.

$$M_{ij} = M_{i}^{e}\left(1 - G\left(\phi_{ij}^{*}\right)\right) \tag{12}$$

$$M_{ii} = M_{i}^{e}\left(1 - G\left(\phi_{ii}^{*}\right)\right) \tag{13}$$

M_{i}^{e}: Potansiyel firma sayısını göstermektedir.

$\left(1 - G\left(\phi_{ij}^{*}\right)\right)$: İhracat yapma olasılığını göstermektedir.

$\left(1 - G\left(\phi_{ii}^{*}\right)\right)$: İç piyasaya yönelik üretim yapma olasılığını göstermektedir.

M_{ij}: İhracat yapan firma sayısını göstermektedir.

M_{ii}: İç piyasaya üretim yapan firma sayısını göstermektedir.

$\left(1 - G\left(\phi_{ij}^{*}\right)\right)$ ifadesinin Kümülatif Yoğunluk Fonksiyonunda $\frac{b^{k}}{\Phi_{ij}^{*\,k}}$ ifadesine eşit olduğunu bildiğimiz için (12) numaralı denklemi, (14) numaralı denklem gibi ve (13) numaralı denklemi de (15) numaralı denklem gibi yazabiliriz.

$$M_{ij} = M_{i}^{e}\frac{b^{k}}{\phi_{ij}^{*\,k}} \tag{14}$$

$$M_{ii} = M_{i}^{e}\frac{b^{k}}{\phi_{ii}^{*\,k}} \tag{15}$$

Sonuç olarak (14) ile ihracat yapan firma sayısına, (15) ile ise yurt içine üretim yapan firma sayısına ulaşılmaktadır.

4.1.4.1. Dış Pazara Üretim Yapabilmek İçin Gereken Minimum Verimlilik Seviyesi

İlk olarak firma problemi kısmında gösterilen (7) numaralı denklem bir firmanın ihracat yapması durumundaki kâr fonksiyonunu göstermektedir. Φ_{ij}^{*} verimlilik düzeyinde kâr sıfıra eşittir.

$$Max_{p_{ij}}\ p_{ij}q_{ij} - \frac{q_{ij}w_i\tau_{ij}}{\phi_{ij}\Phi^w} - f_{ij}w_i \tag{7}$$

$$p_{ij}(\phi_{ij}) = \frac{\sigma}{\sigma-1}\frac{w_i\tau_{ij}}{\phi_{ij}\Phi^w} \tag{8}$$

(8) numaralı denklemi (7) numaralı denkleme yerleştirerek (16) numaralı denkleme ulaşılır.

$$\pi_{ij} = q_{ij}\left(\frac{\sigma}{\sigma-1}\frac{\tau_{ij}w_i}{\Phi^*_{ij}\Phi^w} - \frac{\tau_{ij}w_i}{\Phi^*_{ij}\Phi^w}\right) - f_{ij}w_i \tag{16}$$

$$\pi_{ij} = q_{ij}\frac{1}{\sigma-1}\frac{\tau_{ij}w_i}{\phi^*_{ij}\Phi^w} - f_{ij}w_i \tag{17}$$

$$p_{ij}(\phi^*_{ij}) = \frac{\sigma}{\sigma-1}\frac{\tau_{ij}w_i}{\phi^*_{ij}\Phi^w} \tag{18}$$

(18) numaralı denklem verimlilik seviyesinin ϕ^*_{ij} olması durumunda fiyat seviyesini göstermektedir.

$$q_{ij}(\phi) = \frac{(L_j-U_j)(1-t_j)w_j+U_j\theta_j}{p_j^{1-\sigma}p^{\sigma}_{ij(\phi)}} \tag{4}$$

$$q_{ij}(\phi^*_{ij}) = \frac{(L_j-U_j)(1-t_j)w_j+U_J\theta_J}{p_j^{1-\sigma}p^{\sigma}_{ij}(\phi^*_{ij})} \tag{19}$$

(19) numaralı denklem ise verimlilik seviyesinin ϕ^*_{ij} olması durumunda tüketim miktarını göstermektedir.

$$p_{ij}(\phi^*_{ij})q_{ij}(\phi^*_{ij}) = r_{ij}(\phi^*_{ij}) \tag{20}$$

(20) numaralı denklem ϕ^*_{ij} verimlilik seviyesinde toplam geliri göstermektedir.

$$q_{ij}\frac{1}{\sigma-1}\frac{\tau_{ij}w_i}{\phi^*_{ij}\Phi^w} = \frac{r_{ij}(\phi^*_{ij})}{\sigma} \tag{21}$$

(21) numaralı eşitlik ile toplam gelirden değişken maliyetler çıkarılması durumu gösterilmiştir.

$$\pi_{ij}(\phi^*_{ij}) = \frac{r_{ij}(\phi^*_{ij})}{\sigma} - f_{ij}w_i \tag{22}$$

$$r_{ij}(\phi^*_{ij}) = p_{ij}^{1-\sigma}(\phi^*_{ij})\frac{[(L_j-U_j)(1-t_j)w_j+\theta_jU_j]}{P_j^{1-\sigma}} \tag{23}$$

Φ^*_{ij} verimlilik seviyesinde kâr sıfıra eşittir.

Bu durumda kâr denklemini aşağıdaki gibi yazabiliriz.

$$\left(\frac{\sigma}{\sigma-1}\frac{\tau_{ij}w_i}{\phi_{ij}^{*}\Phi^{w}}\right)^{1-\sigma}\frac{[(L_j-U_j)(1-t_j)w_j+U_j\theta_j]}{p_j^{1-\sigma}\sigma}-f_{ij}w_i=0 \tag{24}$$

$$\phi_{ij}^{*}=\left(\frac{f_{ij}w_iP_j^{1-\sigma}\sigma}{(L_j-U_j)(1-t_j)w_j+U_j\theta_j}\right)^{\frac{1}{\sigma-1}}\left(\frac{\sigma}{\sigma-1}\frac{\tau_{ij}w_i}{\Phi^{w}}\right) \tag{25}$$

$$\phi_{ii}^{*}=\left(\frac{f_{ii}w_iP_j^{1-\sigma}\sigma}{(L_i-U_i)(1-t_i)w_i+U_i\theta_i}\right)^{\frac{1}{\sigma-1}}\left(\frac{\sigma}{\sigma-1}\frac{w_i}{\Phi^{w}}\right) \tag{26}$$

Yurt içi ticarette taşıma maliyeti 1'e eşittir ($\tau_{ii}=1$). Bu durumda (27) ve (28) numaralı denklemleri yazabiliriz.

$$\left(\frac{\Phi_{ij}^{*}}{\Phi_{ii}^{*}}\right)^{\sigma-1}=\left(\frac{\tau_{ij}}{\tau_{ii}}\right)^{\sigma-1}\left(\frac{f_{ij}}{f_{ii}}\right)=\tau_{ij}^{\sigma-1}\left(\frac{f_{ij}}{f_{ii}}\right) \tag{27}$$

$$\frac{\Phi_{ij}^{*}}{\Phi_{ii}^{*}}=\tau_{ij}\left(\frac{f_{ij}}{f_{ii}}\right)^{\frac{1}{\sigma-1}} \tag{28}$$

(28) numaralı denklem ile yurt dışı üretim ve yurt içi üretim yapmak için gereken minimum verimlilik seviyelerinin oranlanmış hali gösterilmektedir.

4.1.5. Denge Koşulları

Modeli karakterize eden denklemlerin tamamına ulaşabilmek için denge koşullarının sağlanması gerekmektedir. Bu aşamada sağlanması gereken denge koşulları sıfır kâr koşulu, emek piyasası denge koşulu ve gelir harcama eşitliğidir.

4.1.5.1. Sıfır Kâr Koşulu

Sıfır kâr koşuluna göre i ya da j ülkesindeki herhangi bir firmanın beklenen ortalama kârının batık maliyete (f_e) eşit olması gerekmektedir. Bu aşamada öncelikle beklenen ortalama kâr denklemi yazılacaktır. Beklenen ortalama kâr denklemi (29) numaralı denklem ile gösterilmiştir.

$$\sum_{j=1}^{2}E\left(\bar{\pi}_{ij}\right)=f_{ei}w_i \tag{29}$$

$$\sum_{j=1}^{2}\left[1-G(\phi_{ij}^{*})\right]\bar{\pi}_{ij}=f_{ei}w_i \tag{30}$$

$$\left[1-G(\phi_{ij}^{*})\right]\left(\sum_{1}^{2}\int_{\phi_{ij}^{*}}^{\infty}\pi_{ij}(\phi)\frac{g(\phi)}{1-G\left(\phi_{ij}^{*}\right)}d(\phi)\right)=f_{ei}w_i \tag{31}$$

$$\sum_{1}^{2}\int_{\phi_{ij}^{*}}^{\infty}\left(\frac{\sigma}{\sigma-1}\frac{w_i\tau_{ij}}{\phi_{ij}\Phi^{w}}\frac{(L_j-U_j)(1-t_j)w_j+U_j\theta_j}{p_j^{1-\sigma}p_{ij(\Phi)}^{\sigma}}-f_{ij}w_i\right)g(\phi)d(\phi)=f_{ei}w_i \tag{32}$$

$$\sum_{1}^{2}\frac{f_{ij}}{\phi_{ij}^{*k}}\frac{\sigma-1}{k-\sigma+1}=\frac{f_{ei}}{b^{k}} \tag{33}$$

4.1.5.2. Emek Piyasası Denge Koşulu

Emek piyasasında dengenin sağlanması için emek arzı emek talebine eşit olmak zorundadır. İşsizliğin olduğu modelde emek piyasası dengesi (34) numaralı denklem ile gösterilmiştir.

M_i^e: i ülkesindeki potansiyel firma sayısını göstermektedir.

M_{ij}: i ülkesinden j ülkesine ihracat yapan firma sayısını göstermektedir.

$$M_{ij}\left[\sum_1^2 \int_{\phi_{ij}^*}^{\infty}\left(q_{ij}(\phi)\frac{\tau_{ij}}{\phi_{ij}\Phi^w}+f_{ij}\right)\frac{g(\phi)}{1-G\left(\phi_{ij}^*\right)}d(\phi)\right]+M_i^e f_{ei}=L_j-U_j \quad (34)$$

$$M_{ij}=\frac{b^k}{f_{ei}}\frac{\sigma-1}{\sigma k}\frac{L_j-U_j}{{\Phi_{ij}^*}^k} \quad (35)$$

$$M_{ii}=\frac{b^k}{fe}\frac{\sigma-1}{\sigma k}\frac{L_i-U_i}{{\Phi_{ii}^*}^k} \quad (36)$$

$\Phi_{ij}^* > \Phi_{ii}^*$ olduğu için $M_{ij} < M_{ii}$ sonucuna ulaşılır.

4.1.5.3. Gelir Harcama Denge Koşulu

Ekonominin denge koşullarından biri de gelirlerin harcamalara eşit olmasıdır. (37) numaralı denklem i ülkesindeki gelir harcama denklemini göstermektedir. Denklemin sol tarafında toplam gelir bulunmaktadır. $(L_i-U_i)(1-t_i)w_i$ çalışanların toplam gelirini gösterirken θU_i ise işsiz kişilerin toplam gelirini göstermektedir. Sağ tarafta ise yapılan toplam harcamalar görülmektedir. $M_{ji}p_{ji}q_{ji}$ ihracat mallarına yapılan harcamaları gösterirken $M_{ii}p_{ii}q_{ii}$ ise yerli mallara yapılan harcamaları göstermektedir. $(L_i-U_i)(1-t_i)w_i+\theta U_i = M_{ji}p_{ji}q_{ji}+M_{ii}p_{ii}q_{ii}$ (37)

4.1.5.4. Denk Bütçe Denklemi

Walras Kanunu'ndan elde edilen sonuca göre bir denklem sistemindeki n tane eşitlikten n-1 tanesi sağlanıyorsa n. denklem de sağlanır (Mas-Collel et al., 1995:54). Buna dayanarak modeli çözen denklem sisteminde (39) numaralı denkleme yer verilirken (37) numaralı denkleme ise yer verilmeyecektir. Devletin denk bütçe denklemi (37) numaralı denklem ile gösterilmiştir. Devletin işsizlerin tüketim harcamalarını finanse edebilmesi için dağıttığı işsizlik sigortası toplanan vergiler aracılığı ile ödenmektedir. İşsizlik sigortası çalışanların gelirinin t kadarlık kısmının vergi olarak toplanması ve işsiz kişilere eşit olarak dağıtılmasını ifade etmektedir. Bu nedenle devletin denk bütçe denklemine göre toplanan vergiler dağıtılan işsizlik sigortasına eşit olmak zorundadır.

$$\theta_i U_i=(L_i-U_i)t_i w_i \quad (38)$$

$$\theta_i=\frac{(L_i-U_i)t_i w_i}{U_i} \quad (39)$$

4.1.6. Genel Fiyat Endeksi

M_i^e: Potansiyel firma sayısını göstermektedir.

M_{ii}: İç piyasaya üretim yapan firma sayısını göstermektedir.

M_{ij}: Dış piyasaya üretim yapan firma sayısını göstermektedir.

(13) numaralı denklem potansiyel firma sayısı ve iç piyasaya üretim yapan firma sayısı arasındaki ilişkiyi göstermektedir.

$$M_i^e \left(1 - G(\phi_{ii}^*)\right) = M_{ii} \tag{13}$$

(12) numaralı denklem potansiyel firma sayısı ve ihracat yapan firma sayısı arasındaki ilişkiyi göstermektedir.

$$M_i^e \left(1 - G\left(\phi_{ij}^*\right)\right) = M_{ij} \tag{12}$$

P_i: i ülkesindeki genel fiyat endeksini göstermektedir.

$$P_i = \left[\sum_{j=1}^{2} M_{ij} \int_{\phi_{ij}^*}^{\infty} p_{ij}^{1-\sigma}(\phi) \frac{g(\phi)}{1-G\left(\phi_{ij}^*\right)} d\phi\right]^{\frac{1}{1-\sigma}} \tag{40}$$

$$P_i^{1-\sigma} = \left(\frac{\sigma}{\sigma-1}\frac{w_i}{\Phi^w}\right)^{1-\sigma} \frac{kb^k}{1+k-\sigma}\left(M_{ii}\phi_{ii}^{\sigma-1-k} + M_{ij}\tau_{ij}^{1-\sigma}\phi_{ij}^{\sigma-1-k}\right) \tag{41}$$

4.1.7. Dengeyi Karakterize Eden Denklemler

Aşağıda nümerik analiz yöntemleri ile çözümü yapılan modeli karakterize eden denklemler sıralanmıştır. Bu denklemlerin çözümünden elde edilen sonuçlar ise beşinci bölümde yorumlanmıştır.

1) $\Phi^w = (w_i(1-t_i) - \overline{w}_i \frac{\beta}{\delta})^{\forall}$ (1)

2) $q_{ij}(\phi) = \frac{(L_j - U_j)(1-t_j)w_j + U_j\theta_j}{P_j^{1-\sigma} p_{ij(\phi)}^{\sigma}}$ (4)

3) $q_{ii}(\phi) = \frac{(L_i - U_i)(1-t_i)w_i + U_i\theta_i}{P_i^{1-\sigma} p_{ii(\phi)}^{\sigma}}$ (5)

4) $p_{ij}(\phi_{ij}) = \frac{\sigma}{\sigma-1}\frac{w_i\tau_{ij}}{\phi_{ij}\Phi^w}$ (8)

5) $p_{ii}(\phi_{ii}) = \frac{\sigma}{\sigma-1}\frac{w_i}{\phi_{ii}\Phi^w}$ (9)

6) $\phi_{ij}^* = \left(\frac{f_{ij}w_i P_j^{1-\sigma}\sigma}{(L_j - U_j)(1-t_j)w_j + U_j\theta_j}\right)^{\frac{1}{\sigma-1}} \left(\frac{\sigma}{\sigma-1}\frac{\tau_{ij}w_i}{\Phi^w}\right)$ (25)

7) $\phi_{ii}^* = \left(\frac{f_{ii}w_i P_j^{1-\sigma}\sigma}{(L_i - U_i)(1-t_i)w_i + U_i\theta_i}\right)^{\frac{1}{\sigma-1}} \left(\frac{\sigma}{\sigma-1}\frac{w_i}{\Phi^w}\right)$ (26)

$$8)\ \frac{\phi_{ij}^{*}}{\phi_{ii}^{*}} = \tau_{ij}\left(\frac{f_{ij}}{f_{ii}}\right)^{\frac{1}{\sigma-1}} \tag{28}$$

$$9)\ \sum_{j=1}^{2} \frac{f_{ij}}{\phi_{ij}^{*\,k}} \frac{\sigma-1}{k-\sigma+1} = \frac{f_{ei}}{b^{k}} \tag{33}$$

$$10)\ M_{ij} = \frac{b^{k}}{f_{ei}} \frac{\sigma-1}{\sigma k} \frac{L_j - U_j}{\Phi_{ij}^{*\,k}} \tag{35}$$

$$11)\ M_{ii} = \frac{b^{k}}{f_{ei}} \frac{\sigma-1}{\sigma k} \frac{L_i - U_i}{\Phi_{ii}^{*\,k}} \tag{36}$$

$$12)\ \theta_i = \frac{(L_i - U_i)t_i w_i}{U_i} \tag{39}$$

$$13)\ P_i = \frac{\sigma}{\sigma-1}\frac{w_i}{\Phi^{w}}\left(\frac{kb^{k}}{1+k-\sigma}\right)^{\frac{1}{1-\sigma}}\left(M_{ii}\phi_{ii}^{\sigma-1-k} + M_{ij}\tau_{ij}^{1-\sigma}\phi_{ij}^{\sigma-1-k}\right)^{\frac{1}{1-\sigma}} \tag{41}$$

5. Sonuçların Yorumlanması

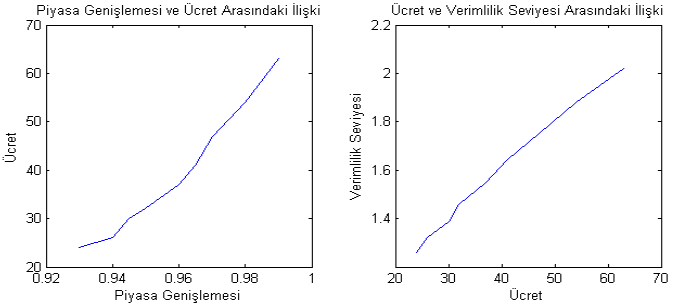
Model sonuçlarına parametre değerleri için belirli varsayımsal değerler atanarak nümerik çözümleme yapılmış ve aşağıda bu varsayımsal durumun niceliksel çözümlemesine yer verilmiştir. Çözüm aşamasında MATLAB programından yararlanılmıştır. Çalışmanın giriş bölümünde de bahsedildiği gibi dış ticaretin ülke ekonomisine olabilecek etkileri üzerinde iki farklı görüş modele pazar rekabeti (δ) ve piyasa genişlemesi (β) değişkenleriyle dâhil edilmiştir. Varsayım gereği ticaret maliyetinde meydana gelen bir artış rekabet faktöründe azalmaya sebep olacaktır. Bir başka ifadeyle ticaret maliyetinde meydana gelen azalma piyasadaki rekabetin artmasına sebep olacaktır. Bu cümlede ifade edilen piyasadaki rekabetin ticaret maliyetinin bir fonksiyonu olduğudur ($\delta'(\tau) < 0$). Serbestleşme yanlıları ise ticaret bariyerlerinin düşmesinin pazar genişlemesine sebep olarak ülke refahını artıracağını ifade etmektedir. Pazar genişlemesi modele (β) değişkeniyle dâhil edilmekte ve varsayım gereği ticaret bariyerinde meydana gelen azalış pazar genişlemesine yol açmaktadır. Pazar genişlemesi ticaret bariyerinin bir fonksiyonudur ($\beta'(\tau) < 0$). Yapılan analiz sonuçları pazar genişlemesinde ve piyasadaki rekabette meydana gelen değişiklikler çerçevesinde değerlendirilecektir.

5.1. Ücret ve İşçi Verimliliği Arasındaki İlişkinin Pazar Genişlemesi ve Rekabet Faktörü Çerçevesinde İncelenmesi

Etkin ücret varsayımı gereği ücretlerde meydana gelen artışın verimliliği artırması, ücretlerde meydana gelen azalışın ise verimliliği azaltması gerekmektedir. Bununla beraber ülkede nüfus kısıtı olduğu için firmaların işçi talebi firmaların ücretleri artırmasına sebep olmaktadır. Firmaların maliyetlerini azaltma durumunda kalması ise ücretlerde azalmaya sebep olmaktadır. Pazar genişlemesinin piyasa rekabetini domine etmesi durumunda, piyasa ücreti ve işçi verimliliği arasındaki ilişki Şekil 5'te gösterilirken piyasadaki rekabetin piyasa genişlemesini domine etmesi durumunda, piyasa ücreti ve işçi verimliliği arasındaki ilişki ise Şekil 6'da gösterilmiştir. Bu tip modellerde para ve parasal değişkenler genellikle

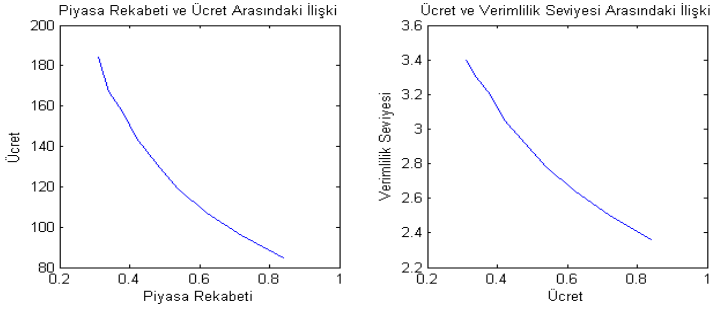
kullanılmaz ve tüm değişkenler reel cinsten ifade edilmektedir. Ücretler de reel olarak tüketim malı cinsinden tanımlıdır.

Şekil: 5
Piyasa Genişlemesinin Piyasa Ücreti ve İşçi Verimliliğine Etkisi



Pazar genişlemesinin baskın olması durumunda söz konusu ekonomide model gereği nüfus kısıtı bulunduğu için firma bir taraftan işçi alımı yapsa bile bir taraftan da işçi verimliliğini artırma yoluna gidecektir. Etkin ücret varsayımı gereği verimliliğini artırmak isteyen firma ücret artırımı yoluna gidecektir. Sonuç olarak pazar genişlemesinin baskın olması ücretlerin artmasına ve dolayısıyla verimlilik artışına yol açmıştır. Bu sonuç kullanılan verimlilik denkleminin beklentileri karşıladığını göstermektedir.

Şekil: 6
Piyasa Rekabetinin Piyasa Ücreti ve İşçi Verimliliğine Etkisi

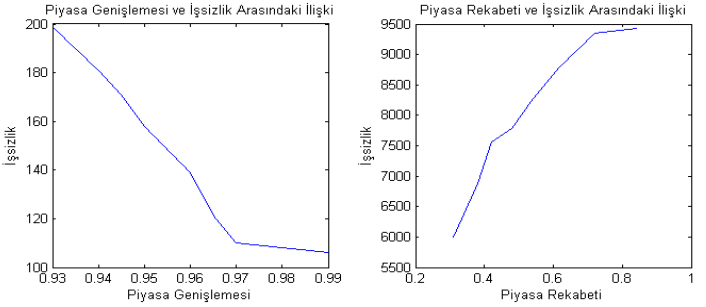


Piyasadaki rekabette meydana gelen artış yerli firmaların rekabet karşısında ayakta kalabilmesini zorlaştırmaktadır. Firmalar rekabet ile mücadele etmek için işçi maliyetlerini azaltma yoluna gitmektedir. Bir taraftan işçi çıkarma yoluna giden firma bir taraftan da işçi maliyetlerini azaltmak için ücretleri azaltma yoluna gitmektedir. Etkin ücret varsayımı gereği ücretlere meydana gelen azalma işçi verimliliğini de azaltmaktadır. Sonuç olarak piyasadaki rekabetin artması ücretlerde aşınmaya yol açarak işçi verimliliğini de azaltmıştır. Bu sonuç da Şekil 2'de olduğu gibi kullanılan verimlilik denklemini doğrulamıştır.

5.2. Piyasa Genişlemesi ve Piyasa Rekabetinin İşsizlik Üzerindeki Etkisi

Piyasa genişlemesi durumunda yerli piyasaya ve dış piyasaya üretim yapan firma sayısında artış meydana gelmiştir. Bu durum işsizliğin azalmasına sebep olmuştur. Artan piyasa rekabeti ile yerli piyasaya üretim yapan firma sayısında azalış meydana gelirken, ihracat yapan firma sayısında ise artış meydana gelmiştir. Fakat yerli piyasaya üretim yapan firma sayısı ihracat yapanlara göre daha fazla olduğu için işsizliği artırmıştır. Pazar genişlemesinin ve rekabet artışının işsizlik üzerindeki etkisi Şekil 7'de gösterilmiştir[4].

Şekil: 7
Piyasa Genişlemesi ve Piyasadaki Rekabetin İşsizlik Üzerindeki Etkisi



Piyasadaki rekabetin, piyasada meydana gelen büyümeyi domine etmesi durumunda kurgulanan modelde ortaya çıkan sonuç şu şekilde özetlenebilir. Öncelikle firma artan rekabet ile mücadele edebilmek için maliyetleri düşürmek isteyecektir. Bu durum ücretlerin azalmasına yol açacaktır. Ücretlerde meydana gelen azalma etkin ücret varsayımı gereği verimliliğin azalmasına yol açacaktır. Rekabet artışının etkilerinden biri de firmanın pazar payını artırabilmek için ürettiği malların fiyatında azalmaya gitmesidir. Diğer taraftan rekabet artışı sonucu üretim yapan firma sayısında azalma meydana gelmektedir. Azalan firma sayısının sonucu olarak piyasadaki işsizlik artmaktadır. Pazar büyümesinin yarattığı etkinin baskın olması halinde işsizlik oranı azalmaktadır. Yani dış ticaretin serbestleşmesi pazar büyümesinin yarattığı etki ile işsizlik oranının düşmesine sebep olur. Pazar genişlemesinden faydalanmak isteyen firma verimliliği artırmak isteyecektir. Verimliliği artırmak isteyen firma işçileri gözlemleyemediği için büyüyen pazardan pay alabilmek adına ücretleri artırarak işçi verimliliğini artırma yoluna gidecektir. Verimlilik artışı mal kalitesini artırarak fiyatlarının artmasına sebep olmuştur. Artan kârlar ve genişleyen pazar ise piyasaya daha çok firma girmesine sebep olarak işsizliğin azalmasına yol açmıştır. Pazar genişlemesinin ülkeye sağladığı avantajlar ülkenin refahının artması, işgücünün verimliliğinin artması ve dolayısıyla üretimde verimlilik artışıdır. Üretimde verimlilik artışına bağlı olarak mal fiyatında meydana gelen artış, mal fiyatında meydana gelen artışa

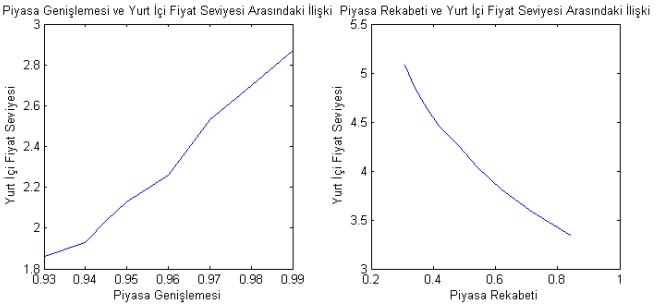
[4] *Böyle bir varsayımsal ekonomide modeldeki koşulların geçerli olması halinde işsizlik kişi sayısı olarak azalmaktadır.*

bağlı olarak ortaya çıkan kâr artışı, kâr artışına bağlı olarak piyasa giren firma sayısında artış ve sonuç olarak ortaya çıkan işsizliğin azalması olarak sıralanabilir.

5.3. Fiyatlar Üzerindeki Etkiler

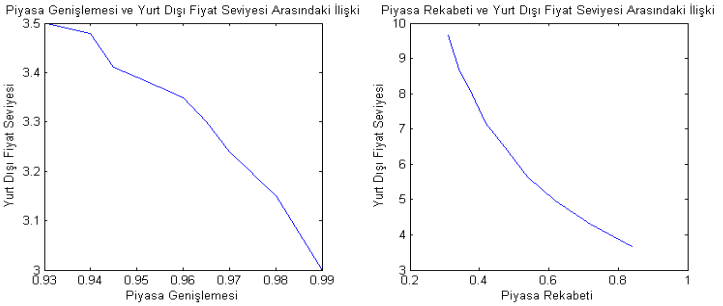
Pazar genişlemesinin baskın olması durumunda yerli malı fiyatı ve genel fiyat endeksi üzerindeki etkisi ücretlerde meydana gelen artışa dayalı olarak pozitif yönlüdür; fakat ihracat malı fiyatı ticaret bariyerinin doğrudan etkisi nedeniyle negatif yönlüdür. Diğer taraftan piyasadaki rekabetin baskın olmasının yerli malı fiyatı, ithal mal fiyatı ve genel fiyat endeksi üzerindeki etkisi ücretlerde meydana gelen aşınmaya dayalı olarak negatif yönlüdür. Pazar genişlemesinin ve piyasadaki rekabetin yerli mal fiyatları üzerinde yaptığı değişimler Şekil 8'de, ithal mal üzerinde yaptığı değişimler Şekil 9'da ve genel fiyat seviyesi üzerinde yaptığı değişimler Şekil 10'da gösterilmiştir.

Şekil: 8
Piyasa Genişlemesi ve Piyasadaki Rekabetin Yerli Mal Fiyatı Üzerindeki Etkisi



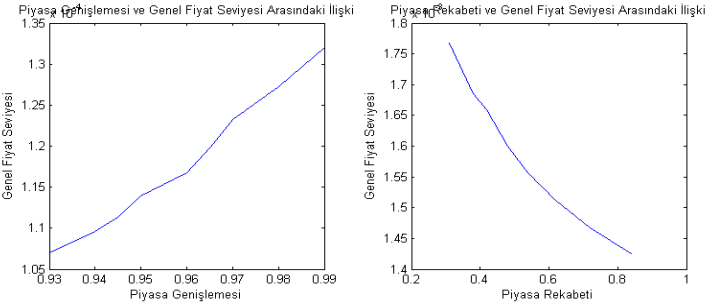
Piyasa genişlemesinin piyasadaki rekabeti domine etmesi halinde ücretlerde artış meydana gelmektedir. Ücretlerde meydana gelen artış yerli mala olan talebin artmasına yol açar. Yerli mala olan talebin artması ise yerli mal fiyatında artışa yol açmıştır. Piyasadaki rekabetin artması durumunda ise ücretlerde azalış meydana gelecek ve bu azalış ise yerli mala olan talebi baskılayarak yerli mal fiyatının düşmesine sebep olmaktadır.

Şekil: 9
Piyasa Genişlemesi ve Piyasadaki Rekabetin İthal Mal Fiyatı Üzerindeki Etkisi



Piyasa genişlemesinin piyasadaki rekabeti baskılaması durumunda ücretlerde artış meydana gelecektir bu durumun fiyatlarda artış yaratması beklenirken diğer taraftan piyasa genişlemesinin anlamı ticaret bariyerlerinin azalmasıdır ve yurt dışına satılan malın fiyatı yerli malın fiyatının aksine ticaret bariyerinden de etkilenmektedir. Ticaret bariyerlerinde meydana gelen düşüş ücretlerde meydana gelen artışı baskılayarak yurt dışına satılan mal fiyatlarının azalmasına sebep olur. Diğer taraftan piyasadaki rekabet artışının piyasa genişlemesini domine etmesi halinde hem dolaylı olarak ücretlerin azalmasıyla talebin azalması hem de direkt olarak artan rekabetin etkisiyle ithal mal fiyatlarında azalma meydana gelir.

Şekil: 10
Piyasa Genişlemesi ve Piyasadaki Rekabetin Genel Fiyat Seviyesi Üzerindeki Etkisi



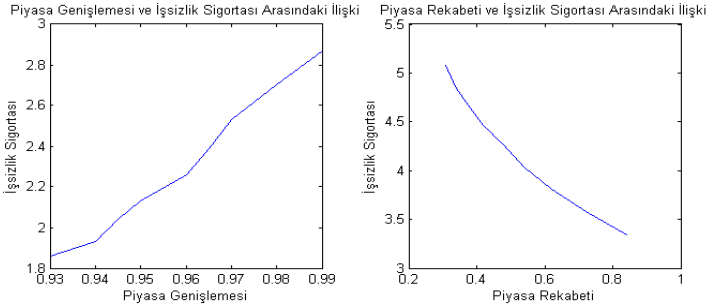
Piyasa rekabetinin piyasa genişlemesini domine etmesi halinde hem yerli mal hem de ithal mal fiyatında azalma meydana gelmektedir. Bu iki etki ile genel fiyat seviyesinin de azaldığı görülmektedir. Piyasa genişlemesinin baskın olması durumunda ise yerli mal fiyatları artarken ithal mal fiyatları azalmaktadır. Genel fiyat seviyesi denklemine bakıldığında fiyatların ve firma sayılarının etkili olduğu görülmektedir. Yapılan analiz sonucunda iç piyasaya üretim yapan firma sayısının ithalat yapan firma sayısından yüksek

olduğu görülmüştür. Dolayısıyla yurt içine üretim yapan firma sayısı daha fazla olduğu için fiyat denkleminde yurt içi fiyat eğilimi baskın olacak ve genel fiyat seviyesi artacaktır.

5.4. İşsizlik Sigortasında Meydana Gelen Değişim

Kurgulanan model gereği işsizlik ve işsizlik sigortasında meydana gelen değişimlerin aksi yönde sonuçlar doğurması beklenmektedir. Şekil 7'ye ve Şekil 11'e bakıldığında işsizlik ve işsizlik sigortası arasında ters yönlü bir ilişki olduğu açıkça görülmektedir.

Şekil: 11
Piyasadaki Rekabetin ve Piyasa Genişlemesinin İşsizlik Sigortası Üzerindeki Etkisi

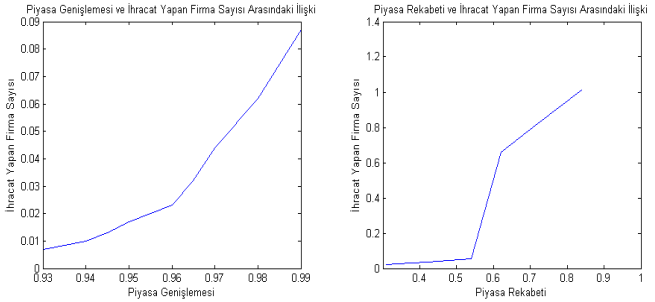


Modelde işsizlik sigortası, çalışanlardan alınan vergiler aracılığı ile ödenmektedir. Piyasa genişlemesinin baskın olması durumunda işsizlik azaldığı ve dolayısıyla çalışan sayısı artığı için toplanan vergiler artmıştır. Ayrıca bu vergilerin dağıtılacağı işsiz sayısında da azalma meydana gelmiştir. Sonuç olarak işsizliğin azalmasına bağlı olarak işsizlik sigortasında artış meydana gelmektedir. Piyasadaki rekabetin baskın olması durumunda ise işsizlik artacak ve toplanan vergiler azalacaktır. Ayrıca toplanan vergiden faydalanacak olan işsiz kişi sayısı artmıştır. Sonuç olarak toplanan vergilerin azalması işsizlik sigortasının azalmasına yol açmaktadır.

5.5. Firma Sayısında Meydana Gelen Değişimler

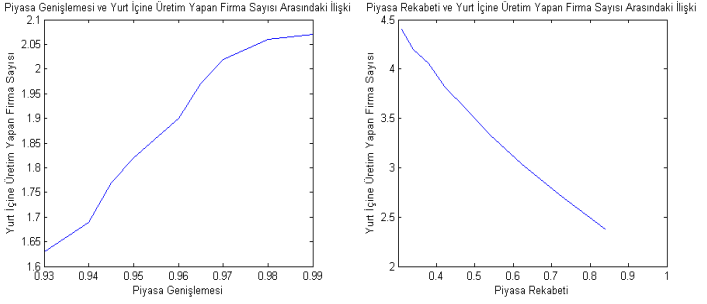
İhracat yapan firma sayısının piyasa rekabetinin baskın olmasından ve pazar genişlemesinin baskın olmasından nasıl etkilendiği Şekil 12'de gösterilirken iç piyasaya üretim yapan firma sayısının piyasa rekabetinin baskın olmasından ve pazar genişlemesinin baskın olmasından nasıl etkilendiği Şekil 13'te gösterilmiştir.

Şekil: 12
Piyasadaki Rekabetin ve Piyasa Genişlemesinin İhracat Yapan Firma Sayısı Üzerindeki Etkisi



Piyasa genişlemesinin baskın olması halinde ihracat yapan firma sayısında artış meydana gelmektedir. (35) numaralı denkleme bakıldığında aşağıdaki sonuçlara ulaşmak mümkündür. Modelde nüfus sabittir ve piyasa genişlemesi durumunda işsizlik azalmaktadır. Ayrıca piyasa genişlemesi durumunda ihracat yapmak için gereken minimum verimlilik seviyesinde azalma meydana gelmektedir. Bu iki etki ile piyasa genişlemesi halinde ihracat yapan firma sayısı artmaktadır. Nüfus sabitken piyasadaki rekabetin baskın olması halinde, ücretler ve işçi verimliliği azalmakta, işsizlik ise artmaktadır. Yukarıda sayılan etkilere bağlı olarak ihracat yapmak için gereken minimum verimlilik seviyesinde azalma meydana gelmekte ve ihracat yapan firma sayısında artış olmaktadır. Fakat piyasa genişlemesinin baskın olması durumunda ihracat yapan firma başına düşen üretim artarken, rekabetin baskın olması durumunda ihracat yapan firma başına düşen üretim azalmaktadır.

Şekil: 13
Piyasadaki Rekabetin ve Piyasa Genişlemesinin İç Piyasaya Üretim Yapan Firma Sayısı Üzerindeki Etkisi



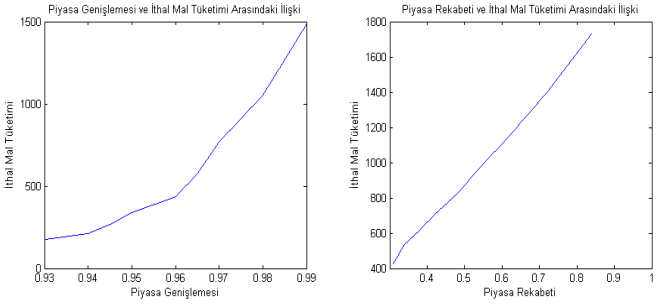
Piyasa genişlemesinin baskın olmasının olası sonuçlarından daha önceki bölümlerde de bahsedilmiştir. Fakat kısaca hatırlatmak gerekirse pazar genişlemesi ev sahibi ülkedeki ücretlerin artmasına ve işsizliğin azalmasına sebep olmaktadır. Hem ücretlerde meydana

gelen artış hem de işsizliğin azalması iç piyasada üretilen mala olan talebi artırmaktadır. Talepte meydana gelen artış fiyat artışına ve dolayısıyla kâr artışına sebep olarak firma sayısının artmasına yol açmaktadır. Piyasadaki rekabetin baskın olması ise bir taraftan işsizliğe sebep olurken bir taraftan ücretlerde azalmaya sebep olmaktadır. Bu etkiler dolayısıyla yerli mala olan talep azaldığı için yerli mal fiyatı düşmektedir. Dolayısıyla piyasada azalan kârlar firmaların endüstriden çıkmasına sebep olmaktadır. Bu iki etki ise iç piyasada üretilen mala olan talebi azaltarak üretim yapan firma sayısının azalmasına yol açmaktadır.

5.6. Mal Tüketiminde Meydana Gelen Değişimler

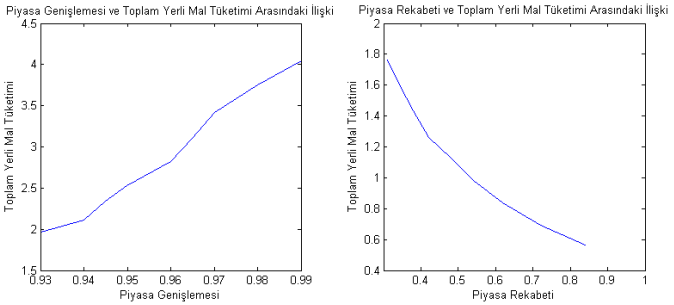
Pazar genişlemesinde ve piyasadaki rekabette meydana gelen değişimler tüketilen mal miktarlarında da değişime sebep olmaktadır. İthal mal tüketiminde meydana gelen değişimler Şekil 14'te gösterilirken yerli mal tüketiminde meydana gelen değişimler Şekil 15'te gösterilmektedir.

Şekil: 14
Piyasadaki Rekabetin ve Piyasa Genişlemesinin İthal Mal Tüketiminde Yarattığı Değişim



Daha önce de bahsedildiği gibi pazar genişlemesi durumunda hem işsizlik azalmakta hem de ücretlerde artış meydana gelmektedir. Bu iki etki ithal mala olan talebi artıracaktır. Sonuç olarak piyasa genişlemesi durumunda toplam ithal mal tüketimi artmaktadır. Diğer taraftan piyasadaki rekabetin artması durumunda ücretlerde azalma meydana gelmektedir. Bu etkinin yanında ithal mal fiyatında azalma meydana gelmektedir. Fiyatlarda meydana gelen azalmanın etkisiyle ücretlerdeki azalmaya rağmen ithal mal tüketimi artmaktadır.

Şekil: 15
Piyasadaki Rekabetin ve Piyasa Genişlemesinin Yerli Mal Tüketiminde Yarattığı Değişim



Piyasa genişlemesinin piyasadaki rekabeti domine etmesi halinde ücretlerde artış meydana gelmekte ve toplam yerli mal tüketimi artmaktadır. Piyasadaki rekabetin artması durumunda ise pazar genişlemesinde meydana gelen etkinin tam zıttı ortaya çıkmaktadır. Artan rekabetin hem ücretlerde azalmaya hem de işsizlikte artışa sebep olduğu bilinmektedir. Bu etkilerin bir sonucu olarak toplam yerli mal tüketimi azalmaktadır.

Tablo 1'de 5. bölümde açıklanan grafiklere ait bir özete yer verilmiştir.

Tablo: 1
Piyasa Genişlemesi ve Piyasa Rekabetinin Baskın Olması Durumunda Üçüncü Modelde Meydana Gelen Değişimler

Piyasa Genişlemesinin Baskın Olması Durumunda Meydana Gelen Değişiklikler	Piyasa Rekabetinin Baskın Olması Durumunda Meydana Gelen Değişiklikler
Ücret artıyor.	Ücret azalıyor.
Verimlilik artıyor	Verimlilik azalıyor.
Yerli mal fiyatı artıyor.	Yerli mal fiyatı azalıyor.
İthal mal fiyatı azalıyor.	İthal mal fiyatı azalıyor.
İşsizlik azalıyor.	İşsizlik artıyor.
İşsizlik sigortası artıyor.	İşsizlik sigortası artıyor.
İç piyasaya üretim yapan firma başına düşen üretim artıyor.	İç piyasaya üretim yapan firma başına düşen üretim azalıyor.
İç piyasaya üretim yapan firma sayısı artıyor.	İç piyasaya üretim yapan firma sayısı azalıyor.
İhracat yapan firma sayısı artıyor.	İhracat yapan firma sayısı artıyor.
Genel fiyat seviyesi artıyor.	Genel fiyat seviyesi azalıyor.

6.Sonuç

Bu çalışmada dış ticaretin işsizlik üzerindeki etkisi Melitz (2003) dış ticaret modeline etkinlik ücreti dâhil edilerek incelenmiştir. Çalışmanın giriş bölümünde de bahsedildiği gibi dış ticaretin ülke ekonomisine olabilecek etkileri üzerinde iki farklı görüş bulunmaktadır. Korumacılık yanlılarına göre ticaret bariyerlerinin düşmesi eğer ülke yeterince güçlü değilse ülke ekonomisine zarar verecektir; yerel firmalar pazar payını kaybedecek ya da endüstriden çekilecektir. Serbestleşme yanlılarına göre ise ticaret bariyerlerinin düşmesi pazar genişlemesine ve tüketim çeşitliliğine sebep olarak ülke refahını artıracaktır. Bu çalışmada her iki etki de eş anlı olarak analize dahil edilmiştir; bu sayede literatüre katkı sağlamak

amaçlanmıştır. Bu çerçevede analiz edilen modelden elde edilen sonuçlar aşağıda özetlenmiştir.

Model çözümünden elde edilen sonuçlara göre piyasa genişlemesinin baskın olması durumunda ücretlerde artış meydana gelmekte ve etkin ücret varsayımı gereği ücretlerde meydana gelen artış işçi verimliliğini artırmaktadır. Piyasa rekabetinin baskın olması ve artmaya devam etmesi durumunda ise ücretlerde aşınma meydana gelmekte ve işçi verimliliği azalmaktadır. Piyasa genişlemesinin baskın olması ve artmaya devam etmesi durumunda işsizlik azalmaktadır. Piyasa genişlemesinden faydalanmak isteyen firma verimliliği artırmak isteyecektir. Verimliliğini artırmak isteyen firma ücretleri artırma yoluna gidecektir. Verimlilik artışı mal kalitesini artırarak fiyatların artmasına sebep olur; artan kârlar ve genişleyen pazar piyasaya daha çok firma girmesine sebep olarak işsizliğin azalmasına yol açar.

Modelde piyasadaki rekabetin baskın olması ve artması durumunda ise işsizlik oranı artmaktadır. Firma artan rekabet ile mücadele edebilmek için ücretleri düşürerek maliyetleri azaltma yoluna gidecektir. Hem ücretlerde meydana gelen düşüşün verimliliği azaltması hem de firmanın rekabet gücünü artırmak için mal fiyatlarında azalmaya gitmesi firmanın yükünü artıracaktır. Bazı firmalar hem verimlilikteki düşüşten hem de fiyat indirimine gidemediğinden rekabet edemeyecek ve piyasa dışına itilecektir. Dolayısıyla piyasadaki firma sayısı azalacak ve işsizlik artacaktır.

Piyasa genişlemesinin baskın olması durumunun ücret artışına yol açtığına daha önce değinilmiştir. Ücretlerde meydana gelen artışa bağlı olarak yerli mal fiyatları artarken ticaret bariyerinin düşmesi sonucu piyasa genişlemesi halinde ithal mal fiyatları düşecektir. Piyasa rekabetinin baskın olması durumunda ise daha önce de belirtildiği gibi ücretlerde aşınmaya yol açmaktadır. Ücretlerde meydana gelen aşınma ise mallara olan talebin azalmasına yol açarak ithal ve yerli mal fiyatının düşmesine sebep olmaktadır.

Model kurulurken ekonomideki işsiz kişilerin tüketim ihtiyaçlarını karşılayabilmeleri için ihtiyaç duydukları işsizlik sigortasının, çalışanlardan alınan vergiler sayesinde ödendiğine değinilmiştir. Piyasa genişlemesinin baskın olması durumunda ücretler artacaktır. Ayrıca işsizlik azaldığı için hem daha çok vergi toplanacak hem de vergilerin dağıtılacağı kişi sayısında azalma meydana gelecektir. İşsizlik sigortası toplanan verginin tamamının eşit şekilde işsiz kişilere verilmesi olduğu için işsizlik sigortası artacaktır. Piyasadaki rekabetin baskın olması durumunda ise işsizlik artacağı için işsizlik sigortası azalacaktır. Rekabetin baskın olması durumunda hem ücretlerde düşüş meydana geldiği için hem de çalışan kişi sayısı azaldığı için toplanan vergiler azalacaktır. Diğer taraftan işsizlik sigortasına ihtiyaç duyan birey sayısının artması da işsizlik sigortasının düşmesine sebep olacaktır. Modelde piyasa genişlemesinin baskın olması durumunda firma sayısı artarken (işsizliğin azalma sebeplerinden biridir aynı zamanda) piyasa rekabetinin baskın olması durumunda firma sayıları azalmaktadır (işsizliğin artma sebeplerinden biridir aynı zamanda).

Sonuç olarak yapılan bu çalışma ile ticari serbestleşmenin birer sonucu olan piyasa genişlemesinin ve artan pazar rekabetinin etkileri arasında zıt yönlü bir ilişki olduğu görülmektedir. Uluslararası ticaretten fayda sağlamak isteyen ülkeler uluslararası ticaret politikalarını belirlerken bu iki farklı etkiyi ve olası sonuçlarını göz önünde bulundurmalıdır.

Kaynaklar

Amand, M. & F. Pelgrin (2016), "Pareto Distributions in International Trade: Hard to Identify, Easy to Estimate", *Toulouse School of Economics Macroeconomics Seminar Working Paper*.

Aw, B.Y. et al. (2000), "Productivity and Turnover in the Export Market: Micro-level Evidence from the Republic of Korea and Taiwan (China)", *World Bank Economic Review*, 14, 65-90.

Axtell, R.L. (2001), "Zipf Distribution of U.S. Firm Sizes", *Science*, 293, 1818-1820.

Baldwin R. & P. Krugman (1989), "Persistent Trade Effects of Large Exchange Rate Shocks", *The Quarterly Journal of Economics*, 104(4),635-654.

Baldwin, R. & W. Gu (2003), "Export-Market Participation and Productivity Performance in Canadian Manufacturing", *Canadian Journal of Economics*, 36(3),634-657.

Baldwin, R. (1990), "Hysteresis in Trade", *Empirical Economics*, 15(2), 127-142.

Bentivogli, C. & P. Pagano (1999), "Trade, Job Destruction and Job Creation in European Manufacturing", *Open Economies Review*, 10, 165-184.

Bernard, A. et al. (2007), "Firms in International Trade", *Journal of Economic Perspectives*, 21(3), 105-130.

Bernard, A.B. & J.B. Jensen (1999), "Exceptional Exporter Performance: Cause, Effect, or Both?", *Journal of International Economics*, 47, 1-25.

Bernard, A.B. et al. (2003), "Plants and Productivity in International Trade", *American Economic Review*, 93(4), 1268-1290.

Brecher, R.A. (1974), "Minimum Wage Rates and the Pure Theory of International Trade", *The Quarterly Journal of Economics*, 88(1),98-116.

Caliendo, L. et al. (2019), "Trade And Labor Market Dynamics: General Equilibrium Analysis of The China Trade Shock", *Econometrica*, 87(3), 741-835.

Clerides, S.K. et al. (1998), "Is Learning by Exporting Important? Micro-dynamic Evidence fromColombia, Mexico, and Morocco", *The Quarterly Journal of Economics*, 113, 903-947.

Cote, S.L. (2007), "Tariff reduction and employment in Canadian manufacturing", *Canadian Journal of Economics*, 40(3), 843-860.

Dutt, P. et al. (2009), "International trade and unemployment: Theory and Cross-National Evidence", *Journal of International Economics*, 78, 32-44.

Egger, H. & U. Kreickemeier (2009), "Firm Heterogeneity and the Labor Market Effects of Trade Liberalization", *International Economic Review*, 50(1), 87-216.

Fugazza, M. & A.C. Molina (2009), "The Determinants of Trade Survival", *HEID Working Paper*, No:05/2009, 1-37.

Helpman, E. & O. Itshoki (2010), "Labor Market Rigidities, Trade and Unemployment", *Review of Economic Studies*, 77(3), 1100-1137.

Helpman, E. et al. (2004), "Export versus FDI with Heterogeneous Firms", *American Economic Review*, 94(1), 300-16.

Hung, L.W. & S.K. Peng (2019), "Unemployment With Trade And Firm Heterogeneity", *International Journal of Economic Theory*, 16(1), 62-81.

Janiak, A. (2007), "Does Trade Liberalization Lead to Unemployment? Theory and Some Evidence", Mimeo, Universite Libre de Bruxelles *Thesis*, 1-50.

Krugman, P. (1980), "Scale Economies, Product Differentiation, and the Pattern of Trade", *The American Economic Review*, 70(5), 950-959.

Lee, K.Y. (2018), "A Quantitative Trade Model with Unemployment", *Korea Institute for International Economic Policy Working Papper*, No:18-04.

Mas-Colell, A. et al. (1995), *Microeconomic Theory*, New York: Oxford University Press.

Matusz, S.J. (1986), "Implicit Contracts, Unemployment and International Trade", *The Economic Journal*, 96(382), 307-322.

Melitz, M.J. & S.J. Redding (2012), "Heterogeneous Firms and Trade", *Center for Economic Performans Discussion Paper*, No.1183, 1-66.

Melitz, M.J. (2003), "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity", *Econometrica*, 71, 1695-1725.

Melitz, M.J. (2008), "International Trade and Heterogeneous Firms", içinde: S.N. Durlauf (ed.), *New Palgrave Dictionary of Economics Second Edition*, New York: Palgrave Macmillan.

Pişkin, E. (2017), "Türkiye İhracatının Ölüm-Kalım Meselesi", *Munich Personal RePEc Archive*, No. 81459.

Saez, E. (2001), "Using Elasticities to Derive Optimal Income Tax Rates", *Review of Economic Studies*, 68, 205-229.

Sosyoekonomi

2022, Vol. 30(51), 353-364

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.17
Date Submitted: 05.03.2021
Date Revised: 27.10.2021
Date Accepted: 18.01.2022

Bilimsel ve Teknolojik Performansın Ekonomik Büyümeye Etkisi: OECD Ülkeleri Üzerine Bir Panel Veri Analizi[1]

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The Role of Scientific and Technological Performance on Economic Growth: A Panel Data Analysis for OECD Countries[2]

Abstract

Non-physical factors such as education, knowledge, information, innovation, and research and development (R&D) are new sources for economic growth. The study analyses the effect of scientific and technological performance on GDP. Pedroni Cointegration Test, Vector Error Correction Model, and Granger Causality Analysis are applied to 21 OECD member countries for the 2003-2016 period. As the result of the analysis, it is determined that there is a long-term relationship between R&D expenditures used in the concretization of scientific and technological performance, the number of patents applied for innovation, and GDP. Further, the relationships' directions are determined from patent applications to GDP and GDP to R&D expenditures.

Keywords : Granger Causality Analysis, R&D, Patent Applications, Economic Growth, Panel Data.

JEL Classification Codes : O01, O47 C23.

Öz

Eğitim, bilgi, enformasyon, yenilik ve araştırma ve geliştirme (Ar-Ge) gibi fiziki olmayan faktörler ekonomik büyümenin yeni kaynakları olarak ifade edilmektedir. Bu çalışmada, bilimsel ve teknolojik performansın GSYH üzerindeki etkisi analiz edilmiştir. Bu amaçla, 21 OECD ülkesi için, 2003-2016 yılları panel verisi kullanılarak Pedroni Eşbütünleşme Testi, Vektör Hata Düzeltme Modeli (VECM) ve Granger Nedensellik Analizi uygulanmıştır. Analiz sonucunda bilimsel ve teknolojik performansın somutlaştırılmasında kullanılan GSYH harcamalarından Ar-Ge harcamaları, yenilik yapmak için başvurulan patent sayıları ile GSYH arasında uzun süreli bir ilişki olduğu ve bu ilişkinin yönünün de patent başvurularının GSYH'nin sebebi ve GSYH'nin da Ar-Ge harcamalarının sebebi olacak şekilde gerçekleştiği belirlenmiştir.

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[1] *Bu çalışma Dr. Öğr. Üyesi Onur DEMİREL danışmanlığında Ayşe TEKİN tarafından hazırlanan ve Süleyman Demirel Üniversitesi Sosyal Bilimler Enstitüsü İktisat Anabilim Dalında 2019 yılında savunulan "Bilimsel ve Teknolojik Performansın Ekonomik Büyümeye Etkisi, OECD Ülkeleri Üzerine Bir Panel Veri Analizi" başlıklı yüksek lisans tezinden türetilmiştir.*

[2] *This article is reproduced from the Master's Thesis titled "The Role of Scientific and Technological Performance on Economic Growth: A Panel Data Analysis for OECD Countries" that was prepared by Ayşe TEKİN, supervised by Asst. Prof. Onur DEMİREL and presented to the Department of Economics, Institute of Social Sciences, Süleyman Demirel University in 2019.*

Anahtar Sözcükler : Granger Nedensellik Analizi, Ar-Ge, Patent Başvuruları, Ekonomik Büyüme, Panel Veri.

1. Giriş

Bilim ve teknoloji ile Ar-Ge ayrılmaz iki kavram olarak kabul edilmektedir. Bilim ile teknoloji arasındaki bağlantı teknolojinin 'uygulamalı bilim' olarak somutlaştırılmasından kaynaklanmaktadır. Günümüz tüketim eğilimleri dikkate alındığında teknoloji, bilgi, Ar-Ge ve yenilik barındıran mal ve hizmetlerin tüketiminin ağırlıklarının giderek arttığı görülmektedir. Dolayısıyla bu kavramlar günümüzde olduğu gibi gelecekte de güç dengelerini belirleyecek faktörlerdir. Dolayısıyla bu kavramlar ile ekonomik büyüme ve kalkınma arasındaki ilişkinin incelenmesi büyük önem taşımaktadır. Bu amaçla çeşitli ölçütler kullanılmakla birlikte bu ölçütlerin en önemlilerinden biri milli gelirden Ar-Ge faaliyetlerine yapılan harcamalardır. Ülkeler arasındaki bilimsel gelişmişliği ölçmeye yarayan araçlardan diğer bazıları ise Ar-Ge'de çalışan personel sayısı, yayınlanan bilimsel makale sayıları ve patent başvurularıdır.

Ekonomik büyümenin en önemli unsurlarından bir tanesi büyümenin sürdürülebilir olmasıdır. Sürdürülebilir büyümenin gerçekleşmesi içinse, yaşanan yenilikleri takip etmek ve gerçekleşen bu yenilikleri uygulayabilen bir ülke statüsünde olmak önem arz etmektedir.

İktisat literatürü bu bağlamda incelendiğinde, bilimsel ve teknolojik çalışmalar ile ekonomik büyüme ilişkisini inceleyen çok sayıda çalışmanın olduğu görülmektedir. Ar-Ge harcamaları gibi bilgi ekonomisi temelli değişkenlerin iktisat literatüründe incelenmesi ilk olarak Romer'in 1986 yılındaki içsel büyüme modeline kadar uzanmaktadır. Öte yandan teknolojinin günlük yaşamdaki önemi attıkça da bu alana dair çalışmaların yaygınlaştığı görülmektedir. Ar-Ge'ye yapılan harcamalar ve patent başvurusunun ekonomik büyüme üzerindeki etkisini inceleyen çalışmalardan bir kısmına Tablo 1'de yer verilmiştir.

Tablo: 1
Ar-Ge Harcamaları ve Patent Başvurusunun Ekonomik Büyüme Üzerindeki Etkilerini İnceleyen Çalışmalar

Yazar(lar)	Değişken(ler)	Yöntem ve Ülke(ler)	Başlıca Bulgular
Akarsu vd. (2020)	Ar-Ge harcamaları, Patent başvuruları, Ekonomik büyüme	Panel Veri Analizi, 14 Ülke (1996-2017)	Ar-Ge harcamalarında %1'lik bir artış, makalede incelenen 14 ülkenin GSYH üzerinde %0,87'lik bir puan artışına sebep olmaktadır. Patent başvuru sayıları ile GSYH arasında negatif bir ilişki tespit edilmiştir.
Xu, Li (2019)	Ekonomik büyüme, Yenilikçi insan sermayesi, Ticarete açıklık	Panel Veri Analizi, OLS, SLM, SEM Modelleri Çin (2000-2016)	Yenilikçi insan sermayesi, ticarete açıklık ve ekonomik büyüme arasında pozitif ve istatistiksel olarak anlamlı bir ilişki bulunmuştur. Yenilikçi insan sermayesi ile ekonomik büyüme arasında eşbütünleşme vardır. Yenilikçi insan sermayesi stokundaki %1'lik artış çıktı düzeyinde %1,10 artışa yol açmaktadır.
Özcan, Özer (2018)	Ar-Ge harcamaları ve patent başvuruları, Ekonomik büyüme	PMGE ve MGE yöntemleri ile Panel Veri Analizi OECD Ülkeleri (1995-2013)	Ar-Ge harcamaları ve patent başvurusu sayıları arasında sadece uzun dönemde eşbütünleşme ilişkisi tespit edilmiştir. İlişkinin yönü pozitif olarak ölçülmüştür.
Altıner, Toktaş (2017)	İnovasyon, Ekonomik büyüme	Panel Veri Analizi, CDLM Testi, Hadri-Kurozumi Birim Kök Testi, 21 Ülke (1992-2015)	Seriler arasında uzun dönemli ilişkinin varlığı eşbütünleşme analizi ile tespit edilmiştir. Uzun dönemde inovasyon oranının ekonomik büyüme üzerinde pozitif ve anlamlı bir etkiye sahip olduğu sonucuna ulaşılmıştır.

Macerinskiene, Aleknaviciute (2017)	Ekonomik büyüme, Entelektüel insan sermayesi	Küme Analizi, Korelasyon ve Regresyon Analizi, SAW Modeli, 25 AB Ülkesi	Entelektüel sermayenin bileşenleri (beşerî, sosyal, yapısal ve ilişkisel sermaye) ekonomik büyümenin hızı üzerinde istatistiksel olarak anlamlı bir etkiye sahiptir.
Dam, Yıldız (2016)	Ar-Ge harcamaları, Patent, Ekonomik büyüme	Panel Veri Analizi, BRICST, Meksika (2000-2012)	Ar-Ge ve inovasyon ile ekonomik büyüme arasında pozitif ve istatistiksel olarak anlamlı bir ilişki bulmuşlardır.
Sungur, Aydın, Eren (2016)	Ar-Ge, İnovasyon, İhracat, Ekonomik büyüme	ADF ve PP Testleri Granger Nedensellik Analizi, Türkiye (1990-2013)	Ar-Ge'den büyümeye doğru tek yönlü; Ar-Ge işgücü ile ihracat pozitif bileşenleri arasında ise çift yönlü ilişki bulmuşlardır.
Inekwe (2015)	Ar-Ge harcamaları, Ekonomik büyüme	Dinamik Panel Veri Analizi (GMM), 66 Ülke (2000-2009)	Gelişmekte olan ülkelerde Ar-Ge harcamalarının ekonomik büyüme üzerinde olumlu etkisi tespit edilmiştir. Bu etki üst orta gelirli ekonomilerde pozitif iken düşük gelirli ekonomilerde önemsizdir.
Gülmez, Akpolat (2014)	Ar-Ge faaliyetleri, İnovasyon ve Ekonomik büyüme	Dinamik Panel Veri (GMM) Yaklaşımı, Türkiye ve 15 AB Ülkesi (2000-2010)	Ar-Ge harcamalarının ekonomik büyüme üzerindeki etkisi patent başvurularına göre 4 kat daha fazladır. Uzun dönemde patent başvurularından ve Ar-Ge harcamalarından ekonomik büyümeye doğru pozitif ve anlamlı bir ilişki tespit edilmiştir.
Gülmez, Yardımcıoğlu (2012)	Ar-Ge harcamaları, Ekonomik büyüme	Panel Eşbütünleşme ve Panel Nedensellik Analizi 21 OECD Ülkesi (1990-2010)	21 OECD Ülkesinde Ar-Ge harcamalarındaki %1'lik artış, ekonomik büyüme üzerinde %0,77'lik bir artışa sebep olmaktadır. Değişkenler arasında uzun dönemli nedensellik ilişkisi tespit edilmiştir. Değişkenler arasında karşılıklı olarak anlamlı bir ilişki bulunmuştur.
Güloğlu, Tekin (2012)	Ar-Ge harcamaları, İnovasyon, Ekonomik büyüme	Panel Veri Analizi (GMM), Var Modeli, 13 Yüksek Gelirli OECD Ülkesi (1991-2007)	İnovasyon, patentler ve yeni teknolojik gelişmeler içsel büyüme modelinde de vurgulandığı gibi ekonomik büyümeye neden olmaktadır. Pazar büyüklüğü ve İnovasyon oranı da Ar-Ge faaliyetlerine neden olmaktadır.
Alene (2010)	Ar-Ge harcamaları, Üretkenlik artışı	Malmquist TFP Endeksi Ölçümleri, Afrika (1970-2004)	Ar-Ge harcamalarındaki artış Afrika tarımında sosyal açıdan karlı bir yatırım olarak kabul edilmektedir. Ar-Ge harcamaları ile tarımsal verimlilik arasında doğru orantılı bir ilişki tespit edilmiştir.
Genç, Atasoy (2010)	Ar-Ge harcamaları, Ekonomik büyüme	Panel Veri Analizi, 34 ülke (1997-2008)	Ar-Ge harcamalarından ekonomik büyümeye doğru tek yönlü nedensellik ilişkisi bulmuşlardır.
Yaylalı vd. (2010)	Ekonomik büyüme, Ar-Ge harcamaları	Vektör otoregresyon modeli, Granger Nedensellik Analizi, Türkiye (1990-2009)	Ar-Ge harcamalarından ekonomik büyümeye doğru pozitif yönde bir nedensellik tespit edilmiştir.
Afşar (2009)	Eğitim harcamaları, Ekonomik büyüme	Granger Nedensellik Testi, Türkiye (1963-2005)	Eğitim yatırımları ile büyüme arasında tek yönlü bir nedensellik vardır, yönü eğitim yatırımlarından ekonomik büyümeye doğrudur.
Özer, Çiftçi (2009)	Ar-Ge harcamaları, Araştırmacı sayıları, Patent sayıları, GSYH	Panel Veri Analizi, OECD Ülkeleri (1990-2005)	Araştırmacı sayılarının, patent sayılarının ve Ar-Ge harcamalarının GSYH üzerinde yüksek ve pozitif oranlı bir etkiye sahip olduğu tespit edilmiştir.
Ünlükaptan (2009)	İktisadi kalkınma, Rekabetçilik, İnovasyon	Kanonik Korelasyon Analizi, 27 EU ülkesi	İktisadi kalkınma ile rekabetçilik ve inovasyon arasında yüksek bir korelasyon bulmuştur.
Altın, Kaya (2009)	Ar-Ge harcamaları, Ekonomik büyüme	VEC Modeli, Türkiye (1990-2005)	Uzun dönemli bir nedensellik ilişkisi bulunmuştur. Yapılan Ar-Ge harcamaları uzun dönem ekonomik performansı etkilemektedir. Kısa dönemde ise bir ilişki tespit edilememiştir.
Ay, Yardımcı (2008)	Beşerî sermaye, Ekonomik büyüme	Zaman Serileri-VAR Modeli, Türkiye (1950-2000)	Uzun dönemde fiziksel ve beşerî sermayenin ekonomik büyüme ve verimlilik üzerine etkisi pozitif ve anlamlıdır.
Driouchi, Azelmad, Anders (2006)	Ekonomik büyüme, Eğitim yatırımları, Ar-Ge, Bilgi teknolojileri	Regresyon Analizi, 56 ülke (1995-2001)	Eğitim yatırımları, Ar-Ge ve bilgi teknolojilerinin ekonomik büyüme üzerinde pozitif ve anlamlı bir etkiye sahiptir. Bu etkinin derecesi gelişmiş ve gelişmekte olan ülkelerde farklı düzeylerde gerçekleşmektedir.
Ülkü (2004)	Ar-Ge Faaliyetleri, İnovasyon ve Ekonomik büyüme	Panel Veri Analizi, 20 OECD Ülkesi (1981-1997)	Değişkenler arasında pozitif bir ilişki bulunduğu tespit edilmiştir. Ar-Ge, inovasyon ve yenilikler ekonomik büyümede kalıcı sonuçlar ortaya koymasa da sonuçlar içsel büyüme modellerini desteklemektedir.
Mulligan, Sala-I-Martin (2000)	Ekonomi, İnsan sermayesi	Panel Veri Analizi, ABD (1940-1990)	Beşerî sermaye stoku, üretim fonksiyonu ve toplam girdilerin istikrarlı bir fonksiyonu olarak gerçekleşmektedir. Beşerî sermaye stokuna ilişkin anlamlı tahminler üretilmesinde makale önem arz etmektedir.
Rebelo (1998)	Ekonomik büyüme, Sermaye, Bilgi	Literatür taraması, Neoklasik büyüme modellerinin etkileri	Beşerî sermayenin ve teknolojinin ekonomik büyüme üzerindeki etkileri, inovasyon yatırımı yapan ülkelerde diğer ülkelere kıyasla daha yüksek oranda gerçekleşmektedir.
Coe, Helpman (1995)	Yerli ve yabancı Ar-Ge sermayesi, Beşerî sermaye, TFP (Toplam Faktör Verimliliği)	Panel Veri Analizi, 21 OECD Ülkesi (1971-1990)	Yerli ve yabancı Ar-Ge sermayesi ile beşerî sermaye eşbütünleşiktir. Her iki değişken de TFP'nin önemli belirleyicilerindendir. Yerli Ar-Ge sermayesinin etkisi yabancı Ar-Ge sermayesine oranla daha büyüktür.
Grossman, Helpman (1994)	Ekonomik büyüme, İnovasyon	Literatür taraması, 24 OECD Ülkesi (1970-1988)	Sürdürülebilir ekonomik büyümenin sağlanmasında önemli rol oynayan inovasyon, teknoloji ve insan sermayesi büyüme teorilerine yenilik kazandırması bakımından önemli bir etkiye sahiptir.
Lichtenberg (1993)	Ar-Ge harcamaları, Ekonomik büyüme	Panel Veri Analizi, OECD Ülkeleri (1972-1985)	Kamu harcamaları ile ekonomik büyüme arasında negatif ilişki tespit edilmiştir. Özel sektör Ar-Ge harcamaları ile ekonomik büyüme arasında bir ilişki tespit edilememiştir.

Barro (1991)	Eğitim seviyesi, Ekonomik büyüme	Granger Nedensellik Testi, Eşbütünleşme, 98 ülke (1960-1985)	Eğitim seviyesi ve ekonomik büyüme arasındaki eşbütünleşme anlamlıdır.

Ulusal ve uluslararası literatür taramasının sonucunda bilimsel ve teknolojik gelişmelerin somut verilerini elde etmeye yarayan Ar-Ge harcamaları ve patent başvurularının ekonomik büyüme üzerinde pozitif etkisi olduğu sonucuna ulaşılmıştır. Elde edilen bulgular içsel büyüme modellerini destekler niteliktedir. Ar-Ge harcamaları ve patent başvurusunun ekonomik büyüme üzerindeki etkilerini inceleyen çalışmaların literatür ile uyumlu olarak gerçekleştiği tespit edilmiştir. Benzer bir sonuca gelişmiş ülkeler için Taş vd. (2017: 201) de ulaşmışlardır.

Çalışmanın temel amacı, 21 OECD ülkesine ait 2003-2016 dönemi yıllık panel verileri kullanılarak bilimsel ve teknolojik performans ile GSYH arasında nedensellik ilişkisinin olup olmadığını belirlemektir. Teknoloji çağının ekonomik etkilerini daha net görebilmek için 2003-2016 yılları verileri tercih edilmiştir. Bu amaçla, Pedroni Eşbütünleşme Testi, Vektör Hata Düzeltme Modeli ve Granger Nedensellik Analizinden faydalanılmıştır. Çalışmanın devamında öncelikle kullanılan model tanıtılmakta, model tahmin sonuçları verilmekte ve bu sonuçlar tartışılmaktadır.

2. Veri ve Yöntem

Çalışmada, bilimsel ve teknolojik performansın GSYH üzerine etkisini ölçebilmek amacıyla, 21 OECD ülkesinin (bkz. Tablo 2) 2003-2016 yıllarına ait yıllık GSYH, patent başvuru sayısı ve milli gelirden Ar-Ge'ye yapılan harcama miktarı panel verileri kullanılmıştır. Panel veri; yatay kesitteki birimlerin zaman serisi içerisindeki değişimlerini gözlemleme, birimlerin değişimini ayrı ayrı veya birlikte açıklayabilme ve her bir birimin ilgili açıklayıcı değişkene bağlı olarak öngörüsünü yapabilme üstünlüklerine sahip olması dolayısıyla tercih edilmiştir (Bayraktutan-Demirtaş, 2011: 5). Çalışmada OECD ülkelerinin seçilmesinin sebebi ise bu ülkelerin toplam dünya üretiminin dörtte üçünü (Akça, 2018: 70) gerçekleştirmeleridir.

Tablo: 2
Araştırmaya Dahil Edilen 21 OECD Ülkesi

ABD	Finlandiya	Japonya	Portekiz
Almanya	Fransa	Kanada	Slovakya
Avusturya	Hollanda	Kore	Türkiye
Belçika	İrlanda	Macaristan	
Birleşik Krallık	İspanya	Meksika	
Çek Cumhuriyeti	İsrail	Polonya	

Ülkelere ait GSYH (GDP) değerleri dolar cinsinden, patent başvuru sayıları (PA) mutlak değer olarak ve milli gelirden Ar-Ge'ye yapılan harcama miktarı (GERD) ise % olarak dikkate alınmıştır (bkz. Tablo 3).

Tablo: 3
Kullanılan Veri ve Değişkenler

	Değişken	Tanım	Birim	Kaynak
Bağımlı Değişken	GDP	Reel Gayri Safi Milli Hasıla	Dolar	Dünya Bankası (WB)
Bağımsız Değişkenler	PA	Patent Başvurusu	Adet	WB
	GERD	Milli Gelirden Ar-Ge'ye Yapılan Harcamalar	%	WB ve OECD Veri Tabanı

Model tahmini için çalışmada EViews 9 ekonometrik paket programından faydalanılmıştır.

Çalışmada Eşitlik 1 yardımıyla Ar-Ge harcamalarının ve patent başvurularının milli gelirde meydana getirdiği etki incelenmiştir.

$$DGDP_{it} = \beta_0 + \beta_1 DPA_{it} + \beta_2 DGERD_{it} + \varepsilon_{it} \quad (1)$$

Yukarıdaki eşitlikte GDP_{it}, t zamanında i ülkesi için GSYH'sini; PA_{it}, t zamanında i ülkesinin patent başvuru sayısını; $GERD_{it}$, t zamanında i ülkesinde GSYH'den Ar-Ge'ye yapılan harcama yüzdesini ve ε_{it}, hata terimini ifade etmektedir.

Panel veri kullanımıyla ilgili dikkat edilmesi gereken diğer bir husus zaman serilerinden kaynaklanan birim kök sorunudur. Serilerde birim kökün olup olmadığını test eden Im, Pesaran, Shin testi Eşitlik 2 yardımı ile gerçekleştirilmiştir (Kök & Şimşek, 2021; Hatırlı vd., 2012; Im et al., 2003).

$$\Delta y_{it} = a\, y_{i,t-1} + \sum_{j=1}^{pi} B_{ij}\, \Delta y_{i,t-1} + x_{it}\, \delta + \varepsilon_{it} \quad (2)$$

Hata bileşen modeli olarak adlandırılan rassal etkiler modelinde β_{it}'yi sabit olarak ele almaktansa β_1'in ortalama değeriyle birlikte rassal bir değişken olarak varsayılmasıyla Eşitlik 3'e β_{it} yerine $\beta_{1i} = \beta_1 + \varepsilon_{it}$ yazılması ile Eşitlik 4 ve 5 elde edilmektedir.

$$Y_{it} = \beta_{1i} + \beta_2 X_{2it} + \beta_3 X_{3it} + U_{it} \quad (3)$$

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + \varepsilon_{it} + U_{it} \quad (4)$$

$$Y_{it} = \beta_1 + \beta_2 X_{2it} + \beta_3 X_{3it} + W_{it} \quad (5)$$

Eşitlik 5'teki W_{it}, bileşik hata terimini ifade etmektedir. Yatay kesite özgü hata bileşeni ε_{it}'nin ve zaman serisi ve yatay kesitin bileşiminden oluşan hata terimi U_{it}'nin bu özelliğinden dolayı model, hata bileşen modeli olarak adlandırılmaktadır (Kök & Şimşek, 2021).

Modelde değişkenlerin optimum gecikme sayısını belirlemek amacıyla Schwarz bigi kriteri (SCI) kullanılmıştır. Seriler düzeylerinde durağan olmadığı için sabit terimli ve trendsiz model kullanılarak birinci dereceden farkları alınıp durağanlaştırılmıştır. Dolayısıyla tahminleme için Eşitlik 1'de verilen değişkenlerin, birinci dereceden farkı alınarak durağanlaştırılmış versiyonları kullanılmıştır.

$$DGDP_{it} = \beta_0 + \beta_1 DPA_{it} + \beta_2 DGERD_{it} + \varepsilon_{it} \quad (6)$$

3. Model Tahmin Sonuçları

OECD ülkelerinde bilimsel ve teknolojik gelişmeler ile ekonomik büyüme arasındaki ilişkiyi inceleyen çalışmada panel veri seti kullanıldığı için öncelikle sabit ve rassal etkilerden hangisinin kullanılacağına karar vermek gerekmektedir. Bu amaçla, Hausman testi kullanılmıştır ve sonuçlar aşağıdaki tabloda verilmiştir.

Tablo: 4
Hausman Test Sonucu

	Ki-kare İstatistiği	Ki-kare Olasılık
Rassal etki	1,301	0,522

Hausman test sonuçlarına göre olasılık değeri 0,05'ten büyük olduğu için H_0 hipotezi reddedilmemiş ve rassal etkiler modelinin kullanılması gerektiği tespit edilmiştir.

Çalışmada bütün değişkenlerin birim kök analizi Levin, Lin, Chu ve Breitung (LCC-B); Im, Pesaran ve Shin (IPS); Augmented Dickey Fuller (ADF) ve Phillips-Peron (PP) testleri ile yapılmış ve durağan olup olmadıkları tespit edilmiştir. Aşağıdaki tabloda serilerin birim kök analizi için düzey ve birinci dereceden fark değerleri verilmiştir.

Tablo: 5
Birim Kök Testi Sonuçları

Birim Kök Testleri					
Değişkenler		**LLC-B**	**IPS**	**ADF**	**PP**
GDP	**Düzey**	-3,12182	1,25612	33,6561	50,0752
		(0,0009)*	(0,8955)	(0,8172)	(0,1835)
	1. Fark	-10,5517	-6,76274	117,623	138,123
		(0,0000)*	(0,0000)*	(0,0000)*	(0,0000)*
GERD	**Düzey**	-2,24509	0,48310	44,0793	19,9364
		(0,0124)**	(0,6855)	(0,3837)	(0,9985)
	1. Fark	-7,47927	-6,81908	123,371	140,705
		(0,0000)*	(0,0000)*	(0,0000)*	(0,0000)*
PA	**Düzey**	-1,18949	1,01200	45,9070	56,1462
		(0,1171)	(0,8442)	(0,3135)	(0,0709)***
	1. Fark	-14,1125	-11,0083	177,097	201,560
		(0,0000)*	(0,0000)*	(0,0000)*	(0,0000)*

*Not: *; **; *** sırasıyla %1, %5 ve %10 düzeyinde anlamlılığı ifade etmektedir.*

GDP, GERD ve PA değişkenleri sabit terimli ve trendsiz düzeylerinde birim kök içerdikleri için öncelikle birinci farkları alınarak durağanlaştırılmıştır. GDP ve GERD değişkenleri (IPS, ADF ve PP testlerine göre) düzeyde birim kök içerdiği için birinci dereceden farkı alınarak, tekrar birim kök testi uygulanmıştır. Bu test sonucunda GDP ve GERD serileri durağan hale gelmiştir. PA değişkeninin de birinci dereceden farkı alındığında ilgili değişkenin durağanlaştığı görülmüştür.

Seriler aralarında birinci dereceden bütünleşiktir. Serilerin her birinin birinci dereceden farkları alındığında durağanlaşmaları seriler arasında eşbütünleşme ilişkisinin var olduğunu tespit etmek açısından bir ön koşul oluşturmaktadır.

Değişkenler arasında uzun dönemde bir ilişkinin olup olmadığını tespit etmek için Pedroni eşbütünleşme testi uygulanmış ve test sonuçları Tablo 6'da verilmiştir.

Tablo: 6
Pedroni Eşbütünleşme Testi Sonuçları

Model: $GDP_{it} = \beta 0 + \beta 1\ GERD_{it} + \beta 2\ PA_{it} + \varepsilon_{it}$				
Grup İçi				
	t istatistiği	**Olasılık**	**Ağırlıklandırılmış t istatistiği**	**Olasılık**
Panel V istatistiği	-3,447540	0,9997	-3,296324	0,9995
Panel rho istatistiği	-0,969323	0,1662	-0,090417	0,4640
Panel PP istatistiği	-26,79408*	0,0000	-7,387830*	0,0000
Panel ADF istatistiği	-15,83623*	0,0000	-6,057248*	0,0000
Gruplar Arası				
Panel rho istatistiği	1,970854	0,9756		
Panel PP istatistiği	-13,21031*	0,0000		
Panel ADF istatistiği	-8,263831*	0,0000		

*Not: *, %5 düzeyinde anlamlılığı ifade etmektedir.*

Pedroni Eşbütünleşme Testi sonucunda Panel V ve rho istatistikleri istatistiksel olarak anlamlı değildir. Ancak çoğunluğa göre karar verileceğinden dolayı Pedroni eşbütünleşmedeki sıfır hipotezi reddedilir yani değişkenler arasında eşbütünleşme olduğu sonucuna ulaşılmıştır. Bu da uzun dönemde GDP, GERD ve PA serilerinin birlikte hareket ettiği anlamına gelmektedir. Test sonuçlarına göre kısa dönemde farklı hareket ettikleri zannedilen değişkenler uzun dönemde aynı trendi paylaşmakta ve birlikte hareket etmektedirler. Eşbütünleşme ilişkisinden dolayı nedensellik ilişkisinin tespiti ve nedenselliğin yönünün belirlenebilmesi için VAR modeli yerine VECM (Vector Error Correction Model) modeli kullanılmıştır (Granger, 1969: 424-438). VECM sonuçları Tablo 7'de verilmiştir.

Tablo: 7
Vektör Hata Düzeltme Modeli Sonuçları

		Katsayı	**Std. Hata**	**t-istatistik**	**Olasılık**
1	$LGDP=\beta_1+\beta_2 LGERD$	0,000227	0,000158	1,435681	0,1518
2	$LGERD=\beta_1+\beta_2 LGDP$	-0,018818	0,007585	-2,481048	0,0135*
3	$LGDP=\beta_1+\beta_2 LPA$	0,000762	0,000635	1,199871	0,2308
4	$LPA=\beta_1+\beta 2 LGDP$	-0,007448	0,004827	-1,542985	0,1235
5	$LGERD=\beta_1+\beta 2 LPA$	-0,019041	0,008104	-2,349671	0,0192*
6	$LPA=\beta_1+\beta_2 LGERD$	0,003087	0,000903	3,420256	0,0007
$LGERD=\beta_1+\beta_2 LGDP$*					
L(DGERD) = C(1)* L(DGERD) - **0.045** *L(DGDP)					
$LGERD=\beta_1+\beta 2 LPA$*					
L(DGERD) = C(1)* L(DGERD) - **0.066***L(DPA)					

*Not: *, %5 düzeyinde anlamlılığı ifade etmektedir.*

Uzun dönemli ilişkilerde, dengede meydana gelen sapmalar karşısında modelin vereceği tepki Vektör Hata Düzeltme Modeli (VECM) ile test edilir. Katsayılar negatif ve anlamlı olduğunda, uzun dönemde meydana gelen sapmalarda yeniden dengeye doğru yönelmeler oluşacaktır.

Hata düzeltme mekanizmasının işlerliği için hata düzeltme katsayılarının sıfırdan farklı olması gerekmektedir. Tablo 7'den görüldüğü üzere, 2. ve 5. modellerde bağımsız değişkenlere ait t istatistik değerleri %5 anlamlılık düzeyinde anlamlıdır ve bu modellere ait

hata düzeltme katsayıları (-0,02) sıfırdan farklı ve negatiftir. Dolayısıyla bu modellerin kısa dönem dengesizliklerden uzun dönem dengeye azalarak geldikleri tespit edilmiştir.

Model tahmin sonuçlarına göre, milli gelirden Ar-Ge'ye yapılan harcamalar (GERD) ile milli gelir (GDP) arasında uzun dönemli pozitif yönlü bir ilişki mevcuttur. Buna göre GDP'de ortaya çıkan %1'lik artış, GERD'i %0,045 oranında etkilemektedir. Yine, GERD ile patent başvurusu (PA) arasında uzun dönemli bir ilişki mevcuttur ve PA'da meydana gelen %1'lik artış GERD'i %0,066 oranında etkilemektedir.

Ar-Ge harcamaları ve patent sayıları ile GDP arasındaki uzun dönem ilişki VECM yöntemi ile analiz edildikten sonra değişkenler arasında sebep sonuç ilişkisinin olup olmadığı ve ilişki varsa ilişkinin yönü literatürde yaygın olarak kullanılan Granger Nedensellik Testi ile test edilmiştir. Test sonuçları Tablo 8'de verilmiştir.

Tablo: 8
Granger Nedensellik Test Sonuçları

D(GDP)	**H_0 = Nedeni değildir.**	**F istatistiği**	**Olasılık**
D(GERD)	H_0 hipotezi kabul edilir.	2,412	0,661
D(PA)	H_0 hipotezi reddedilir.	25,817	0,000*
D(GERD)	**H_0 = Nedeni değildir.**	**F istatistiği**	**Olasılık**
D(GDP)	H_0 hipotezi reddedilir.	7,920	0,095**
D(PA)	H_0 hipotezi kabul edilir.	3,025	0,554
D(PA)	**H_0 = Nedeni değildir.**	**F istatistiği**	**Olasılık**
D(GDP)	H_0 hipotezi kabul edilir.	1,919	0,751
D(GERD)	H_0 hipotezi kabul edilir.	0,710	0,950

*Not: * ve ** sırasıyla %1 ve %10 anlamlılık düzeylerini ifade etmektedir.*

Granger Nedensellik Testi sonuçları dikkate alındığında D(PA)'nın %1 anlamlılık düzeyinde D(GDP)'nin ve D(GDP)'nin de %10 anlamlılık düzeyinde D(GERD)'in Granger nedeni oldukları; öte yandan başka bir nedensellik ilişkisinin bulunmadığı tespit edilmiştir. Diğer bir ifade ile patent başvuruları ekonomik büyümenin; gayrisafi milli hasıla da Ar-Ge harcamalarının nedeni olduğu sonucuna ulaşılmıştır. Sonuç olarak D(PA)'dan D(GDP)'ye ve D(GDP)'den D(GERD)'e doğru tek yönlü nedensellik ilişkileri söz konusudur (bkz. Tablo 9).

Tablo: 9
Granger Nedensellik Analizi Sonuçları

Değişkenler	**GDP**	**GERD**	**PA**
GDP			

Not: Tabloda ok işaretleri nedenselliğin yönünü ifade ederken boş kutucuklar, değişkenler arasında nedensellik ilişkisi olmadığını ifade etmektedir.

4. Sonuç

Bilimsel ve teknolojik performansın bir göstergesi olan Ar-Ge harcamaları ve patent başvurularının ekonomik büyümeye olan etkisinin analiz edildiği çalışmada, 21 OECD

ülkesine ait 2003-2016 dönemi yıllık verileri kullanılmıştır. Bu amaçla değişkenler arasında ilişki olup olmadığının ve nedenselliğin yönünün belirlenmesi için Hausman testi sonucunda rassal etkiler modelinin kullanılması gerektiği tespit edilmiş, ardından sırasıyla birim kök testleri, Pedroni Eşbütünleşme Testi, Vektör Hata Düzeltme Modeli (VECM) ile Granger Nedensellik Testi uygulanmıştır.

Panel veri analizi sonuçlarına göre Ar-Ge harcamaları ve patent başvuruları ile milli gelir arasında uzun dönemli bir ilişki olduğu tespit edilmiştir. Sonuçlar literatür kapsamında değerlendirildiği zaman, (1) patent başvurularından milli gelire doğru tespit edilen tek yönlü ilişkinin literatürle uyumlu olduğu; (2) milli gelirden Ar-Ge harcamalarına doğru tespit edilen tek yönlü ilişkinin ise teorik beklentinin tersi yönde olduğu görülmektedir. Literatürde patent başvurularının milli geliri olumlu etkilediğini bulan çok sayıda çalışma söz konusudur (Özcan ve Özer (2018); Gülmez ve Akpolat (2014); Güloğlu ve Tekin (2012); Özer ve Çiftçi (2009); Ülkü (2004)). Öte yandan literatürdeki çalışmaların önemli bir kısmı Ar-Ge'den milli gelire doğru bir nedensellik tespit etmektedir (Akarsu vd. (2020); Altıner ve Toktaş (2017); Inekwe (2015); Gülmez ve Akpolat (2014); Gülmez ve Yardımcıoğlu (2012); Güloğlu ve Tekin (2012); Alene (2010); Genç ve Atasoy (2010)). Dolayısıyla milli gelirden Ar-Ge'ye doğru tespit edilen ilişki literatür ile uyumlu olmamakla birlikte gelişmekte olan ülkeler için Ar-Ge'nin ancak belirli bir gelir düzeyinin üzerinde hayata geçebilmesi dolayısıyla bu türden bir ilişkinin ortaya çıktığı düşünülmektedir.

Diğer taraftan çalışma bulgularına göre, milli gelirden Ar-Ge harcamalarına ve patent başvurularından Ar-Ge harcamalarına doğru uzun dönemdeki politikaların sapması geçicidir ve kısa dönemlidir. Her iki model için de katsayıların negatif olması kısa dönemli dengesizliklerden dengeye doğru yönelme olduğu anlamına gelmektedir. Fakat uyarlanma hızı katsayıları "-0,02" olduğundan uyarlama hızının oldukça yavaş olduğu sonucuna ulaşılmıştır.

Çalışmada patent başvurularından milli gelire doğru bulunan tek yönlü ilişki ise beklentiler ve literatür ile uyumludur. Öte yandan beklenti ve literatürün aksine milli gelirden Ar-Ge harcamalarına doğru tek yönlü bir ilişki tespit edilmiştir. Bu bağlamda, Ar-Ge harcamalarının artırılması öncelikle milli gelirin artırılmasına ve Ar-Ge'ye ayrılabilecek payın bu yolla artırılması sayesinde olabilecektir. Bu durum orta gelir düzeyindeki ülkeler için öncelikle aşılması gereken bir zorluk olarak kabul edilmektedir. Belirli bir gelirin üzerinde ise artan Ar-Ge harcamalarının milli geliri yükseltmesi beklenilebilir.

Granger Nedensellik Testi sonuçlarından patent başvurularının ekonomik büyümeye pozitif etkisinin olduğu sonucuna ulaşılmıştır. Buna göre patent başvurularındaki artış bir ekonomide yenilik yapma potansiyelini artırdığından dolayı ekonomik büyümeyi olumlu yönde etkilemektedir. Burada, Ar-Ge harcamalarının da milli geliri artırıcı bir etkisi olması sonucu beklenmekle birlikte test sonuçlarına göre Ar-Ge harcamalarının milli gelir üzerinde beklenen etkisinin gerçekleşmediği sonucuna varılmıştır. Tablo 1'de verilen uluslararası literatür dikkate alındığında inovasyon, bilgi ve beşerî sermaye faktörlerinin ekonomik büyümeyi pozitif ve anlamlı etkilediği görülmektedir. Bu bağlamda çalışma sonucunda

patent başvurularından milli gelire doğru gerçekleşen etkinin literatürle uyumlu, Ar-Ge harcamalarından milli gelire etkisinin literatürle uyumsuz olduğu sonucuna varılmıştır.

Sonuç olarak, 21 OECD ülkesinde Ar-Ge faaliyetlerine verilen önemin ve yapılan patent başvuru sayısının zamanla arttığı gözlenmektedir. Ar-Ge için yapılan harcamaların ve yeni gelişmelerin patentlerle de desteklenmesi gerekmektedir. Yenilik potansiyeli bir ülkenin yerel ve ulusal pazarda rekabet gücünü artıracaktır. Bilimsel faaliyetlerin olumlu yönde gelişme göstermesi sadece ülke refahına etki etmekle kalmayacak aynı zamanda ülkelerin siyasal, sosyal ve kültürel hayatta da dönüşümler gerçekleştirebilmesine olanak sağlayacaktır. Diğer taraftan bilimsel ve teknolojik gelişmeler, uluslararası piyasada ve küresel finans sistemleri de dâhil olmak üzere pek çok konuda ülke kalkınmasına yardımcı olacaktır. Bu yüzden OECD ülkelerinin ve diğer ülkelerin Ar-Ge faaliyetlerine gerekli fonları ayırmaları, patent desteklerini artırmaları, yeterli sayıda ve kapasitede bilim insanını istihdam etmeleri, bu bilim insanlarının çalışmalarını destekleyerek onları teşvik etmeleri, bu şekilde de beyin göçünün önüne geçmeleri ve yeniliklere öncülük edebilecek bilimsel makaleleri yayımlamaları gerekmektedir.

Kaynaklar

Afşar, M. (2009), "Türkiye'de Eğitim Yatırımları ve Ekonomik Büyüme İlişkisi", *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 9(1), 85-98.

Akarsu, Y. vd. (2020), "Ülke Karşılaştırmaları ile Araştırma Geliştirme Harcamaları ve Ekonomik Büyüme İlişkisi: Panel Veri Analizi", *Sosyal Bilimler Araştırma Dergisi*, 9(4), 159-167.

Akça, H.S. (2018), "Ekonomik Büyüme ve İnovasyon İlişkisi Seçilmiş OECD Ülkeleri Üzerine Bir Panel Veri Analizi", *Yüksek Lisans Tezi*, Konya Karatay Üniversitesi Sosyal Bilimler Enstitüsü, Konya.

Alene, A.D. (2010), "Productivity Growth and the Effects of R&D in African Agriculture", *Agricultural Economics*, 41(3-4), 223-238.

Altın, O. & A. Kaya (2009), "Türkiye'de Ar-Ge Harcamaları ve Ekonomik Büyüme Arasındaki Nedensel İlişkinin Analizi", *Ege Akademik Bakış*, 9(1), 251-259.

Altıner, A. & Y. Toktaş (2017), "The Effects of Innovation on Economic Growth in the Emerging Market Economics: Panel Data Analysis", *Journal of Current Researches on Business and Economics*, 7(2), 477-496.

Ay, A. & P. Yardımcı (2008), "Türkiye'de Beşerî Sermaye Birikimine Dayalı Ak Tipi İçsel Büyümenin Var Modeli ile Analizi (1950-2000)", *Maliye Dergisi*, (155), 39-54.

Barro, R.J. (1991), "Economic Growth in a Cross Section of Countries", *Quarterly Journal of Economics*, 106(2), 407-443.

Bayraktutan, Y. & I. Demirtaş (2011), "Gelişmekte Olan Ülkelerde Cari Açığın Belirleyicileri: Panel Veri Analizi, Kocaeli Üniversitesi", *Sosyal Bilimler Enstitüsü Dergisi*, 22(2), 1-28.

Coe, D. & E. Helpman (1995), "International R&D Spillovers", *European Economic Review*, 39(5), 859-887.

Dam, M. & B. Yıldız (2016), "BRICS-TM Ülkelerinde Ar-Ge ve İnovasyonun Ekonomik Büyüme Üzerine Etkisi: Ekonometrik Bir Analiz", *Akdeniz Üniversitesi İİBF Dergisi*, 16(33), 220-236.

Driouchi, A. et al. (2006), "An Econometric Analysis of the Role of Knowledge in Economic Performance", *The Journal of Technology Transfer*, 31(2), 241-255.

Genç, M. & Y. Atasoy (2010), "Ar & Ge Harcamaları ve Ekonomik Büyüme İlişkisi: Panel Veri Analizi", *Bilgi Ekonomisi ve Yönetimi Dergisi*, 5(2), 27-34.

Granger, W.J. (1969), "Investigating Causal Relations by Econometric Models and Cross-Spectral Methods", *Econometrica*, 37(3), 424-438.

Grossman, G. & E. Helpman (1994), "Endogenous Innovation in the Theory of Growth", *Journal of Economic Perspectives*, 8(1), 23-44.

Gülmez, A. & A.G. Akpolat (2014), "Ar-Ge & İnovasyon ve Ekonomik Büyüme: Türkiye ve AB Örneği için Dinamik Panel Veri Analizi", *AİBÜ Sosyal Bilimler Enstitüsü Dergisi*, 14(2), 1-17.

Gülmez, A. & F. Yardımcıoğlu (2012), "OECD Ülkelerinde Ar-Ge Harcaması ve Ekonomik Büyüme İlişkisi: Panel Eşbütünleşme ve Panel Nedensellik Analizi (1990-2010)", *Maliye Dergisi*, (163), 335-353.

Güloğlu, B. & R.B. Tekin (2012), "A Panel Causality Analysis of the Relationship Among Research and Development, Innovation and Economic Growth in High-Income OECD Countries", *Eurasian Economic Review*, 2(1), 32-47.

Hatırlı, S.A. vd. (2012), "Tekstil ve Konfeksiyon İhracatının Talep Fonksiyonu", *Atatürk Üniversitesi İktisadi ve İdari Bilimler Dergisi*, 26(3-4): 185-198.

Im, K.S. et al. (2003), "Testing for Unit Roots in Heterogeneous Panels", *Journal of Econometrics*, 115(1), 53-74.

Inekwe, J.N. (2015), "The Contribution of R&D Expenditure to Economic Growth in Developing Economies", *Social Indicators Research*, 124(3), 727-745.

Kök, R. & N. Şimşek (2021), *Panel Veri Analizi*, <https://debis.deu.edu.tr/userweb/recep.kok/dosyalar/panel2.pdf>, 13.01.2021.

Lichtenberg, F.R. (1993), "R&D Investment and International Productivity Differences", *Working Paper*, No. w4161, National Bureau of Economic Research.

Macerinskiene, I. & R. Aleknaviciute (2017), "National Intellectual Capital Influence on Economic Growth in the European Union Countries", *Equilibrium*, 12(4), 573-592.

Mulligan, C.B. & X. Sala-I-Martin (2000), "Measuring Aggregate Human Capital", *Journal of Economic Growth*, 5(3), 215-252.

Özcan, S.E. & P. Özer (2018), "Ar-Ge Harcamaları ve Patent Başvuru Sayısının Ekonomik Büyüme Üzerindeki Etkileri: OECD Ülkeleri Üzerine Bir Uygulama", *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 18(1), 15-28.

Özer, M. & N. Çiftçi (2009), "Ar-Ge Harcamaları ve İhracat İlişkisi: OECD Ülkeleri Panel Veri Analizi", *Dumlupınar Üniversitesi Sosyal Bilimler Dergisi*, 23(3), 39-50.

Rebelo, S. (1998), "The Role of Knowledge and Capital in Economic Growth", *World Institute for Development Economic Research*, 149-178.

Romer, P.M. (1986), "Increasing Returns and Long-Run Growth", *Journal of Political Economy*, 94(5), 1002-1037.

Sungur, O. vd. (2016), "Türkiye'de Ar-Ge, İnovasyon, İhracat ve Ekonomik Büyüme Arasındaki İlişki: Asimetrik Nedensellik Analizi", *SDÜ İİBF Dergisi*, 21(1), 173-192.

Tarı, R. (2014), *Ekonometri*, Kocaeli, Umuttepe Yayınları.

Taş, Ş. vd. (2017), "Ar-Ge Harcamaları ve Ekonomik Büyüme Arasındaki İlişki: Türkiye Örneği", *Ömer Halis Demir Üniversitesi İİBF Dergisi*, 10(2), 178-187.

Ülkü, H. (2004), "R&D, Innovation, and Economic Growth: An Empirical Analysis", IMF *Working Paper* WP/04/85, <https://www.imf.org/external/pubs/ft/wp/2004/wp04185.pdf>, 13.01.2021.

Ünlükaplan, İ. (2009), "Avrupa Birliği Üyesi Ülkelerde İktisadi Kalkınma, Rekabetçilik ve İnovasyon İlişkilerinin Kanonik Korelasyon Analizi ile Belirlenmesi", *Maliye Dergisi*, 157(2), 235-250.

Xu, Y. & A. Li (2019), "The Relationship Between Innovative Human Capital and Interprovincial Economic Growth Based on Panel Data Model and Spatial Econometrics", *Journal of Computational and Applied Mathematics*, 365, 1-11.

Yaylalı, M. vd. (2010), "Türkiye'de Ar & Ge Yatırım Harcamaları ve Ekonomik Büyüme Arasındaki Eş-Bütünleşme ve Nedensellik İlişkisi: 1990-2009", *The Journal of Knowledge Economy & Knowledge Management*, 5(2), 13-26.

Sosyoekonomi

2022, Vol. 30(51), 365-388

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.18
Date Submitted: 13.03.2021
Date Revised: 01.11.2021
Date Accepted: 19.01.2022

Bağımsız Denetim Ücretlerini Etkileyen Faktörlere Yönelik Bir Araştırma: Şeffaflık Raporlarında Yer Alan Denetim Gelirleri Çerçevesinde BIST 100 Örneği

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An Investigation on Audit Fee Determinants: BIST 100 Case within Scope of Audit Revenues in Transparency Reports

Abstract

This study aims to reveal the factors affecting independent audit fees on the basis of companies traded in the BIST (Borsa Istanbul) 100. Financial reports of 98 companies and transparency reports of audit firms were analysed in the frame of the auditee and auditor characteristics, and derivative instruments for 2013-2018 time period. When the characteristics of the client firms are evaluated, a significant positive relationship was reported between the size of the firm and the audit fees. On the other hand, the significant effect of the auditor's opinion and audit tenure on the audit fees become prevalent within the scope of the auditor firms. In addition to these, significant positive relationship was reported between the number of derivative instruments and comprehensive income and audit revenues.

Keywords : Audit Fee, Auditing, Audit Revenues, Derivatives, Comprehensive Income.

JEL Classification Codes : M4, M41, M42.

Öz

Bu çalışma BIST (Borsa İstanbul) 100'de işlem gören işletmeler bazında bağımsız denetim ücretlerini etkileyen faktörleri ortaya koymayı amaçlamaktadır. 2013-2018 dönemine ait finansal verileri incelenen 98 şirket ve bu şirketleri denetleyen denetim firmalarının şeffaflık raporları kullanılarak bağımsız denetim ücretlerini etkileyebilecek faktörler, denetlenen firmaya ve denetçi firmaya ait özellikler ile türev araç kullanımı çerçevesinde incelenmiştir. Denetlenen işletme özellikleri değerlendirildiğinde firma büyüklüğü ile denetim ücretleri arasında anlamlı pozitif ilişki raporlanmıştır. Denetim firması özellikleri kapsamında ise denetçi görüşü ile denetim firması ile çalışılan sürenin denetim ücretleri üzerinde anlamlı etkisi ön plana çıkmaktadır. Bu sonuçlara ek olarak, türev araç tutarı ve kapsamlı gelir ile denetim gelirleri arasında ise anlamlı pozitif ilişki raporlanmıştır.

Anahtar Sözcükler : Bağımsız Denetim Ücreti, Bağımsız Denetim, Bağımsız Denetim Gelirleri, Türev Araçlar, Kapsamlı Gelir.

1. Giriş

Denetim genel olarak sunulan bir bilginin sunan haricindeki taraflar açısından doğrulanması olarak ifade edilebilir ve bu kapsamda pek çok bilgi türünden ve denetiminden söz edilebilir (Smieliauskas & Lam, 2004). En genel ifadeyle denetim; faaliyet, muhasebe ve uygunluk denetimi olarak tür temelinde de ifade edilebilir. Denetim süreci sonunda bağımsız denetçiler tarafından oluşturulan denetim raporları, ekonomik çevrede yer alan paydaşların karar verme süreçlerinde temel veri kaynağını oluşturmaktadır. İşletme içi çıkar gruplarından olan işletme yöneticileri, faaliyet süreçlerine dair güvenceyi denetim raporlarıyla sağlarken, işletme dışı çıkar grupları ise ekonomik kararlarını güvence kazandırılmış raporlarda sunulan bu bilgiler ışığında oluşturmaktadırlar (Kaval, 2005).

Bu çalışmada bağımsız denetim süreci, denetim ücretleri ekseninde ele alınmıştır. Denetim piyasasının yapısı, pazarda fiyatların belirlenme süreci ve fiyat belirlenme sürecini etkileyen faktörler bağımsız denetim literatüründe önemli bir yer tutmaktadır. Denetim ücretlerine ilişkin literatürün gelişme göstermesinde ise Enron, Worldcom, Parmalat vs. muhasebe skandallarının etkisi büyüktür. Söz konusu muhasebe skandallarında bağımsız denetim firmalarının kimi zaman iş birliği kimi zaman da farkında olmak ancak önemsememek şeklinde sürece dahil olmaları, denetim firmaları üzerinde denetleyici otoritelerin baskısını artırmıştır. Denetleyici ve düzenleyici otoritelerin etkisiyle denetim firmaları faaliyet raporlarının hazırlanma sürecinde daha şeffaf bir politika izleyerek denetim ücretlerine ve bu ücretleri oluşturan alt basamakların (denetim ile ilişkili olan ve olmayan ücretler, danışmanlık hizmetleri, vb.) açıklanmasına önem vermeye başlamışlardır. Türkiye'de denetçi firmalar tarafından şeffaflık raporlarının yayınlanması ve dolayısıyla denetim ücretlerine ait veriye ulaşılması 2013 yılına uzanmaktadır. Farklı ülke uygulamaları incelendiğinde, İngiltere'de 2008, Avrupa Birliği ülkelerinde ise 2014 senesinde denetim firmaları için şeffaflık raporlarının yayınlanması zorunlu hale getirilmiştir (EU, 2014). Ülkemizde ise 26 Aralık 2012 tarih ve 28509 sayılı Resmi Gazete'de yayımlanan 13.1.2011 tarihli ve 6102 sayılı Türk Ticaret Kanunu ve 26.9.2011 tarihli ve 660 sayılı Kamu Gözetimi, Muhasebe ve Denetim Standartları Kurumunun Teşkilat ve Görevleri Hakkında Kanun Hükmünde Kararname çerçevesinde "Bağımsız Denetim Yönetmeliği"nin 36. maddesi uyarınca "*bir takvim yılında Kamu Yararını İlgilendiren Kuruluş (KAYİK) denetimi yapmış denetim kuruluşları ilgili takvim yılına müteakip, özel hesap dönemi kullanan denetim kuruluşları ise hesap dönemi kapanışını müteakip dördüncü ayın sonuna kadar yıllık şeffaflık raporunu Kuruma bildirir ve kendi internet sitesinde yayımlar*" kararı ile yetkili kuruluşlarca her yıl şeffaflık raporu yayımlanır.

Bu çalışmanın temel motivasyonunu Türkiye'de faaliyet gösteren ve BIST 100'de işlem gören firmaların bağımsız denetim süreci çerçevesinde denetim ücretlerini etkileyen faktörlerin saptanması oluşturmaktadır. Yapılan çalışmada denetim ücretlerinin belirlenmesinde, denetlenen firmaya ait özellikler (firma büyüklüğü, faaliyetlerin karmaşıklık düzeyi, faaliyet gösterilen sektör, finansal performans) ile denetçi firma ile ilişkilendirilen özellikler (firma büyüklüğü, denetçi görüşü, müşteri firma ile çalışılan süre, uluslararası faaliyet gösterme) birlikte ele alınmıştır. Çalışmanın literatürdeki diğer

çalışmalardan ayrıştığı nokta ise denetim ücretlerinin tespitinde türev araçların rolünü sorgulamasıdır. Literatür incelendiğinde özellikle gelişmiş ülkelerde denetim ücretlerine ilişkin birçok çalışma yapıldığı; ancak, gelişmekte olan ülke ekonomilerinde konuya yeteri önemin verilmediği söylenebilir. Bu durumun nedeni ise büyük ölçüde bağımsız denetim ücretlerine ait verilerin kamu ile paylaşılmamasıdır. Bu çerçevede yapılan bu çalışma ülkemiz ve gelişmekte olan ülkeler ekseninde literatüre pozitif katkı sağlamayı amaçlamaktadır.

Çalışmanın ikinci bölümünde bağımsız denetim ücretleri ve ücretleri etkileyen faktörlere ilişkin literatür taraması yapılmış ve hipotezler oluşturulmuştur. Örnekleme ait özellikler, kullanılan ampirik model tasarımı, değişkenler ve elde edilen sonuçlar üçüncü bölümde detaylandırılmış. Son olarak dördüncü bölümde sonuç ve gelecek çalışma önerileri ile çalışma sonlandırılmıştır.

2. Kavramsal Çerçeve

Denetim ücretlerine ilişkin miktar ve içeriğe ait detaylar genellikle denetlenen firma ile denetçi firma arasında, denetim süreci başlamadan önce belirlenir. Bu süreçte harcanan emek ve zamanın adil bir şekilde fiyatlandırılması büyük önem arz etmektedir (Al-Matarneh, 2012). Denetim ücretlerinin hangi faktörler tarafından belirlendiğini tespit etmeye çalışan çalışmalar arasında tam bir fikir birliği bulunmamaktadır. Bu kapsamda ilgili literatür, ana hatlarıyla denetim ücretlerini etkileyen faktörleri, denetlenen firma, denetçi firma ve kurumsal yönetim ekseninde ele almaktadır.

Bağımsız denetim ücretlerinin belirlenmesinde kavramsal çerçevenin oluşturulması ve ampirik testlerin modellenmesi konusunda Simunic (1980) tarafından yapılan çalışma literatürde önemli bir kaynak niteliği taşımaktadır. Simunic (1980) çalışmasında ekonomi bakış açısıyla denetim ücretlerini arz-talep dengesi çerçevesinde açıklamaya çalışmıştır. Bu ekonomik dengenin oluşturulmasında talep kısmını denetim hizmetleri (denetçi firma özellikleri ve kurumsal yönetim faktörleri) arz tarafını ise müşteriler (denetlenen firma) temsil etmektedir. Denetçi firmaya ait özellikler denetçi firmanın büyüklüğü, denetçi firma ile çalışılan süre (denetçi rotasyonu) ve denetim firmasının yerel ya da global çalışma statüsüne ilişkindir. Talep fonksiyonu kapsamında incelenen kurumsal yönetim faktörleri arasında ise yönetim kurulu büyüklüğü, yönetim kurulunun bağımsızlığı, deneyimi, denetim kurulunun varlığı ve bağımsızlığı öne çıkmaktadır (Beasley, 1996; Yatim et al., 2006; Boo & Sharma, 2008; Ranasinghe et al., 2018). Denetim ücretlerinin belirlenmesi modelinde arz fonksiyonunu temsil eden müşteri firmaların özellikleri arasında ise firma büyüklüğü, finansal performansı, faaliyetlerin karmaşıklığı ve firmanın faaliyet gösterdiği sektör bilgisi yer almaktadır (Urhoghide & Emeni 2014).

Denetim ücretlerinin belirlenmesinde öne çıkan diğer konu ise denetim riskinin tespitidir. Denetim riski; i) müşteriye ait riskler (denetlenen firmanın finansal başarısızlık riski), ii) denetçi firmaya ait ancak üçüncü taraflardan kaynaklanan riskler (denetim şirketinin bir müşteri nedeniyle dava, vb. olumsuz durumlarla karşılaşma, imaj kaybı riski)

ve iii) finansal tablo denetim riski (mali tabloların önemli yanlışlıklar içermesi ve denetçinin farkında olmayarak uygun olmayan bir görüş bildirmesi vs.) olarak sınıflandırılabilir (Ranasinghe et al., 2018). Müşteriye ait riskler ve denetçi firmaya ait riskler birbirleri ile yakın ilişki içerisindedirler (O'Malley, 1993). Denetim sürecinde müşterinin yaşadığı finansal ya da faaliyetlere yönelik bir sıkıntı dolaylı olarak denetçinin saygınlığını, yasal sürecini ve denetim ücretinin ödenmesi sürecini etkileyebilecektir (Morgan & Stocken, 1998; Bell et al., 2001). Olası riskler nedeniyle denetim ücretlerinde bir artış olması ise karşılaşılan risk ile doğru orantılı olarak denetim sürecinde harcanan emeğin ve çalıştırılacak personel sayısının artması, denetim sürecinde daha profesyonel bir ekibe ihtiyaç duyulması ve buna bağlı olarak da çalışma sürelerinin uzaması ile ilişkilendirilebilir (DeFond & Zang, 2014).

Ülkeler arası ya da analiz edilen sektör ve zamanlar arasında farklılık gösterse de, denetim ücretleri ile denetçi firma ve denetlenen firma özellikleri arasında anlamlı ilişkiler raporlayan pek çok çalışma (Francis, 1984; Francis & Stokes, 1986; Francis & Simon, 1987; Chan et al., 1993; Anderson & Zeghal, 1994; Brinn et al., 1994; Hackston & Milne, 1996; Adams et al., 1997; Cameran, 2005; Clatworthy & Peel, 2006; Gonthier-Besacier & Schatt 2007; Naser & Nuseibeh, 2008; Vermeer et al., 2009; Karim & Hasan, 2012; Soyemi & Olowookere, 2013; Hesar et al., 2014; Kikhia, 2015) bulunmaktadır.

Denetlenen firmalar bazında ele alındığında, denetim ücretleri üzerindeki etkisi en belirgin şekilde öne çıkan özelliğin firma büyüklüğü olduğu görülmektedir. Büyük firmaların denetiminde bu firmaların faaliyetlerinin boyutu ve yaygın etkisi nedeniyle denetim sürecinde daha kalabalık ve belli konularda uzmanlaşmış denetim personelinin görev alması gerekebilmektedir (Brinn et al., 1994; Joshi & Bastaki, 2000; Ahmed & Goyal, 2005). Denetim sürecinde daha detaylı prosedürlerin izlenmesi, denetim süresi ve personel giderlerinde artış nedeniyle müşteri firmanın büyüklüğü denetim ücretlerini ve bu kapsamda denetim gelirlerini artırmaktadır (Rick et al., 2005; Gonthier-Besacier & Schatt, 2007). Diğer taraftan büyük firmaların daha güçlü iç kontrol mekanizmalarından ötürü denetim ücretlerinin daha düşük gerçekleşeceği yönünde çalışmalar da bulunmaktadır. Güçlü bir iç kontrol süreci denetim sürecinde harcanan zaman ve eforu azaltabilecek, denetçinin daha küçük örneklemler bazında çalışmasına imkân sağlayarak denetim ücretlerini azaltabilecektir (Vu, 2012). Denetim ücretlerinin tespitinde öne çıkan bir diğer faktör ise müşteri firmanın karlılığıdır. Çalışmalar (Firth, 1985; Dugar et al., 1995) finansal performansı yüksek olan firmaların özellikle gelir/gider yaratma süreçlerinin denetiminin hassasiyetinden ve taşıdığı risklerden ötürü denetim ücretlerini artırdığını göstermektedir.

Müşteri firmanın firmanın faaliyetlerinin karmaşıklığı denetim ücretlerinin tespitinde etkisi araştırılan bir diğer konudur. Denetim sürecinde ve özellikle denetim maliyetinin belirlenmesinde en gözlemlenebilir ve fiyatlandırılabilir özellikler denetimde harcanan zaman ve emektir (Ahmed & Goyal, 2005). Müşteri firmanın karmaşık faaliyetler yürütmesi (yapılan işin karmaşık yapısı, yaygın şube ağı, global ölçekte faaliyetler) daha yüksek denetim ücretlerine neden olabilmektedir (Joshi & Bastaki, 2000; Gonthier-Besacier & Schatt, 2007). İştirak ve bağlı ortaklıkları fazla olan ya da yerel düzeyde faaliyetlere ek

olarak uluslararası düzeyde de faaliyet gösteren şirketlerin faaliyetlerinin karmaşıklığı daha detaylı denetim süreçleri gerektirebilecek ve denetim ücretlerini artırabilecektir (Thinggaard & Kiertzner, 2008; Xu, 2011). Gonthier-Besacier & Schatt (2007) Fransız şirketlerini bilişim sektörü ve diğerleri olmak üzere iki grupta incelemişler ve bilişim sektöründeki işlemlerin karmaşıklığının daha deneyimli bir denetim ekibi ve detaylı denetim süreçleri gerektirdiğini ve buna bağlı olarak sektördeki denetim ücretlerinin yüksek olduğunu ortaya koymuşlardır.

Denetim firmasının büyüklüğü, sözleşme süresi (denetçi firma ile çalışılan süre) ve denetim firmasının uluslararası denetim ağına dahil olması ise denetim ücretlerinin tespitinde arz fonksiyonu kapsamında incelenmektedir. Büyük denetim firmaları sahip oldukları kaynaklar ile iş gücü imkanları, eğitim ve profesyonel deneyim gibi ayırt edici özellikleri nedeniyle daha kaliteli denetim hizmeti vermektedirler (Palmrose, 1986). Sahip oldukları rekabet avantaji, marka imajı ve yüksek itibarın bir sonucu olarak büyük denetim firmaları müşterilerinden daha yüksek ücretler talep etmektedirler (Ho & Ng, 1993). Denetim literatürüne "Dört Büyük" denetim şirketi (Deloitte, KPMG, Ernst&Young, PricewaterhouseCoopers) olarak geçen ve uluslararası düzeyde faaliyet gösteren denetim şirketleri sahip oldukları maddi ve donanımsal avantajlar (deneyim, kaliteli iş gücü, sürekli eğitim, bilgi avantajı) nedeniyle denetim ücretlerini daha yüksek seviyede belirleyebilmektedirler (Reynold & Francis, 2000). Denetim firması büyüklüğü ile denetim ücretleri arasında anlamlı bir ilişki bulamayan çalışmalar da (Che-Ahmad & Houghton, 1996; Al-Harshani, 2008) mevcuttur. Denetim ücretlerinin belirlenmesi sürecinde denetim firmasına ait özellikler arasında yer alan denetim firması ile çalışılan süre (Johnson et al., 2002) uzadıkça ise denetçinin müşteriyi firmayı daha iyi tanıması, faaliyetlerinin ve taşıdığı risklerin farkında olması beklenmektedir. Bu nedenle denetim süresinin azalması ve sürecin kolaylaşmasının denetim ücretini düşürdüğü (Bedard & Johnstone, 2010) savunulmaktadır.

Literatürde çok fazla ele alınan bir faktör olmamakla birlikte, bu çalışma kapsamında denetim ücretleri üzerindeki olası etkisi araştırılan bir diğer faktör ise türev araçlardır. Bu alanda yapılan çoğu çalışma türev araç kullanımının kazançlardaki dalgalanmayı ve hisse senedi volatilitesini düşürdüğünü, bir diğer ifadeyle riski azaltarak (Barton, 2001; Pincus & Rajgopal, 2002; Kilic et al., 2013) hisse senedi fiyatlarını düşürdüğünü (Guay, 1999; Jin & Jorion, 2006) savunmaktadır. Müşteri işletmenin faaliyetlerinde türev araç kullanımı ve ilişkili muhasebeleştirme ve değerleme süreçleri denetim riski kapsamında da ele alınabilir. Denetim riski kapsamında öne çıkan temel kabul denetim riskinin yüksek (düşük) olması durumunda denetim sürecinde harcanan emeğin yoğunluğunun ve miktarının artması (azalması) şeklindedir (Bell et al., 2001; Bedard & Johnstone, 2004; Schelleman & Knechel, 2010). Türev araç kullanımının denetim ücretleri üzerindeki etkisi ise temelde iki şekilde ortaya çıkmaktadır. Denetçilerin türev araç kullanımını denetlenen firmanın faaliyetlerinin risk düzeyinde azalma olarak değerlendirmesi denetim ücretlerini de azaltabilecek ve türev araç kullanımı ile bağımsız denetim ücretleri arasında negatif bir ilişki gözlemlenebilecektir. Diğer taraftan, türev araç kullanımının işletme riskine pozitif etkisinin beklenmesi durumunda, türev araçlarla ilişkili muhasebe hesaplarının ve özellikle değerleme süreçlerinin karmaşıklığı denetim sürecinde talep edilecek ücretlerin artmasına da neden

olabilecektir (Ranasinghe et al., 2018). Tablo 1'de denetim ücretlerini belirleyen faktörlere ilişkin literatürde ön plana çıkan bazı çalışmalar detaylandırılarak listelenmiştir.

Literatürde yer alan çalışmalar ışığında bu çalışma kapsamında test edilen araştırma hipotezleri ise şu şekildedir:

H_1: Denetlenen firmalara ait özellikler ile denetim ücretleri arasında anlamlı bir ilişki bulunmamaktadır.

H_2: Denetçi firmalara ait özellikler ile denetim ücretleri arasında anlamlı bir ilişki bulunmamaktadır.

H_3: Türev araç kullanımı ile denetim ücretleri arasında anlamlı bir ilişki bulunmamaktadır.

Tablo: 1
Denetim Ücretlerini Etkileyen Faktörlere İlişkin Literatürde Yer alan Bazı Çalışmalar

YAZAR & DÖNEM	Örneklem	Değişkenler	Araştırmanın Sonucu
Simunic (1980)	1977 yılında "Who Audits America?" listesinde yer alan halka açık 1,207 şirkete gönderilen anketler sonucunda analize dahil edilen 397 şirket	Bağımlı Değişken: Denetim Ücretleri (Bağımsız Denetim ve İç Denetim) Bağımsız Değişkenler: Toplam Varlıklar, Alacaklar, Stoklar, Karlılık değişkenleri, Denetçi Görüşü, Denetçinin Şirkette Çalışma Süresi, Denetçinin Büyük Sekiz Denetim Şirketinden olup olmama durumu	Denetçi ücretlerini etkileyen faktörler denetlenen firmanın faaliyetlerinin karmaşıklığı (alacaklar+stoklar), denetlenen firmanın yaygın şube ağına sahip olması, yabancı para işlemlerinin düzeyi olarak belirlenmiştir.
Francis (1984)	Sydney Borsasında işlem gören 150 şirkete ait 1974-1978 dönemi finansal verileri	Bağımlı Değişken: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam Varlıklar, Alacaklar, Stoklar, Karlılık değişkenleri, Borçluluk Oranları, Denetçi Görüşü, Denetçinin Büyük Sekiz Denetim Şirketinden olup olmama durumu	Denetçi ücretleri üzerinde denetim firmasının büyüklüğünün ("Büyük 8") anlamlı ve pozitif etkisi bulunmaktadır.
Palmrose (1986)	S&P endeksinde işlem gören şirketler ile "Who Audits America?" listesinde yer alan halka açık 1,200 şirketin 1981 senesine ait finansal verileri	Bağımlı Değişken: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam Varlıklar, Alacaklar, Stoklar, Karlılık değişkenleri, Borçluluk Oranları, Denetçi Görüşü, Denetçinin Büyük Sekiz Denetim Şirketinden olup olmama durumu, Denetim Raporu Sayısı, Denetim Şirketi Şube Sayısı, Denetçi Uzmanlığı, Denetlenen Şirketin Sektörü, Sahiplik Oranı	Denetçi ücretlerini üzerinde denetim firmasının büyüklüğü ("Büyük 8") anlamlı ve pozitif yönde etkilemektedir.
Hackenbrack & Knechel (1997)	1991 senesi baz alınarak 450 şirketin finansal verileri ve bu şirketlere gönderilen anketler ışığında analiz yapılmıştır.	Bağımlı Değişken: Bağımsız Denetim İçin Harcanan Süre Bağımsız Değişkenler: Müşteri Firmanın Toplam Geliri, Müşteri firmanın şube sayısı, halka açıklık oranı, iç denetim komitesinin varlığı, danışmanlık hizmeti verilip verilmediği	Denetçi ücretleri üzerinde müşteri firmanın büyüklüğü, faaliyet gösterilen sektör (finansal sektörde daha az denetçi ücreti gözlemlenmiştir), faaliyetlerin karmaşıklık düzeyi, müşteri firmanın işletme riski (özel sektörde faaliyet göstermesi) anlamlı etkiye sahiptir.
Goddard & Masters (2000)	Londra Borsasında işlem gören ve aynı zamanda Times 1000 listesinde yer alan 253 şirketin 1994-1995 dönemine ait verileri	Bağımlı Değişken: Bağımsız denetim ücreti Bağımsız Değişkenler: Toplam varlıklar, şube sayısı, yurtdışı faaliyet gösteren şube sayısı, borçluluk oranları, denetçi görüşü, işletme sermayesi oranları, denetim firmasının büyüklüğü, denetim dışı ücretler, sahiplik oranı	İç denetim komitesinin varlığı ile denetçi ücretleri arasında negatif ilişki raporlanmıştır.
Chung & Narasimhan (2002)	Avrupa, Asya ve Afrika örnekleminde 12 ülkede faaliyet gösteren şirketlerin 1989-1993 dönemine ait verileri (6,198 gözlem) analiz edilmiştir.	Bağımlı Değişken: Bağımsız denetim ücreti Bağımsız Değişkenler: denetlenen şirketin gelişmekte olan ülkelerden birinde faaliyet göstermesi, faaliyet gösterilen sektör, denetçi firma büyüklüğü, karlılık, toplam satış gelirleri	Denetçi ücretleri üzerinde gelişmekte olan ülke etkisi öne çıkan bir faktör olmuştur. Gelişmiş ülkelerdeki denetçi ücretleri gelişmekte olan ülkelere kıyasla anlamlı şekilde daha yüksektir. Diğer taraftan denetçi ücretleri büyük ölçüde denetim firmasının büyüklüğüne ("Büyük 6") bağlıdır.

Mansi et al. (2004)	COMPUSTAT veri tabanında yer alan şirketlere ait 1974-1988 dönemini kapsayan 8,529 firma-yılı veri	Bağımlı Değişkenler: Kredi derecelendirme notu, kredi marjı Bağımsız Değişkenler: Denetim firması büyüklüğü, denetçinin şirkette çalışma süresi, karlılık oranları, borçluluk oranları	Denetim firmasının büyüklüğü ile denetçi ücretleri arasında pozitif; denetçinin şirkette çalışma süresi ile denetçi ücretleri arasında negatif ilişki raporlanmıştır.
Larcker & Richardson (2004)	2000-2001 dönemi S&P endeksinde yer alan 5,815 firma-yılı gözlem	Bağımlı Değişkenler: Bağımsız Denetim Ücretleri (Denetim ile ilişkili olan ve olmayan ücretler, toplam deneti ücreti) Bağımsız Değişkenler: Yönetim kurulu bağımsız üye oranı, defter değeri / Pazar değeri, ihtiyari tahakkuklar, sahiplik oranı	İhtiyari tahakkuklar ve yönetim kurulu bağımsızlığının düşük oranda olması ve düşük defter değeri / pazar değeri oranı ile denetim ücretleri arasında pozitif ilişki raporlanmıştır.
Ghosh & Lustgarten (2006)	2000-2003 dönemi için Standard&Poor's veri tabanında yer alan 3,423 şirkete ait finansal veri	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, dönen varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, şube sayısı, yurtdışı şube sayısı, denetçi görüşü, denetçi değiştirip değiştirmeme durumu	Denetçi ücretleri oligopol piyasa düzeni çerçevesinde ve rekabet bakış açısıyla ele alınmıştır. Buna göre büyük ölçekli denetim firmaları fiyat rekabeti çerçevesinde yeni müşterilerinden diğer denetim firmaları ile kıyaslandığında %11 düzeyinde daha düşük ücret talep etmektedirler.
Gonthier-Besacier & Schatt (2007)	Fransa Borsasında (SBF 250) faaliyet gösteren ve dipnotlarında denetçi ücretlerini açıklayan 127 şirketin 2002 senesine ait finansal verisi	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, faaliyet gösterilen sektör, toplam alacaklar, toplam stoklar, denetim firması büyüklüğü, karlılık, danışmanlık ücretleri	Denetçi ücretleri ile müşteri firmanın büyüklüğü, firma riski ve denetçi firmanın büyüklüğü ("Büyük 4") arasında anlamlı ilişkiler raporlanmıştır. Buna göre bilişim sektöründe faaliyet gösteren şirketlerin firma riski ve denetim ücretleri daha yüksektir.
Hogan & Wilkins (2008)	2003-2004 dönemleri arasında COMPUSTAT veri tabanında yer alan ve iç kontrol eksikliği raporlayan 284 şirkete ait finansal veri	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, denetçi görüşü, ihtiyari tahakkuklar, sahiplik oranı, şirketin satın alma/birleşme faaliyetinde bulunma durumu, faaliyetlerden sağlanan toplam nakit, yabancı para işlemleri	Denetim riski ve denetlenen firmanın iç kontrol kalitesi denetçi ücretlerini anlamlı yönde etkilemektedir. İhtiyari tahakkuklar ile iç kontrol eksiklikleri denetim ücretleri üzerinde artırıcı etkiye sahiptir.
Boo & Sharma (2008)	ABD'de faaliyet gösteren 357 bankaya ait finansal veri	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, şube sayısı, yabancı ülkede faaliyet gösteren şube sayısı, denetçi görüşü, yönetim kurulu ve denetim komitesi bağımsız üye oranı, denetçi firma büyüklüğü	Denetim komitesinin bağımsızlığının denetim ücretini azalttığı gözlemlenmiştir.
Griffin et al. (2009)	2002-2006 döneminde Yeni Zelanda'da faaliyet gösteren şirketlere ait 724 firma yılı gözlem	Bağımlı Değişkenler: Bağımsız Denetim Ücretleri (Denetim ile ilişkili olan ve olmayan ücretler) Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, denetçi görüşü sahiplik oranı, denetçi firma büyüklüğü, yabancı ülke borsalarında işlem görme durumu, denetçi değişimi olup olmama durumu, faaliyet gösterilen sektör, finansal tabloların uluslararası muhasebe standartlarına göre hazırlanıp hazırlanmadığı	UFRS'ye geçiş döneminin denetçi ücretleri üzerindeki etkisinin ele alındığı çalışmada, denetim ile ilişkili ücretlerin UFRS'ye geçiş döneminde anlamlı bir artış gösterdiği gözlemlenmiştir.
Friis & Nielsen (2010)	2001-2008 dönemi için 269 büyük ölçekli Danimarka'da faaliyet gösteren firmaya ait 1,593 firma-yılı veri	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam satış gelirleri, Stoklar, Mali duran varlıklar, finansal giderler, karlılık oranları, borsada işlem görme, şube sayısı, denetçi değişimi olup olmama durumu, finansal tabloların uluslararası muhasebe standartlarına göre hazırlanıp hazırlanmadığı	UFRS'ye geçiş durumunun denetçi ücretleri üzerinde bir etkisi olmamakla birlikte, UFRS döneminde büyük ve karmaşık faaliyet akışına sahip firmaların karşılaştıkları denetçi ücretlerinde anlamlı artışlar gözlemlenmiştir.
Singh & Newby (2010)	Avustralya'da faaliyet gösteren 300 firmaya ait 2005 senesi finansal verisi	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, şube sayısı, yabancı ülkede faaliyet gösteren şube sayısı, denetçi görüşü, denetim firması büyüklüğü, faaliyet gösterilen sektör, yönetim kurulu yıllık toplantı sayısı, denetim komitesi yıllık toplantı sayısı, yönetim kurulu bağımsız üye oranı, denetim komitesi bağımsız üye oranı	Denetlenen firmanın iç denetim mekanizmasının varlığı ile denetçi ücretleri arasında pozitif ilişki raporlanmıştır.

Caneghem (2010)	2007 dönemi için Belçika'da faaliyet gösteren şirketlere ait 4,403 firma-yılı gözlem	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, varlık devir oranı, borsada işlem görme durumu, denetçi değişikliği, denetim firması büyüklüğü, şirketin birden fazla denetim firması tarafından denetlenmesi, şirkette çalışan personel sayısı, faaliyet gösterilen sektör	Denetçi ücretleri büyük ölçüde denetim firması büyüklüğüne bağlıdır.
Zerni (2012)	2003-2007 dönemi için İsveç'te faaliyet gösteren şirketlere ait 862 firma-yılı gözlem	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, defter değeri/pazar değeri, denetçinin uzmanlığı, denetçinin kamu sektörü deneyimi, sahiplik oranı, denetim firması büyüklüğü	Denetçi ücretleri üzerinde denetim firmasının büyüklüğünün ve denetçi firmanın sektörel uzmanlığının pozitif yönde anlamlı etkisi gözlemlenmiştir.
Abu Risheh & Al-Saeed (2014)	1998-2011 dönemi için Amman Borsasında işlem gören 91 şirket (1274 gözlem) analiz edilmiştir.	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam satış gelirleri, Stoklar, Mali duran varlıklar, finansal giderler, karlılık oranları, borçluluk oranları, toplam şerefiye, yabancı ülkelerde faaliyet gösterme, finansal tabloların uluslararası muhasebe standartlarına göre hazırlanıp hazırlanmadığı	Elde edilen sonuçlara göre UFRS'ye geçildikten sonra denetçi ücretlerinde anlamlı artışlar gözlemlenmiştir. Aynı zamanda denetim firmasının global düzeyde faaliyet göstermesi, şerefiye hesabının büyüklüğü, müşteri firmanın büyüklüğü ve müşteri firmanın faaliyetlerinin karmaşıklık düzeyi de ücretler üzerinde yukarı yönlü baskı yapmaktadır.
Castro et al. (2015)	2002 dönemi için Brezilya borsasında (BM&FBOVESPA) işlem gören 226 şirket analiz edilmiştir.	Bağımlı Değişkenler: Bağımsız Denetim Ücreti Bağımsız Değişkenler: Toplam varlıklar, karlılık oranları, borçluluk oranları, stok devir oranları, şube sayısı, yabancı ülkede faaliyet gösteren şube sayısı, denetçi görüşü, denetim firması büyüklüğü, faaliyet gösterilen sektör, yönetim kurulu bağımsız üye oranı, denetim komitesi bağımsız üye oranı	Müşteri firmanın faaliyetlerinin karmaşıklığı, denetçi firmanın büyüklüğü ve işletme riskinin denetçi ücretleri üzerinde olumlu pozitif etkisi gözlemlenmiştir. Diğer çalışmalardan farklı olarak kurumsal yönetim faktörleri de anlamlı çıkmış ancak ilişkilerin yönü pozitif olarak gözlemlenmiştir. Bu durum ise güçlü kurumsal yönetim faaliyetlerinin yanında getirdiği uzun bürokratik ve süreçsel basamakların denetçinin iş yükünü artırdığı ve zaman alarak ücretler üzerinde yükselme yönünde baskı yarattığı şeklinde yorumlanmıştır.
Erdoğan & Kutay (2016)	2013 dönemi için Türkiye'de KAYİK denetimi yapmaya yetkili ve en az bir KAYİK denetimi yapmış olan bağımsız denetim firmaları (64 adet) incelenmiştir.	Bağımlı Değişken: Bağımsı denetim gelirleri Bağımsız Değişkenler: Şirket kuruluş yılı, uluslararası denetim ağına dahil olma, sorumlu ortak denetçi sayısı, KAYİK sayısı, toplam sermaye	KAYİK sayısı arttıkça bağımsız denetim firmalarının gelirlerinin arttığı tespit edilmiştir.
Hossain et al. (2017)	2007-2011 dönemi için Japonya Nikkei Endekste yer alan 11,300 firma-yılı gözlem analiz edilmiştir.	Bağımlı Değişkenler: Bağımsız Denetim Ücreti, Denetçi Görüşü, İhtiyari Tahakkuklar Bağımsız Değişkenler: Karlılık oranları, borçluluk oranları, faaliyetlerden elde edilen toplam nakit, türev araçlar, borsada işlem görme, yabancı ülke borsalarında işlem görme, finansal tabloları uluslararası muhasebe standartlarına göre düzenleme, şirketim denetlenen dönemde muhasebe politikası değişikliği yapıp yapmama durumu, sermaye artırımı yapılı yapılmaması, sahiplik oranı, yabancı sahiplik oranı, denetim ekibinde yer alan muhasebe alanında profesyonel denetçi sayısı	Denetim ekibinde yer alan denetçilerin deneyimi, profesyonelliği arttıkça denetçi ücretleri de artış göstermektedir.
Yazıcı (2019)	2015-2017 dönemi için Türkiye'de faaliyet gösteren denetim şirketlerine ait 126 adet şeffaflık raporunda yer alan finansal veri	Bağımlı Değişken: Bağımsız Denetim Gelirleri Bağımsız Değişken: Bağımsız denetim yetki yaşı, bağımsız denetim şirketinin yaşı, ortak sayısı, sorumlu denetçi sayısı, denetim sayısı,	Şirket yaşı, ortak sayısı, sorumlu denetçi sayısı ve denetim sayısı değişkenleri bir bütün olarak ele alındığında; bu değişkenlerin denetim gelirlerindeki değişimin 2016 ve 2017 yılları için sırasıyla %28,8 ve %43,7'sini açıkladığı raporlanmıştır.

3. Araştırmanın Veri ve Yöntemi

Hipotezlerin test edilmesinde yapılan analizler panel veri teknikleri kullanılarak yapılmıştır. Panel veri analizi, zaman boyutuna ait kesit verileri kullanarak ekonomik

ilişkilerin tahmin edilmesini içeren bir ekonomik yöntemdir (Gujarati, 2003). Diğer bir ifadeyle panel veri analizi verileri yatay kesit ve zaman serisi bazında birleştirerek bir analiz kurgular. Bu çerçevede panel veri ile yapılan analizler yatay kesit ve zaman serilerinin özelliklerini de içerdiği için yatay kesit ve zaman serisi analizlerine oranla daha çok ve istatistiki anlamda daha sağlam bilgi yansıtır (Greene, 2003; Baltagi, 2008). Çalışma kapsamında 2013-2018 dönemi için BIST 100'de işlem gören 98 firma (574 firma-yılı gözlem) analiz edilmiştir. Modellerde yer alan değişkenlerin hesaplanmasında şirketlere ait finansal veriler KAP (Kamuyu Aydınlatma Platformu) bünyesinde yer alan finansal tablolardan elde edilmiş, denetim ücretleri ise denetim firmalarının şeffaflık raporlarından çekilmiştir. Şeffaflık raporları 2014 senesinden itibaren denetim firmalarının kamuya açıklamaları zorunlu olan faaliyet raporlarıdır. Bu kapsamda, denetim firmalarının şeffaflık raporlarına firmalara ait web siteleri aracılığıyla ulaşılmıştır. Örneklem periyodunun 2013 senesi ile başlamasının nedeni ise bu tarih öncesinde denetim ücretlerine ait verinin temin edilme güçlüğüdür. Hipotezlerin test edilmesinde denetim ücretlerini belirleyen faktörlerin test edilmesinde Simunic (1980) tarafından geliştirilen ve literatürde geçerliliği ortaya konmuş ampirik model ve değişkenler kullanılmıştır.

$$LnAuditRev_{TOTAL} = \beta_0 + \beta_1 LnTA + \beta_2 ClientComplexity + \beta_3 Derivatives + \beta_4 ROA + \beta_5 CI + \beta_6 Lev + \beta_7 ClientIndustry + \beta_8 Loss + \beta_9 AuOp + \beta_{10} AuTenure + \beta_{11} AuIntLink + \beta_{12} BigN + \varepsilon$$

$$LnAuditRev = \beta_0 + \beta_1 LnTA + \beta_2 ClientComplexity + \beta_3 Derivatives + \beta_4 ROA + \beta_5 CI + \beta_6 Lev + \beta_7 ClientIndustry + \beta_8 Loss + \beta_9 AuOp + \beta_{10} AuTenure + \beta_{11} AuIntLink + \beta_{12} BigN + \varepsilon$$

$$LnNon\text{-}AuditRev = \beta_0 + \beta_1 LnTA + \beta_2 ClientComplexity + \beta_3 Derivatives + \beta_4 ROA + \beta_5 CI + \beta_6 Lev + \beta_7 ClientIndustry + \beta_8 Loss + \beta_9 AuOp + \beta_{10} AuTenure + \beta_{11} AuIntLink + \beta_{12} BigN + \varepsilon$$

Değişken tanımları ise aşağıda verilmiştir:

$LnAuditFee_{TOTAL}$: Denetim gelirlerinin logaritması (Denetim ile ilişkili gelirler + Denetim ile ilişkili olmayan gelirler)

LnAuditFee: Denetim ile ilişkili gelirler

LnNon-AuditFee: Denetim ile ilişkili olmayan gelirler

LnTA: Toplam aktif büyüklüğü logaritması

ClientComplexity: Müşteri işletmenin faaliyetlerinin karmaşıklığı (Stoklar ve ticari alacaklar hesabının toplamı)

Derivatives: Net türev araçlar

ROA: Aktif karlılık oranı (Toplam Aktifler/Net Dönem Kârı)

CI: Kapsamlı kâr

Lev: Kaldıraç oranı (Toplam Borç/Toplam Aktif)

Loss: Finansal başarısızlık (Müşteri işletme cari dönem ya da geçmiş iki yılda zarar ettiyse "1", diğer durumlar "0")

Client Industry: Müşteri işletmenin faaliyet gösterdiği sektör (Denetlenen işletmenin faaliyet gösterdiği sektör finansal sektör ise "1", diğer sektörlerden biri ise "0")

BigN: Denetim Firmasının Büyüklüğü (Dört büyük denetim şirketinden birinden hizmet alınması durumunda "1", diğer durumlar "0")

AuOp: Denetçi görüşü (Denetlenen firmaya bir önceki denetim döneminde olumlu denetim görüşü dışında verilen görüşler için "1", diğer durumlar "0")

AuTenure: Denetçi ile çalışılan süre (Denetlenen işletme aynı denetim firması ile en az 3 yıldır çalışıyorsa "1", diğer durumlar "0")

AuIntLink: Denetçinin uluslararası faaliyet düzeyi (Denetçi uluslararası düzeyde faaliyet gösteriyorsa "1", diğer durumlar "0")

Bağımlı değişken seçiminde bağımsız denetim gelirleri, denetim ile ilişkili bağımsız denetim gelirleri (LnAuditRev), denetim hizmeti ile ilişkili olmayan denetim gelirleri (LnNon-AuditRev) ve toplam bağımsız denetim gelirleri ($LnAuditRev_{TOTAL}$) olarak modellere dahil edilmiştir. Denetim gelirleri logaritmaları alınarak modellere dahil edilmiş, bu sayede gelirlerde gözlemlenebilecek uç değerler normalize edilerek analiz sonuçlarında sapmaya neden olabilecek sıkıntılar kontrol altına alınmıştır. Ülkemizde faaliyet gösteren şirketlerin finansal tablolarında ya da dipnotlarında denetim ücretlerine ilişkin bir bilgi yer almamaktadır. Bu nedenle, bu çalışmada denetim ücretlerini etkileyen faktörlerin tahmin edileceği modelde gerçek denetim ücretlerinin yer alması mümkün olmamıştır. Denetim ücretlerini temsilen bağımsız denetim gelirleri hesabı kullanılmıştır (Ramzy, 1988; Ezzamel et al., 2002; Stanley, 2011; Zhang et al., 2014). Denetim firmalarının şeffaflık raporlarında yer alan denetim ile ilişkili gelirler hesabı tamamen finansal tablo denetiminden elde edilen gelirler ile ilişkilidir. Denetim firmaları, bağımsız denetim faaliyetinden elde edilen gelirlere ilaveten, 3568 Sayılı Kanun'a (1989) göre muhasebecilik ve mali müşavirlik mesleğinin konusu olan, genel kabul görmüş muhasebe prensipleri ve ilgili mevzuat hükümleri gereğince, defterlerini tutmak, bilanço, kâr zarar tablosu ve beyannameleri ile diğer belgelerini düzenlemek ve benzeri işleri yapmak; muhasebe sistemlerini kurmak, geliştirmek, işletmecilik, muhasebe, finans, mali mevzuat ve bunların uygulamaları ile ilgili işlerini düzenlemek veya bu konularda müşavirlik yapmak; usulsüzlük hakkında danışmanlık hizmeti sağlamak; vergi denetimi gelirleri, özel amaçlı denetim gelirleri gibi denetim ile ilişkili olmayan faaliyetlerden de gelir elde edebilmektedirler. 3568 Sayılı Kanun'da ismen sayılan faaliyetler ise denetim firmalarının denetim faaliyeti ile ilişkili olmayan gelirlerini oluşturmaktadır. Denetim firmaları şeffaflık raporlarında denetim faaliyetleri ile ilişkili olan ve olmayan gelirlerini birbirlerinden ayrı bir şekilde sunmaktadırlar. Ancak, örneklemde yer alan bütün denetim firmalarının denetim ile ilişkili olmayan gelirlerinin kaynağını tam bir şeffaflık çerçevesinde raporladıklarını belirtmek mümkün değildir. Bu nedenle denetim ile ilişkili olmayan gelirler denetim firmalarının şeffaflık raporlarında yer alan toplam tutarlar çerçevesinde dikkate alınmış, kendi içinde ayrıca bir sınıflandırma yapılmamıştır.

Bağımlı değişkenlerin tespitinde denetim ücretleri için alt sınıflandırma gruplarının oluşturulmasının nedeni denetim firmalarının gelirleri incelendiğinde esas faaliyetlerden (denetim ile ilişkili) elde edilen gelirlerin yıllar bazında düşüş göstermesi, danışmanlık hizmeti vb. gelir kaynaklarının (denetim ile ilişkili olmayan) ise artış eğiliminde olmasıdır. Dünya genelinde faaliyet gösteren dört büyük denetim firmasının 2002 yılında (Sarbanes-Oxley düzenlemeleri öncesinde) toplam gelirlerinin %40'ı danışmanlık hizmetlerinde oluşurken, bu oran 2017 yılında %70'e yükselmiştir (Friedman & Mahieux, 2021). Türkiye'deki mevcut durum incelendiğinde ise bağımsız denetim şirketlerinin gelirlerinin yaklaşık %64'ü finansal tablo denetiminden gelmesine karşın yaklaşık %36'sının ise finansal tablo denetimi dışındaki gelirlerden elde edildiği görülmektedir (Sakin & Türk, 2019). Bu oranlar dikkate alındığında, denetim ücretlerinin denetim ve denetim dışı gelirler olarak iki gruba ayrılması, denetim ücretlerini etkileyen faktörlerin daha doğru bir şekilde ortaya konulmasını sağlayabilecektir.

β_1 ve β_8 arasında yer alan değişkenler denetlenen firma özellikleri, β_9 ve β_{12} arasında yer alan değişkenler ise denetim firmasına ait özellikler ile denetim ücretleri arasındaki ilişkileri ölçmektedir. Toplam aktif büyüklüğü, denetlenen firmanın büyüklüğünün denetim ücretleri üzerindeki etkisini ortaya koymak amacıyla modelde yer almaktadır. Müşteri işletmenin aktif büyüklüğü arttıkça, denetimi gerçekleştiren ekipte yer alan denetçi sayısı ve denetime ayrılan süre de artmakta, bu nedenle de denetim maliyetinde artış beklenmektedir (Simunic, 1980; Skitek, 2009). Denetlenen firmanın karlılığı ise aktif karlılık oranı (ROA) ile ifade edilmiştir. Firmaların gelir yaratma sürecinin tespit edilmesi ve ilgili denetim prosedürlerinin uygulanması, denetim sürecinde üzerinde en fazla düşünülen, zaman ve emek harcanan faaliyetler arasında yer almaktadır. Diğer taraftan işletmelerin karlılığının ardında yatan dinamiklerin ortaya konması, muhasebe hilelerinin tespit edilebilmesi açısından da büyük öneme sahiptir (Naser & Nuseibeh, 2007; Travner, 2016). Bu kapsamda müşteri firmanın karlılığı denetim riskinin tespitinde dikkate alınılan bir faktördür ve dolaylı olarak denetim ücretlerini yükseltmesi beklenir. Müşteri işletmenin aktif karlılık oranına ek olarak kaldıraç oranı (Lev) ve finansal başarısızlık (Loss) değişkenleri de modele eklenen denetim maliyetini artırması beklenen unsurlardır.

Müşteri işletmenin faaliyetlerinin karmaşıklığı arttıkça denetim prosedürlerinin sıkılaştırılması, denetime ayrılan sürenin artırılması, ilgili alanda profesyonelleşmiş denetim ekibi ile çalışılmasını gerekli kılabilmektedir. Denetlenen firmanın faaliyetlerinin karmaşıklığı, reel sektörde faaliyet gösteren firmalar için stoklar ve ticari alacaklar hesabının toplamı finansal sektörde faaliyet gösteren firmalar için toplam krediler hesabının toplamı olarak modele dahil edilmiştir. Ticari alacaklar ve stoklar hesabı ile toplam krediler hesapları; ölçüm, değerleme, muhasebeleştirme manipülasyonları kapsamında en fazla hile yapılan hesap kalemleri olma açısından en riskli muhasebe hesapları arasında yer almaktadır (Lenhart & Defliese, 1957; Simunic, 1980; Jones et al., 1991; Dechow et al., 1995; McNichols, 2001). Bu nedenle bu hesapların denetiminde daha denetim firmaları daha sıkı prosedürler uygulamakta ve denetim süreci daha maliyetli olmaktadır. Denetim riskini ve dolayısıyla denetim ücretlerini artırması beklenen bu değişkene ek olarak denetlenen firmanın faaliyet gösterdiği sektör de modele eklenmiş; finansal sektör ile reel sektörde

faaliyet gösteren firmaların bağımsız denetim ücretlerindeki değişimdeki farklılaşma (Boo & Sharma, 2008; Cameron & Perotti, 2014) ortaya konmaya çalışılmıştır.

Bu çalışmanın diğer çalışmalardan farklılaştığı ve literatüre katkı sunmayı planladığı faktör ise denetlenen firmanın türev araç kullanımına ilişkindir. Türev araçlar literatür taramasında da bahsedildiği üzere kullanım amacına bağlı olarak denetlenen firmanın faaliyet riskini artırabileceği gibi firmanın risk seviyesini azaltabilecek bir etkiye de sahiptir. Genellikle kur riskini yönetmek adına işletmeler tarafından kullanılan türev araçlar, gerçeğe uygun değerin pozitif olması durumunda varlık, negatif olması durumunda ise yükümlülük olarak muhasebeleştirilmektedir. Kur riskini yönetmek için kullanılmasına ilaveten işletmelerin türev araçları spekülasyon amaçlı kullandıkları da bilinmektedir. Bu çalışmada ise türev araçlar işletmelerin aktif ve pasifinde yer alan net türev araçlar toplamı olarak analizlere dahil edilmiştir. Türev araç tutarının modellere dahil edilmesinde spekülasyon amaçlı ya da hedge muhasebesi ayrımı yapılamamasının temel nedeni veri eksikliğidir. Örneklemde yer alan çoğu işletmenin türev araç hesabında bir tutar yer almamakta, türev araç raporlaması yapan işletmelerin ise çok az bir kısmı (%18) bu hesaba dair ayrıntılı bilgi sunmaktadır. Müşteri işletmenin finansal tablolarında yer alan türev araç tutarı arttıkça, müşteri işletmenin faaliyetlerinin karmaşıklık seviyesi artabilecektir. Bu durumda, denetim firmasının özellikli bu finansal kalemlerin ölçümü ve değerlemesi konusunda denetim ekibinde uzman personel bulundurma gereksinimi artabilecek ve bu durum da denetim maliyetlerini yükseltebilecektir (Hossain et al., 2017).

Denetim ücretlerinin tespitinde denetim firmasına ait özellikler kapsamında denetim firmasının büyüklüğü (BigN), denetçi görüşü (AuOp), rotasyon süresi (AuTenure) ve denetim firmasının uluslararası denetim ağına dahil olup olmama durumu (AuIntLink) değişkenleri test edilmiştir. Denetim firmasının büyüklüğü arttıkça, faaliyet alanı genişlemekte, artan pazar payı denetim firmasının tanınırlığını ve itibarını artırmakta, sunulması beklenen yüksek kaliteli denetim hizmeti ise bağımsız denetim ücretlerini yükseltmektedir (DeAngelo, 1981). Benzer şekilde, denetim firmasının büyüklüğüne ek olarak uluslararası denetim ağına dahil olup olmamasının denetim ücretleri üzerindeki etkisi de test edilmiştir.

Diğer taraftan denetim firmasının denetlenen firma ile çalıştığı sürenin artmasının denetim ekibinin denetim sürecine daha aşina olmasına, riskleri daha erken ve etkin bir şekilde tespit ederek denetim maliyetlerini düşürmesine neden olduğu beklenmektedir (O'Keefe et al., 1994; Stein et al., 1994; Davidson & Gist, 1996; Schelleman & Knechel, 2010). Denetim ücretlerinin tespitinde, denetim firmasına ilişkin özellikler arasında dikkate alınan son değişken ise bir önceki dönemde denetlenen firmanın denetim raporunda yer alan denetim görüşüdür. Denetlenen firmanın bir önceki dönemde olumlu görüş dışında bir görüş alması durumunda, denetim firması müşteri işletmeye daha temkinli yaklaşacak, önemlilik seviyelerini daha aşağı çekerek denetim sürecinin daha sıkı bir şekilde ilerlemesi yönünde adımlar atabilecektir (Houghton & Jubb, 1999). Bu nedenle bir önceki dönemde olumlu görüş dışında denetim görüşü raporlanan firmalar için bağımsız denetim ücretlerinin daha yüksek olması beklenmektedir (Cobbin, 2002; Larcker & Richardson, 2004).

3.1. Araştırmanın Bulguları ve Sonuçları

2013-2018 dönemleri arasında BIST100'de işlem gören şirketler bazında denetim ücretlerini etkileyen faktörlerin ortaya konmasını amaçlayan bu çalışmada yapılan analizler çerçevesinde öncelikle Tablo 2'de değişkenlere ait tanımlayıcı istatistikler raporlanmıştır.

Tablo: 2
Tanımlayıcı İstatistikler

Değişkenler	Ortalama	Medyan	Mak.	Min.	Standart Sapma	Gözlem Sayısı
Ln(AuditRev$_{TOTAL}$)	14,255	13,355	18,910	0,00	3,465	574
Ln(AuditRev)	13,839	11,517	18,845	0,00	3,463	574
Ln(NonAuditRev)	12,419	10,721	17,925	0,00	4,031	574
Ln(TA)	18,881	19,512	24,185	10,771	2,544	574
ClientComplexity	0,989	0,245	397,91	0,00	16,59	574
Derivatives	0,056	0,00	2,029	0,00	0,223	574
ROA	0,034	0,037	0,995	-1,375	0,143	574
Comprehensive Income	2,675	0,057	1529,76	-1,378	63,354	574
Lev	1,489	0,602	494,82	0,005	20,479	574

LnAuditFee$_{TOTAL}$: Toplam denetim gelirleri, LnAuditFee: Denetim ile ilişkili gelirler, LnNon-AuditFee: Denetim ile ilişkili olmayan gelirler, LnTA: Toplam varlıklar, ClientComplexity: Stoklar ve ticari alacaklar hesabının toplamı, Derivatives: Net türev araçlar, ROA: Toplam Aktifler/Net Dönem Kârı, CI: Kapsamlı kar, Lev: Toplam Borç/Toplam Aktif, Loss: Müşteri işletme cari dönem ya da geçmiş iki yılda zarar ettiyse "1", diğer durumlar "0", Client Industry: Finansal için "1", diğer durumlar "0", BigN: Dört büyük denetim şirketi için "1", diğer durumlar "0", AuOp: Olumlu denetim görüşü dışında verilen görüşler için "1", diğer durumlar "0", AuTenure: Denetlenen işletme aynı denetim firması ile en az 3 yıldır çalışıyorsa "1", diğer durumlar "0", AuIntLink: Denetçi uluslararası düzeyde faaliyet gösteriyorsa "1", diğer durumlar "0".

Tablo: 3
Regresyon Analizi Sonuçları

		Bağımlı Değişken: LnAuditFee$_{TOTAL}$		**Bağımlı Değişken:** LnAuditFee		**Bağımlı Değişken:** LnNon-AuditFee	
		Katsayı	**p değeri**	**Katsayı**	**p değeri**	**Katsayı**	**p değeri**
Kesim Katsayısı	β_0	8,91	0,00***	2,98	0,31	12,00	0,00***
LnTA	β_1	0,21	0,05**	0,06	0,72	0,18	0,41
ClientComplexity	β_2	0,00	0,96	1,04	0,09*	-3,66	0,11
Derivatives	β_3	4.21E-09	0,01***	1.84E-09	0,03**	1.92E-09	0,42
ROA	β_4	0,61	0,64	2,13	0,33	1,78	0,51
CI	β_5	0,13	0,035**	0,11	0,42	0,00	0,90
Lev	β_6	1,68	0,25	1,33	0,35	0,28	0,88
Client Industry	β_7	-4,35	0,12	-3,66	0,17	-5,51	0,10*
BigN	β_8	-0,31	0,68	-0,33	0,65	0,47	0,60
AuOp	β_9	1,71	0,00***	1,82	0,00***	1,60	0,02**
AuTenure	β_{10}	-1,05	0,00***	-0,92	0,01***	-1,35	0,00***
AuIntLink	β_{11}	1,52	0,10*	1,36	0,10*	1,07	0,35
Adjusted R^2		0,38		0,44		0,40	

****, ** ve * sırasıyla %1, %5 ve %10 istatistiksel anlam düzeylerini ifade etmektedir. Bütün analizlerde otokorelasyon ve çoklu varyans düzeltmeleri yapılmıştır.*

Tablo 2'de yer alan değişkenler, analizlere dahil edildikleri formlarda, bir diğer ifadeyle logaritmik dönüşümleri uygulanmış (denetim gelirleri, toplam varlıklar) ve toplam aktifler ile normalleştirilmiş değerleri ile listelenmektedir.

Araştırmanın yöntemine ilişkin bilgilerin yer aldığı bölümde de belirtildiği gibi hipotezlerin test edilmesinde panel regresyon analizi yapılmıştır. Tüm ekonometrik analizlerde olduğu gibi panel veri analizinde de öncelikle verilerin analize hazır hale getirilmesi gerekmektedir. Öncelikle örneklemde yer alan uç değerlerin analiz sonuçlarını

etkilememesi açısından veriler yüzde bir seviyesinde (her iki uç dahil olacak şekilde) merkezi eğilim ortalamaları (winsorized mean) ile analizlere dahil edilmiştir. Çoklu doğrusal bağlantı sorunu olup olmadığı VIF (Variance Inflation Factor) değerleri ile kontrol edilmiştir. Çoklu doğrusal bağlantı endeks değeri arttıkça katsayıları tahmin eden regresyon modeli istikrarsız olmakta ve katsayılara ilişkin standart hatalar çok yüksek çıkabilmektedir. Bu nedenle VIF değerinin 10'dan düşük olması istenir (Baltagi, 2008). Analize dahil edilen değişkenlerin hiçbirinde çoklu doğrusal bağlantı problemine rastlanmamıştır.

Bütün zaman serisi analizlerinde olduğu gibi, yatay ve dikey kesit analizini bir arada yapan panel veri analizinde de değişkenler arasındaki ilişkilerin sahte olmaması açısından değişkenlerin durağanlık özelliği göstermeleri gerekir. Standart birim kök testleri ise panel veriler için pek uygun olmamakta, panel veri için geliştirilmiş birim kök testleri daha güçlü sonuçlar vermektedir. Panel birim kök testleri, birimlerden gelen bilgiyle zaman serisinden gelen bilgileri birleştirerek zaman serisi varyasyonuna ek olarak panel varyasyonunu da dikkate alır ve sonuç olarak tahmin etkinliği artar ve daha küçük standart hatalar üretilir. Geliştirilen panel birim kök testlerinden bazılarına Breitung (2000), Levin, Lin&Chu (2002), Chang (2002), Choi (2002), Im, Pesaran&Shin (2003), Fisher odaklı testler (ADF, PP) örnek olarak gösterilebilir. Bu çalışmada ise diğer modellerle kıyaslandığında elde edilen daha güçlü kanıtlar nedeniyle Levin, Lin&Chu birim kök testi ile durağanlık sınaması yapılmıştır. Levin, Lin&Chu bireysel birim kök testleri özellikle küçük örneklemlerde istatistiksel açıdan daha güçlü sonuçlar vermektedir (Baltagi, 2008). Yapılan durağanlık sınamalarında değişkenlerin (gölge değişkenler hariç) olasılık değerleri sıfıra yakın çıkmış, bir diğer ifadeyle değişkenler durağan özellik göstermişlerdir.

Panel veri modelinin tahmininde havuzlanmış regresyon, sabit etkiler ve rassal etkiler olmak üzere üç yaklaşım söz konusudur. Yatay kesit değişkenlerinin sabit ve rassal etkilerden bağımsız olduğu konusunda emin olunabildiği durumlarda havuzlanmış regresyon modeli kullanılabilir. Ancak havuzlanmış regresyon modeli katsayıların her bir yatay kesit için tüm zaman dilimlerinde aynı olduğunu varsayar ki bu pek de uygun bir yaklaşım değildir (Brooks, 2008). Denklemi tahmin ederken sabit etkiler modelinin mi yoksa rassal etkiler modelinin mi seçilmesi gerektiğine karar vermek gerekir. Bu kapsamda Hausman testi yapılmıştır. Çalışmada kullanılan veri seti dengesiz panel olduğu için yatay kesit ve zaman serilerinin bir arada rassal olma durumu mümkün olmamaktadır. Dolayısıyla rassal etkiler modeli kesit rassal ve zaman serisi rassal etkiler için ayrı ayrı incelenmiştir. Hausman testi sonuçlarına göre rassal etkiler modelini kullanmak uygun olmayıp (kesit rassal p değeri: 0.00***, zaman serisi rassal p değeri: 0.00***), denklem sabit etkiler modeli ile tahmin edilmelidir. Veri setinde yer alan işletmeler farklı sektörlerde faaliyet gösterdikleri için sabit etkiler tahminleyicileri ile analiz yapılması sektörel farklılıkların yanlı analiz sonuçlarına neden olması olasılığını da ortadan kaldırmıştır.

Panel regresyon analizi sonuçları Tablo 3'te raporlanmıştır. Bağımlı değişkenin toplam denetim geliri olarak belirlendiği ilk modelde, denetlenen firmanın büyüklüğü, türev araç kullanımı, kapsamlı gelir karlılık oranı, denetçi görüşü, denetçi firma ile çalışılan süre ve denetçi firmanın uluslararası düzeyde faaliyet gösterme durumunun denetim ücretleri

üzerinde anlamlı pozitif etkileri olduğu görülmüştür (R^2 =0,38). Yapılan çalışmada müşteri firmanın büyüklüğü toplam aktif büyüklüğü ile temsil edilmiştir ve elde edilen sonuçlara göre müşteri firmanın büyüklüğü arttıkça toplam denetim ücretleri de %5 istatistiksel anlam düzeyinde artış göstermektedir. Literatürde yer alan çalışmalarla (Simunic, 1980; Hackenbrack & Knechel, 1986; Gonthier-Besacier & Schatt, 2007; Abu Risheh & Al-Saeed, 2014) da uyumlu olarak büyük firmaların denetimi daha fazla zaman, daha kalabalık denetçi grubu ve emek gerektirmekte ve bu durum da denetim ücretlerini artırmaktadır.

Türev araç kullanımının denetim ücretleri üzerindeki etkisi de %1 istatistiksel anlamlılık düzeyinde anlamlı ve pozitif olarak raporlanmıştır. Elde edilen bu sonuç denetim ücretleri tahmin modelinde türev araçları da kullanan Hossain et al. (2017) tarafından yapılan çalışmayı destekler niteliktedir. Türev araç kullanımı ile denetim ücretleri arasındaki pozitif ilişki, türev araç kullanımının denetçi firma tarafından müşteri işletmenin risklilik düzeyini düşürmesi yönünde pozitif bir etki olarak değil de türev işlemler muhasebesinin karmaşıklığı nedeniyle ücretler üzerinde artış yönünde bir baskı yarattığı söylenebilir. Türev araç tutarı ile denetim gelirleri (denetim ile ilişkili gelirler ve toplam denetim gelirleri) arasındaki ilişki istatistiksel olarak anlamlı olmakla birlikte anlamlılık katsayısı oldukça düşüktür. Bu durumun örneklemde yer alan çoğu işletme (%57,63) için türev araç tutarının eksik veri olmasından kaynaklanması olasıdır. Daha büyük bir veri seti ile daha yüksek anlamlılık seviyelerinin elde edileceği ise beklenen bir durumdur.

Yapılan panel regresyon analizinde aktif karlılığı ile denetim ücretleri arasındaki ilişki anlamsızken (Gonthier-Besacier & Schatt, 2007; Boo & Sharma, 2008; Hogan & Wilkins, 2008; Friis & Nielsen, 2010), kapsamlı gelir üzerinden ölçülen aktif karlılığı ile denetim ücretleri arasındaki ilişki %5 anlam düzeyinde ve pozitif yönlü (0,13) olarak anlamlıdır. Kapsamlı gelir tablosunda yer alan alt gelir gruplarının belirlenmesinde gerçekleşmemiş kazanç ve kayıpların tahmini söz konusudur (Chambers et al., 2007). Bu nedenle kapsamlı gelir raporlaması denetim ekibi tarafından dikkatlice denetlenerek, tahminlerin doğruluğunun güvenilir ve gerçeği yansıtan bir şekilde raporlandığına dair güvence verilmesi önem arz eden bir alandır. Bu açıdan bakıldığında, sonuçların kapsamlı gelir ile bağımsız denetim gelirleri arasında olumlu ilişki ortaya koyması, denetim ücretleri üzerindeki pozitif yönlü hareketi açıklayabilmektedir. Kapsamlı gelir incelendiğinde gerçeğe uygun değer kavramının ön plana çıktığı ve bu kapsamda kapsamlı geliri oluşturan alt unsurların özellikle muhasebeleştirme ve değerleme açısından karmaşık süreçler içerdiği söylenebilir. Dolayısıyla yüksek kapsamlı gelir değerleri, denetçi firmanın iş yükünü artırmakta ve denetim sürecini uzatmakta ve nihayetinde denetim ücretlerinde anlamlı bir artış gözlemlenmektedir. Literatürde kapsamlı gelir hesabının denetim ücretleri ya da denetim gelirlerinin tahmininde kullanıldığı bir çalışmaya rastlanılamamıştır. Bu nedenle kapsamlı gelirin denetim ücretleri ve denetim gelirleri ile arasındaki ilişkinin daha detaylıca irdelenmesi gerekmektedir.

Denetçi firma tarafından bakıldığında ise denetim gelirleri baz alınarak açıklanmaya çalışılan denetim ücretlerinin belirlenmesinde denetçi görüşlerinin anlamlı olduğu gözlemlenmiştir. Sonuçlara göre olumlu görüş dışında denetim görüşü alan firmaların maruz

kaldığı denetim ücretleri olumlu görüş verilen müşterilere göre anlamlı düzeyde daha yüksektir (Simunic, 1980; Palmrose, 1986; Goddaard & Masters, 2000; Ghosh & Lustgarten, 2006; Hogan & Wilkins, 2008; Griffin et al., 2009; Singh & Newby, 2010; Hossain et al., 2017). Olumlu görüş alan müşterilerin denetçi firma tarafından risk düzeyi yüksek firma olarak değerlendirildiği ve dolayısıyla bu firmalar için daha yüksek ücretler talep edildiği çıkarımında bulunulabilir. Denetçi ile çalışılan süre ile denetim ücretleri arasındaki ilişki ise %1 anlam düzeyinde anlamlı ve negatiftir. Bu sonuca göre denetçi firma ile 3 yıl ve daha uzun süredir iş ilişkisinde bulunan firmaların karşılaştığı denetim ücretleri diğer firmalar ile kıyaslandığında daha düşüktür. Bu alanda öne çıkan literatürde (Simunic, 1980; Mansi et al., 2004) de savunulduğu gibi denetçi firma ile çalışılan süre uzadıkça, denetçi firmanın müşteri firmayı tanıma düzeyi artmakta, denetim süreci kısalmakta ve nispeten kolaylaşmaktadır, söz konusu ilişkiden dolayı da daha düşük denetim ücretleri söz konusu olabilmektedir. Diğer taraftan yapılan çalışmada test edilmemekle birlikte, denetçi firma ile çalışılan sürenin uzamasının denetçi bağımsızlığı üzerindeki olası negatif etkisi de gözden kaçırılmamalıdır. Denetim gelirleri üzerinde denetim firmasının büyüklüğünün anlamlı bir etkisi gözlemlenmemiştir (Boo & Sharma, 2008; Griffin et al., 2009); ancak, denetçi firmanın global faaliyet düzeyi (Chung & Narasimhan, 2002; Caneghem, 2010; Abu Risheh & Al-Saeed, 2014; Castro et al., 2015) denetim ücretlerini anlamlı ve pozitif yönde etkilemektedir. Bu kapsamda denetim hizmeti alınan firmanın uluslararası düzeyde faaliyet gösteren bir firma olması denetim ücretlerini artırmaktadır. Literatürde yapılan çalışmalar tarafından desteklendiği gibi global düzeyde faaliyet gösteren denetim firmalarında itibar düzeyi ve denetim kalitesi daha yüksek olabilmekte ve bu durum da denetçi maliyetlerini yükseltmektedir. Özetle, elde edilen sonuçlar doğrultusunda kısmen denetlenen müşteriye ait bahsi geçen özelliklerin (firma büyüklüğü, karlılık) kısmen de denetçi firmaya ait özelliklerin (denetçi görüşü, sözleşme süresi, global düzeyde faaliyet durumu) ve son olarak türev araç kullanımının toplam denetim ücretleri üzerinde anlamlı etkileri olduğu söylenebilir. Bu çerçevede H_1, H_2 ve H_3 reddedilmiştir.

Sadece bağımsız denetim süreci ile ilişkili ücretlerin bağımlı değişken olarak kurgulandığı ikinci modelde ise denetlenen firmanın faaliyetlerinin karmaşıklık düzeyi, türev araç kullanımı, denetçi firma ile çalışılan süre ve denetçi firmanın global düzeyde faaliyet göstermesine yönelik değişkenlerin denetim ücretleri üzerinde anlamlı bir etkisi olduğu gözlemlenmiştir. Birinci modelden farklı olarak müşteri firmanın büyüklüğü ve finansal performansının denetim ücretleri üzerindeki anlamlı pozitif etkisi ikinci modelde yok olmuştur. Diğer taraftan müşteri firmanın faaliyet düzeyinin karmaşıklaşmasının denetim ücretlerini artırdığı gözlemlenmiştir. Literatürde de savunulduğu gibi karmaşık faaliyet düzeyi (stoklar, ticari alacaklar ve krediler düzeyinde) denetçinin iş yükünü, çalışma mesaisinin yoğunluğunu artırmakta ve bu da denetim ücretlerinin daha yukarı bir seviyede belirlenmesine neden olmaktadır. İlk modelde olduğu gibi kurulan ikinci modelde de denetim ücretleri üzerinde farklı seviyelerde müşteri firma ve denetçi firmaya ait özellikler ile türev araç kullanımının anlamlı etkileri dolayısıyla H_1, H_2 ve H_3 reddedilmiştir. Ancak, denetim ile ilişkili ücretlerin belirlenmesinde denetçi firma özelliklerinin (denetçi görüşü, sözleşme süresi, global düzeydeki işbirlikleri) daha baskın olduğu söylenebilir.

Son olarak test edilen üçüncü modelde bağımsız denetim süreci ile ilişkili olmayan ücretleri belirleyen faktörler test edilmiştir. Elde edilen sonuçlara göre denetim dışı ücretler üzerinde sadece müşteri firmanın faaliyet gösterdiği sektör, denetçi görüşü ve denetim firması ile çalışılan sürenin uzunluğu anlamlı etkiye sahiptir. Bu sonuçlara göre finansal sektörde faaliyet gösteren firmaların karşılaştığı denetim ücretleri diğer sektörlerde faaliyet gösteren firmalara nazaran daha yüksektir. Bu sonuç denetçinin uzmanlık alanının ön plana çıktığı literatürle uyumludur. Dolayısıyla, önceki bölümlerde de bahsedildiği gibi finansal sektör diğer sektörlerle kıyaslandığında daha farklı ve kendi içinde muhasebe ve değerleme bazında daha karmaşık dinamiklere sahip bir sektör olarak karşımıza çıkmaktadır. Bu kapsamda finansal sektörde faaliyet gösteren firmaların denetim dışında danışmanlık hizmeti gibi taleplerinin de söz konusu olması bu sektöre ait işletmelerin maruz kaldığı denetim dışı ücretler üzerinde artış yönünde bir eğilim yaratabilmektedir (Boo & Sharma, 2008). Üçüncü model sonuçları ile değerlendirildiğinde türev araç kullanımına ilişkin H_3 dışındaki hipotezler reddedilmekle denetim firmasına ait özelliklerin (denetçi görüşü ve denetçi ile çalışılan sürenin uzunluğu) denetim gelirleri ile açıklanmaya çalışılan denetim ücretlerinin belirlenmesi sürecinde daha ön plana çıktığı söylenebilir.

4. Sonuç

Bu çalışmada 2013-2018 dönemi için BIST 100'de işlem gören 98 şirkete ait 574 firma-yılı gözlem üzerinden denetim ücretlerini etkileyen faktörler ortaya konmaya çalışılmıştır. Ülkemizde faaliyet gösteren işletmeler denetim hizmeti için ödedikleri ücretleri henüz finansal raporlarında açıklamamaktadırlar. Bu nedenle neredeyse tamamı denetim ücretlerinden oluşan denetim gelirleri (Ramzy, 1988; Ezzamel et al., 2002) dikkate alınarak denetim ücretlerini etkileyen faktörler açıklanmaya çalışılmıştır. Denetim ücretlerini etkileyen faktörlerin müşteri firmaya ait özellikler, denetçi firmaya ait özellikler ve türev araç kullanımı ekseninde ele alındığı çalışmada denetim ücretleri ise toplam denetim geliri, denetim ve denetim dışı gelirler olmak üzere üç model halinde dikkate alınmıştır.

Elde edilen sonuçlar incelendiğinde denetim ücretleri ile ilgili literatürle paralel sonuçlar elde edildiği görülmektedir. Denetim ücretlerinin üzerinde müşteri firmanın büyüklüğünün pozitif yönde ve baskın bir etkisi olmakla birlikte gerek müşteri firmaya gerek denetçi firmaya ait özelliklerin farklı seviyelerde denetim ücretlerini etkilediği görülmektedir. Denetlenen firmaya at özelliklerin denetim ücretleri üzerindeki etkisi modeller bazında değişmekle birlikte, denetçi firmaya ait özelliklerde "denetçi görüşü" ve "denetim firmasıyla beraber çalışılan sürenin uzunluğu" faktörlerinin denetçi üzerinde anlamlı negatif etkileri gözlemlenmiştir. Buna göre olumlu görüş dışında denetim görüşü verilen ve denetim firmasıyla üç yıldan daha az süre çalışan firmaların maruz kaldıkları denetim ücretleri daha yüksek olmaktadır. Denetlenen firmanın önceki dönem denetim raporunda olumlu görüş dışında bir denetim görüşünün yer alması durumunda denetim firması müşteri işletmeye daha temkinli yaklaşacak ve daha sıkı bir denetim süreci planlayacaktır. Elde edilen sonuçlar denetim görüşüne ilişkin bu argümanı desteklemekte ve olumlu görüş dışında alınan görüşlerin denetim ücretlerini artırdığını göstermektedir. Denetim firması ile çalışılan sürenin kısa (üç yıldan az) olması durumunda ise denetlenen

firmanın denetçi firmanın faaliyet sürecini, muhasebe politikasını, taşıdığı riskleri kavrayarak etkin ve etkili bir denetim süreci planlaması daha uzun sürebilecektir. Elde edilen sonuçlarda bu beklentinin maliyetlere yansıdığı ve denetim ücretlerini artırdığı da gözlemlenmiştir. Son olarak, denetçi firmanın uluslararası iş birlikleri olan bir firma olmasının denetim ücretlerini artırdığı şeklinde bulgular elde edilmiştir. Bağımsız denetim şirketlerinin uluslararası denetim ağlarına dahil olması denetim kalitesini artırmakla birlikte mevcut kaliteyi ve denetim firmasının piyasadaki olumlu algısını koruyabilmesi açısından müşteri işletmelerden talep edilen ücretleri artırabilmektedir.

Bu çalışmanın öne çıkan özelliklerinden biri de çoğu çalışmada ele alınmayan "türev işlemler muhasebesini" de dikkate almasıdır. Elde edilen sonuçlar türev araç kullanımının denetim ücretlerini artırdığını göstermektedir. Ayrıca, elde edilen sonuçlara göre finansal performans ölçütlerinden aktif karlılığının denetim ücretleri üzerinde anlamlı bir etkisi bulunmamaktadır. Diğer taraftan bilgimiz dahilinde şimdiye kadar denetim ücretlerini etkileyen faktörlerin tespitinde "kapsamlı gelir" ölçütünü kullanan bir çalışmaya rastlanılmamıştır. Türev araç kullanımı ile ilişkili elde edilen sonuçlarla uyumlu bir şekilde, kapsamlı geliri daha yüksek olan firmalarda daha yüksek düzeyde denetim ücretleri gözlemlenmiştir. Türev araç kullanımı, denetim firmasının bu finansal varlıkların ölçümü ve değerlemesi konusunda uzmanlaşmış denetim ekibi oluşturmayı gerektirebilmektedir. Benzer şekilde türev araçlar, müşteri işletmeninin faaliyetlerinin karmaşıklık düzeyini de artıran bir unsur olarak denetim planlamasından denetim sürecinin tamamlanmasına kadar geçen süreyi de uzatmakta ve denetim ücretleri üzerinde artırıcı bir etki göstermektedir. Bu kapsamda denetçi firmaların türev araç kullanımını iş yükünü artıran bir unsur olarak gördükleri ve bunu da denetim ücretlerine yansıttıkları söylenebilir. Kapsamlı gelir tablosunun hazırlanması, kapsamlı gelirin her bir alt unsurunun geçerli tahminlerle doğru bir şekilde sunulması ve denetimi tıpkı türev araçlarda olduğu gibi denetim sürecini zorlaştırmaktadır. Kapsamlı gelire ilişkin karmaşık değerleme ve denetim süreçlerin bir yansıması olarak da denetim ücretleri yükselmektedir.

Çalışmanın sonuçları değerlendirilirken bir takım kısıtlar da dikkate alınmalıdır. Ülkemizde şeffaflık raporlarının 2013 senesinden itibaren zorunlu hale gelmesi denetim ücretlerine ait veri temini açısından analizlerde 2013 senesinden başlanılmasını gerektirmiştir. Bu durum veri kısıtı nedeniyle elde edilen sonuçların genellenebilirliğini olumsuz yönde etkileyebilir. Avrupa Birliği 2013/34 sayılı Muhasebe Direktifine tam uyum sağlanabilmesi için 30/3/2021 tarihli ve 31439 sayılı (Mükerrer) Resmî Gazete'de yayımlanan karar itibariyle ülkemizde faaliyet gösteren işletmelerin (büyük ve orta boy işletmeler, KAYİKler, zorunlu ya da isteğe bağlı olarak Türkiye Finansal Raporlama Standartlarını uygulayan büyük işletmeler) bağımsız denetçi ya da bağımsız denetim kuruluşundan alınan hizmetlere ilişkin ücretleri finansal raporlarında açıklamaları gerekmektedir. Alınan bu karar bağımsız denetimde kalite ve güvenin artırılması yönünde önemli bir karardır. Diğer taraftan, denetim ücretlerinin açıklanması bu ücretlere ilişkin veri sıkıntısının azalmasına da destek olacak ve akademik çalışmaların zenginleşmesini sağlayacaktır. Bu kapsamda denetim gelirleri üzerinden denetim ücretlerine ilişkin bir çıkarım yapılmaya çalışılan bu çalışma ile elde edilen sonuçların işletmeler tarafından

açıklanacak gerçek denetim ücretleri ile modellenmesi ve analiz edilmesi mümkün olabilecektir. Böylece elde edilen sonuçların güvenilirliği ve geçerliliği de test edilebilecektir. Denetim ücretlerine ilişkin verilerin eksikliğine ek olarak, türev araçlarda da kendini gösteren eksik veri problemi, türev araçlara ilişkin sonucun ekonomik değerinden ziyade ilişkisel yönüne odaklanılmasını daha mantıklı hale getirmektedir. Türev araç tutarına ek olarak, şirketlerin türev araç kullanma durumları kukla değişkenler aracılığıyla test edilerek bağımsız denetim gelirlerindeki farklılaşmanın tespit edilmesi ise gelecek dönemlerde yapılabilecek çalışma önerileri arasında gösterilebilir.

Tüm bunlara ek olarak, gelecekte yapılması planlanan çalışmalarda, denetim ücretleri üzerinde kurumsal yönetim faktörlerinin, UFRS sürecinin, şerefiye ya da yeniden değerleme gibi karmaşık muhasebe işlemlerinin etkisi ve denetim ile ilgili ücretlerin yanında denetim dışı gelirleri etkileyen faktörlerin de araştırılması literatürü zenginleştirecektir. Bir bütün olarak değerlendirildiğinde bu çalışmanın işletmelerin, denetim firmalarının ve düzenleyici otoritelerinin denetim ücretlerini etkileyen faktörlere ilişkin karar verme süreçlerine olumlu katkıda bulunabileceği beklenmektedir.

Kaynaklar

Abu Risheh, K.E. & A.A. Mo'taz (2014), "The Impact of IFRS Adoption on Audit Fees: Evidence from Jordan", *Accounting & Management Information Systems/Contabilitate si Informatica de Gestiune*, 13(3), 520-536.

Adams, M. et al. (1997), "The Determinants of External Audit Costs in the New Zealand Life Insurance Industry", *Journal of International Financial Management and Accounting*, 8(1), 69-86.

Ahmed, K. & M.K. Goyal (2005), "A Comparative Study of Pricing of Audit Services in Emerging Economies", *International Journal of Auditing*, 9(2), 103-116.

Ajide, F.M. (2014), "Audit Pricing in Nigerian Banking Industry: A Panel Analysis (2008-2012)", *IOSR Journal of Economics and Finance*, 2(6), 26-34.

Al-Harshani, M.O. (2008), "The Pricing of Audit Services: Evidence from Kuwait", *Managerial Auditing Journal*, 23(7), 685-696.

Al-Matarneh, G.F. (2012), "The Pricing of Audit Services: Evidence from Jordan", *International Business Research*, 5(3), 114-121.

Amba, S.M. & F.K. Al-Hajeri (2013), "Determinants of Audit Fees in Bahrain: An Empirical Study", *Journal of Finance and Accountancy*, 13, 1-10.

Anderson, T. & D. Zeghal (1994), "The Pricing of Audit Services: Further Evidence from the Canadian Market", *Accounting and Business Research*, 24(95), 195-207.

Baltagi, B. (2008), *Econometric Analysis of Panel Data*, 4th Ed., John Wiley & Sons.

Barton, J. (2001), "Does the Use of Financial Derivatives Affect Earnings Management Decisions?", *The Accounting Review*, 76(1), 1-26.

Beasley, M.S. (1996), "An Empirical Analysis of The Relation Between the Board of Director Composition and Financial Statement Fraud", *The Accounting Review*, October, 443-465.

Bedard, J.C. & K.M. Johnstone (2010), "Audit Partner Tenure and Audit Planning and Pricing", *Auditing: A Journal of Practice & Theory*, 29(2), 45-70.

Bell, T.B. et al. (2001), "Auditors' Perceived Business Risk and Audit Fees: Analysis and Evidence", *Journal of Accounting Research*, 39(1), 35-43.

Big4.com. (2015), *An Analysis of the 2014 Financial Performance of the World's Largest Accounting Firms*, <http://Www.Big4.Com/Wpcontent/Uploads/2015/01/The-2014-Big-Four-Firms-Performance-Analysisbig4.Com-Jan-2015.Pdf>, 18.05.2015.

Boo, E. & D. Sharma (2008), "Effect of Regulatory Oversight on the Association Between Internal Governance Characteristics and Audit Fees", *Journal of Accounting and Finance*, 4(1), 51-71.

Brinn, T. & et al. (1994), "Audit Fee Determinants of Independent & Subsidiary Unquoted Companies in the UK - An Exploratory Study", *The British Accounting Review*, 26(2), 101-121.

Cameran, M. (2005), "Audit Fees and the Large Auditor Premium in the Italian Market", *International Journal Of Auditing*, 9(2), 129-146.

Caneghem, T.V. (2010), "Audit Pricing and the Big4 Fee Premium: Evidence from Belgium", *Managerial Auditing Journal*, 25(2), 122-139.

Castro, W.B.L. et al. (2015), "Determinants of Audit Fees: A Study in the Companies Listed on the BM&FBOVESPA, Brazil", *Revista Contabilidade & Finanças*, 26(69), 261-273.

Chambers, D. et al. (2007), "An Evaluation of SFAS No. 130 Comprehensive Income Disclosures", *Review of Accounting Studies*, 12(4), 557-593.

Chan, P. et al. (1993), "Determinants of Audit Fees for Quoted UK Companies", *Journal of Business Finance and Accounting*, 20(6), 765-786.

Che-Ahmad, A. & K.A. Houghton (1996), "Audit Fee Premiums of Big Eight Firms: Evidence from the Market for Medium-Size UK Auditees", *Journal of International Accounting, Auditing and Taxation*, 5(1), 53-72.

Chung, S. & R. Narasımhan (2002), "An International Study of Cross-Sectional Variations In Audit Fees", *International Journal of Auditing*, 6(1), 79-91.

Clatworthy, M.A. & M.J Peel (2006), "The Effect of Corporate Status on External Audit Fees: Evidence from the UK", *Journal of Business Finance and Accounting*, 1(2), 169-201.

Cobbin, P.E. (2002), "International dimensions of the audit fee determinants literature", *International Journal of Auditing*, 6(1), 53-77.

DeAngelo, L.E. (1981), "Auditor Size and Audit Quality", *Journal of Accounting and Economics*, 3(3), 183-199.

Dechow, P.M. et al. (1995), "Detecting Earnings Management", *Accounting Review*, 70(2), 193-225.

Defond, M. & J. Zhang (2014), "A Review of Archival Auditing Research", *Journal of Accounting and Economics*, 58(2-3), 275-326.

Dopuch, N. & D. Simunic (1980), "The Nature of Competition in the Auditing Profession: A Descriptive and Normative View", *Regulation and the Accounting Profession*, 34(2), 283-289.

Dugar, A. et al. (1995), "A Comparative Study of the Audit Services Market for Public Sector versus Private Sector Companies in India", *Advances in International Accounting*, 8, 1-13.

Erdoğan, S. & B. Solak (2016), "Türkiye'de Şeffaflık Raporları ve Bağımsız Denetim Sektörüne Yönelik Ampirik Bir Çalışma", *Çankırı Karatekin Üniversitesi İİBF Dergisi*, 6(2), 175-196.

Erdoğan, S. & N. Kutay (2016), "Türkiye'de Bağımsız Denetim Şirketlerinin Karakteristiklerinin Bağımsız Denetim Gelirleri Üzerindeki Etkisi", *Uluslararası Yönetim İktisat ve İşletme Dergisi*, 12(27), 105-122.

European Union (2014), "Directive 2014/56/EU of the European Parliament and of the Council", <http://Eur-Lex.Europa.Eu/Legalcontent/EN/TXT/?Uri=CELEX:32014L0056>, 05.05.2015.

Ezzamel, M. et al. (2002), "The relationship between categories of non-audit services and audit fees: Evidence from UK companies", *International Journal of Auditing*, 6(1), 13-35.

Financial Reporting Council (2008), "The Statutory Auditors (Transparency) Instrument 2008: POB 01/2008", <https://www.Frc.Org.Uk/FRC-Documents/POB/Statutory-Auditors-(Transparency)-Instrument-2008.Aspx>, 13.05.2015.

Firth, M. (1985), "An Analysis of Audit Fees and Their Determinants in New Zealand", *Auditing: A Journal of Practice and Theory*, 4 (2 Spring), 23-37.

Francis, J.R. & D.J. Stokes (1986), "Audit Prices, Product Differentiation, and Scale Economies: Further Evidence from the Australian Market", *Journal of Accounting Research*, 24, 383-393.

Francis, J.R. & D.T. Simon (1987), "A Test of Audit Pricing in the Small-Client Segment of the US Audit Market", *Accounting Review*, 62(1), 145-157.

Francis, J.R. (1984), "The Effect of Audit Firm Size on Audit Prices", *Journal of Accounting and Economics*, 6(2), 133-151.

Friedman, H.L. & L. Mahieux (2021), "How Is the Audit Market Affected by Characteristics of the Nonaudit Services Market?", *Journal of Accounting Research*, 59(3), 959-1020.

Friis, O. & M. Nielsen (2010), "Audit Fees and IFRS Accounting: Is Information Costly?", *Discussion Papers on Business and Economics*, University of Southern Denmark, 3, 1-37.

General Accounting Office (2003), *Public Accounting Firms: Mandated Study on Consolidation and Competition*, Washington, DC.

Ghosh, A. & S. Lustgarten, (2006), "Pricing of Initial Audit Engagements by Large and Small Audit Firms", *Contemporary Accounting Research*, 23(2), 333-368.

Gkountaropoulou, K.M. (2017), "EU Countries' Institutional Environment and Audit Fees: Field of Research EU Banking Sector", *Master Thesis*, International Hellenic University.

Goddard, A. & C. Masters (2000), "Audit Committees, Cadbury Code and Audit Fees: An Empirical Analysis of UK Companies", *Managerial Auditing Journal*, 15(7), 358-371.

Gonthier-Besacier, N. & A. Schatt (2007), "Determinants of Audit Fees for French Quoted Firms", *Managerial Auditing Journal*, 22(2), 139-160.

Greene, W.H. (2003), *Econometric Analysis*, 6th Ed., Pearson Education, India.

Griffin, P.A. et al. (2009), "Governance Regulatory Changes, International Financial Reporting Standards Adoption, and New Zealand Audit and Non-Audit Fees: Empirical Evidence", *Accounting & Finance*, 49(4), 697-724.

Guay, W.R. (1999), "The Impact of Derivatives on Firm Risk: An Empirical Examination of New Derivative Users", *Journal of Accounting and Economics*, 26(1-3), 319-351.

Gujarati, D.N. (2009), *Basic Econometrics*, 5th Ed., Tata Mcgraw-Hill Education.

Habib, A. et al. (2018), "Money Laundering and Audit Fees", *Accounting and Business Research*, 48(4), 427-459,

Hackenbrack, K. & W.R. Knechel (1997), "Resource Allocation Decisions in Audit Engagements", *Contemporary Accounting Research*, 14(3), 481-499.

Hackston, D. & M.J. Milne (1996), "Some Determinants of Social and Environmental Disclosures in New Zealand Companies", *Accounting, Auditing & Accountability Journal*, 9(1), 77-108.

Hassan, Y. & K. Naser (2013), "Determinants of Audit Fees: Evidence from an Emerging Economy", *International Business Research*, 6(8), 13-25.

Hesar, H.D. et al. (2014), "A Study of the Relationship between Audit Fees and Board Compensation in TSE-Listed Firms", *Journal of Educational And Management Studies*, 4(2), 204-209.

Ho, S. et al. (1993), "The Determinants of Audit Fees in Hong Kong: An Empirical Study", *Asian Review of Accounting*, 4(2), 32-50.

Hogan, C.E. & M.S. Wilkins (2008), "Evidence on the Audit Risk Model: Do Auditors Increase Audit Fees in the Presence of Internal Control Deficiencies?", *Contemporary Accounting Research*, 25(1), 219-242.

Hossain, S. et al. (2017), "The Relationship Between Audit Team Composition, Audit Fees, and Quality", *Auditing: A Journal of Practice & Theory*, 36(3), 115-135.

Houghton, K.A. & C. Jubb. 1999. "The Cost of Audit Qualifications: The Role of Non-Audit Services", *Journal of International Accounting, Auditing & Taxation*, 8(2), 215-240.

Jha, A. & Y. Chen (2014), "Audit Fees and Social Capital", *The Accounting Review*, 90(2), 611-639.

Jin, Y. & P. Jorion (2006), "Firm Value and Hedging: Evidence from U.S. Oil and Gas Producers", *The Journal of Finance*, 6(2), 893-919.

Johnson, V.E. et al. (2002), "Audit-Firm Tenure and the Quality of Financial Reports", *Contemporary Accounting Research*, 19(4), 637-660.

Jones, J.J. (1991), "Earnings management during import relief investigations", *Journal of Accounting Research*, 29(2), 193-228.

Joshi, P.L. & H. Bastaki (2000), "Determinants of Audit Fees: Evidence from the Companies Listed in Bahrain", *International Journal of Auditing*, 4(2), 129-138.

Karim, W. & T. Hasan (2012), "The Market for Audit Services in Bangladesh", *Journal of Accounting in Emerging Economies*, 2(1), 50-66.

Kaval, H. (2005), *Muhasebe Denetimi: Uluslararası Finansal Raporlama Standartları Uygulama Örnekleriyle*, Gazi Kitabevi, Ankara.

Kikhia, H.Y. (2015), "Determinants of Audit Fees: Evidence from Jordan", *Accounting and Finance Research*, 4(1), 42-53.

Kilic, E. et al. (2012), "The Impact of SFAS 133 on Income Smoothing by Banks through Loan Loss Provisions", *The Accounting Review*, 88(1), 233-260.

Larcker, D.F. & S.A. Richardson (2004), "Fees Paid to Audit Firms, Accrual Choices, and Corporate Governance", *Journal of Accounting Research*, 42(3), 625-658.

Lenhart, N.J. & P.L. Defliese (1957), *Montgomery's Auditing*, 8th edn. (New York: The Ronald Press Company).

Liu, S. (2017), "An Empirical Study: Auditors' Characteristics And Audit Fee", *Open Journal of Accounting*, 6(28), 52-70.

Mansi, S.A. et al. (2004), "Does Auditor Quality and Tenure Matter to Investors? Evidence from the Bond Market", *Journal of Accounting Research*, 42(4), 755-793.

McNichols, M.F. (2001), "Research Design Issues in Earnings Management Studies", *Journal of Accounting and Public Policy*, 19(4), 313-345.

Mohammed, N.H. & A. Saeed (2018), "Determinants of Audit Fees: Evidence from UK Alternative Investment Market", *Academic Journal of Nawroz University*, 7(3), 34-47.

Monsuru, A.F. (2014), "Audit Pricing in Nigerian Banking Industry: A Panel Analysis (2008-2012)", *IOSR Journal of Economics and Finance*, 2(6), 26-34.

Morgan, J. & P. Stocken (1998), "The Effects of Business Risk on Audit Pricing", *Review of Accounting Studies*, 3(4), 365-385.

Naser, K. & R. Nuseibeh (2008), "Determinants of Audit Fees: Empirical Evidence from an Emerging Economy", *International Journal of Commerce And Management*, 17(3), 239-254.

Niemi, L. (2004), "Auditor Size and Audit Pricing: Evidence from Small Audit Firms", *European Accounting Review*, 13(3), 541-560.

O'Malley, S.F. (1993), "Legal Liability is Having a Chilling Effect on the Auditor's Role", *Accounting Horizons*, 7(2), 82-87.

Palmrose, Z.V. (1986), "Audit Fees and Auditor Size: Further Evidence", *Journal of Accounting Research*, 24(1), 97-110.

Pincus, M. & S. Rajgopal (2002), "The Interaction Between Accrual Management and Hedging: Evidence from Oil and Gas Firms", *The Accounting Review*, 77(1), 127-160.

Ramzy, W.A. (1988), *The determinants of audit fees: An analytical study*, Heriot-Watt University.

Ranasinghe, T. et al. (2018), *Do Auditors Charge a Risk Premium? Evidence from the Association Between Derivative Hedging and Audit Fees*, <https://ssrn.com/abstract=3229910>, or <http://dx.doi.org/10.2139/ssrn.3229910>, 13.07.2018.

Reynolds, J.K. & J.R. Francis (2000), "Does Size Matter? The Influence of Large Clients on Office-Level Auditor Reporting Decisions", *Journal of Accounting and Economics*, 30(3), 375-400.

Rick, H. et al. (2005), *Principles of Auditing: An Introduction to International Standards on Auditing*, 2nd Ed., London: Prentice Hall.

Rusmanto, T. & S.R. Waworuntu (2015), "Factors Influencing Audit Fee in Indonesian Publicly Listed Companies Applying GCG", *Procedia-Social And Behavioral Sciences*, 172, 63-67.

Said, S.M. & A. Qasim (2010), "External Auditors' Reliance on Internal Auditors and Its Impact on Audit Fees: An Empirical Investigation", *Managerial Auditing Journal*, 25(6), 509-525.

Sakin, İ. & Z. Türk (2019), "Bağımsız Denetim Kalitesi Açısından Bağımsız Denetim Kuruluşlarının Özellikleri ve Denetim Gelirleri: Bağımsız Denetim Kuruluşları Üzerine Bir Araştırma", *Business & Management Studies: An International Journal*, 7(3), 200-220.

Schelleman, C. & W.R. Knechel (2010), "Short-Term Accruals and the Pricing and Production of Audit Services", *Auditing: A Journal of Practice & Theory*, 29(1), 221-250.

Simunic, D.A. (1980), "The Pricing of Audit Services: Theory and Evidence", *Journal of Accounting Research*, 18(1), 161-190.

Singh, H. & R. Newby (2010), "Internal Audit and Audit Fees: Further Evidence", *Managerial Auditing Journal*, 25(4), 309-327.

Smieliauskas, W. & K.C.K Lam (2004), "Quality financial reporting and its relationship to audit quality via an expanded risk model", *Journal of Forensic Accounting*, V, 273-310.

Soyemi, K.A. & J.K. Olowookere (2013), "Determinants of External Audit Fees: Evidence from the Banking Sector in Nigeria", *Research Journal of Finance and Accounting*, 4(15), 50-58.

Stanley, J.D. (2011), "Is the audit fee disclosure a leading indicator of clients' business risk?", *AUDITING: A Journal of Practice & Theory*, 30(3), 157-179.

Stice, J.D. (1991), "Using Financial and Market Information to Identify Pre-Engagement Factors Associated with Lawsuits against Auditors", *Accounting Review*, 66(3), 516-533.

Taylor, M.H. & D.T. Simon (1999), "Determinants of Audit Fees: The Importance of Litigation, Disclosure, and Regulatory Burdens in Audit Engagements in 20 Countries", *The International Journal of Accounting*, 34(3), 375-388.

Thinggaard, F. & L. Kiertzner (2008), "Determinants of Audit Fees: Evidence from a Small Capital Market with a Joint Audit Requirement", *International Journal of Auditing*, 12(2), 141-158.

Urhoghide, R.O. & F.K. Emeni (2014), "The Effect of Client Characteristics on Audit Fee: Evidence from Nigeria", *Global Journal of Accounting*, 4(1), 48-58.

Urhoghide, R.O. &F.O.I. Izedonmi (2015), "An Empirical Investigation of Audit Fee Determinants in Nigeria", *International Journal of Business and Social Research*, 5(8), 48-58.

Vermeer, T.E. et al. (2009), "Audit Fees at US Non-Profit Organizations.Auditing", *A Journal of Practice & Theory*, 28(2), 289-303.

Vu, D.H.T (2012), "Determinants of Audit Fees for Swedish Listed Non-Financial Firms in NASDAQ OMX Stockholm", <https://lup.lub.lu.se/student-papers/search/publication/2856912>, 13.07.2018.

Xu, Y. (2011), "The Determinants of Audit Fees: An Empirical Study of China´s Listed Companies", <http://Lup.Lub.Lu.Se/Luur/Download?Func=Downloadfile&Recordoıd=2201488&Fileoıd=2436306>, 13.07.2018.

Yatim, P. et al. (2006), "Governance Structures, Ethnicity, And Audit Fees of Malaysian Listed Firms", *Managerial Auditing Journal*, 21(7), 757-782.

Yazıcı, N. (2019), "Türkiye'de Bağımsız Denetim Şirketlerinin Gelirlerini Etkileyen Unsurların Şeffaflık Raporlarının Analizi ile Belirlenmesi", *Gümüşhane Üniversitesi Sosyal Bilimler Enstitüsü Elektronik Dergisi*, 10(1), 168-180.

Zerni, M. (2012), "Audit Partner Specialization and Audit Fees: Some Evidence from Sweden", *Contemporary Accounting Research*, 29(1), 312-340.

Sosyoekonomi

2022, Vol. 30(51), 389-405

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.19
Date Submitted: 31.03.2021
Date Revised: 07.10.2021
Date Accepted: 20.01.2022

Türkiye'de Vergi Esnekliği ve Kamu Kesimi Büyüklüğü İlişkisi[1]

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The Relationship Between Tax Elasticity and The Size of Public Sector in Turkey[2]

Abstract

Tax elasticity, calculated by dividing the proportional change in tax revenues by the proportional change in the tax base, helps to provide automatic stability in public revenues. In this study, we aimed to determine the relationship between the total tax revenue elasticity and the size of the public sector for the period 1990-2019 in Turkey, there is no causality in the short term, but one-way causality from the size of the public sector to tax elasticity was determined in the long term. Also, population change, and economic growth affect the size of the public sector because one-way causality towards the size of the public sector has been determined.

Keywords : Tax Elasticity, Public Sector Size, Public Expenditures.

JEL Classification Codes : H2, H21, H69.

Öz

Vergi gelirlerindeki oransal değişimin, vergi matrahındaki oransal değişime bölünmesi ile hesaplanan vergi esnekliği, kamu gelirlerinde otomatik istikrar sağlanmaya yardımcı olur. Türkiye'de 1990-2019 dönemi için toplam vergi gelirleri esnekliği ile kamu kesimi büyüklüğü arasındaki ilişkinin tespitini amaçladığımız çalışmada, kısa dönemde bir nedensellik tespit edilmemiş, ancak uzun dönemde kamu kesimi büyüklüğünden vergi esnekliğine doğru tek yönlü nedensellik tespit edilmiştir. Ayrıca Türkiye'de nüfus değişimi ve ekonomik büyüme kamu kesimi payını etkilemekte çünkü kamu kesimi büyüklüğüne doğru tek yönlü bir nedensellik tespit edilmiştir.

Anahtar Sözcükler : Vergi Esnekliği, Kamu Kesimi Büyüklüğü, Kamu Harcamaları.

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[1] *Söz konusu makale çalışması Afyon Kocatepe Üniversitesi Bilimsel Araştırma Projeleri Komisyonunca kabul edilen 20.SOS.BIL.01 no'lu proje kapsamında desteklenmektedir.*

[2] *This study was supported by the Afyon Kocatepe University Research Projects Commission (project number: 20.SOS.BIL.01).*

1. Giriş

Vergilemeden beklenen amaç ve fonksiyonlar, zamanla iktisadi ve toplumsal hayattaki değişimlere bağlı olarak değişim göstermiştir. Tüm değişimlere rağmen mali amaç olarak ifade edilen kamusal mal ve hizmetlerin finansmanını sağlama amacı günümüzde de vergilemenin en önemli amacı olma özelliğini korumaktadır. Söz konusu amaç ile ilgili olan vergilemede etkinlik kavramı, ekonomide refah kaybı yaratmayan, eğer yaratıyorsa kaybın minimum olduğu ve aynı zamanda yüksek vergi hasılatı sağlayan vergileme ile ilişkilidir. Vergilemede etkinlik devletin kamu harcamalarını karşılayabilmek adına optimal düzeyde gelir sağlama amacına hizmet etmektedir (Güler & Karaca, 2017: 166).

Vergilemede etkinliğin ölçülmesinde ve uygulamaya konulması planlanan veya konulan vergi politikalarının etkinliğinin tespiti noktasında vergi esnekliği kavramı çok önemlidir. Çünkü vergi esnekliği, vergi gelirlerinin milli gelire olan duyarlılığını ölçmek için kullanılan bir parametre olup aynı zamanda vergi sisteminin otomatik büyüme potansiyelini de göstermektedir. Bir vergi sisteminin esnekliği ne kadar yüksek olursa, vergi gelirleri ulusal gelirdeki büyümeye o kadar duyarlı olacaktır.

Vergi esnekliğinin hesaplanması, vergi yapısının dönüşümü hakkında bilgi vermekle birlikte vergi sisteminin konjonktüre olan duyarlılığını ve dolayısıyla vergi sisteminin otomatik stabilizatör olma özelliğini de etkilediği için önemlidir. Vergi esnekliği, vergi gelirlerinin kamu harcamalarını karşılama gücü hakkında da bilgiler vermektedir. Esnek bir vergi sistemi demek milli gelirde meydana gelen artıştan daha yüksek düzeyde vergi hasılatında bir artış meydana gelmesi demektir. Esnek bir vergi sistemine sahip ülkeler milli gelirlerindeki büyümeye duyarlı olacaklardır ve bu durumda da gelirdeki artış kamu harcamalarını artırıcı yönde etki yapacaktır. Sonuç olarak gelirdeki artış sayesinde daha fazla kamu harcaması gerçekleştirebilecektir. Literatürde, vergi sisteminin esnekliğinin ülkelerin kamu kesimi büyüklüğü ile olan ilişkisinin düzeyine yönelik az sayıda somut bulguya rastlanmaktadır. Bu çalışmanın amacı, "Ekonomide kamu kesiminin payının artması ya da azalması, vergi sisteminin esnekliğini ne düzeyde ilişkidir?" sorusundan hareketle, vergi gelirlerinin esnekliği ile kamu kesimi büyüklüğü arasındaki ilişkinin tespit edilmesidir.

Kamu kesimi büyüklüğünün hesaplanmasında en çok tercih edilen yöntem olan kamu harcamalarının GSYH'ye oranında kullanılan kamu harcamaları, kamu gelirlerini karşılama kabiliyeti hakkında yorum yapmamızı sağlamaktadır (Güler, 2017: 163). Dolayısıyla bu çalışmada kamu kesimi büyüklüğü olarak kamu harcamalarının GSYH payı dikkate alınacaktır. Çalışmada kamu kesimi büyüklüğü ile toplam vergi gelirleri esnekliği arasındaki kısa ve uzun dönemli nedensellik ilişkisi Türkiye açısından 1990-2019 dönemi için ele alınacaktır. 1990-2019 yılları arasında Türkiye'de vergi gelirlerinin esnekliği ile kamu kesimi büyüklüğü arasındaki ilişkinin tespit edilmesini amaçlayan bu çalışmada, ekonomide kamu kesimi payının artması ya da azalmasının vergi gelirlerinin konjonktüre olan duyarlılığını diğer bir ifadeyle vergi sisteminin otomatik stabilizatör olma özelliğini etkileyip etkilemediği incelenmiştir. Söz konusu iki değişken nedensellik testi ile sınanırken,

literatürde yer alan çalışmalardan yola çıkarak, diğer kontrol değişkenler nüfus değişimi ve ekonomik büyüme olarak belirlenmiştir.

2. Vergi Esnekliği Kavramı

Uygulanan maliye politikalarının etkinliğinin ölçülmesi bakımından vergi gelirlerinin, milli gelirdeki değişikliğe verdiği tepkinin tahmin edilmesi son derece önemlidir (Boschi & d'Addona, 2019: 2). Tepkinin tahmin edilmesi kadar, söz konusu tepkinin milli gelirdeki değişmelerle birlikte otomatik olarak mı gerçekleştiği yoksa otomatik değişimlere ek olarak devlet tarafından alınan tedbirler neticesinde mi gerçekleştiğinin tespit edilmesi son derece önemlidir.

Vergi sisteminde etkinliğin ölçülmesinde kullanılan vergi esnekliği, vergi gelirlerinin milli gelirdeki değişmelere olan duyarlılığını ifade etmek için kullanılan bir kavramdır. Söz konusu kavramı matematiksel olarak ifade etmek gerekirse, vergi gelirlerindeki yüzde değişimin vergi matrahındaki yüzde değişime bölünmesidir. Devlet tarafından vergi oranlarında yapılan bir değişiklik gibi ihtiyari bir değişikliğin olmadığı varsayılarak hesaplandığı için vergi esnekliği varsayımsal bir yapıdadır. Neticede de vergi sisteminin otomatik büyüme potansiyelini göstermektedir (Acheson et al., 2017: 2).

Vergi esnekliğinin tahmin edilmesi sadece ülkemizde değil tüm dünyada çok sayıda çalışmaya konu olmuştur. Her ekonomideki parasal ve mali otoriteler için vergi esnekliğinin ölçülmesinin önemli nedenleri vardır. Bu nedenlerden ilki esnekliğin makroekonomik tahminlere dayandırılarak hükümet gelirlerinin tahmin edilmesi için taşıdığı önemdir. Eğer tahminlerde ciddi yanılmalar ortaya çıkarsa bu durum özellikle orta vadeli bütçe hedeflerinden sapmalara sebebiyet verebilir. İkinci neden olarak ise otomatik stabilizatörlerin ve ihtiyari tedbirlerin etkilerini ayrıştırabilmektir (Havranek et al., 2016: 5866). Vergi gelirlerinin milli gelire olan duyarlılığını ölçmede kullanılan ve standart bir parametre olan vergi esnekliği gelecek yıl mali yıl bütçesinin hazırlanmasında önemli bir unsurdur. Ayrıca vergi esnekliği bütçe dengelerinin döngüsel olarak ayarlanmasında da önemli bir role sahiptir. Vergi esnekliğinin doğru tespit edilmesinin önemi 2000'li yılların ortasında daha fazla artmıştır. Bunun sebebi ise ekonomik büyüme oranlarının standart esneklik hesaplamaları ile birleştirilerek hesaplanabilmesidir (Wolswjik, 2007: 7).

Vergi esnekliğinin tüm vergi sistemi için hesaplanması mümkün iken, ayrı ayrı her bir vergi türü için de hesaplanması mümkündür. Tüm vergi sistemi için vergi esnekliği denklem 1'de; vergi türleri için hesaplanan vergi esnekliği ise denklem 2'de gösterilmiştir (Mansfield, 1972: 426):

$$ET_t y = \frac{\Delta Tt}{\Delta Y} \text{ x } \frac{Y}{Tt} \qquad \text{(denklem 1)}$$

$$ET_t y = \frac{T1}{Tt}\left[\frac{\Delta T1}{\Delta Y} \text{ x } \frac{Y}{T1}\right] + \ldots\ldots + \frac{Tk}{Tt}\left[\frac{\Delta Tk}{\Delta Y} \text{ x } \frac{Y}{Tk}\right] + \ldots\ldots + \frac{Tn}{Tt}\left[\frac{\Delta Tn}{\Delta Y} \text{ x } \frac{Y}{Tn}\right] \qquad \text{(denklem 2)}$$

$ET_t y$: Toplam vergi gelirlerinin esnekliği,

T_t: Toplam vergi geliri,

ΔT_t: Vergi gelirlerindeki yüzde değişim (otomatik değişim),

Y: GSYH,

ΔY: GSYH'deki yüzde değişim.

Vergi esnekliği hem kısa dönem için hem de uzun dönem için hesaplanabilmektedir. Her iki dönem için hesaplamanın amacı farklıdır. Kısa dönem esneklik ile hedeflenen konjonktür dönemlerinde GSYH'deki dalgalanmaların vergi gelirlerindeki değişikliğinin belirlenmesi iken, uzun dönem hesaplanan esneklik ile GSYH'deki artışların zaman içerisinde vergi gelirlerinde nasıl büyüme meydana getirdiğinin tespitidir. Hesaplanan esneklik katsayıları farklı değerler alabilmektedir. Söz konusu katsayının alabileceği değerler 0 veya 1 olabileceği gibi 1'den büyük veyahut küçük de olabilir. Katsayının 1'den büyük olması vergi sisteminin esnek bir yapıda oluğunun göstergesidir. Ayrıca katsayının 1'den büyük olması konjonktürün canlanma dönemlerinde yüksek gelir elde edildiği, daralma dönemlerinde ise daha az gelir edildiği ve vergi gelirlerindeki artışın GSYH'deki artıştan daha fazla olduğu anlamına gelmektedir. Katsayının 1'den küçük olması vergi gelirlerindeki artışın GSYH'deki artışın gerisinde kaldığının ve esnek olmayan bir vergi sisteminin varlığının göstergesidir. Esneklik katsayısının 1 olması vergi sisteminin birim esnek bir yapıya sahip olduğu diğer bir ifade ile vergi gelirlerindeki artış ile GSYH'deki artışın eşit ölçüde olduğunu; katsayının 0 olması ise vergi gelirleri ile GSYH arasında herhangi bir ilişkinin söz konusu olmadığını göstermektedir.

Vergi sisteminin esnek olması arzu edilen bir durumdur. Çünkü konjonktürel değişimlere karşı vergi sisteminin esnekliği gelir istikrarını sağlamakta ve vergi sisteminde düzenleme yapma ihtiyacını azaltmaktadır (Haughton, 1998: 3). Ayrıca esnek bir vergi sistemine sahip devletlerde borçlanma ve harcama planlamaları da kolaylaşmaktadır.

Tüm vergi sistemlerinde olduğu gibi Türk vergi sistemini esneklik açısından değerlendirmek gerekirse vergi tarifelerine ve vergi türlerine göre farklılık göstermektedir. Vergileri konularına göre değerlendirmek gerekirse artan oranlı gelir vergisi esnek yapıdadır; düz oranlı kurumlar vergisinin esnekliği ise bire eşittir. Vergi türleri arasında farklılık göstermekle birlikte harcamalar üzerinden alınan vergiler dikkate alındığında söz konusu vergilerin esnekliği düşük, servet üzerinden alınan vergilerin ise nötrdür. Çalışma kapsamında değerlendirme yapabilmek adına aşağıdaki tabloda genel bütçe vergi gelirleri, gelir vergisi kurumlar vergisi ve katma değer vergisinin esnekliğine yer verilmiştir.

Tablo: 1
Genel Bütçe Vergi Gelirleri, Gelir Vergisi, Kurumlar Vergisi ve Katma Değer Vergisi Tahsilatının GSYH'ye (2009 Bazlı) Göre Esneklikleri (2000-2019)

YILLAR	GENEL BÜTÇE VERGİ GELİRLERİ	GELİR VERGİSİ	KURUMLAR VERGİSİ	KATMA DEĞER VERGİSİ
2000	1,32	0,44	0,88	1,71
2001	1,13	1,97	1,28	1,11
2002	1,08	0,40	1,11	1,38
2003	1,36	0,81	1,82	1,08
2004	0,85	0,66	0,48	1,16
2005	1,08	0,97	1,13	0,76
2006	1,58	1,06	-0,49	1,17
2007	1,13	1,73	2,27	0,81
2008	0,85	1,29	1,44	0,64
2009	9,24	9,91	30,37	0,39
2010	1,25	0,46	0,65	1,60
2011	1,02	1,05	1,37	1,30
2012	0,92	1,30	0,78	0,63
2013	1,04	0,85	-0,14	1,31
2014	0,73	1,23	0,93	0,41
2015	1,10	1,09	0,36	1,24
2016	1,18	1,48	2,28	0,83
2017	0,94	0,85	1,21	1,16
2018	0,90	1,10	2,28	1,07
2019	0,74	1,24	0,27	0,52

Kaynak: Gelir İdaresi Başkanlığı'nın resmi internet sayfasından temin edilmiştir[3].

Tablo incelendiğinde, vergi esnekliklerinde genel olarak dalgalı bir seyrin olduğu görülmektedir. Katma değer vergisi hariç diğer vergilerde ve toplam vergi gelirlerinin esnekliğinde 2009 yılındaki yüksek düzeyler dikkat çekmektedir. Özellikle kurumlar vergisi için 30,37 düzeyindeki esneklik oldukça fazladır. Söz konusu oranları yorumlamak gerekirse GSYH'deki bir birimlik artış toplam vergi gelirleri tahsilatında 9,24 gelir vergisi tahsilatında 9,91 ve kurumlar vergisi gelirlerinde ise 30,37 oranında bir artış meydana getirmiştir. Bunun nedeni 2008 yılında ortaya çıkan ve tüm dünyayı etkileyen küresel krizin etkisi olduğu söylenebilir. Kurumlar vergisi esnekliğinin bu denli yüksek olmasının sebebi ise küresel krizin etkisi ile GSYH'de düşüş yaşanması ve buna karşılık kurumlar vergisi tahsilat rakamlarında önemli ölçüde farklılık olmaması olarak açıklanabilir.

3. Kamu Kesimi Büyüklüğü ve Ölçülmesi

Devlete olan ihtiyacın ortaya çıktığı tarihten günümüze kadar, devlete hangi tür görevler yükleneceği ve devletin sınırlarının ne olacağı tartışma konusu olmuştur. Bazı dönemlerde devlete yüklenen görevler artarken bazı dönemlerde ise azalmıştır. Bu görevlerdeki artış ve azalışta ülkelerin ekonomik, sosyal ve siyasal yapıları etkin rol oynamıştır. Son yıllarda ise hâkim olan devlet anlayışı ülkelerin kalkınma seviyeleri göz önünde tutularak minimal devletten sosyal refah devletine doğru bir geçişin olduğu yönündedir. Bu değişim ile birlikte devlet, toplumun huzur ve refahını gözetme amacıyla

[3] *Genel Bütçe Vergi Gelirlerine ilişkin esneklik katsayıları tarafımızca hesaplanmıştır.*

milli ekonomi içerisindeki payını artırmakta ve özel kesime yol gösterici bir tutum izleyerek sosyal alanlarda toplumun refahını artıran harcamalarda bulunmaktadır. Bu durumda devletin kamusal hizmet üretmesi ve sosyal hayatta etkin konuma gelmesi, kamu kesiminin payını daha da artırmıştır (Sandalcı & Sandalcı, 2016: 412).

Kamu kesiminin iktisadi hayat içerisindeki varlık sebebi değerlendirildiğinde, asıl sebebin piyasa ekonomisi ile rekabet olmadığı, sınırsız insan ihtiyaçlarının kıt kaynaklar ile giderilmesi sürecinde piyasa ekonomisine işlerlik kazandırmak olduğu görülmektedir. Ancak klasik devlet anlayışı diğer bir ifade ile devletin ekonomiye müdahalesinin sınırlı tutulması gerektiği görüşünden günümüze kamu kesiminin iktisadi hayat içerisinde hangi ölçekte yer alacağı, mal ve hizmetlerin hangisinin piyasa eliyle hangisinin kamu kesimi tarafından üretileceğinin tartışması devam etmektedir. Bu tartışma kamu kesiminin sınırlarının ne olacağının belirlenmesi açısından da önemlidir. Bir ülkedeki kamu kesiminin büyüklüğü, yapısı ve bileşimi ülkeden ülkeye farklılık göstermektedir. Bu farklılık ülkelerin tarihsel, siyasal ve ekonomik faktörlerinden kaynaklanmaktadır. Tüm tartışmalara rağmen hem gelişmiş hem de gelişmekte olan ülkelerde ülke ekonomisi içerisinde geçmişten günümüze kadar kamu kesiminin büyüklüğü artış trendi içerisinde olduğu bilinmektedir (Ertekin, 2020: 141-142).

Kamu kesiminin ekonomideki rolü ve ağırlığının ne ölçüde olması gerektiği iktisatçılar arasında ciddi tartışma konusu olmuştur. Başlıca iktisat okullarını bu kapsamda ele almak gerekirse ilk olarak klasik liberal düşünceye göre kamu kesiminin ekonomideki rolü minimal olmalıdır. Kamu kesimi sadece adalet, güvenlik gibi tam kamusal mal ve hizmetleri sunarken ekonomiye müdahalede bulunmalıdır. Çünkü Klasiklere göre ekonomi zaten tam istihdam denge düzeyindedir ve ekonomik istikrarsızlıkların asıl sebebi kamu harcamaları ve vergiler gibi maliye politikası araçları ile yapılan müdahalelerdir. Keynesyen iktisadi düşünceye göre ise, kamu kesimi müdahaleci devlet anlayışı ile ekonomide varlığını sürdürmelidir. Bu düşünceye göre kamu kesiminin ekonomi içerisindeki payı artmalıdır. Neo-Klasik düşünceye göre ise kamu kesimi sadece bazı sebeplerle ekonomiye müdahalede bulunabilir. Bu sebepler gelir dağılımında adalet ve kaynak dağılımında etkinliğin sağlanmasıdır.

Kamu kesiminin bir ekonomideki büyüklüğünü ölçerken kamu harcamaları, vergiler, kamu yatırım harcamaları ve kamu istihdamı gibi çeşitli unsurlar bulunmaktadır. Bu unsurlardan yola çıkarak Ekonomik Özgürlükler Endeksi (Economic Freedom of the World: EFW) oluşturulurken "kamu kesiminin büyüklüğü"nü ölçmek için kullanılan göstergeler aşağıdaki gibidir (Acar, 2010: 11):

- Toplam tüketim içinde kamunun tüketimi,
- GSYH'nin yüzdesi olarak transfer harcamaları ve sübvansiyonlar,
- Toplam yatırım harcamaları içinde kamu yatırım harcamalarının payı,
- Gelirlerden ve ücretlerden alınan vergi oranı ve bu oranların uygulandığı gelir ve ücret eşiği.

Bir ülkede kamu kesiminin büyüklüğünü ölçmek için çeşitli yöntemler bulunmaktadır. Bu yöntemler ülkeler arası karşılaştırma yapabilmek adına oldukça önemlidir. Yöntemlerden en çok bilinen ve yaygın olarak da kullanılan kamu harcamalarının GSYH'ye oranlanmasıdır (Kirmanoğlu, 2014: 41). Hesaplamalar yapılırken GSMH'den ziyade GSYH tercih edilir. Bunun sebebi GSMH ile GSYH arasındaki fark ile açıklanmaktadır ve en önemli fark üretimin sınırlarıdır. GSYH, yerli ya da yabancı şirketler tarafından ülke sınırları içerisinde üretilen tüm mal ve hizmetleri hesaba alır. Diğer ülkelerde üretilen malları ve hizmetleri kapsamaz. GSMH, üretimin yeryüzünde nerede gerçekleştiğine bakılmaksızın yerli şirketler tarafından üretilen tüm ürünleri ölçmektedir. Diğer bir ifade ile GSMH net dış faktör gelirlerini de kapsamakta ve bu gelirler çok sayıda ülkede istikrarlı bir seyir sergilememektedir (Erden-Özsoy & Tosunoğu, 2017: 286).

3.1. OECD Ülkelerinde ve Türkiye'de Kamu Kesimi Büyüklüğü

Kamu kesiminin büyüklüğünün ne olması gerektiği ile ilgili tartışmalar halen devam etse de söz konusu büyüklüğün ekonomi içerisindeki payı genelde artış göstermektedir. Çok sayıda gelişmiş ülkede ise önemli bir paya sahip olduğunu söylemek mümkündür. Söz konusu ifade, Tablo 2'de verilen OECD ülkelerinde kamu kesimi büyüklükleri ile gözlenmektedir.

2007-2020 dönemine ait veriler incelendiğinde OECD üyesi ülkelerde kamu kesimi büyüklüğünün %40 civarında olduğu görülmektedir. Avusturya, Belçika, Danimarka, Fransa ve İsveç gibi birçok gelişmiş ülkede kamu harcamalarının GSYH'ye oranı, diğer bir ifade ile kamu kesiminin büyüklüğü genel olarak %50'ye yakın veya üzerinde bir seviyede seyretmektedir. Bu durum özellikle Kıta Avrupası'ndaki ülkelerdeki refah devleti anlayışı ile açıklanabilir. Ayrıca tabloda dikkat çeken bir diğer husus kamu kesimi büyüklüğü neredeyse ülkelerin tamamında 2009 yılına kadar sürekli artış göstermiş ve 2009 yılından sonra da azalma eğilimine girmesidir Türkiye özelinde incelendiğinde ise Türkiye'de kamu kesimi büyüklüğünün son dönemde yaklaşık %35 seviyelerinde olduğu görülmektedir. Diğer ülkelere benzer şekilde Türkiye'de de 2008 yılındaki yükseliş de dikkat çekmektedir. Bu artışın sebebi ABD'de ortaya çıkan ve tüm dünyayı olduğu gibi Türkiye'yi de etkileyen Mortgage krizidir. Türkiye krizden etkilenmiş fakat bu etkilenme ciddi boyutlara ulaşmamıştır. Kriz sonrasında kamu kesimi büyüklüğünde ciddi dalgalanmalar yaşanmamış ve kamu kesimi büyüklüğü krizi takip eden yıllarda azalma trendine girmiştir.

Tablo: 2
OECD Ülkelerinde Kamu Kesiminin Büyüklüğü (Kamu Harcamaları / GSYH, %)[4]

ÜLKE	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Avustralya	34,67	36,99	38,37	36,93	37,2	36,33	36,6	36,74	37,38	36,68	36,85	36,56	41,14	..
Avusturya	49,24	49,87	54,14	52,84	50,9	51,21	51,65	52,43	51,13	50,07	49,3	48,75	48,56	57,89
Belçika	48,56	50,78	54,68	53,88	55,3	56,48	56,12	55,6	53,72	53,12	52,04	52,2	52,1	60,18
Kanada	39,34	39,59	44,28	43,9	42,38	41,72	40,77	39,16	40,83	41,56	41,26	41,65	41,73	53,28
Kolombiya	37,07	36,3	38,24	37,23	37,42	39,15	40,92	45,14	45,01	43,29	44,85	45,07**	45,94	..
Kosta Rika	30,71 *	34,97*	34,84*	38,72*	38,41*	30,91*	32,15*	31,98*	32,05*	32,53*	33,03*	42,07*	43,62	..
Çek Cumhuriyeti	40,44	40,87	44,36	43,63	43,19	44,68	42,65	42,62	41,93	39,75	38,98	40,6	41,36	47,5
Danimarka	49,59	50,41	56,54	56,67	56,43	57,95	55,82	55,22	54,53	52,48	50,55	50,55	49,24	53,99
Estonya	33,74	39,4	45,59	39,94	37,09	38,95	38,18	37,52	39,24	39,07	39,19	39,29	38,93	45,13
Finlandiya	46,57	47,88	54,09	53,91	53,66	55,44	56,82	57,28	56,49	55,65	53,63	53,37	53,19	56,68
Fransa	52,57	53,3	57,15	56,88	56,29	57,11	57,23	57,21	56,8	56,69	56,5	55,71	55,62	62,44
Almanya	43,4	44,2	48,2	48,14	45,24	44,92	44,94	44,3	44,14	44,35	44,2	44,46	45,17	51,09
Yunanistan	47,07	50,85	54,08	52,96	55,12	56,71	62,87	50,7	54,13	50,02	48,47	48,48	47,85	60,69
Macaristan	49,94	48,8	50,68	48,91	49,12	49,25	50,16	50,14	50,42	46,85	46,5	45,89	45,71	51,62
İzlanda	44,79	63,45	53,67	48,9	50,65	47,85	46,08	45,94	43,57	46,52	44,49	43,99	43,43	49,69
İrlanda	35,96	41,88	47,14	65,11	46,91	42,52	40,82	37,84	29,3	28,27	26,33	25,7	24,57	28,42
İsrail	42,06	42,75	42,8	41,06	40,62	41,18	41,16	39,61	38,52	38,71	39,55	40,4	39,93	..
İtalya	46,78	47,83	51,11	49,93	49,17	50,59	50,95	50,86	50,32	49,08	48,76	48,38	48,63	57,29
Japonya	35	36,07	40,69	39,74	40,64	40,61	40,76	40,2	39,33	39,29	38,64	38,83	..	..
Kore	28,04	29,81	32,28	29,6	30,38	30,8	30,13	30,42	30,4	30,3	30,27	31,15	33,92	..
Litvanya	35,29	38,13	44,95	42,38	42,51	36,13	35,49	34,7	35,09	34,19	33,15	33,84	34,63	43,47
Letonya	34,59	38,39	45,23	45,99	40,92	38,56	38,23	38,94	38,65	37,38	38,72	39,36	38,41	43,6
Lüksemburg	37,86	39,8	45,09	44,28	42,62	44,1	43,54	42,22	41,98	41,02	42,26	42,34	42,32	47,79
Mesika	21,59	25,03	25,47	25,44	28,79	28,53	28,44	28,05	28,2	26,67	26,1	27,46	26,74	..
Hollanda	42,46	43,22	47,67	47,94	46,84	46,86	46,6	45,86	44,69	43,6	42,4	42,25**	41,97**	48,14
Yeni Zelanda	38,28	41,16	41,67	47,36	43,54	42,09	40,19	39,77	38,83	38,89	37,77	38,45	40,53	..
Norveç	41,74	40,58	46,5	45,39	44,18	43,31	44,41	46,25	49,28	51,53	50,48	48,82	51,47	58,36
Polonya	42,9	44,17	45,01	45,85	44,09	43,15	42,98	42,64	41,68	41,11	41,27	41,54	41,87	48,8
Portekiz	44,51	45,34	50,22	51,9	50,02	48,89	49,92	51,74	48,25	44,84	45,37	43,24	42,53	48,45
Slovak Cumhuriyeti	36,38	36,99	44,41	42,5	41,63	41,15	42,5	43,3	45,77	42,66	41,33	41,66	42,68	47,99
Slovenya	43,41	45,05	49,36	50,18	50,86	49,35	60,27	50,84	48,71	46,16	44,07	43,53	43,3	51,98
İspanya	39,26	41,44	46,23	46,03	46,15	48,66	45,83	45,11	43,89	42,44	41,2	41,66	42,05	52,28
İsveç	49,29	50,03	52,26	50,39	49,67	50,88	51,59	50,69	49,34	49,73	49,23	49,84	49,33	52,92
İsviçre	30,09	30,64	32,46	32,12	32,09	32,42	33,32	32,91	33,23	33,3	33,26	32,55	32,72	..
Türkiye	..	..	37,72	35,31	33,32	33,21	32,59	31,94	31,74	33,85	33,96	34,69	35,45	..
Birleşik Krallık	40,99	44,37	47,2	47,27	45,77	45,62	43,92	43,09	42,28	41,54	41,26	41,06	41,1	51,56
ABD	37,43	39,82	43,26	43,17	42,05	40,23	39,01	38,35	37,89	38,21	37,99	37,81	38,14	..
OECD Ortalama	40,6	42,72	46,15	45,95	44,84	44,67	44,88	44,1	43,57	42,71	42,18	42,18	42,45	..

Kaynak: OECD (2021).
**: Tahmini Değer,*
***: Geçici Değer.*

4. Ampirik Literatür

Ulusal ve uluslararası literatür incelendiğinde vergi esnekliği ile ilgili farklı ülkeleri konu edinen çok sayıda çalışma mevcuttur. Ancak vergi esnekliği ile kamu kesimi büyüklüğü arasında ilişki kuran çalışma sayısı oldukça sınırlıdır. Bu konu hakkında literatürde ulusal ve uluslararası ampirik çalışmalar Tablo 3'te verilmiştir.

[4] *OECD (2021)'den temin edilen veri setinde Şili'ye ait veriler bulunmamaktadır.*

Tablo: 3
Vergi Esnekliği ve Kamu Kesimi Büyüklüğü İlişkisine İlişkin Ampirik Çalışmalar

Yazar/ Çalışmanın Yılı	Analizin Yapıldığı Yer	Analizin Yapıldığı Yıllar	Kullanılan Ekonometrik Yöntem	Bulgular
Craig & Heins (1980)	ABD Eyaletleri	1970-1975	Regresyon Analizi (En Küçük Kareler Yöntemi)	Çalışmada vergi esnekliğinin hükümet harcamaları üzerindeki etkisi analiz edilmiştir. Bağımlı değişkenler olarak kişi başı hükümet harcaması ve kişi başı hükümet harcamalarının yüzdesi; bağımsız değişkenler olarak ise vergi esnekliği, kişi başı gelir, kişi başı federal yardım, nüfus yoğunluğu, eyalet ve yerel gelir, kentsel nüfus ve 18 yaş üstü nüfus. Analizlerin bulgularına göre hükümetler tarafından yapılan harcama düzeylerinin vergi esnekliği ile pozitif ilişkisi vardır.
Dilorenzo (1982)	250.000 veya daha fazlası nüfusa sahip 66 eyalet bölgesi	1867-1977		Çalışmada bağımlı değişken kişi başı harcamadaki değişim; bağımsız değişkenler ise nüfustaki değişim, nüfus yoğunluğundaki değişim, kişi başı gelirdeki değişim, vergi esnekliği, kişi başı yerel gelirdeki değişim, hükümetler arası gelirdeki değişimdir. Çalışmadan elde edilen bulguya göre vergi esnekliği ile yerel kamu harcaması arasındaki anlamlı ve negatif bir ilişki vardır.
Misiolek & Elder (1988)	ABD Eyaletleri	1967-1984	Regresyon Analizi	Çalışmada iki bağımlı değişken kullanılmıştır. Bunlar kişi başı reel vergi geliri ve kişi başı gerçek yerel-eyalet harcamasıdır. Bağımsız değişkenler ise kişi başı kişisel gelir, nüfus, eyalet yerel yönetim çalışanlarının aylık ortalama maaşı, eyalet-yerel vergi gelirlerinin zaman içerisindeki değişimi, gerçek kişisel gelirin zaman içerisindeki değişimi. Çalışmanın bulgularına göre vergi esnekliğinin vergi gelirleri üzerindeki etkisi anlamlı ve pozitif iken, kamu harcamaları üzerindeki etkisi yoktur.
Dollery & Worthingon (1995)	7 Avustralya Eyaleti	1982-1992	Birleştirilmiş Zaman Serileri	Bağımlı değişken kişi başı kamu harcaması; bağımsız değişkenler kişi başı gelir, 65 yaş üstü nüfus oranı, 19 yaş altı nüfus oranı, nüfus yoğunluğu, vergi esnekliği, dolaylı ve dolaysız vergi oranı. Elde edilen sonuçlara göre vergi esnekliğinin kamu harcamaları üzerinde etkisi yoktur.
Adejare & Akande (2017)	Oyo Eyaleti	1990-2015	Çoklu Regresyon Modeli	Çalışmada Oyo Eyaletinde kişisel gelir vergisinin devlet harcamaları üzerindeki etkisi analiz edilmiştir. Bağımlı değişken Oyo eyaleti kamu harcamaları; bağımsız değişkenler kişisel gelir vergisi (PAYE), sermaye kazanç vergisi, yol vergisi ve diğer vergilerdir. (Damga vergisi, bahis ve kumar vergileri, ticari tesisler ve tescil vergileri vb). Elde edilen bulgulara göre Kişisel gelir vergisinin kamu harcamaları üzerinde olumlu bir etkisi vardır. Oyo eyaletinde kamu harcamaları üzerinde negatif önemsiz etkilere sahip olan sermaye kazanç vergisi ve yol vergisi haricinde, diğer tüm değişkenler Oyo eyaletindeki kamu harcamaları üzerinde pozitif anlamlı etkiye sahiptir.
Patnaik & Yaji (2018)	Hindistan'ın 5 büyük eyaleti (Andhra Pradesh, Maharashtra, Uttar Pradesh, Bihar ve Punjab.)	2001-2010	Regresyon Analizi	Çalışmada bağımlı değişken olarak eyalet düzeyinde devlet harcamaları; bağımsız değişken olarak ise GSYH, merkezi yardım ve vergi esnekliği kullanılmıştır. Analiz sonucuna göre Bihar hariç diğer eyaletlerde devlet harcamaları ile vergi esnekliği arasında pozitif bir ilişki mevcuttur. Dolayısıyla, vergi esnekliğine sahip bir devlet, yasal vergi oranlarında bir değişiklik olmaksızın (gelirini artırmak için) bile harcamalarını artırabilir.
Kutbay & Aksoy (2020)	7 OECD ülkesi (Kanada, İzlanda, Letonya, Litvanya, Lüksemburg, Hollanda ve İsviçre)	1997-2016	Panel Veri Analizi	Çalışmada bağımlı değişken olarak kamu harcamaları, bağımsız değişkenler olarak ise vergi esnekliği, tüketici fiyat endeksi ve nüfus artış oranı kullanılmıştır. Analiz sonucuna göre vergi esnekliği ve nüfus artışı kamu harcamalarını artırmakta; tüketici fiyat endeksi ise kamu harcamalarını azaltmaktadır.
Yılancı vd. (2020)	Türkiye	Ocak 2006 / Kasım 2019	Asimetrik Nedensellik Testi	Çalışmanın amacı kamu harcamaları ile vergiler arasında nedensellik ilişkisinin tespitidir. Çalışma bulgularına göre uzun dönemde vergi gelirlerinden kamu harcamalarına doğru tek yönlü bir nedensellik ilişkinin varlığı saptanırken, vergi gelirlerinin pozitif şoklarından kamu harcamalarının pozitif şoklarına doğru, kısa, orta ve uzun vadede tek yönlü asimetrik bir nedensellik ilişkinin varlığı saptanmıştır. Dolayısıyla uzun dönemde Türkiye'de vergi-harcama hipotezinin geçerli olduğu; kısa, orta ve uzun vadelerde ise asimetrik vergi-harcama hipotezinin geçerli olduğu bulgusuna ulaşılmıştır.

5. Veri Seti ve Model

Bu çalışma ile Türkiye'de kamu kesimi büyüklüğü ile vergi esnekliği arasındaki ilişki tespit edilmeye çalışılmıştır. Vergi esnekliği test edilirken toplam vergi geliri esnekliği dikkate alınmış ve genel bütçe vergi gelirlerine ilişkin esneklik katsayıları tarafımızca hesaplanmıştır. Hesaplama yapılırken toplam vergi gelirleri tahsilat tutarları Gelir İdaresi

Başkanlığı'ndan, GSYH verileri ise 1990-2017 dönemi Strateji ve Bütçe Başkanlığı, 2018-2019 yılları ise TÜİK'ten temin edilmiştir. Modelde kullanılan diğer değişken olan kamu kesimi büyüklüğü ise 1990-2003 dönemi için Strateji ve Bütçe Başkanlığı'nın; 2004-2019 dönemi ise Hazine ve Maliye Bakanlığı'nın resmi internet sayfasından temin edilmiştir. Ayrıca modelde kullanılan nüfus değişimi değişkeninin verileri Dünya Bankası'ndan temin edilmiştir. Verilerin devamlılığı açısından modelde kullanılacak dönem 1990-2019 olarak belirlenmiştir.

Seriler arasındaki nedensellik ilişkisinin test edilebilmesi için öncelikle serilerin durağanlık sınamasının yapılması gerekmektedir. Serilerin durağan olmaması, sahte regresyon problemi ile karşı karşıya olmamıza neden olacağından, değişkenin farkının alınması gerekmektedir. Orijinal seride fark almayı her gözlem arasındaki değişme olarak tanımlamak mümkündür (Sevüktekin & Nargeleçekenler, 2010: 237). Durağan hale getirilebilmesi için x defa farkının alınması gereken bir değişken; I(x) olarak ifade edilmektedir. Durağanlığı sınamak için kullanılan bir yöntem birim kök sınamasıdır. Bu durumun tespiti için modeldeki değişkenlere ait serilere, ekonometrik modellerde durağanlığın tespitinde çoğunlukla kullanılan ADF (Augumented Dickey Fuller) ve Phillips-Perron (PP) Birim Kök Testleri uygulanmıştır (Gujarati, 1999: 718-719).

Durağan olmayan zaman serilerinin düzey değerleriyle ele alınıp alınamayacağını anlamak için eşbütünleşme testinin yapılması gerekir. Eşbütünleşme ekonomik değişkenler arasındaki uzun dönemli ilişkinin istatistiksel olarak sunulmasıdır (Sevüktekin & Nargeleçekenler, 2010: 481). Serilerin düzey değerleriyle yapılan birim kök sınamasında durağan olmadıkları anlaşıldığından birinci derece farkları alınarak durağan hale getirilmiş ve koentegrasyon araştırılmıştır. Aynı dereceden farkı alındığında durağan hale getirilen seriler arasında koentegrasyon (eşbütünleşme) olması durumunda Engle ve Granger tarafından 1987 yılında geliştirilen Hata Düzeltme Modeli kullanılmaktadır.

Analizde kullanılan değişkenler;

eTV: Toplam vergi gelirleri için esneklik katsayıları,

rGSYH: Gayrisafi yurt içi hasıla (Zincirlenmiş hacim endeksine göre olan değerler analize dahil edilmiştir),

ND: Nüfus değişimi,

KKB: Kamu kesimi büyüklüğü,

Δ: Her bir değişkenin birinci dereceden farkı şeklindedir.

6. Analiz Sonuçları

Kamu kesimi ile vergi esnekliği arasındaki ilişkinin test edilmesi için yapılan analizler Eviews 10.0 ekonometri paket programı yardımıyla gerçekleştirilmiştir. Öncelik olarak serilerin durağanlığını incelemek için birim kök testleri yapılmaktadır. Durağan olmayan serilerle çalışılması halinde, sahte regresyon problemi ile karşılaşılabileceği ve bu

durumda regresyon analizi ile elde edilen sonuçların geçersiz sayılacağı ifade edilmektedir. Durağan olmayan seriler ile yapılan regresyon analizlerinin, sadece bu seriler arasındaki eşbütünleşme (koentegrasyon) ilişkisi varsa gerçek ilişkiyi yansıtacağı kabul edilmektedir (Gujarati, 1999: 726).

6.1. Birim Kök Testleri

Durağan olmayan seriler birçok hipotez testini geçersiz kıldığı için bu sorunu ortadan kaldırmak için Augumened Dickey- Fuller (ADF) testi ve Philips-Perron Testi kullanılmıştır. Buna göre; Ho: seri durağan değildir (birim köke sahiptir) iken alternatif hipotez olarak Ha: seri durağandır (birim köke sahip değildir) şeklindedir.

Tablo: 4
ADF Testi ve Philips-Perron Testi Sonuçları

DEĞİŞKENLER	**ADF-t istatistiği Düzey Değerleri**		**ADF-t istatistiği Birinci farkları**	
	Sabit	Sabit ve Trendli	Sabit	Sabit ve Trendli
KKB	-2.480(0.13)	-2.458(0.34)	**-4.889(0.00**)**	**-4.919(0.00**)**
logrGSYH	-0.001(0.95)	-2.255(0.44)	**-5.722(0.00**)**	**-5.709(0.00**)**
eTV	-2.433(0.14)	**-6.458(0.00**)**	**-5.522(0.00**)**	**-6.221(0.00**)**
ND	-2.105(0.24)	**-4.165(0.01*)**	**-3.675(0.01*)**	**-4.997(0.00**)**
DEĞİŞKENLER	**Philips-Perron istatistiği Düzey Değerleri**		**Philips-Perron istatistiği Birinci farkları**	
	Sabit	Sabit ve Trendli	Sabit	Sabit ve Trendli
KKB	-2.328(0.17)	-1.990(0.58)	**-4.889(0.00**)**	**-4.921(0.00**)**
logrGSYH	0.144(0.96)	-2.255(0.44)	**-6.016(0.00**)**	**-7.419(0.00**)**
eTV	**-5.196(0.00**)**	**-5.801(0.00**)**	**-13.751(0.00**)**	**-15.888(0.00**)**
ND	-1.858(0.34)	-1.866(0.64)	**-6.911(0.01*)**	**-6.594(0.01*)**

** işareti %5 düzeyinde anlamlılığı ifade etmektedir.*
*** işareti %1 düzeyinde anlamlılığı ifade etmektedir.*
Sadece reel olarak hesapladığımız GSYH değer içermekte, diğer değişkenler % olarak ifade edildiğinden, sadece rGSYH değişkeninin önce mutlak değeri ardından logaritması alınmıştır.

ADF ve Philip-Perron testi sonucunda, serilerin birinci derece farklarının alınması durumunda tümünün durağan hale geldiği gözlenmiştir. Serilerin bir kısmının düzeyde durağan bir kısmının da birinci derece farkları ile durağan olması, aynı seviyede durağan olmadıklarını göstermektedir. Oysaki analize devam etmek için tümünün aynı seviyede durağanlığının sağlanması önemlidir. Söz konusu durağanlık ise birinci dereceden farklarının alınmasıyla sağlanmıştır.

Serilerin geleneksel birim kök testlerine göre (ADF ve PP) göre I(1) olmasından dolayı seriler arasındaki eşbütünleşme ilişkisinin araştırılabileceğine karar verilmiştir. Durağan olmayan fakat aynı düzeyde farkları alınarak durağanlığı yakalayan serilerde Granger Nedensellik Testleri ile bulunan bulgular sahte olabilir. Bu nedenle farklı koentegrasyon teknikleri yardımıyla, seriler arasındaki uzun dönemli ilişkinin varlığı araştırılır.

6.2. Johansen Eşbütünleşme Testi

ADF ve PP birim kök test sonuçlarına göre, seriler düzeyde durağan olmayıp birinci derece farkları alınınca ancak durağan olmuştur. Dolayısıyla aynı dereceden durağan

olmaları eşbütünleşme testi için gerekli ilk aşamanın sağlandığını göstermektedir. Bu durumda seriler arasındaki uzun dönemli ilişki Johansen eşbütünleşme yöntemiyle test edilebilir. Johansen eşbütünleşme testi için uygun gecikmenin belirlenmesin ve seriler arasında uzun dönemli ilişkinin olup olmadığının test edilmesi gereklidir. VAR modeli ile uygun olan gecikme uzunluğu bulunacak ve bazı kriterler dikkate alınacaktır. Bunlar AIC, FPE, SC, LR, HQ kriterleri şeklindedir.

Tablo: 5
VAR Modeline Uygun Gecikme Uzunluğunun Belirlenmesi

Gecikme Sayısı	LR	FPE	AIC	SC	HQ
1	115.102	0.003	5.776	**6.774***	6.054
2	**29.998***	**0.002***	**5.242***	6.984	**5.744***

LR: Sequential modified LR test statistics, FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion, HQ: Hannan-Quinn information criterion.

VAR modeline uygun olan gecikme uzunluğu sayısı, kriterlerden çoğunluğunun yani 3 tanesinin sonucuna göre 2 olarak belirlenmektedir. Uygun olan gecikme uzunluğuna göre yapılan Johansen Koentegrasyon Testi sonucunda, koentergrasyonun olmadığı tespit edilmiştir.

Tablo: 6
Johansen Eşbütünleşim Testi Sonuçları

Sıfır Hipotezi	Maksimum öz değer istatistiği	%95 kritik değer	İz istatistiği	%95 kritik değer	Öz değer
r=0	**44.293***	24.159 (0.00)	**81.682***	40.174 (0.00)	0.817
r≤1	**36.185***	25.823 (0.00)	**53.717***	42.915 (0.03)	0.805
r≤2	12.724	19.387 (0.35)	17.531	25.872 (0.37)	0.387

*Not: r, eşbütünleşme sayısını, *, %5 düzeyindeki anlamlılığı ifade etmektedir.*

Eşbütünleşme testi, eşbütünleşik vektörün liner olup, sabit ve trend içerdiği modele uygun olarak gerçekleştirilmiştir. Hesaplanan test istatistikleri belli bir anlamlılık düzeyindeki %5 kritik değerden büyükse HO hipotezi reddedilir. (H0: eşbütünleşme yoktur). Maksimum özdeğer ve iz istatistiklerine göre, eşbütünleşme vardır. Bu sonuçlara göre, analiz dönemi içerisinde Türkiye'de modelde yer alan değişkenler arasında uzun dönemli bir denge ilişkisinin geçerli olduğundan söz etmek mümkündür.

6.3. Değişkenler Arasındaki Nedensellik İlişkisinin Vektör Hata Düzeltme Modeli (VECM) ile Belirlenmesi

Eşbütleşmenin varlığı durumunda nedensellik ilişkilerinin hata düzeltme modeli (Vector Error Correction Model, VECM) ile analiz edilmesi gerekmektedir. Değişkenler arasında uzun dönemli bir ilişki olması halinde Engle ve Granger (1987) çalışmalarında hata düzeltme mekanizmasının kullanılabileceğini göstermişlerdir. Böylece uzun dönem dengesinde oluşacak bir sapmanın düzeltilebileceği ortaya atılmıştır. Burada kullanılacak olan regresyonda sapmaların düzeltilmesi için hata düzeltme terimi (ECT) kullanılmaktadır. Dolayısıyla çalışmada kullanılan zaman serileri arasında incelenecek Granger nedensellik

testi vektör hata düzeltme modeli (VECM) temelli olacaktır. Burada kullanılacak olan her bir bağımlı değişken için açıklayıcı değişkenlerin katsayılarına uygulanan Wald testinden elde edilen F istatistik değerleri ile hata düzeltme terimlerinin katsayılarının t istatistik değerleri Tablo 7'de gösterilmiştir. Sınamaya ilişkin hata düzeltme denklemleri aşağıdaki gibidir:

$$\Delta \log GSYH_t = \propto_0 + \propto_1 \Delta \log GSYH_{t-1} + \propto_2 \Delta eTVG_t + \propto_3 \Delta eTVG_{t-1} + \propto_4 \Delta nufusD_t + \propto_5 \Delta nufusD_{t-1} + \propto_6 \Delta KKB_t + \propto_7 \Delta KKB_{t-1+} \propto_8 e1_{t-1} + \varepsilon_{t1} \quad (3)$$

$$\Delta eTVG_t = \beta_0 + \beta_1 \Delta eTVG_{t-1} + \beta_2 \Delta \log GSYH_t + \beta_3 \Delta \log GSYH_{t-1} + \beta_4 \Delta nufusD_t + \beta_5 \Delta nufusD_{t-1} + \beta_6 \Delta KKB_t + \beta_7 \Delta KKB_{t-1+} \beta_8 e1_{t-1} + \varepsilon_{t2} \quad (4)$$

$$\Delta nufusD_t = \delta_0 + \delta_1 \Delta nufusD_{t-1} + \delta_2 \Delta logGSYH_t + \delta_3 \Delta logGSYH_{t-1} + \delta_4 \Delta eTVG_t + \delta_5 \Delta eTVG_{t-1} + \delta_6 \Delta KKB_t + \delta_7 \Delta KKB_{t-1} + \delta_8 e1_{t-1} + \varepsilon_{t3} \quad (5)$$

$$\Delta KKB_t = £_0 + £_1 \Delta KKB_{t-1} + £_2 \Delta \log GSYH_t + £_3 \Delta \log GSYH_{t-1} + £_4 \Delta eTVG_t + £_5 \Delta eTVG_{t-1} + £_6 \Delta nufusD_t + £_7 \Delta nufusD_{t-1} + £_8 e1_{t-1} + \varepsilon_{t4} \quad (6)$$

Tablo: 7
Hata Düzeltme Modeline Dayalı Nedensellik Testi Sonuçlar

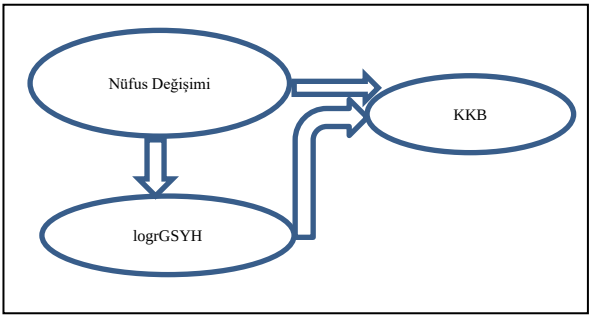
	Kısa Dönem Nedensellik				Uzun dönem Nedensellik	
Bağımlı Değişken	Bağımsız Değişkenler					
	KKB	logrGSYH	ND	eTV	ECT	t ist.
KKB	-	**0.055 (0.003)***	**8.877 (0.001)***	0.628 (0.543)	**-1.30 [0.00]***	**-6.78**
logrGSYH	0.439 (0.649)	-	**4.617 (0.020)***	0.511 (0.606)	0.006 [0.01]	6.46
ND	0.052 (0.949)	0.922 (0.912)	-	0.139 (0.870)	**-0.300 [0.00]***	**-7.32**
eTV	1.367 (0.276)	2.434 (0.110)	1.697 (0.205)	-	**-3.164 [0.00]***	**-15.47**

*Not: t istatistiği kritik değerden büyükse anlamlıdır, diğer ifade ile nedensellik kaynağıdır. * %5 önem düzeyinde anlamlılığı gösterir. ( ) kısa dönem analizde prob. değerleridir, []uzun dönem analizde prob. değerleridir.*

Tabloda gösterilen değişkenlere ait ECT'nin (hata terimi) t istatistiği değerlerinin kritik değerlerden büyük olması halinde, bağımlı değişkenin uzun dönemde diğer değişkenlerle arasında nedensellik ilişkisi olduğu sonucuna ulaşılmıştır. Burada önemli olan ECT için prob. yani olasılık değerinin 0.05'den küçük olması ve katsayı değerinin mutlaka (-) işaretli olması gereklidir. Buradan hareketle tabloda yer alan sonuçlara göre uzun dönemde KKB, eTV, ND bağımlı değişken oldukları zaman diğerlerine doğru nedensellik ilişkisinin mevcut olduğu ancak logrGSYH'den diğer değişkenlere doğru uzun dönemli nedensellik ilişkisinin olmadığı söylenebilmektedir. Kısa dönemde ise ND'den KKB ve logrGSYH'ye doğru bir nedensellik tespit edilmiştir. KKB ile eTV arasında kısa dönemli nedensellik söz konusu değildir.

Tablo 7'deki kısa dönem nedensellik testi sonuçlarına göre, nüfus değişiminden kamu kesimi büyüklüğüne ve GSYH'den da yine kamu kesimi büyüklüğüne doğru doğru tek yönlü pozitif nedensellik ilişkisinin olduğu görülmektedir. Nüfus değişimi arttıkça kamu kesimi büyümekte yani kamu harcamalarının hasıla içindeki payı artmaktadır. Aynı zaman nüfus ülkedeki GSYH'nin artmasına da etki etmektedir.

Şekil: 1
Kısa Dönem Nedensellik Analizi Sonucu



Kısa dönem nedensellik testi sonuçlarında, çalışmanın konusunu oluşturan kamu kesimi büyüklüğü ile vergi gelirleri esnekliği ilişkisi gözlenmemektedir. Elde edilen bulgulara göre kamu kesimi büyüklüğünden vergi gelirleri esnekliğine doğru bir nedensellik mevcut değildir. Bu sonuçtan yola çıkarak Türkiye'de kısa dönemde kamu kesiminin genişlemesi ile vergi gelirlerinin esnekliği arasında bir ilişki yoktur. Benzer sonuç literatürde yer alan Dollery ve Worthing (1995) ile Misiolek ve Elder (1988) tarafından yapılan farklı ülke örneklerinin ve farklı dönemlerin ele alındığı çalışmalarda da söz konusudur. Bunun yanında literatürde oldukça az çalışma olmakla birlikte Debasis ve Venkat (2018: 70) vergi esnekliği ile hükümet harcamaları arasında pozitif ve anlamlı bir ilişki tespit etmiştir. Sonuçların birbirinden farklı olmasının nedeni, yapılan çalışmalarda farklı ülke örnekleri ve farklı dönemlerin alınmasıdır.

Yapılan analizlerden elde edilen bulgularına göre ekonomik büyüme ile kamu kesimi büyüklüğü arasında da kısa dönemde tek yönlü pozitif nedensellik tespit edilmiş olup bu sonuç yapılan diğer çalışmalar ile desteklenmektedir. Türkiye'de kamu büyüklüğünün iktisadi büyüme üzerindeki etkilerini test etmeye yönelik yapılan ampirik çalışmalar arasında Yamak ve Küçükkale (1997) ile Terzi (1998); ekonomik büyümenin Granger anlamında kamu harcamalarını pozitif yönde etkilediğini tespit etmişlerdir. Elde ettikleri sonuç, Türkiye'de kamu harcamaları payındaki artışın ekonomik gelişmeyle birlikte arttığı yönündedir. Aslında bu sonuç bir anlamda Wagner Yasasının geçerli olduğunu ortaya koymuştur.

7. Sonuç

Devletler artan kamu harcamalarının finansmanı için vergi gelirlerine ihtiyaç duyarlar. Vergilerin ise optimum bir şekilde tahsil edilmesi etkin bir vergi sistemi ile mümkündür. Vergilemede etkinliğin ölçülmesi yöntemi olan vergi esnekliği vergi sistemleri için arzu edilen bir durumdur.

Vergi esnekliği vergi sistemi için ölçülebileceği gibi her bir vergi türü için de hesaplanabilmektedir. Genel bütçe vergi gelirleri, gelir vergisi, kurumlar vergisi ve katma değer vergisi 2000-2019 dönemi vergi esneklikleri dalgalı seyir izlemekte ayrıca katma değer vergisi hariç diğer vergilerde ve toplam vergi gelirlerinin esnekliğinde 2009 yılındaki yükseklik dikkat çekmektedir. Bunun nedeni olarak 2008 yılındaki Mortgage krizi gösterilebilir. Söz konusu vergiler arasında 2009 yılı için esneklik katsayısı en fazla olan vergi kurumlar vergisidir. Kurumlar vergisi esnekliğinin bu denli yüksek olmasının sebebi, küresel krizin etkisi ile GSYH'de düşüş yaşanması ve buna karşılık kurumlar vergisi tahsilat rakamlarında önemli ölçüde farklılık olmaması olarak açıklanabilir. Görüldüğü üzere ülkelerdeki ekonomik krizler, ekonomik göstergeleri etkilemektedir. Bu süreçte vergi gelirleri de elbette etkilenmekte, iradi vergi politikaları zaman zaman beklenen etkiyi gösterememekte ve otomatik stabilizatör olarak vergi sisteminin esnekliği önem arz etmektedir. Bir vergi sisteminin esnekliği, vergilerin otomatik stabilizatör olma özelliklerini etkilemektedir. Ülkedeki kamu kesiminin payı yani daha liberal bir devlet anlayışı ile daha müdahaleci devlet anlayışına sahip olan ülkelerde, vergi esnekliği ne düzeyde değişmekte ya da etkilenmektedir? sorusundan hareketle, sadece Türkiye özelinde, kamu kesimi büyüklüğü ile vergi gelirlerinin esnekliği arasındaki ilişki araştırılmıştır. Bu çalışma daha sonra gelişmiş ve gelişmekte olan ülke örnekleri ile desteklenerek, ülkedeki yönetim anlayışı ile vergi esnekliği ilişkisinin belirlenmesi hedeflenmektedir.

Kamu kesimi büyüklüğü ile toplam vergi gelirleri esnekliği arasındaki ilişkinin Türkiye açısından ele alındığı çalışmada, 1990-2019 dönemi içinde geçerli olmak üzere değişkenler arasındaki kısa ve uzun dönemli nedensellik araştırılmıştır. Çalışmanın amacı kamu kesimi büyüklüğü arttıkça vergi gelirlerinin esnekliğinin bundan nasıl etkilendiğini yani aralarında bir nedensellik olup olmadığının ortaya konmasıdır. Yapılan analiz göstermektedir ki; kısa dönemde devletin ekonomideki rolünün artması ya da azalması, vergilerin otomatik stabilizatör olma özellikleri üzerinde bağlayıcı etkiye sahip değildir. Türkiye örneğinde çıkan bu sonuç, bazı uluslararası çalışmalarda da her ne kadar farklı ülke ve dönemler ele alınmış olsa da benzer niteliktedir. Uzun dönemli test sonuçlarında ise, Türkiye'de eTV'nin yani vergilerin gelir esnekliğinin bağımlı değişken olarak ele alındığı durumda, söz konusu değişkenden diğer değişkenlere doğru uzun dönemli nedensellik ilişkisi söz konusudur. Yine aynı şekilde uzun dönem analizinde KKB yani kamu kesimi büyüklüğünden diğer değişkenlere doğru nedensellik ilişkisinin olduğu görülmüştür. Bu durumda diğer değişkenler yani büyüme, nüfus değişimi ve vergi gelirlerinin esnekliği birer bağımsız değişken olarak kamu kesimi büyüklüğünü etkilemektedir. Yani uzun dönemde ekonomik büyüme kamu harcamalarının hasıla içindeki payını artırmaktadır, Ayrıca nüfus değişimi de benzer şekilde uzun dönemde kamu kesimini genişletmektedir. Türkiye'de gerek kısa gerekse uzun dönemde büyüme, nüfus değişimi birer bağımsız değişken olarak kamu kesimi büyüklüğünü etkilemektedir. Uzun dönemde büyüme ve nüfus değişimi yanında vergi gelirlerinin esnekliğinin de kamu kesimi büyüklüğünü etkilediği gözlenmiştir.

Kısa dönem sonuçlara bakıldığında ise, ele alınan dönem itibariyle Türkiye'de nüfus değişimi hem devletin büyümesi yani kamu harcamalarının artmasını hem de ekonomik büyümeyi etkilemektedir ve bu etki pozitif yönlüdür. Nüfus değişimi arttıkça devletin daha

fazla harcama yapması söz konusu olmaktadır ayrıca literatürde de nüfus artışı kamu harcamalarını artıran nedenler arasında yer almaktadır. Bununla birlikte Türkiye'de nüfus değişimi büyümeyi de olumlu yönde etkilemiş ve ekonomik büyüme de kamu harcamalarını pozitif yönde etkilemiştir. Bu sonuç Türkiye'de bir anlamda Wagner Yasasının geçerli olduğunu ortaya koymuştur. Çünkü kamu harcamaları payındaki artışın ekonomik gelişmeyle birlikte arttığı tespit edilmiştir.

Kaynaklar

Acar, M. (2010), "Serbest Ticaret, Ekonomik Özgürlükler ve Refah", *Ahmet Yesevi Üniversitesi, Bilig Türk Dünyası Sosyal Bilimler Dergisi*, 53, 1-28.

Acheson, J. et al. (2017), "Income Tax Revenue Elasticities in Ireland: An Analytical Approach", *The Economic and Social Research Institute Research Series: Dublin*, No: 59.

Adejare, A.D. & S. S. Akande (2017), "The Impact of Personal Income Tax on Government Expenditure in Oyo State", *Journal of Account and Financial Management*, 2(4), 635-643.

Boschi, M. & S. d'Addona (2019), "The Stability of Tax elasticities Over the Business Cycle in European Countries", *CAMA Working Paper*, 44, 1-43.

Craig, E.D. & A.J. Heins (1980), "The Effect of Tax Elasticity on Public Spending", *Public Choice*, 33, 267-275.

Debasis, P. & Y. Venkat (2018), "Assessing the Effects of Tax Elasticity on Government Spending", *International Journal of Engeering and Management Research*, 8(5), 70- 76.

Dilorenzo, T.J. (1982), "Tax Elasticity and the Growth of Local Public Expenditure", *Public Finance Quarterly*, 10(3), 385-392.

Dollery, B.E. & A.C. Worthington (1995), "State Expenditure and Fiscal Illusion in Australia: A Test of the Revenue Complexity, Revenue Elasticity and Flypaper Hypotheses", *Economic Analysis and Policy*, 25(2), 125-140.

Erden-Özsoy, C. & B.T. Tosunoğlu (2017), "GSYH'nin Ötesi: Ekonomik Gelişmenin Ölçümünde Alternatif Metrikler", *Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi*, 26(1), 285-301.

Ertekin, Ş. (2020), "Türkiye'de Kamu Kesimindeki Büyümenin İşsizlik Üzerindeki Etkisi: 1980 Sonrası Dönem Analizi", *İzmir İktisat Dergisi*, 35(1), 141-154.

Gelir İdaresi Başkanlığı, <https://gib.gov.tr/yardim-ve-kaynaklar/istatistikler>, 15.02.2021.

Gujarati, D.N. (1999), *Temel Ekonometri*, (Çev. Ü. Şenesen & G.G. Şenesen), İstanbul: Literatür Yayınları.

Güler, A. & C. Karaca (2017), "Türkiye'de Etkin Bir Vergi Sisteminin Kurulmasına İlişkin Politika Önerileri", içinde: *Scientific Cooperation for the Future in Economics and Administrative Sciences International Conference*, 6-8 September, Greece, 165-177.

Güler, H. (2017), "Ücretlilerden Kesilen Gelir Vergisinin Türk Vergi Sistemi Üzerindeki İstikrar Etkisi", *Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi*, 9(4), 161-168.

Haughton, J. (1998), "Estimasting Tax Buoyancy, Elasticity and Stability", *Eager/PSGE- Excise Project Methodological Note*, 1, 1-8.

Havranek, T. et al. (2016), "Dynamic Elasticities of Tax Revenue: Evidence From the Czech Republic", *Applied Economics*, 48(60), 5866-5881.

Hazine ve Maliye Bakanlığı Muhasebat Genel Müdürlüğü, <https://muhasebat.hmb.gov.tr/merkezi-yonetim-butce-istatistikleri>, 15.02.2021.

Kirmanoğlu, H. (2014), *Kamu Ekonomisi*, İstanbul: Beta Yayınları.

Kutbay, H. & E. Aksoy (2020), "Vergi Esnekliğinin Kamu Harcamaları Üzerindeki Etkisi: Seçili OECD Ülkeler İçin Panel Veri Analizi", *Fiscaoeconomia*, 4(3), 580-594.

Mansfield, C.Y. (1972), "Elasticity and Buoyancy of a Tax System: A Method Applied to Paraguay", *IMF Staff Paper*, 19(2), 425-446.

Misiolek, W.S. & H.W. Elder, (1988), "Tax Structure and the Size of Government: An Empirical Analysis of the Fiscal Illusion and Fiscal Stress Arguments", *Public Choice*, 57, 233-245.

OECD (N/A), <https://stats.oecd.org/Index.aspx?DataSetCode=NAAG#>, 15.02.2021.

Patnaik, D. & V. Yaji (2018), "Assessing the Effects of Tax Elasticity on Government Spending", *International Journal of Engineering and Management Research*, 8(5), 70-76.

Sandalcı, U. & İ. Sandalcı, (2016), "Kamu Kesimi Ekonomik Büyüklüğü ve Kamu Etkinlik Düzeyi İlişkisi", *Pamukkale Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 25(1), 413-429.

Sevüktekin, M. & M. Nargeleçekenler (2010), *Ekonometrik Zaman Serileri Analizi*, Nobel Yayın Dağıtım, 3. Baskı, Ankara.

Terzi, H. (1998), "Kamu Harcamaları ve Ekonomik Kalkınma İlişkisi Üzerine Ekonometrik Bir İnceleme", *İşletme Finans Dergisi*, Ocak, 67-78.

Wolswjik, G. (2007), "Short- and Long-Run Tax Elasticities The Case of The Netherlands", *European Central Bank Working Paper Series*, No: 763, 1-41.

Yamak, N. & Y. Küçükkale (1997), "Türkiye'de Kamu Harcamaları Ekonomik Büyüme İlişkisi", *İşletme ve Finans Dergisi*, 12(131), 5-14.

Yılancı, V. vd. (2020), "Türkiye'de Kamu Harcamaları ile Vergi Gelirleri Arasındaki İlişki: Frekans Alanda Asimetrik Testinden Kanıtlar", *Sayıştay Dergisi*, 31(116), 121-139.

Sosyoekonomi

2022, Vol. 30(51), 407-426

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.20
Date Submitted: 19.02.2021
Date Revised: 30.12.2021
Date Accepted: 21.01.2022

E7 Ülkeleri ile Türkiye Arasındaki Dış Ticaretin Panel Veri Analizi: Çekim Modeli Yaklaşımı[1]

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A Panel Data Analysis of Foreign Trade Between E7 Countries and Turkey: The Gravity Model Approach[2]

Abstract

According to the Gravity Model, international trade should be explained based on GDP and geographical distances among countries. This study aims to determine the factors affecting global trade volume among Turkey and E7 countries and test whether the Gravity Model is suitable for explaining the trade volume using panel data analysis. Linder and population variables that are expected to affect the foreign trade were used as explanatory variables in the model. The study results confirmed that the variables in the gravity model significantly explained international trade among Turkey and E7 countries between the years 2000-2018. According to the results, the international trade of Turkey to E7 countries is positively and significantly related to the GDP and the population variables. Moreover, distance due to geographical location was negatively and significantly linked to international trade.

Keywords : International Trade, E7, Gravity Model, Panel Data Analysis.

JEL Classification Codes : F1, F120, C33.

Öz

Çekim Modeline göre ülkeler arasındaki dış ticaret, GSYH ve ülkeler arasındaki mesafe değişkenleriyle açıklanabilmektedir. Bu çalışmanın amacı, Türkiye ve E7 ülkeleri arasında gerçekleşen ticaret hacmine etki eden faktörleri belirlemek ve Çekim Modelinin ticaret hacmini açıklamaya uygunluğunu panel veri analiz ile test etmektir. Dış ticaret ilişkisini etkilemesi beklenen Linder ve nüfus ise modelde açıklayıcı değişkenler olarak kullanılmıştır. Araştırma sonucunda, 2000-2018 yılları arasında Çekim Modeli değişkenlerinin Türkiye ve E7 ülkeleri arasındaki ticaret hacmini anlamlı bir şekilde yordadığı bulunmuştur. Buna göre Türkiye'nin E7 ülkeleri ile gerçekleştirdiği ticaret ilişkisi, GSYH ve E7 ülkelerinin nüfusları ile pozitif ve anlamlıdır. Ayrıca dış ticaretin, mesafe ile negatif ve anlamlı ilişkisinin olduğu görülmüştür.

Anahtar Sözcükler : Uluslararası Ticaret, E7, Çekim Modeli, Panel Veri Analizi.

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[1] *Bu çalışma, Akdeniz Üniversitesi Sosyal Bilimler Enstitüsü'ne Arş. Gör. Makber TEKİN tarafından sunulan "Türkiye'nin E7 Ülkeleri ile Gerçekleştirdiği Dış Ticaretinin Çekim Modeli Yaklaşımıyla Analizi" başlıklı yüksek lisans tez çalışmasından üretilmiştir.*

[2] *This study is derived from Res. Asst. Makber TEKIN's master's thesis called "The Gravity Model Approach to Analysis of Foreign Trade Conducted with Turkey and E7 Countries", presented at the Institute of Social Sciences of Akdeniz University.*

1. Giriş

Küreselleşmenin uluslararası ticareti artırıcı etkisi ülkeleri ekonomik büyümeye teşvik ederek ülkelerin dış ticaret faaliyetlerine ağırlık vermelerini ve karşılıklı dış ticaret akışları gerçekleştirmelerini sağlamaktadır (Khandare, 2011: 4). Gerçekleşen dış ticaret akışları genellikle ülkelerin ekonomik merkezleri arasındaki bağlantıların bir göstergesi olarak kabul edilmektedir (Paas, 2003: 1). Uluslararası ticareti ve ticaret akışlarının kapsamını ekonomik büyüklük ve uzaklık açısından analiz etmek amacıyla son zamanlarda Çekim Modeli yaklaşımı yaygın olarak kullanılmaktadır (Anderson & Wincoop, 2003: 170). Model, ülkelerin ekonomik büyüklüğünü temsil eden GSYH rakamları ve aralarındaki mesafeden dolayı kaynaklanan uzaklığa göre farklılık gösteren taşıma maliyetleri ile kurulmuştur. Ayrıca model yapısı itibariyle uluslararası ticareti birçok değişken açısından analiz etmeye fırsat vermektedir.

Alan yazınında model ile yapılan birçok çalışma mevcuttur. Bu çalışmalar genellikle ülkeler arasında gerçekleşen ticaret akışlarını Çekim Modeline çalışmanın amacı doğrultusunda eklenmiş kukla değişkenlerle analiz etmektedir (bkz. Aitken, 1973; Thursby & Thursby, 1987; Wall, 1999; Nitsch, 2006; Baytar, 2012; Işık, 2016). Genel olarak çalışmalarda modelin ticaretin kapsamını ve niteliğini açıklamada kullanılabileceği belirtilmiş ayrıca modelin analiz gücünün yüksek olduğu vurgulanmıştır (Paas, 2000: 636). Türkiye'nin E7 (Gelişmekte Olan Yedi Ülke) ülkeleri ile artan dış ticaret rakamları son yıllarda artış göstermekle beraber 2018 itibariyle 64.263 milyar dolardır (World Bank, 2020). Artan dış ticaret rakamları ve literatürde bu ülkeler ile gerçekleşen ticaret akışını güncel veriler ile ele alan çalışmaların sınırlı olması çalışmanın temel motivasyonudur.

Bu çalışmada ele alınan "Gelişmekte Olan Yedi Ülke" (E7) son zamanlarda yüksek dış ticaret hacmine sahip olmakla beraber sermaye piyasaları hızlı bir şekilde artış gösteren ve resmi bir bloklaşma olmayan ülke grubunu temsil etmektedir. E7 ülkeleri arasında Çin, Hindistan, Rusya, Brezilya, Meksika, Endonezya ve Türkiye yer almaktadır. E7 "Gelişmekte Olan Yedi" kavram ilk olarak saygın bir muhasebe firması olan Price Waterhouse Coopers (PWC) tarafından 30 Ekim 2006'da yayımlanan Stern Review raporunda (Samadder et al., 2012: 12) kullanılmıştır. PWC danışmanlık firmasının 2006 yılında yayımladıkları "The World in 2050" (2050'de Dünya) başlıklı araştırma raporu, gelişmekte olan ekonomilerin performanslarını ve 2005'te başlamış olan ekonomik dağılımdaki değişiklikleri göz önüne alarak, gelecek 45 yılı içeren bir gözlemlemeyi içermektedir. Firma 2008 yılında 2050'de olası ekonomik dağılımları ele alarak ülkelerin gelecekteki ekonomik performanslarını savunabilmek adına güncel olan ekonomik verileri ve nüfus artış oranlarını referans alarak tahminlerini güncellemiştir (PWC, 2008: 5-8). Çalışma BRIC'in (Brezilya, Rusya, Hindistan ve Çin) yanı sıra, olağanüstü bir performans göstermesi beklenen diğer ülkeleri de ele almaktadır. Çalışmadaki öngörüler, ülkelerin büyüme çabalarının sonuçlarının olumlu olduğu ve beklenmeyen ekonomik, politik ve doğal sorunların ortaya çıkmadığı varsayımı ile yapılmıştır (Medina, 2010: 5). Firma 2017 yılında yayımladıkları "*The World in 2050: The Long View How will the Global Economic Order Change by 2050?*" başlıklı raporunda ise E7 ülkelerinin 1995 yılında G7 ülkelerinin yarısı kadar ekonomik büyüklüğe sahipken

2015 yılında aynı büyüklüğe ulaştığını ve 2040 yılında G7 ülkelerinin iki katı büyümesinin mümkün olduğunu belirtmiştir. Bu ülkelerin hızlı büyüme eğilimlerinden dolayı gelecek yıllarda ülkelere yapılacak yatırımların artacağı öngörülmektedir. Ayrıca raporda ülkelerin arasında yer alan Türkiye'nin 2050 yılına kadar %3'lük oranla Avrupa'nın en hızlı büyüyen ekonomisi olacağını belirtmiştir. Raporda dünyadaki GSYH'nin %85'ini oluşturan, dünyanın en büyük otuz iki ülkesi için 2050 yılına ulaşan en uzun vadeli küresel büyüme tahminleri de yayımlanmıştır. Bu rapordaki tahminler doğrultusunda küresel ekonomik güç sıralamasında 2016 yılında Çin bir, Hindistan üç, Rusya altı, Brezilya yedi, Endonezya sekiz ve Türkiye on dördüncü sırada yer alırken 2050 yılında Çin'in bir Hindistan'ın iki, Endonezya'nın dört, Brezilya'nın beş, Rusya'nın altı, Meksika'nın yedi ve Türkiye'nin on birinci sırada yer alacağı tahmin edilmiştir (PWC, 2017: 4-9). Bu nedenle son zamanlarda ekonomik büyüme performanslarındaki başarılarından dolayı bu çalışmada E7 ülkeleri ele alınarak Türkiye'nin bu ülkelerle gerçekleştirdiği dış ticaret hacmi analiz edilmiştir.

Çalışmanın temel amacı, Türkiye ve E7 ülkeleri arasında gerçekleşen ticaret hacmine etki eden faktörleri belirlemek ve Çekim Modelinin ticaret hacmini açıklamaya uygun olup olmadığını panel veri analiz ile test etmektir. Bu doğrultuda çalışmada ikinci bölümde Çekim Modeli teorisinin ortaya çıkışı ve teorik altyapısı hakkında bilgi verilmiştir. Üçüncü bölümde uluslararası ticaret alanında dış ticaret akışlarını Çekim Modeli ile açıklayan çalışmalara ilişkin literatür taraması yapılmıştır. Dördüncü bölümde veri seti ve değişkenler, temel Çekim Modeli olmak üzere toplamda üç farklı şekilde kurulan analiz modeli ve analiz prosedürü ele alınmıştır. Beşinci bölümde analiz sonucunda elde edilen bulgulara yer verilmiştir. Son olarak sonuç bölümünde araştırmanın bulguları ele alınarak değerlendirme ve öneriler yapılmıştır.

2. Çekim Modeli

Bölgelerin ekonomik merkezleri arasındaki ilişkilerin bir göstergesi olarak kabul edilen uluslararası ticaret akışları, ekonomik ve mekânsal kavramlar arasındaki bağlantıları temsil eder. Bu durum doğrultusunda uluslararası ticaret akışlarının incelenmesi için "ülke çifti arasındaki ticaret akışını, ekonomik kütleleri (milli gelir) ile orantılı ve aralarındaki mesafeyle ters orantılı olarak" açıklayan Çekim Modeli yaklaşımı son yıllarda yaygın olarak kullanılmaktadır (Paas, 2003: 1-7). Çekim Modeli ilk olarak Tinbergen (1962), Pöyhönen (1963) ve Linneman (1966) tarafından tanıtılmıştır (Porojan, 2001: 265; Nguyen, 2009: 267; Kepaptsoglu et al., 2010: 1). Tinbergen (1962) ve Pöyhönen (1963) modeli, Avrupa ülkeleri arasında gerçekleşen ikili ticaret akış kalıplarını incelemek için kullanmıştır. Linneman (1966), Çekim Modelinin teorik temeline eklemeler yaparak modeli genişletmiş ve Walrasian Modelini kıstas olarak kullanıp Çekim Modeli denkleminin teorik temellerini açıklamıştır (De Benedictis & Taglioni, 2011: 55-56). Yapılan bu çalışmalardan sonra model, uluslararası ticaret alanında özellikle ülkeler arasında gerçekleşen ticaret akışlarını analiz etmede sıklıkla kullanılmıştır (Deardroff, 1998: 7; Leamer & Levinshon, 1995: 44-45).

Uluslararası ticaret alanında önemli ve popüler olan Çekim Modeline yönelik yapılan eleştiriler arasında teorik temelinin yetersiz olması yer almaktadır (Bergstrand, 1985: 474; Kimura & Lee, 2006: 94; Stack, 2009: 775). Deardorff (1998), bu eleştirilerin doğru olmadığını ve 1970'lerin ikinci yarısından itibaren teorik altyapısının genişletilip geliştirilmesi adına kuramsal altyapısına katkıda bulunan pek çok çalışmanın olduğunu belirtmiştir. Bunlar arasında Anderson (1979), ürün farklılaştırmasını varsayan Armington (1969) varsayımından Çekim Modeli denkleminin teorik temelini türetmiş, Bergstrand (1985, 1989) ise modele, mikroekonomik temel geliştirmiştir. Ayrıca karşılıklı ticaret akımlarında belirleyici faktörleri incelemiş ve modeli, Tekelci Rekabet Teorisiyle açıklamıştır.

Helpman ve Krugman (1985), Çekim Modeli denkleminin ölçeğe göre artan getiri ile tekelci rekabet modelinden, Deardorff (1998), ürün farklılaşması dikkate alınmadan Heckscher-Ohlin modelinden de türetilebileceğini göstermiştir. İlerleyen zamanlarda yapılan çalışmalardan Eaton ve Kortum (2002) ise modeli, Ricardo'nun teorisi ile açıklamıştır. Yapılan bu çalışmalardan sonra Çekim Modelinin Heckscher-Ohlin ve Tekelci Rekabet Modelleri dahil olmak üzere farklı modellerden türetilebileceği kabul edilmiştir (Kimura & Lee, 2006: 94). Son olarak Anderson ve Van Wincoop (2003)- Anderson (1979), çalışmasını temel alıp geliştirerek- ikili ticaret akışının hem ikili düzeyde var olan ticari engellerden hem de bu engellerin diğer tüm ülkelere göre göreceli ağırlığından etkilendiğini göstermiştir (Benedictis & D. Taglioni, 2011: 64).

2.1 Basit (İlkesel) Çekim Modeli

Çekim Modeli, ülke çiftleri arasındaki karşılıklı ticaret akışını analiz etmek için kullanılan basit bir ampirik modeldir (Deardorff, 1998: 7-8). Uluslararası ticaret alanında kullanılan model, fizikte Newton'un 1687 yılında doğa bilimleri yazınında önerdiği "Evrensel Kütle Çekim Yasası"nın işlevine benzemektedir. Model, ülke çifti arasındaki ticaret akışını, ekonomik "kütleleri" (milli gelir) ile orantılı ve aralarındaki mesafeyle ters orantılı olarak açıklamaktadır (Dinh, Nguyen & Cuong, 2011: 3-4).

Hollandalı ekonomist Jan Tinbergen aynı yasayı uluslararası ticaret akımlarını analiz etmek için 1962 yılında ekonomi alanına uyarlamıştır. Uluslararası iktisat alanına uyarladığı modelin formülasyonu aşağıdaki gibidir (Batra, 2006: 328);

$$Ticaret_{ij} = \alpha \frac{GSY\dot{I}H_{\dot{I}} GSY\dot{I}H_J}{Mesafe_{ij}} \quad (1)$$

Denklemde yer alan değişkenler;

- $Ticaret_{ij}$: i ve j ülkeleri arasında gerçekleşen ticaretin değerini,
- $GSY\dot{I}H_{\dot{I}}$: i ülkesinin milli hasılası,
- $GSY\dot{I}H_J$: j ülkesinin milli hasılası,
- $Mesafe_{ij}$: i ve j ülkeleri arsındaki uzaklığı,

- α : model sabiti olarak tanımlanır.

Denklem (1)'e göre dış ticaret, ülkelerin GSYH'si ve ülkeler arasındaki coğrafi uzaklık (mesafe) değişkenleri ile açıklanmaktadır. Tinbergen'in kullandığı modele göre ülkeler arasında gerçekleşen ticaret akışını etkileyen pek çok faktör bulunmasına rağmen hiçbiri aşağıda yer alan üç değişken kadar etkili değildir. Bu üç değişken (Tinbergen, 1962: 263);

- Ülkenin ihraç kapasitesinin, ekonomik büyüklüğüne bağlı olması,
- Ülkenin gerçekleştirdiği ihraç düzeyinin, ithalatçı ülkenin ekonomik büyüklüğüne bağlı olması,
- Ulaştırma maliyetleri nedeniyle ticaret hacminin olumsuz etkilenmesidir.

Denklem (1)'in logaritması alınarak, doğrusal formu ve modele karşılık gelen tahmin edilebilir denklemin gösterimi aşağıdaki gibidir (Tinbergen, 1962: 265);

$$\log(Ticaret_{ij}): \beta_0 + \beta_1 \log(GSYİH_İ . GSYİH_J) + \beta_2 \log(Mesafe_{ij}) + e_{ij} \quad (2)$$

Denklem (2);

- $\beta_0, \beta_1, \beta_2$ tahmin edilecek parametreleri,
- e_{ij} hata terimini temsil etmektedir. Hata terimi, ticaret akışlarında tesadüfi faktörlerin etkilerin ölçmektedir.

Denklem (2), ikili ticaretin gelirin pozitif ve mesafenin negatif fonksiyonu olduğu tahmin edilen temel ağırlık model denklemidir (Deardroff, 1998: 9). Denkleme göre iki ülke arasındaki ticaret hacmi, ülkelerin büyüklükleriyle artan aralarındaki uzaklığa göre ise azalan bir fonksiyona dayanmaktadır (Karagöz, 2008: 152).

Ticaret teorisyenleri tarafından Çekim Modelinin, Eksik Rekabet ve Hecksher-Ohlin Modeline dayanan ticaret teorileriyle tutarlı olduğu bulunmuştur. Helpman (1987), mesafe değişkenin ticaret akışları ve ülke büyüklüğü arasında orantılı bir ilişkide pek bir rol içermediğini belirtmiştir. Ancak mesafe değişkeninin açıklayıcı bir değişken olarak modele eklenmesinde önemli birçok neden yer almaktadır. Bu nedenler arasında (Batra, 2006: 329);

- Mesafenin, ulaşım maliyetleri için bir gösterge olması,
- Mesafenin, taşıma sırasında geçen sürenin bir göstergesi ve bozulabilen ürünler için bozulmadan hayatta kalma olasılığı transit zamanın azalan bir fonksiyonu olması,
- Senkronizasyon maliyetleri: fabrikalar birden fazla girişi birleştirdiğinde, darboğazların ortaya çıkmasını önlemek için zamanlamaları senkronize edilmelidir. Senkronizasyon maliyetleri için bir gösterge olan uzaklığın, senkronizasyon maliyetleri arttıkça artması,

- İşlem maliyetleri: mesafe, ticaret fırsatlarını arama maliyetleri ve potansiyel ticaret ortakları arasında güven tesis etme ile ilişkili bulunması ve işlem maliyetleri için yaklaşık bir gösterge niteliğinde olması,
- Kültürel mesafe: daha büyük coğrafi mesafenin daha büyük kültürel farklılıklarla ilişkilendirilebilmesidir. Kültürel farklılıkların ise iletişimi engelleme, müzakere tarzlarında çatışmalara neden olarak ticareti kısıtlamasıdır.

Eksik Rekabet ve Hecksher-Ohlin Modeline dayanan ticaret teorileri Çekim Modelinin temel değişkenlerinin -gelir ve mesafe-modele dahil edilmesini desteklemektedir (Batra, 2006: 330). Basit-İlkesel Çekim Modelinin genişletilmiş hali Tinbergen tarafından 1962 yılında yayımlanan çalışmanın ikinci bölümünde ortaya çıkmıştır. Bu çalışmada Tinbergen, 1958 yılı verilerini kullanarak, 18 ülke için modeli test etmiştir. Çalışmanın ikinci aşamasında modele, ülkeler arasındaki karşılıklı dış ticareti, Çekim Modelinde yer alan değişkenlerin yanında politik ya da yarı ekonomik değişkenlerin sonucu etkileyip etkilemediğini görebilmek adına kukla değişkenler eklenmiştir. Böylelikle modele eklenilen kukla değişkenlerle ilkesel model genişletilmiştir (Dinçer, 2014: 6-7). Bunun dışında birçok çalışma coğrafi faktörler, tarihsel ve kültürel bağlar, genel ticaret politikası ve döviz kuru riski gibi faktörlerin etkilerini test etmek amacıyla ilave değişkenler kullanmış ve modeli genişletmişlerdir (Batra, 2006: 330).

Literatürde Basit/İlkesel olarak geçen modelin kuramsal altyapısında eksiklikler ve yetersizlikler bulunmasıyla beraber genel olarak 1970'li yıllardan sonra kuramı geliştirmeye yönelik çalışmalar yapılmıştır. İlk olarak modelin ekonometrik özelliklerini geliştiren Mátyás (1997; 1998), Chen ve Wall (1999), Breuss ve Egger (1999) ve Egger (2000) yer almaktadır. Daha sonra analizde dikkate alınan açıklayıcı değişkenlerin iyileştirilmesine ve yeni değişkenlerin eklenmesine katkıda bulunarak akademik literatürde basit model kavramının yanı sıra genişletilmiş Çekim Modeli olarak da kullanıldığı çalışmalar arasında Wei, (1996), Soloaga ve Winters (1999), Limao ve Venables (1999), Bougheas et al. (1999), Anderson (1979), Bergstrand (1985;1989), Helpman ve Krugman (1985), Helpman (1987), Deadorff (1995;1998), Evenett ve Keller (1998) yer almaktadır (Zarzoso & Lehman, 2003: 295).

3. Literatür Taraması

Çekim Modeli ile ilgili yazılmış birçok çalışmanın mevcut olması ve modelin son 40 yıldır yaygın olarak kullanılması sebebiyle bu bölümde, uluslararası ticaret alanında yayımlanmış bazı çalışmalar ele alınmıştır. Breuss ve Egger (1999), Filippini ve Molini (2003) ve Baldwin ve Taglioni (2011)'de bölgeler veya ülkeler arasındaki ticaret ilişkisi analiz edilirken Aitken (1973), Thursby ve Thursby (1987), Eichengreen ve Irwin (1998), Endoh (1999), Wall (1999) ve Nitsch (2006)'de ticaret akışlarında döviz kurunun, Linder hipotezinin, tarihsel faktörlerin, ticari korumacı politikaların, ekonomik kuruluşlar ve birlikler gibi açıklayıcı değişkenlerin etkileri test edilmiştir.

Tabloda Türkiye'nin dış ticaretinin çekim modeli ile analiz edildiği çalışmalar da mevcuttur. Bunlar arasında Tatlıcı ve Kızıltan (2011) ve Yaşar (2011) Gümrük Birliğinin Türkiye'nin ticaret akışına ve ihracatına etkisini analiz etmiş ve Ata (2012), Sorhun (2013) ve Işık (2016) Türkiye'nin dış ticaret potansiyelini Çekim Modeli ile incelemiştir.

Tablo: 2
Çekim Modeli ile Uluslararası Ticaret Analizi Yapan Ampirik Çalışmalar

Yıl	Yazar	Amaç	Veriler	Bağımlı Değişkenler	Açıklayıcı Değişkenler
1973	Aitken	Avrupa ticaret ilişkilerini şekillendiren kuvvetlerin incelenmesi	En Küçük Kareler Regresyon Yöntemi, AET ve EFTA, 1951-1967	Ticaret Akışı	İhracat, ithalat, nominal GSYH, nüfus ve fiziki uzaklık, kukla değişken olarak ise komşu ülkeler ve AET ya da EFTA üyeliği
1987	Thursby & Thursby	İkili ticaret akımında döviz kuru değişkenliği ve Linder hipotezi etkisini analizi	Kesit Verisi Regresyon Analizi, 17 Ülke, 1974-1982	Ticaret Akışı	Linder terimi katsayısı, döviz kuru esnekliği
1998	Eichengreen & Irwin	Ticaret akışlarında tarihsel unsurların etkisinin incelenmesi	En Küçük Kareler Regresyon Yöntemi, AB Üyeleri, 1928, 1938, 1949, 1954 ve 1964 Yıllarına İlişkin Veriler	Ticaret Akışı	GSMH, kişi başına düşen GSMH, coğrafi uzaklık ve kukla değişken olarak sınır komşuluğu, GATT ve AET üyeliği
1999	Endoh	AET, Latin Amerika Serbest Ticaret Bölgesi (LAFTA) ve Karşılıklı Ekonomik Yardım Konseyinin (CMEA) bölgesel oluşumunda ticareti özendirici ve caydırıcı etkilerinin analizi	Panel Veri, EEC, LAFTA ve CMEA Üyeleri, 1960-1994	İhracat	GSYH, mesafe, nüfus, AET, LAFTA ve CMEA'nın etkileri, ortak sınır ve ortak dil
1999	Wall	Ticari korumacı politikaların ABD ticareti üzerindeki etkilerine ilişkin yeni tahminler elde etmek,	Panel Veri, ABD ve 85 Ticaret Ortağı Ülke, 1994-1996	Ticaret Akışı	GSYH, mesafe, Heritage Foundation Ticaret Özgürlüğü Endeksi ticaret politikası bileşenleri, NAFTA üyeliği kukla değişkeni
2000	Kimura & Lee	Çeşitli faktörlerin hizmet ticaretine etkisinin incelenmesi	Panel Veri,10 OECD Üyesi, 1999-2000	Ticaret Akışı	GSYH, nüfus, coğrafi uzaklık, kişi başına GSYH ve Dünya Ekonomik Özgürlük Endeksi değerleri, Bölgesel Ticaret Anlaşması ile ortak sınır ve ortak dil kukla değişkeni
2002	Egger	Çekim Modelinin ekonometrik görünümü	Panel Veri, OECD ve 10 Orta ve Doğu Avrupa Ülkesi (CEECs), 1986-1997	İhracat	GSYH, kişi başına düşen GSYH, fiziki ülke büyüklükleri, ülkelerin göreli faktör donatımlarındaki farkları, reel döviz kuru değişkenleri, coğrafi uzaklık değerleri, ortak sınır ile ortak dil
2003	Filippini & Molini	Doğu Asya ülkelerinin ticaret akışlarının analizi	Panel Veri, 11 AB Üyesi, ABD, Japonya, Çin, 6 Asya ve 6 Latin Amerika Ülkesi, 1970-2000	İhracat	Geçmiş ihracat, nüfus, GSYH, coğrafi uzaklık ve teknolojik uzaklık değişkenleri
2003	Anderson & Wincoop	Kanada, ABD ve 30 diğer sanayileşmiş ülkeye ilişkin kapsamlı bir analizi	Doğrusal Olmayan En Küçük Kareler Yöntemi, Kanada, ABD ve 30 Sanayileşmiş Ülke, 1993 Yılı Verileri	İhracat/ Ticaret Akışı	İhracat, ithalat, coğrafi uzaklık, GSYH ve nüfus değişkenleri, sınır etkileri
2003	Baltagi, Egger & Pfaffermayr	EU15, ABD ve Japonya'nın 1986-1997 dönemleri arasında 57 ticaret ortağı ile gerçekleştirdikleri ticaretin analizi	Panel Veri, AB15, ABD, Japonya ve 57 Ticaret Ortağı Ülke, 1986-1997	Ticaret Akışı	Genel ikili boyutun (LGDT), ikili boyuttaki benzerliğin (LSIM), bağıl faktör donanımlarındaki (LRFAC) farklılığın ve CIF ve FOB arasındaki farkla ölçülen nakliye maliyetlerinin (LTC) etkisi
2005	Brun, Carrère, Guillaumont & De Melo	130 ülkenin, 1962-96 yılları arasındaki ticaret akımlarını analizi	Panel Veri, 130 Ülke, 1962-1996	Ticaret Akışı	GSYH, nüfus, mesafe, altyapı ve petrol fiyatları endeksi, temel malların toplam dışsatımdaki payı ve reel döviz kuru değişkenleri ve herhangi bir gümrük birliğine üyelik değişkeni
2006	Batra	Hindistan ticaret potansiyeli analizi	Kesit Veri Analizi, 146 Ülke, 2000 Yılı Verileri	Ticaret Akışı	GSMH, satın alma gücü paritesine göre GSMH, kişi başına gelir, nüfus, coğrafi uzaklık, ticaret hacmi ve kukla değişkenler

2006	Carrère	Bölgesel ticaret anlaşmalarının etkilerinin araştırılması	Panel Veri Analizi, 130 Ülke, 1962-1996	İhracat	GSYH, kişi başına GSYH, nüfus, mesafe, paylaşılan sınırlar, karayla çevrili ülke, altyapı düzeyi, döviz kurları, Serbest Ticaret Anlaşması kukla değişkeni
2006	Nitsch	G7/G8 üyeliğinin ülkelerin ticaret akımına etkisinin analizi	175 Ülke, 1948-1999	Ticaret Akışı	GSYH, Kişi başı GSYH, mesafe, G7/G8 üyeliği, ortak dil, ortak sınır, ortak para birimi, GATT/Dünya Ticaret Örgütü üyeliği, IMF üyeliği, OECD üyeliği, Bölgesel Serbest Ticaret Anlaşması üyeliği, Kolonyal bağlantı
2008	Helpman, Melitz & Rubinstein	Karşılıklı gerçekleşen ticaret akımının Çekim Modeli ile analizi	Panel Veri,161 Ülke, 1970-1997	Ticaret Akışı	Dışsatım, reel GSYH, kişi başına düşen reel GSYH, coğrafi uzaklık değişkenleri ile GATT/ DTÖ üyeliği, kolonyal geçmiş, ortak dil ve bir parasal birliğin üyesi olma kukla değişkenleri
2011	Baldwin & Taglioni	Uluslararası tedarik zincirlerinin ve parça ticaretinin standart Çekim Modeli ile incelenmesi	Panel Veri, 187 Ülke, 2000-2007	Ticaret Akışı	Toplam ithalat, toplam ihracat, ara mal ithalatı, ara mal ihracatı, tüketim mal ihracatı ve ithalatı verileri
2016	Rasoulinezhad & Seong	Güney Kore'nin 13 OPEC üyesi ülke ile gerçekleştirdiği dış ticareti Çekim Modeli yaklaşımı ile analizi	Panel Veri, Güney Kore, 13 OPEC Üyesi, 1980-2014	Ticaret Akışı	GSYH, kişi başı GSYH, mesafe, Dünya Ticaret Örgütü üyeliği, ticari açıklık düzeyi, döviz kuru ve Linder
2011	Tatlıcı & Kızıltan	Çekim Modelinin Türk ihracatını açıklamada uygun olup olmadığı analizi	Panel Veri,46 Ülke, 1994-2007	İhracat	GSYH, nüfusları, ülkelerin başkentlerinin Ankara'ya uzaklıkları, gümrük birliği üyeliği ve ortak sınır
2011	Yaşar	Türkiye'nin ihracatına Gümrük Birliği üyeliğinin etkisinin analizi	Panel Veri, Türkiye-AB Üyeleri, 1999-2009	İhracat	GSYH, mesafe, nüfus
2012	Ata	Türkiye'nin ticaret potansiyelini Çekim Modeliyle incelenmesi	Panel Veri, 68 Ülke (OECD Üyeleri, AB-27 ve Euro Bölgesi), 1980-2009	İhracat	GSYH, mesafe, ortak dil kullanılması, ülke komşuluğu, kolonyal bağ, ülke para birimleri arasındaki reel kur endeksi, ülkelerinin kaç tanesinin kara ile çevrili olduğu
2012	Baytar	Türkiye ve BRIC ülkeleri arasındaki ticaret hacminin analizi	Panel Veri, Türkiye- BRIC, 2001-2010	Ticaret Hacmi	GSYH, mesafe, nüfus, ithalat, ihracat, Ticaret Bağlılık Endeksi, İthalat Nüfus Endeksi ve İhracat Eğilim Endeksi
2013	Sorhun	Türkiye'nin potansiyel dış ticaretinin belirlemek ve potansiyelin ne kadarının kullanıldığının analizi	SPSS, Türkiye-AB-15, AB'ye Son İki Genişlemede Dâhil Olan Ülkeler (AB-Yeni Üyeler), Akdeniz, Ortadoğu, Afrika, Karadeniz Ekonomik İşbirliği (KEİ) ve Orta Asya Ülkeleri, 1992-2012	İthalat/ İhracat	GSYH, mesafe, ortak sınır, AB-15 üyeliği, AB-Yeni üyeleri Akdeniz Ülkeleri, Afrika ülkeleri KEİ ülkeleri, Orta Asya ülkeleri, Arap Baharı ve Küresel kriz kukla değişkenleri
2016	Işık	Türkiye ve Şanghay İşbirliği Örgütü (ŞİÖ) arasında gerçekleşen dış ticaret akımı Çekim Modeli kapsamında analizi	Panel Veri, Türkiye ve Şangay İşbirliği Örgütü (ŞİÖ) 2004-2014	Ticaret Akışı	GSYH, nüfus, mesafeyi, küresel kriz kukla değişkeni

Ülkeler arasındaki ticaret akışını Çekim Modeli kullanarak analiz eden ve ticaret akışlarında döviz kuru, Linder hipotezi ve tarihsel faktörler gibi kukla değişkenler kullanan Aitken (1973), Thursby ve Thursby (1987), Eichengreen ve Irwin (1998), Wall (1999) ve Nitsch (2006) Çekim Modeli varsayımını destekler sonuçlar elde etmişlerdir. Endoh (1999), Egger (2002), Filippini ve Molini (2003), Carrère (2006) ve Baldwin ve Taglioni (2011)'de bölgeler veya ülkeler arasındaki ticaret ilişkisini analiz etmek için bağımlı değişken olarak ihracat verileri ele alınmış ve çalışma sonucunda Çekim Modeli varsayımı desteklenmiştir. Türkiye'nin ticaret akışını ve dış ticaret potansiyellerini Çekim Modeli kullanarak inceleyen Tatlıcı ve Kızıltan (2011), Yaşar (2011), Ata (2012), Sorhun (2013) ve Işık (2016) da benzer sonuçlar elde etmiştir.

Ülke çiftleri arasındaki karşılıklı ticaret akışını analiz etmek için kullanılan basit ampirik model olan Çekim Modeli (Deardorff, 1998: 7-8), geliştirilmeye yönelik yapılan çalışmalar ve eklenen açıklayıcı değişkenlerle beraber yaygın olarak kullanılmıştır. Literatürde gümrük birliğine, serbest ticaret anlaşmasına, uluslararası resmi ekonomik kurum ve kuruluşlarına üyelik ve ortak para birimini paylaşmak, aynı ulusun parçası olmak, geçmişte veya şimdi kolonyal bir bağlantının olması bölgeler arasındaki ticaret akışlarını etkileyebilecek faktörler arasında sayılmaktadır. Bunların potansiyel etkileri de çeşitli kukla değişkenler aracılığıyla yapılan çalışmalarda test edilmektedir (Kepaptsoglu et al., 2010: 9).

Bu çalışma uygulama örnekleri ve zaman aralığı (parametreler) bağlamında literatürde yer alan çalışmalardan farklılık göstermektedir. Türkiye'nin E7 ülkeleri arasında yer alan Çin, Hindistan, Rusya, Brezilya, Meksika ve Endonezya ile 2000-2018 yılları arası gerçekleştirdiği dış ticaret hacminin analiz edilmesi amaçlanana bu çalışmada, bağımlı değişken olarak ticaret hacmi yer alırken bağımsız değişken olarak da Türkiye'nin ve E7 ülkelerinin GSYH'si, nüfusu, Linder değişkeni ve ülke başkentleri arasındaki mesafenin anlamlılığı yer alacaktır.

Çekim Modelinin seçilmesi aşağıda verilen maddelerin önemiyle belirlenmiştir:

- Uluslararası ticaretin modellenmesi ve analiz edilmesi durumlarında son yıllarda yaygın olarak kullanılması,
- Uzun zamandır ekonomideki başarılı ampirik modeller arasında yer alması,
- Ekonomideki istikrarlı ilişkileri açıklayabilmesi,
- Uluslararası ticaret akışlarını araştırmak ve uluslararası ticaretin kapsamını açıklanabilmesi için birden fazla değişkenin kullanılmasına ve dikkate alınabilmesine izin vermesi,
- Bölgesel ticaret modellerini açıklamak için başarılı modellerden biri olması,
- Alternatif uluslararası ticaret kuramlarıyla uyum gösterebilmesidir.

4. Ampirik Çerçeve

4.1. Veri Seti ve Değişkenler

Bu çalışmada Türkiye ve E7 ülkeleri arasındaki dış ticaret hacmi, Çekim Modeli yaklaşımıyla panel veri yöntemi kullanılarak analiz edilmiştir. 2000-2018 dönemi yıllık verilerinin alındığı bu çalışmada 6 (N) ülke 19 yıl (T) olmak üzere 114 gözlem, dengeli panel verileri ile analiz edilmiştir. Dış ticaret hacminin bağımlı değişken seçildiği modellerde ilk önce Basit/İlkesel Çekim Modeli ile analiz yapılmış ve bu doğrultuda açıklayıcı değişkenler GSYH ve mesafe olmuştur. Daha sonra genişletilmiş Çekim Modeli oluşturulmuş ve kurulan diğer modellere Linder ve nüfus değişkeni eklenmiştir. Çalışmada kullanılan veriler ile açıklamalarına ve veri kaynaklarına ilişkin bilgiler Tablo 3'te özetlenmiştir. Serileri olası değişen varyans ve kısmen de otokorelasyona karşı koruyabilmek için tüm değişkenlerin doğal logaritmik dönüşümü yapılmıştır.

Tablo: 3
Kullanılan Değişkenler, Değişken Tanımları ve Kaynakları

Değişkenler	Kısaltma	Veri Tanımları ve Veri Kaynağı
Dış Ticaret Hacmi	$LogDTijt$	-t zamanında i ülkesinden j ülkesine yapılan ihracat ve ithalatın toplamından oluşmaktadır. **Kaynak:** Türkiye İstatistik Kurumu (TÜİK)
GSYH	$LogGSYİHit$ $/LogGSYİHjt$	-t zamanında i ülkesinin yani ihracatçı ülkenin GSYH'si - t zamanında j ülkesinin yani ithalatçı ülkenin GSYH'si **Kaynak:** Dünya Bankası (ABD doları olarak alınmıştır).
Mesafe	$LogMesafeij$	-i ülkesi ile j ülkesi arasındaki coğrafi uzaklığı göstermektedir. **Kaynak**: Ülkeler arasındaki mesafe rakamları http://tr.mesafe hesaplama.himmera.com/ara/ adresinden elde edilmiştir.
Linder Hipotezi	$Linder_{ijt}$	-Karşılıklı ticaret ilişkisinde bulunan ülkelerin kişi başına düşen gelirleri arasındaki fark olarak belirtilmektedir.
Nüfus	$LogNufusit$ $LogNufusjt$	-t zamanında i ülkesinin yani ihracatçı ülkenin toplam nüfusu. -t zamanında j ülkesinin yani ithalatçı ülkenin toplam nüfusu. **Kaynak:** Dünya Bankası

4.2. Panel Veri Analizi

Çekim Modeli uygulamalarında ekonometrik yöntem olarak kullanılan panel veri analizi, tahmin edilmek istenen modelde bireyler, ülkeler, hane halkları, firmalar ve şehirler gibi birimlerin yer aldığı yatay kesit verilerinin zaman serileri içinde analiz edilmesiyle oluşan havuzlandırılmış veriler olarak tanımlanmaktadır (Baltagi, 2005: 1). Ekonometrik modelde, yatay kesit ve zaman serisinin birlikte kullanılması birimler arasında ve zaman içerisinde meydana gelen farklılıkları beraber incelemesine imkân sağlamaktadır (Dinçer, 2013: 112).

Panel veri modelinin standart fonksiyonel gösterilimi aşağıdaki gibidir (Hsiao, 2005: 149). Burada;

$$Y_{it=}a + \beta_{1it}X_{1it} + \beta_{2it}X_{2it} + \cdots \ldots\ldots + \beta_{kit}X_{kit} + u_{it} \quad (3)$$

i = 1,2,….,N(yatay kesit birim sayısı "N" olarak gösterilmekte),
t = 1,2,….,T(dönem sayısı "T" olarak gösterilmekte),
Y: Bağımlı değişken,
X: Bağımsız değişken,
α: Sabit katsayı,
β: Bağımsız değişkenlerin katsayıları,
k: Bağımsız değişken sayısı,
u: hata terimidir.

Bu çalışmanın teorik modeli ise Çekim Modeli doğrusal regresyon değişkenleri ve çalışmanın amacı doğrultusunda eklenmiş açıklayıcı değişkenler ile oluşturulmuştur. Modellerin ekonometrik yaklaşımla tam logaritmik formu:

Model 1

$$LogDT_{ijt} = \beta_0 + \beta_1 logGSYİH_{it} + \beta_2 logGSYİH_{jt} + \beta_3 logMesafe_{ij} + \epsilon_{ijt} \quad (4)$$

Model 2

$$LogDT_{ijt} = \beta_0 + \beta_1 logGSYİH_{it} + \beta_2 logGSYİH_{jt} + \beta_3 logMesafe_{ij} + \beta_4 Linder_{ijt} + \epsilon_{ijt} \quad (5)$$

Model 3

$$LogDT_{ijt} = \beta_0 + \beta_1 logGSYİH_{it} + \beta_2 logGSYİH_{jt} + \beta_3 logNufus_{it} + \beta_4 logNufus_{jt} + \beta_5 logMesafe_{ij} + \epsilon_{ijt} \quad (6)$$

Çekim Modeli teorisi doğrultusunda dış ticaret hacminin, ülkelerin GSYH değişkenlerinin pozitif mesafe değişkenlerinin ise negatif bir fonksiyonu olması beklenmektedir. Diğer açıklayıcı değişkenlerden Linder'in iki ülke arasındaki mamul mal ticaretinin kişi başına gelirlerindeki farkla ters orantılı olması nedeniyle (Thursby ve Thursby, 1987: 488) Çekim Modeli analizi sonucunda, Linder değişkeni işaretinin negatif olması iki ülke arasındaki ticaret akışında Linder Hipotezini doğrular nitelikte olduğu anlamına gelmektedir (Dinçer, 2014: 15). Nüfus değişkeni için ise Oguledo ve Macphee (1994), ticaret yapan ülkelerin nüfus büyüklüklerinin ticaret akışları üzerinde olumsuz ve istatistiksel olarak anlamlı bir etkisinin olduğunu belirtmiştir.

4.3. Panel Birim Kök Testi

Panel veriler için birim kökün varlığı, yatay kesit bağımlılığı testleriyle kontrol edilmektedir. Durağanlık testlerinde, zaman (*T*) ve yatay kesit (*N*) boyutunun karşılaştırmalı büyüklüğüne göre farklı testler uygulanabilmektedir (Demiral vd., 2016: 95). Yatay kesit bağımlılığı testleri literatürde genel olarak 20-30 yılı aşan makro panellerde test edilmiştir. Yatay kesit bağımlılığı testini geliştiren Pesaran'ın da arasında yer aldığı Holly et al. (2010), zaman boyutu olarak 49 ABD eyaletinin 29 yıllık verilerini kullanarak eşbütünleşme ve yatay kesit bağımlılığını incelemiştir. Banerjee ve Carrion-i-Silvestre (2006), yatay kesit bağımlılığı için N = 40 birim ve T = (50; 100; 250) olacak gözlemleri dikkate aldıklarını belirtmiştir. Benzer şekilde literatürde yer alan diğer çalışmalar arasında Westerlund (2005), Pesaran (2015) ve Bai ve Kao (2006) yer almaktadır. Bu çalışmanın boyutları; T = 19 ve N = 6 şeklindedir. Boyut sayısının kısıtlı olması nedeniyle yatay kesit bağımlılığına bakılmamıştır.

Çekim Modellerinde kullanılan makroekonomik (GSYH ve ticaret) değişkenlerin genellikle durağan olmadığı varsayılır (Fidrmuc, 2009: 438). Ayrıca Panel veri modeli, zaman serisini içerdiği için de serilerin durağanlığı analiz edilmelidir. Bu sebeplerden dolayı panel veri analizlerinde öncelik olarak serilerin durağan olup olmadığı panel birim kök testleri aracılığıyla tespit edilmelidir (Sevüktekin & Nargeleçekenler, 2010: 313). Bu çalışmada panel veri analizinde yaygın kullanılan birinci kuşak panel birim kök testlerinden Levin, Lin ve Chu, Im Pesaran Shin, Fisher ADF kök testlerine yer verilmiştir.

4.4. Hausman Testi

Panel veri analizinde, her bir birimde gözlenemeyen birim etkiler ortaya çıkabilmektedir. Birim etkiler, hata terimi değişkeni gibi varsayılıyorsa, rassal etkiler; bir yatay kesit gözlem için tahmin edilmiş bir değişken olarak varsayılıyorsa sabit etkiler yaklaşımı söz konusudur (Tatoğlu, 2018: 79). Panel veri analizde sabit etki ve rassal etki yaklaşımlar arasından modele uygun olan tahmin yönteminin seçimi önemlidir. Bu yaklaşımlar arasında seçimin yapılabilmesi için de Hausman Testi yaygın olarak kullanılmaktadır (Koy vd., 2019: 170).

Sabit ve rassal etki modelleri arasında bazı farklar vardır ve en önemlilerinden biri de birim etkilerin bağımsız değişkenlerle korelasyon halinde olup olmadığıdır. Korelasyonun olmaması durumunda rassal etki modelinin uygunluğu kabul edilmektedir. Tam tersi durumda ise sabit etkiler modelinin uygunluğu söz konusudur (Koy vd., 2019: 170). Çalışmada model seçimi için Hausman Test istatistiğinden yararlanılmış olup test sonucunda rassal etkiler modeli kullanılması uygun görülmüştür.

5. Ampirik Bulgular

Uygulamada ilk olarak değişkenler arasında sahte regresyon bulunmaması amacıyla değişkenlerin birim köke sahip olup olmadığı incelenmiştir. Uygulanacak olan birim kök testleri birinci kuşak panel birim kök testlerinden Levin, Lin ve Chu, Im Pesaran Shin ve Fisher ADF Chi-square kök testleridir. Birim kök test sonuçları istatistik ve prob değerleri açısından tablolaştırılmış ve sonuçları Tablo 4'te sunulmuştur.

Tablo: 4
Birim Kök Test Sonuçları

Değişkenler	Levin, Lin ve Chu		Im, Pesaran ve Shin W-stat		ADF- Fisher Chi-square	
	Test ist.	p-değeri	Test ist.	p-değeri	Test ist	p-değeri
$Dış\ Ticaret\ Hacmi$	-7.73999	0.0000*	-4.00885	0.0000*	39.1732	0.0001*
$GSYIHi$	-10.7454	0.0000*	-7.10318	0.0000*	66.6618	0.0000*
$GSYIHj$	-3.35447	0.0004*	-0.84880	0.1980	13.4387	0.3380
$Linder$	-4.18345	0.0000*	-2.64067	0.0041*	32.6366	0.0011*
$Nüfusi$	2.58757	0.9952	5.66049	1.0000	0.12054	1.0000
$Nüfusj$	-2.29036	0.0110**	-1.46507	0.0715***	27.4621	0.0066*

*Not: *, ** ve *** istatistikleri sırasıyla %1, %5 ve %10 düzeyinde anlamlı olduğunu göstermektedir.*

Birim kök testlerinde $GSYIHi, Linder$ ve $Nüfusj$ değişkenleri durağan olduğu görülmüştür. Diğer değişkenlerden $GSYIHj$ değişkeni sadece Levin, Lin ve Chu testinde %1 anlamlılık düzeyine göre durağanken $Nüfusi$ değişkenin ise hiçbir kök testine göre durağan olmadığı tespit edilmiştir. Tablo 4'ün sonuçlarına göre durağan olmayan serilerin birinci farkı alınarak seriler durağanlaştırılmıştır. Birinci farkı alınan serilerin istatistik ve p değerleri Tablo 5'te sunulmuştur. Sonuçlar, birinci farkları alınan değişken serilerin durağan olduğunu göstermektedir.

Tablo: 5
Birim Kök Test Sonuçları (Birinci Fark)

Değişkenler	Levin, Lin ve Chu		Im, Pesaran ve Shin W-stat		ADF - Fisher Chi-square	
	Test ist	p-değeri	Test ist	p-değeri	Test ist	p-değeri
$GSYİHj$	-3.73416	0.0001*	-2.51835	0.0059*	25.5423	0.0125**
$Nüfusi$	-11.2390	0.0000*	-8.80884	0.0000*	81.8068	0.0000*

*Not: *, ** ve *** istatistikleri sırasıyla %1, %5 ve %10 düzeyinde anlamlı olduğunu göstermektedir.*

Çalışmada Türkiye'nin E7 ülkeleri ile ticaret potansiyeli ticaret hacmi açısından regresyona tabi tutulmuştur. İlk olarak standart Çekim Modeli ile daha sonra modele sırasıyla eklenen Linder ve nüfus değişkenleri ile analiz yapılmıştır. Rassal etkiler modeli yaklaşımının uygulandığı panel regresyon analizleri EGLS (yatay kesit ağırlıklı) yöntemiyle Eviews 9 ekonometri programında yapılmıştır. Standart hataların düzeltilmesi amacıyla White cross section standart errors ve kovaryasyon yöntemi kullanılmıştır. Yapılan testlerin sonuçları Tablo 6, Tablo 7 ve Tablo 8'de gösterilmiştir.

EGLS (yatay kesit ağırlıklı) yöntemiyle tahmin edilen panel regresyon analizleri sonuçlarına göre, Basit/İlkesel Çekim Modeli ile açıklanmaya çalışılan Türkiye'nin E7 ülkeleri ile gerçekleştirdiği ticaret hacmi teoriye uygunluk göstermekte ve sabit katsayısı %10 düzeyinde, diğer katsayılar %1 düzeyinde anlamlılık ifade etmektedir. Tablo 6'da yer alan R^2 ve olasılık (F-istatistik) değerlerine bakıldığında; R^2değerinin 0,92 oranında bulunması ve olasılık (F-istatistik) değerinin 0,05'ten küçük olması nedeniyle modelin istatistiksel olarak anlamlı olduğu görülmektedir. Tahmin sonuçlarına göre Türkiye'nin ve E7 ülkelerinin gayri safi yurtiçi hasılalarında meydana gelen %1'lik artış ticaret hacmini sırasıyla %1.42 ve %0.27 artırmaktadır. Mesafe değişkeninde meydana gelen %1'lik artışın ise ticaret hacmini %1,90 azalttığı görülmektedir. Anderson (1979) ve Matyas (1998) Çekim Modelinin, karşılıklı ticaret akımlarını açıklamada başarılı ve öne çıkan bir yaklaşım olduğunu vurgulamış ve yazarlar "Ülkelerin ticaret hacminin ekonomik büyüklükleriyle doğru, aralarındaki mesafe ile ters yönlü bir ilişkisinin olduğu" (Tinbergen, 1962: 265) teorisini desteklemiştir. Tablo 6'da elde edilen sonuçlar doğrultusunda Çekim Modeli, Türkiye ve E7 ülkeleri arasında gerçekleşen dış ticareti analiz etme noktasında uygun bulunmuştur.

Tablo: 6
Model 1- Panel Regresyon Analiz Sonuçları

Model 1 $LogDT_{ijt} = \beta_0 + \beta_1 logGSYIH_{it} + \beta_2 logGSYIH_{jt} + \beta_3 logMesafe_{ij} + \epsilon_{ijt}$				
Değişkenler	**Katsayısı**	**Std.Hata**	**t-istatistik**	**p-değeri**
Sabit	-7.742748***	3.984617	-1.943160	0.0546
$logGSYIH_{it}$	1.421571*	0.103244	13.76907	0.0000
$logGSYIH_{jt}$	0.275638*	0.081821	3.368771	0.0010
$logMesafe_{ij}$	-1.902321*	0.518688	-3.667562	0.0004
İstatistikler	R^2 = 0.928213 D-Wİst. = 0.427871 F-ist = 474.1042 Olasılık (F-istatistik) = 0.000000			

*Not: *, ** ve *** istatistikleri sırasıyla %1, %5 ve %10 düzeyinde anlamlı olduğunu göstermektedir.*

Çalışmada oluşturulan ikinci modelde Türkiye'nin E7 ülkeleri ile gerçekleştirdiği ticaret hacmi Basit/İlkesel Çekim Modeline Linder değişkeni eklenerek açıklanmaya çalışılmıştır. Tablo 7'de R^2 ve olasılık (F-istatistik) değerlerine bakıldığında; R^2değerinin 0,92 oranında bulunması ve olasılık (F-istatistik) değerinin 0,05'ten küçük olması nedeniyle modelin istatistiksel olarak anlamlı olduğu görülmektedir. Tahmin sonuçlarına göre Türkiye'nin ve E7 ülkelerinin GSYH'sinde %1'lik artış ticaret hacmine sırasıyla %1,45 ve %0,25 artırdığı ve mesafe değişkeninde meydana gelen %1'lik artışın ise ticaret hacmini %1,91 azalttığı görülmektedir. Ayrıca açıklayıcı değişken olarak eklenen Linder değişkenin istatistiksel olarak anlamlı bir etkisinin olmadığı sonucuna ulaşılmıştır. Linder değişkenin istatistiki olarak anlamlı ve negatif işaretli olması, karşılıklı ticarette Linder hipotezini destekler sonuç elde edilmesini ifade etmektedir. Choi (2002), Baltagi, Egger ve Pfaffermayr (2003) ve Thursby ve Thursby (1987) Linder Hipotezinin destekler sonuç elde etmişlerdir. Bu çalışmada ise negatif işarete sahip olan Linder değişkenin, dış ticaret hacmi üzerinde istatistiki olarak anlamlı bir etkisinin olmadığı görülmüştür.

Tablo: 7
Model 2- Panel Regresyon Analiz Sonuçları

Model 2 $LogDT_{ijt} = \beta_0 + \beta_1 logGSYIH_{it} + \beta_2 logGSYIH_{jt} + \beta_3 logMesafe_{ij} + \beta_4 logLinder_{ijt} + \epsilon_{ijt}$				
Değişkenler	**Katsayısı**	**Std.Hata**	**t-İstatistik**	**p-Değeri**
Sabit	-7.812188***	4.615882	-1.692458	0.0934
$\boldsymbol{logGSYIH_{it}}$	1.450436*	0.106528	13.61551	0.0000
$\boldsymbol{logGSYIH_{jt}}$	0.256579*	0.083509	3.072463	0.0027
$\boldsymbol{logMesafe_{ij}}$	-1.910037*	0.626643	-3.048045	0.0029
$\boldsymbol{Linder_{ijt}}$	-0.001834	0.002104	-0.871551	0.3854
İstatistikler	R^2 = 0.929426 D-Wİst. = 0.436321 F-ist = 358.8700 Olasılık (F-istatistik) = 0.000000			

*Not: *, ** ve *** istatistikleri sırasıyla %1, %5 ve %10 düzeyinde anlamlı olduğunu göstermektedir.*

Son olarak kurulan üçüncü modelde ise Türkiye'nin E7 ülkeleri ile gerçekleştirdiği ticaret hacmi Basit/İlkesel Çekim Modeline nüfus değişkeni eklenerek açıklanmaya çalışılmıştır. Tablo 8'de R^2 ve olasılık (F-istatistik) değerlerine bakıldığında; R^2değerinin 0,93 oranında bulunması ve olasılık (F-istatistik) değerinin 0,05'ten küçük olması nedeniyle modelin istatistiksel olarak anlamlı olduğu görülmektedir. Tahmin sonuçlarına göre modele Türkiye'nin nüfus değişkenin istatistiksel olarak anlamlı olmadığı sonucuna ulaşılmıştır. Modelde yer alan diğer değişkenlerin ise istatistiksel olarak anlamlı etkilerinin olduğu görülmektedir. Bu değişkenlerden Ayrıca Türkiye'nin ve E7 ülkelerinin GSYH'sinde ve E7 ülkelerinin nüfusunda %1'lik artışın ticaret hacmine sırasıyla %1,33, %0,20 ve %0,64 artırdığı ve mesafe değişkeninde meydana gelen %1'lik artışın ise ticaret hacmini %1,61 azalttığı görülmektedir.

Tablo: 8
Model 3- Panel Regresyon Analiz Sonuçları

Model 3 $LogDT_{ijt} = \beta_0 + \beta_1 logGSYIH_{it} + \beta_2 logGSYIH_{jt} + \beta_3 logNufus_{it} + \beta_4 logNufus_{jt} + \beta_5 logMesafe_{ij} + \epsilon_{ijt}$				
Değişkenler	**Katsayısı**	**Std.Hata**	**t-İstatistik**	**p-Değeri**
Sabit	-33.15962*	10.74149	-3.087061	0.0026
$logGSYIH_{it}$	1.332925*	0.061025	21.84218	0.0000
$logGSYIH_{jt}$	0.201877*	0.066264	3.046531	0.0029
$logMesafe_{ij}$	-1.616557*	0.608096	-2.658391	0.0090
$logNufus_{it}$	0.808986	0.740812	1.092025	0.2773
$logNufus_{jt}$	0.649102**	0.345211	1.880302	0.0628
İstatistikler	R^2 = 0.934213 D-Wİst. = 0.438707 F-ist = 306.7310 Olasılık (F-istatistik) = 0.000000			

*Not: *, ** ve *** istatistikleri sırasıyla %1, %5 ve %10 düzeyinde anlamlı olduğunu göstermektedir.*

6. Sonuç ve Öneriler

Bu çalışmanın temel amacı, Türkiye ve E7 ülkeleri arasında gerçekleşen ticaret hacmine etki eden faktörleri belirlemek ve Çekim Modelinin ticaret hacmini açıklamaya uygun olup olmadığını panel veri analiz ile test etmektir. Bu amaç doğrultusunda dış ticaret hacmine etkisi olabilecek değişkenlerden, ülkelerin GSYH'si, nüfusu, Linder değişkeni ve ülkelerin arasında coğrafi uzaklıktan kaynaklanan mesafe değişkeni Çekim Modeline eklenerek üç farklı logaritmik model oluşturulmuş ve panel veri analiz yöntemiyle sonuçlar elde edilmiştir.

Çalışmada Türkiye'nin E7 ülkeleri ile gerçekleştirdiği dış ticaretin Çekim Modeli kullanılarak incelenmesinin nedeni, gelişmekte olan E7 ülkelerinin Türkiye ile artan dış ticaret rakamlarıdır. Bir diğer neden ise Price Waterhouse Cooper firmasının 2017 yılında yayımladığı "2050'de Dünya" başlıklı raporunda, E7 ülkelerinin 2016 yılındaki küresel GSYH'nde %37'lik bir paya sahip olduğu ve bu payın 2050 yılında %48'e yükseleceğinin vurgulanmasıdır. E7 ülkelerinin dünya ticaretinde hızla artan dış ticaret payı ve Türkiye'nin bu ülkelerle gerçekleştirdiği dış ticaret hacminin özellikle son yıllardaki artışı nedeniyle, süreci daha iyi analiz edebilmek ve güncel verileri yansıtabilmek adına çalışmada 2000-2018 zaman aralığı kullanılmıştır.

Yapılan analiz sonuçlarına göre 2000-2018 döneminde Türkiye'nin E7 ülkeleri ile gerçekleştirdiği ticaret hacmi Basit/İlkesel Çekim Modeline uygunluk göstermiştir. Dış ticaret hacmi hem Türkiye'nin hem de E7 ülkelerinin GSYH katsayıları ile pozitif yönlü ve anlamlı bir ilişki göstermiştir. Buna göre Türkiye'nin ve E7 ülkelerinin GSYH'sinde gerçekleşecek %1'lik artış ticaret hacmini sırasıyla %1,45 ve %0,25 oranında artıracaktır. Diğer bağımsız değişken olan mesafe ise Türkiye ile E7 ülkeleri arasında gerçekleşen ticaret hacmine negatif yönlü ve anlamlı etki ettiği görülmüştür. Bu durumda mesafe değişkeninden kaynaklanan uzaklığın artması ile dış ticaret hacminin azalması söz konusudur.

Dış ticaret hacminin bağımlı değişken olduğu ve Basit/İlkesel Çekim Modeline Linder değişkeni eklenerek kurulan modele göre GSYH değişkenleri pozitif yönlü ve anlamlı iken mesafe değişkeni negatif yönlü ve anlamlı bir etki etmiştir. Ülkelerin kişi başına

düşen gelirleri arasındaki farkı ifade eden Linder değişkenin ise negatif yönlü olduğu ve dış ticaret hacmi üzerinde istatistiki olarak anlamlı bir etkisinin olmadığı görülmüştür. Bu durum gelir farklarındaki azalmaların gerçekleşen ticaret akışında etki yaratmadığı şeklinde yorumlanabilmektedir.

Son olarak Basit/İlkesel Çekim Modeline toplam talebi gösteren nüfus değişkeni eklenerek oluşturulmuş model, istatistiki olarak anlamlı çıkmıştır. Türkiye'nin ve E7 ülkelerinin GSYH'si ile E7 ülkelerinin nüfusunun bir arada değerlendirildiği modelde bağımsız değişkenlerin dış ticaret hacmi üzerinde pozitif yönlü ve anlamlı bir etkisi olduğu sonucuna varılmıştır. Mesafe değişkenin ise negatif yönde ve anlamlı bir etkisi olmuştur. Modele eklenen bağımsız değişkenlerden Türkiye'nin nüfusunun ise dış ticaret hacmine anlamlı bir etkisinin olmadığı saptanmıştır. Toplam talebi gösteren nüfus değişkenin pozitif ve anlamlı olması E7 ülkelerinin nüfusu arttıkça daha fazla mal ihracatı ve ithalatı gerçekleştirdiği şeklinde yorumlanabilmektedir.

Türkiye'nin E7 ülkeler ile arasındaki dış ticaret rakamlarının artması, ülkenin PWC tarafından yapılan 2050 yılı için tahmini küresel ekonomi güç sıralamasındaki konumuna erişmesini kolaylaştıracağı gibi ülkeye ekonomik açıdan birçok fayda sağlayacaktır. Bu çerçevede 2018 yılları itibariyle gerçekleştirilen dış ticaret rakamı 64.263 milyar dolar olsa da E7 ülkeleri ile gerçekleştirilmesi gereken potansiyel ticaret hacminin daha yüksek olmasını beklemek yanlış olmayacaktır. Bu doğrultuda Türkiye'nin dış ticaret hacmini artırmak için ekonomik büyüklük ölçütlerinden biri olan GSYH oranın da artırması gerekmektedir. Bu amaçla Türkiye, GSYH oranlarını artırmak için temel olarak üretim miktarını artırabilir.

Türkiye'nin E7 ülkeleri ile gerçekleştirdiği dış ticaret kalemlerinde yer alan ürün gruplarına bakıldığında Türkiye'nin genel olarak yüksek katma değerli ürünleri ithal ettiği görülmektedir. Bu ürünlerin yüksek maliyetli olması ve Türkiye'nin ihraç kaleminin genel olarak ithal kalemine göre değer açısından düşük maliyetli ürünlerin oluşturması ülkenin dış ticaret açığını artırmaktadır. Bu açıdan Türkiye'nin ekonomisi için artırması gereken ürün miktarlarının içerisinde ham ve yarı mamul olan ürünlerin işlenmesi ve katma değerlerinin artırılması ülkenin dış ticaret açığını azaltabileceği gibi GSYH oranlarının yükselmesini de sağlayabilir. Ayrıca, Michaely (1977) ve Balassa (1978) gibi iktisatçılar da ihracat ve büyüme arasındaki pozitif ilişkinin olduğu sonucunu vurgulamışlardır. Bu sebeple Türkiye'nin ihracatını artırması ekonomik büyümesi açısından önem arz edebilir.

Bu çalışma belirli açıklayıcı parametreler ile kurulduğundan gelecekte bu alanda yapılan çalışmalar için birkaç öneride bulunmak yerinde olacaktır. Gelecekte yapılan çalışmalar; genişletilmiş Çekim Modelinde açıklayıcı parametreler arasında yer alan ekonomik bütünleşmelerin etkisi, tarifeler ve tarife dışı engeller, siyasi rejimlerdeki benzerlik/ farklılık, teknolojik yakınlık/ uzaklığa ilişkin çeşitli değer ve rasyolar, altyapı donanımı, kültürel benzerlik, dışa açıklık oranı ve beşerî sermayeye ilişkin çeşitli rasyolar ile model kurarak Türkiye ve E7 ülkeleri arasındaki dış ticaret akışına etkilerini analiz edebilirler. Ayrıca Türkiye'nin gelişmiş ülkelerden oluşan G7 ülkeleri gerçekleştirdiği dış

ticaret akışı Çekim Modeli ile analiz edilip bu araştırmanın verilerinden elde edilen sonuçlar ile karşılaştırılacağı bir araştırma ortaya konulabilir.

Kaynaklar

Aitken, N.D. (1973), "The Effect of the EEC and EFTA on European Trade: A Temporal Cross-Section Analysis", *American Economic Association*, 63(5), 881-892.

Anderson J.E. & E. Wincoop (2003), "Gravity with Gravitas: A Solution to the Border Puzzle", *NBER Working Paper Series*, Paper No. 8079.

Anderson, J.E. (1979), "A Theoretical Foundation for the Gravity Equation", *American Economic Review*, 69(1), 106-116.

Armington, P.S. (1969), "A Theory of Demand for Products Distinguished by Place of Production", *IMF Staff Papers*, 16(1), 159-176.

Ata, S. (2012), "Türkiye'nin İhracat Potansiyeli: Çekim Modeli Çerçevesinde Bir İnceleme", *International Conference on Eurasian Economies*, 13 Ekim, Kazakistan, 276-282.

Bai, J. & C. Kao (2006), "On the Estimation and Inference of a Panel Cointegration Model with Cross-Sectional Dependence", *Contributions to Economic Analysis*, 274, 3-30.

Balassa, B. (1978), "Exports and Economic Growth Further Evidence", *Journal of Development Jiconomics*, 5,181-189.

Baldwin, R. & D. Taglioni (2011), "Gravity Chains: Estimating Bilateral Trade Flows When Parts And Components Trade Is Important", *NBER Working Paper*, 16672.

Baltagi, B.H. (2005), *Econometric Analysis of Panel Data*, Third Edition, John Wiley & Sons Inc., New Jersey.

Baltagi, B.H. et al. (2003), "A Generalized Design For Bilateral Trade Flow Models", *Economics Letters*, 80, 391-397.

Banerjee, A. & J.L. Carrion-i-Silvestre (2006), "Cointegration in Panel Data with Breaks and Cross-Section Dependence", in: *ECB Working Paper Series*, European Central Bank.

Batra, A. (2006), "India's Global Trade Potential: The Gravity Model Approach", *Global Economic Review*, 35(3), 327-361.

Baytar, R.A. (2012), "Türkiye ve BRIC Ülkeleri Arasındaki Ticaret Hacminin Belirleyicileri: Panel Çekim Modeli Analizi", *İstanbul Ticaret Üniversitesi Sosyal Bilimler Dergisi*, 11(21), 403-424.

Bergstrand, J.H. (1985), "The Gravity Equation in International Trade: Some Microeconomic Foundations and Empirical Evidence", *The Review of Economics and Statistics*, 67(3), 474-481.

Bergstrand, J.H. (1989), "The Generalized Gravity Equation, Monopolistic Competition, and the Factor-Proportions Theory in International Trade", *Review of Economics and Statistics*, 71(1), 143-153.

Breuss F. & P. Egger (1999), "How Reliable Are Estimations of East-West Trade Potentials Based on Cross-Section Gravity Analyses?", *Empirica*, 26(2), 81-94.

Brun, J.F. et al. (2005), "Has Distance Died? Evidence from a Panel Gravity Model", *The World Bank Economic Review*, 19(1), 99-120.

Carrère, C. (2006), "Revisiting The Effects of Regional Trade Agreements on Trade Flows With Proper Specification of The Gravity Model", *European Economic Review*, 50(2), 223-247.

Choi, C. (2002), "Linder hypothesis revisited", *Applied Economics Letters*, 9, 601-605.

De Benedictis, L. & D. Taglioni (2011), "The gravity model in international trade", in: L. De Benedictis & L. Salvatici (eds.), *The Trade Impact of European Union Preferential Policies: An Analysis Through Gravity Models*, (55-90), Springer, (Chapter 4).

Deardorff, A. (1998), "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?", in: J.A. Frankel (ed.), *In The Regionalization of the World Economy*, (7-32), Chicago: University of Chicago.

Demiral, M. vd. (2016), "Petrol Gelirleri ve Ekonomik Büyüme: Seçilmiş Petrol Zengini Gelişmekte Olan Ülkeler Üzerine Bir Panel Veri Analizi", *Sosyoekonomi*, 24(27), 85-102.

Dinçer, G. (2013), "Dış Ticaret Kuramında Çekim Modeli: Türkiye-AB Ticaretinin Analizi", *Doktora Tezi*, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.

Dinçer, G. (2014), "Dış Ticaret Kuramında Çekim Modeli", *Ekonomik Yaklaşım*, 24(88), 1-34.

Dinh, T B. et al. (2011), "Applying Gravity Model to Analyze Trade Activities of Vietnam", *External Economics Review*, No: 69.

Egger, P. (2002), "An Econometric View on the Estimation of Gravity Models and the Calculation of Trade Potentials", *The World Economy*, 25(2), 297-312.

Eichengreen, B. & D. Irwin (eds.) (1998), *The Role of History in Bilateral Trade Flows*, The University of Chicago Press, Chicago, London.

Endoh, M. (1999), "Trade creation and trade diversion in the EEC, the LAFTA and the CMEA: 1960-1994", *Applied Economics*, 31(2), 207-216.

Fidrmuc, J. (2009), "Gravity Models in Integrated Panels", *Empir Econ*, 37,435-446.

Filippini, C. & V. Molini (2003), "The Determinants of East Asian Trade Flows: A Gravity Equation Approach", *Journal of Asian Economics*, 14(5), 695-711.

Helpman, E. & P. Krugman (1985), *Market Structure and Foreign Trade*, Cambridge: MIT Press.

Helpman, E. et al. (2008), "Estimating Trade Flows: Trading Partners And Trading Volumes", *NBER Working Paper*, 12927.

Holly, S. et al. (2010), "A Spatio-Temporal Model of House Prices in the USA", *Journal of Econometrics*, 158, 160-173.

Hsiao, C. (2005), "Why Panel Data?", *The Singapore Economic Review*, 50(2), 143-154.

Işık, N. (2016), "Türkiye ile Şanghay İşbirliği Örgütü Arasındaki Ticaret Akımlarının Panel Çekim Modeli İle Tahmini", *Uluslararası İktisadi ve İdari İncelemeler Dergisi*, (17), 151-174.

Karagöz, K. (2008), "Türkiye'nin Turizm Potansiyeli: Çekim Modeli Yaklaşımı", *Anatolia: Turizm Araştırmaları Dergisi*, 19(2), 149-156.

Kepaptsoglou, K. et al. (2010), "The Gravity Model Specification for Modeling International Trade Flows and Free Trade Agreement Effects: A 10-Year Review of Empirical Studies", *The Open Economics Journal*, 3, 1-13.

Khandare, V.B. (2011), "Impact of Globalization on International Trade (With Special Reference to India)", *International Journal of Trade and Services*, 3(1), 1-14.

Kimura, F. & H. Lee (2006), "The Gravity Equation in International Trade in Services", *Review of World Economics*, 142(1), 93-121.

Koy, A. vd. (2019), *Ekonometri Uygulamaları*, Seçkin Yayıncılık, Ankara.

Lampe, M. (2008), "Bilateral Trade Flows in Europe, 1857-1875: A New Dataset", *Res Econ Hist.*, 26(1), 81-155.

Leamer, E. & J. Levinsohn (1995), "International Trade Theory: The Evidence", *NBER Working Paper* No. 4940, 1-54.

Michaely, M. (1977), "Exports and Growth An Empirical Investigation", *Journal of Development Economics*, 4, 49-53.

Nguyen, K. (2009), "Gravity Model by Panel Data Approach An Empirical Application with Implications for the ASEAN Free Trade Area", *ASEAN Economic Bulletin*, 26(3), 266-277.

Nitsch, V. (2006), "Does the G7/G8 promote trade?", *Economics Letters*, 94, 136-140.

Oguledo V. & C.R. Macphee (1994), "Gravity Models: A Reformulation and an Application to Discriminatory Trade Arrangements", *Applied Economics*, 26(2), 107-120.

Paas, T. (2000), "The Gravity Approach for Modeling International Trade Patterns for Economies in Transition", *IAER*, 6(4), 633-648.

Paas, T. (2003), "Regional Integration and International Trade in the Context of EU Eastward Enlargement", Hamburgisches Welt-Wirtschafts-Archiv (HWWA) Hamburg Institute of International Economics, *Discussion Paper* No. 218: 1-30.

Pesaran, M.H. (2015), *Time Series and Panel Data Econometrics*, Oxford University Press.

Porojan, A. (2001), "Trade Flows and Spatial Effects: The Gravity Model Revisited", *Open Econ Rev*, 12, 265-280.

Pöyhönen, P. (1963), "A Tentative Model for the Volume of Trade between Countries", *Weltwirtschaftliches Archiv*, Bd. 90, 93-100.

Price Waterhouse Coopers (2008), *The World in 2050: Beyond The BRIC's A Broader Look At Emerging Market Growth Prospects*, PWC London UK.

Price Waterhouse Coopers (2017), *The Long View How will the Global Economic Order Change by 2050*, PWC London UK.

Rasoulinezhad, E. & G. Seong (2016), "A Panel Data Analysis of South Korea's Trade with OPEC Member Countries: The Gravity Model Approach", *Iran.Econ.Rev.*, 20(2), 203-224.

Samadder, S. et al. (2012), "Scaling Analysis of Prime Stock Exchange Indices of the Emerging Seven (E7) Countries", *Int J Appl Comput Sci Math*, 2(1), 12-22.

Sevüktekin, M. & M. Nargeleçekenler (2010), *Ekonometrik Zaman Serileri Analizi*, Geliştirilmiş 3. Baskı, Nobel Yayın, İstanbul.

Sorhun, E. (2013), "Türkiye'nin Eksik Dış Ticareti, Ticari Potansiyeli ve Yeni Fırsatlar", *DEÜ İİBF Dergisi*, 28(1), 25-47.

Stack, M.M. (2009), "Regional Integration and Trade: Controlling for Varying Degrees of Heterogeneity in the Gravity Model", *The World Economy*, 32(5), 772-789.

Tataoğlu, F.Y. (2018), *Panel Veri Ekonometrisi: Stata Uygulamalı*, Beta Basım Yayım, İstanbul.

Tatlıcı, Ö. & A. Kızıltan (2011), "Çekim Modeli: Türkiye'nin İhracatı Üzerine Bir Uygulama", *Atatürk Ü. İİBF Dergisi*, 10. Ekonometri ve İstatistik Sempozyumu Özel Sayısı, 287-299.

Thursby, J.G. & M.C. Thursby (1987), "Bilateral Trade Flows, the Linder Hypothesis, and Exchange Risk", *The Review of Economics and Statistics*, 69(3), 488-495.

Tinbergen, J. (1962), *Shaping the World Economy*, New York, The Twentieth Century Fund.

Wall, H.J. (1999), *Using The Gravity Model to Estimate The Costs of Protection*, Federal Reserve Bank of St. Louis.

Westerlund, J. (2005), "New Simple Tests for Panel Cointegration", *Econometric Reviews*, 24(3), 297-316.

World Bank (2020), <https://data.worldbank.org/>, 15.07.2020.

Yaşar, H.N. (2011), "Avrupa Birliği ve Türkiye Arasındaki Gümrük Birliği Çerçevesinde Türkiye İhracatının Çekim Modeli Uygulaması", *Yüksek Lisans Tezi*, Dokuz Eylül Üniversitesi Sosyal Bilimler Enstitüsü, İzmir.

Zarzoso, I.M. & F.N. Lehmann (2003), "Augmented Gravity Model: An Empirical Application to Mercosur-European Union Trade Flows", *Journal of Applied Economics*, 6(2), 291-316.

Sosyoekonomi

2022, Vol. 30(51), 427-447

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.21
Date Submitted: 07.06.2021
Date Revised: 15.12.2021
Date Accepted: 22.01.2022

Türkiye'de İyi ve Kötü İşler: Genç Çalışanlar Üzerinden Bir Analiz

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Good and Bad Jobs in Turkey: An Analysis on Young Employees

Abstract

Young people are at a disadvantage in terms of work and working conditions compared to adult workers in Turkey as in the rest of the world. This study analyses the quality of the jobs that young people are employed in through the "*Labour Market Segmentation Theory*" and assesses the factors affecting this situation. This framework divided jobs into *'good*' and '*bad*' jobs following the relevant theory. The 2019 TUIK Household Labour Force Survey Micro Data Set (HIAMVS) is utilized in the analysis. The young population range is a 15-29 age group, similar to ILO's "Global Employment Trends for Youth" reports. Probit model results indicate that jobs are segmented, supporting the theory. According to the findings, the socio-demographic characteristics of young people, the sector they work in, their occupation, and the region they live in significantly affect the probability of employment in a good job.

Keywords : Quality of Jobs, Young Employees, Segmented Labour Market Theory.

JEL Classification Codes : J42, J31, J21.

Öz

Dünya geneline benzer biçimde Türkiye'de de yetişkin çalışanlara göre gençler, iş ve çalışma koşulları açısından dezavantajlı durumdadır. Bu çalışmanın amacı, gençlerin çalıştıkları işlerin kalitesini "*Tabakalı İşgücü Piyasası Kuramı*" üzerinden analiz etmek ve bir durum tespiti yapmaktır. Araştırmada, ilgili kurama uygun biçimde işler '*iyi* ve *kötü iş'* olarak ayrılmış, analizler 2019 TÜİK Hanehalkı İşgücü Anketi Mikro Veri Seti (HİAMVS)'nden yararlanılarak yapılmıştır. Çalışmada, genç nüfus ILO'nun *"Gençler için Küresel İstihdam Eğilimi Raporları"*na benzer biçimde, 15-29 yaş olarak belirlenmiştir. Probit model bulguları, kuramı destekleyecek biçimde işlerin tabakalaştığını göstermektedir. Bulgulara göre, gençlerin sosyo-demografik özellikleri, çalıştıkları sektör, meslekleri, yaşadıkları bölge iyi işte çalışma olasılığını anlamlı düzeyde etkilemektedir.

Anahtar Sözcükler : İşin Niteliği, Genç Çalışanlar, Tabakalı İşgücü Piyasası Kuramı.

1. Giriş

Birleşmiş Milletler (BM), Uluslararası Çalışma Örgütü (ILO), Ekonomik Kalkınma ve İşbirliği Örgütü (OECD) ve Avrupa Birliği (AB)'nin çalışma raporlarında, uluslararası ve ulusal yazında sıklıkla gençlerin işgücü piyasasındaki eğreti çalışma biçimleri vurgulanmaktadır. Verimlilik ve ücret ilişkisini, '*işin kalitesi*' açısından inceleyen çalışmalarda, işin niteliği/kalitesi ile bireysel ve toplumsal refah, büyüme ve kalkınma arasında yakın bir ilişki saptanmıştır (Kalleberg & Vaisey, 2005: 431). Dolayısıyla, gençlerin düşük kaliteli işlerde çalışmaları, verimliliği ve ücreti düşük işlerde çalışmalarına neden olmaktadır.

İşgücü piyasasında benzer verimliliğe sahip bireylerin farklı ücret alması, Neo-Klasik İktisat yaklaşımı ile emeğin verimlik farkları üzerinden arz yönlü biçimde açıklanmaktadır. Neo-Klasik İktisadın ücret dağılımını açıklamada yetersiz kalması (Taubman & Wachter, 1986: 1183); yaklaşımın iktisat yazınında reddedilmesine (Cain, 1976), anti-tezi olarak, Kurumcu İktisadın egemen olduğu '*Tabakalı İşgücü Piyasası Kuramı*' (Berndt, 2014) ve Neo-Klasik İktisadın egemen olduğu '*Beşerî Sermaye Kuramı*'nın (Dickens & Lang, 1992; Bauder, 2001) gelişmesine ve ücret ile verimlilik arasındaki ilişkinin talep yönlü biçimde açıklanmasına neden olmuştur.

İktisat yazınında verimlilik ve ücret ilişkisinin farklılaşmasının veya ücretin belirlenmesinin tarihsel kökeni, Ortodoks iktisatçı, Smith'in üretimde iş bölümü ve uzmanlaşmaya bağlı farklı işlerde farklı ücret (Jastienė, 2010: 55) ve '*Telafi Edici Ücret Farklılıkları*' yaklaşımına (işçi sendikaları ve düşünsel unsurlar gibi) (Taubman & Wachter, 1986: 1187)[1], Marshall'ın 1880'lerde meslek, coğrafya ve endüstri farklılıklarına dayanarak ortaya attığı '*rekabet edemeyen piyasalar*' (Marshall, 2013) ve Mill'in işgücü piyasasında kurumsal gelenek ve kurallara göre işleyen *'rekabet etmeyen gruplar'*dan oluşan piyasalar (Taubman & Wachter, 1986: 1187; Jakštienė, 2010: 55) varsayımlarına dayanmaktadır.

Ortodoks Kurama göre emeğin ücreti, bireysel özelliklerine göre belirlenmektedir. Aynı zamanda piyasadaki rekabet koşulları, gruplar arasındaki işgücü piyasasından kaynaklanan farklılıkların azalmasını ve işverenin kârını en üst düzeye çıkarmasını sağlayabilmektedir. Bu bağlamda Neo-Klasik İktisada göre, işgücü piyasasında ücrete bağlı bir tabakalaşma anormal bir durumdur (Reich et al., 1973: 359). Ancak mevcut koşullarda yeterli önlemler alınmasına rağmen, gruplar arasındaki işgücü piyasası farklılıkları ortadan kalkmamış ve Ortodoks Kuram işgücü piyasasındaki tabakalaşmayı açıklamada yetersiz kalmıştır (Reich et al., 1973: 359).

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[1] *Adam Smith (1997: 89-94)'e göre; ücretlerin eşitlenmemesinin veya yüksek olmasının temel nedeni işin dört koşullu ile ilgilidir. İşin ilk koşulu olan, zorluk, temizlik ve saygınlığı ne kadar çoksa; ikinci koşul işi öğrenmenin maliyeti, zaman ve çabası ne kadar çoksa; üçüncü koşul işin sürekliliği ne kadar uzunsa ve dördüncü koşul bireye duyulan güven ne kadar çoksa, ücret de o kadar çok olacaktır. Ayrıca, bir diğer koşula göre bir işte başarılı olma olasılığı ne kadar yüksekse, o işin kazancı o kadar yüksek olacaktır. Bu durumda, nitelikli ve niteliksiz emeğin kazancı da eşit olmayacaktır.*

Ortodoks İktisattan farklı biçimde Kurumcu İktisada göre, işgücü piyasası tabakalı bir yapıya sahiptir: *İşsizlik, ayrımcılık ve gelir dağılımı sorunlarının* temelinde tabakalı yapı yer almaktadır (Taubman & Wachter, 1986: 1183). Tabakalı yapı, benzer niteliklere sahip bireylerin benzer işlerde çalışmasını ve benzer ücret almasını engellemektedir. Örneğin; bireylerin eğitim olanaklarından eşit biçimde yararlanamaması, '*işin niteliği (iyi ve kötü iş)*' açısından işgücü piyasasını rekabetçi olmayan piyasalara dönüştürerek (Leontradidi, 1998), emeğin niteliğinin altında veya üzerinde ücret almasına ve ücretin de tabakalaşmasına neden olmaktadır (Fishman & Kimhi, 2013: 2; Cain, 1976; Kumaş & Çağlar, 2017: 56). Bu noktada işe bağlı beceri farklılıkları, bazı bireylerin neden diğerlerinden daha fazla para kazandığını açıklamaktadır (Kalleberg et al., 1981: 656).

Dünyanın pek çok ülkesinde gençler işgücü piyasasında işsizlik, ayrımcılık, sosyal dışlanma, düşük gelir grubunda yer alma ve eğitimde eşit fırsatlara sahip olamama gibi nedenlerden dolayı kendi verimliliklerine göre değil, işin niteliğine göre ücret aldıkları tabakalı bir piyasada çalışabilmektedir. Bu bağlamda çalışmanın soruları; '*Tabakalı İşgücü Piyasası Kuramı'nın Türkiye'de genç çalışanlar açısından geçerli midir*?' ve '*15-29 yaş grubundaki gençlerin iyi veya kötü bir işte çalışma durumunu belirleyen unsurların neler olduğu*'dur. Soruların yanıtı, kuramla ilgili yazınında en temel eserlerden biri olan, Peter B. Doeringer ve Michael J. Piore'nin (1970) "*Internal Labor Markets and Manpower Analysis*" başlıklı araştırması esas alınarak yanıtlanmaya çalışılmıştır. Bu çalışmanın amacı, kuramın 15-29 yaş arası gençler odağında incelenmesidir. Dolayısıyla, analizlerde temel bazı işgücü piyasası göstergeleri dışında, diğer yaş grupları ile karşılaştırma yapılmamıştır. Kuramın analizi TÜİK 2019 İşgücü İstatistikleri Mikro Veri Seti aracılığı ile yapılmıştır. Çalışma, kurama yönelik yazın incelemesi ve probit model kullanılarak elde edilen bulguları içeren iki temel bölümden oluşmaktadır. Çalışmanın yazın incelemesinde, 'Türkiye'de Tabakalı İşgücü Piyasası Kuramı'nı genç çalışanlar (15-29 yaş) açısından inceleyen bir esere rastlanılmamıştır. Dolayısıyla bu araştırmanın amacı, ilgili yazına genç işgücünün işgücü piyasasındaki konumlarını açığa çıkarmaya yönelik farklı bakış açısı ile katkı sağlamaktır.

2. Yazın İncelemesi

Ücrete bağlı işgücü piyasasında ikili yapı, Averitt'in (1968) "*İkili Ekonomi: Amerikan Sanayi Yapısının Dinamikleri*" eseri ve 1970'li yılların başında Doeringer ve Piore'nin (1970) "*İçsel İşgücü Piyasaları: İnsan Gücü Analizi*" eseri ile tartışılmaya başlanmış ve '*İkili İşgücü Piyasası*' kavramı (Hudson, 2007: 286) diğer bir ifade ile '*Tabakalı İşgücü Piyasası*' kavramı iktisat yazınında yerini almıştır. Reich et al. (1973; 1975) ise '*İçsel İşgücü Piyasası*'nı düzenlilik ve '*Dışsal İşgücü Piyasası*'nı düzensizlik ile betimleyerek kuramı genişletmiştir. Kalleberg (1981, 2003, 2009, 2012) tarafından yapılan çok sayıdaki kuramsal ve deneysel çalışmalar 'iyi iş' ve 'kötü iş' ayrımını belirginleştirerek evrimleştirmiştir.

Tabakalı işgücü piyasası '*İçsel ve Dışsal Piyasa* (internal-external market) *ve Birincil ve İkincil Piyasa* (primary-secondary sector) ve *İyi ve Kötü İş (good-bad job)*' biçiminde sınıflandırılmaktadır. İkili tabakalı yapı, birincil ve ikincil piyasa veya içsel ve dışsal

piyasayı içermektedir. Doringer ve Piore (1970: 25), içsel işgücü piyasalarını beceri özgüllüğü; işbaşı eğitimi ve geleneksel kurallar gibi geleneksel iktisat kuramında öngörülemeyen bir dizi faktörle açıklamaktadır. Beceri özgüllüğü, o işi yapmanın ayrı bir bilgi-tecrübe gerektirmesini ifade etmektedir (Doeringer & Piore, 1970: 26).

İçsel piyasada işin gerektirdiği bilgi, beceri, donanım, yetenek ve/veya nitelik ne kadar yüksekse, ücret o kadar yüksektir. Yüksek ücretli işler '*iyi işlerdir'* ve bu işler, birincil piyasa/içsel piyasada (firma piyasası veya kariyer piyasası) bulunmaktadır. İçsel işgücü piyasalarında ücret ve emeğin üretim sürecindeki yeri rekabetten/piyasadan bağımsız biçimde, işletmenin yönetsel kurallarına (Doeringer & Piore, 1970: 8-9, 25) ve verimlilikten daha çok gelenek gibi faktörlere göre (Wachter, 1974: 639) belirlenmektedir. İçsel işgücü piyasası çalışanlarına *'iyi işi'* yani; yüksek ücreti düzenli geliri, uzun süreli iş ilişkisini, çalışma garantisini, iş güvencesini, iyi çalışma koşullarını, iş eğitimini, firma ve sektörde hareketliliği, kariyer fırsatını, eşitlik ve kararlara katılımı, işbaşı eğitimini, sendikalaşma, avans ve teşvik olanağını, yönetimde adaleti, sağlığa daha fazla erişimi, sigorta ve emeklilik yardımlarını ve iş güvenliğini sağlayan bir piyasadır (Doeringer & Piore, 1970: 25, 272; Daw & Hardie, 2012: 1182; Kumaş & Çağlar, 2017: 56). Bu piyasada başarı ödüllendirilmekte ve kişi genellikle kendi becerisi ile işe alınmaktadır (Reich et al., 1973: 360). Sürekliliği olan ve eğitimli işgücüne sahip olmak isteyen işverenler, çalışanlarına kariyer olanağı sunarak onların daha uzun süre işte kalmalarına yardımcı olmaktadır (Smith & Noma, 1985: 149). Aynı zamanda, içsel piyasaya dışsal piyasadan geçiş neredeyse kapalıdır ve iyi işleri barındıran bu piyasadaki firmalarda çalışma edilen bireyler, piyasanın etki ve rekabetinden korunmaktadır (Eriksson & Werwatz, 2005: 2). Dolayısıyla, ücret farklılıkları esas olarak işlerin özelliklerinden kaynaklanmaktadır (McNabb, 1987: 259).

İçsel işgücü piyasasında yer alan firmalarda üretim genelde sermaye yoğun tekniğe, makineye ve yüksek teknolojiye dayanmaktadır. İçsel işgücü piyasası içerisinde yer alan işler, yönetsel işler (profesyonel ve yönetici işleri) ve doğrudan üretim sürecindeki mavi yakalılara yönelik işlerden oluşmakta (Doeringer & Piore, 1970: 10-11, 25; Jastiené, 2010: 56) ve işler üst veya alt kademe olarak sınıflandırılmaktadır. Bu işlerde ücretler, özel anlaşmalarla pazarlık edilmektedir (Anderson et al., 1987: 573). İçsel piyasada giriş pozisyonundaki işler için niteliksiz veya zanaat odaklı becerilere sahip bireyler seçilmektedir (Wachter, 1974: 643).

İkincil/dışsal piyasada işlerin niteliğine paralel biçimde azınlık işçileri, gençler ve çocuklar gibi (Doeringer & Piore, 1970: 273-274; Reich et al., 1973: 360; Wachter, 1974: 651) dezavantajlı gruplar çalışmaktadır (Doeringer & Piore, 1970: 272). Ayrımcılık ve işsizlik, ikincil piyasada eksik çalışmaya neden olmaktadır (Doeringer & Piore, 1970: 165, 301; Piore, 1972; Wachter, 1974: 639; Hudson, 2007: 298; Anderson et al., 1987: 573).

İkincil piyasa/dışsal piyasada, ücret ve çalışma koşulları, içsel piyasanın tersine, piyasadaki rekabet koşullarına göre belirlenmektedir (Anderson et al., 1987: 573). Dolayısıyla bu piyasa kötü işleri barındırmaktadır. *Kötü iş*; düşük ücretli, iş güvencesinin olmadığı, kariyer fırsatının çok sınırlı olduğu ya da olmadığı, çalışma koşullarının kötü ve

yüksek işgücü devrinin olduğu, sendikalaşmanın ve yan ödemelerin olmadığı, sosyal hakların çok az elde edildiği, kısa süreli ve genellikle keyfi ve kaprisli bir yönetimin olduğu işlerdir (Doeringer & Piore, 1970; Hudson, 2007: 272; Lazear & Oyer, 2004: 531; Piore, 1972; Hudson, 2007: 288; Dickens & Lang 1988: 132; Reich et al., 1973; Wachter, 1974; Osterman, 1975; Horn, 1980; Anselme & Weisz, 1985; Rebitzer & Robinson, 1991; Lamotte & Zubiri-Rey, 2008; Kalleberg et al., 2000). İşgücü piyasasındaki kötü/ikincil işler rutinleşmiş nitelik taşırken, iyi/birincil işler yaratıcılık gerektirmektedir (Reich et al., 1973: 360).

Daw ve Hardie'nin 1957 Wisconsin Longitudinal Study (WLS) veri tabanını kullanarak ABD'de yaptıkları araştırmasında birincil sektör, medyan üzerinde ücreti, çeşitli çıkarları ve en yüksek iş güvencesini sağlayan işler olarak tanımlanmıştır (2012: 1184). Diğer yandan, ikincil piyasadaki işler, çoğunlukla yarı zamanlıdır ve güvencesizdir (Daw & Hardie, 2012: 1182).

Dışsal piyasadaki firmaların çoğu hizmet, toptan ve perakende ticaret sektörlerinde faaliyet göstermektedir (Wachter, 1974: 651). İkincil piyasada (veya piyasadaki firmalarda) bireylerin yoğun bir denetim ve baskı altında olması, işbaşı eğitimi ve kariyer gelişiminin sınırlı olması, (Loveridge & Mok, 1980), çalışanların aynı işyerinde uzun süreli ya da yüksek verimlilikle çalışma konusundaki güdülenmelerini düşürmektedir. Oysa birincil piyasada çalışanlar, sağladıkları çıkarlar karşılığında (sağlık yararları, sigorta poliçeleri, emekli aylığı ücretleri ve iş güvenliği gibi), kendilerini işverene ispatlamaya ve hizmet etmeye güdülemiştir (Doeringer & Piore, 1970: 165, 301; Piore, 1972; Wachter, 1974: 639; Hudson, 2007: 298; Kalleberg et al., 2009: 101, 107; Kalleberg, 2012: 436). Ayrıca birincil piyasaya göre ikincil piyasada, daha yüksek düzeyde işe geç kalma ve devamsızlık oranları ve işten çıkarmalar görülmektedir (Wachter, 1974: 651). Tersi biçimde, içsel işgücü piyasasında kıdem tazminatı gibi sosyal hakların bulunması ve firmaların kendi işe alma kurallarının olması, işten çıkarmanın maliyetini yükseltmektedir. Bu nedenle iyi işlerin olduğu içsel işgücü piyasası, piyasa koşullarından ve ekonomik krizlerden çok daha az etkilenmektedir. (Bosanquet, 1987).

İyi işler için eğitim, genellikle bir pasaport niteliğindedir. Eğitimli ve nitelikli işçiler, niteliksiz işçilerden daha üretken olma eğilimindedirler. Ancak, işgücü piyasası tabakalaşmış ise eğitim tek başına iyi işlere erişmede yetersiz kalmaktadır (Pages & Stampini, 2009: 387). Bununla birlikte, McNabb'in (1987) araştırmasında eğitimin, birincil piyasada kalmak için tek başına yeterli olmadığı, birincil piyasanın sosyal değer ve yapısına da uyum sağlamanın önemli olduğu ve iyi eğitim sayesinde içsel/birincil piyasada çalışan kişilerin, zamanla ikincil piyasaya geçtikleri/kaydıkları tespit edilmiştir.

Ashton et al. (1990), 1980'lerde Birleşik Krallıkta yaptıkları araştırmada tabakalaşmanın işgücü piyasasında yarattığı baskının gençlerin; çalışacakları mesleklerin değişimine neden olduğunu ve her bir tabakanın farklı kariyer fırsatı, işsizlik tehdidi ve kendine özgü giriş ve çıkış modeli sunmasının, kişisel özelliklerden bağımsız olarak, piyasada kalma şanslarını kısıtladığını tespit etmiştir.

Ashton et al. (1990) benzer biçimde, López-Roldán ve Fachelli (2020: 867, 869) ve López-Roldán et al. (2021: 90, 95), tabakalı işgücü piyasasını İspanya ve Arjantin'de faktör ve küme analizi yöntemleri ile karşılaştırdıkları çalışmalarda da kısa süreli, düşük beceri gerektiren, kayıt dışı ve çoğunlukla yarı zamanlı, iş güvencesinin sağlanmadığı, en düşük ücret düzeyinin olduğu işlerde, özellikle diğer hizmetler, inşaat ve perakende sektörlerinde (ve ayrıca İspanya örneğinde birincil sektörde) ve küçük ölçekli ve özel sektördeki işletmelerde çoğunlukla gençlerin çalıştığı gözlenmiştir.

López-Roldán ve Fachelli (2020: 867, 869) ve López-Roldán et al. (2021)'nin çalışmalarındaki sektörlere benzer biçimde Norveç'te 1995 yılında 18-24 yaş grubunda tabakalı yapının çok değişkenli analizler ile 2000 genç üzerinde analiz edildiği araştırmada, tekrarlayan işsizlik yaşayan erkeklerin inşaat, süreç endüstrisi ve ulaşım gibi düşük nitelik gerektiren işlerinde kadınların ise satış, perakende ve nitelik gerektirmeyen hizmet işlerinde yoğunlaştığı ve cinsiyete göre mesleki tabakalaşmanın, iş eğitimi ve sürekli işte çalışma durumunu belirlediği görülmüştür (Stavik & Hammer, 2000).

Lukac et al. (2019), on bir Avrupa ülkesini karşılaştırdıkları araştırmada da gençlerin kötü olarak nitelenebilecek işlerde çalıştıkları gözlenmiştir: İşgücü piyasasındaki tabakalaşmanın işlerin standart ve standart olmayan (ücret, çalışma saatleri ve denetim açısından) tanımlamalar ile ölçüldüğü araştırmada, gençlerin dezavantajlı grup olarak standart olmayan ve daha düşük gelir getiren işlerde çalıştıkları gözlenmiştir (Lukac et al., 2019).

Tabakalı İşgücü Piyasası Kuramı ILO tarafından da benimsenmiş ve işgücü piyasasının tabakalaşması olgusu geliştirilmiştir. ILO'ya göre İşgücü piyasasında tabakalaşma, son yıllarda tüm dünyada gözlemlenebilmekte ve piyasalar farklı özelliklere ve davranış kurallarına göre alt pazarlara veya bölümlere ayrışmaktadır. Tabakalaşma, sözleşmeye dayalı düzenlemeler (iş sözleşmelerinin sürekli/geçici doğası boyunca bölünmesi) gibi işgücü piyasası kurumlarının özelliklerinden, uygulama eksikliğinden (resmi/resmi olmayan bölünme) ve işgücünün özelliklerinden (göçmen ve göçmen olmayan işçiler gibi) kaynaklanabilmektedir (ILO, 2021a). ILO "*2020 Gençlik için Küresel İstihdam Eğilimleri*" raporunda, işgücü piyasalarının küresel boyutta yaş ve cinsiyete göre tabakalaştığı ve teknolojik değişimin etkilerinin, yetişkin çalışanlara göre gençlerde, eşitsiz dağılıma ve farklı sonuçlara neden olduğu vurgulanmaktadır (ILO, 2020: 59, 106-123). ILO raporuna göre (2020: 109), çoğu ülkede yetişkinlerle karşılaştırıldığında gençler, düzensiz, standart olmayan ve eğreti işlerde[2] çalışmalarından dolayı daha fazla ücret eşitsizliği yaşamaktadır ancak küresel ekonomik ve mali krizler yaşa bağlı ücret makasını daraltmıştır.

[2] *ILO (2016:18)'ya göre eğreti istihdam, iş güvencesizliğini, yoksulluk düzeyinde veya altında düşük ve süreksiz bir ücreti, yüksek riskte iş kaybını, en az düzeyde sosyal korumayı ve iş hukuku düzenlemelerini, çalışma koşullarında en düşük düzeyde kontrolü, belirsiz bir çalışma süresini, korumasız ve ayrımcılığa açık işlerde çalışmayı ifade etmektedir.*

Çalışma sırasında 'Tabakalı İşgücü Piyasası Kuramı'nı Türkiye'de doğrudan gençler için araştıran bir çalışmaya rastlanılmamıştır. Bununla birlikte, kurama göre işgücü piyasasının analizinin yapıldığı az sayıdaki çalışmada gençlerin genellikle kötü işlerde çalıştıkları bulgularına ulaşılmıştır. İnşaat sektöründe Karaalp-Orhan ve Aksoylu'nun nitel yöntemle 41 kişi ile görüşerek yaptıkları çalışmada, kurumsal firmalarda genç ve yetişkinler arasında belirgin bir ücret farklılıkları ve dışsal piyasada çalışanların içsel piyasadakiler ile aynı nitelikte olmalarına rağmen düşük ücretle çalıştıkları (Karalp-Orhan & Aksoylu, 2018: 12-13) tespit edilmiştir. Şenel'in inşaat sektörü özelinde, TÜİK 2016 İşgücü Anketi Mikro Veri Seti ve Denizli ilindeki nitel araştırmada (16 kişi), genç ve 50 yaş üzeri çalışanların iyi işte çalışma olasılıklarının, diğer yaş gruplarına göre çok daha düşük olduğu gözlenmiştir (Şenel, 2021: 16, 34-35).

Aydın (2009: 41, 47, 75): TÜİK İşgücü Anketi Mikro Veri Seti 1988-2006 dönemini içeren araştırmasında, enformel çalışmanın büyük bir bölümünün gençlerden oluştuğu sonucuna ulaşmıştır. Ayrıca kamu sektörü ve kurumsallaşmış büyük ölçekli firmaları, düzenli iş-gelir ve iş güvencesi ve iyi çalışma koşulları, kariyer fırsatı ve sendikalaşma olanağı sağlamasından dolayı içsel piyasa; sendikalaşma olanağı sunmaması, daha az iş güvencesini sağlaması ve piyasanın rekabetine açık olmasından dolayı kamu sektöründe sözleşmeli ve geçici çalışanları, taşeron çalışanlarını, özel sektördeki küçük işletmelerde çalışanları dışsal piyasa çalışanları olarak nitelemiştir.

Kumaş vd. (2014: 367, 368, 370) işletme ölçeği odağında kuramın geçerliliğini test ettikleri ve TÜİK 2011 İşgücü Anketi Mikro Veri Seti aracılığı ile yaptıkları İkili Lojistik Regresyon analizlerinde, ücretli, maaşlı çalışan 15-19 yaş grubu; işletme ölçeği, meslek ve sektör değişkenlerine göre en olumsuz koşullara sahip grup yaş grubu olarak tespit edilmiştir. Kumaş ve Çağlar'ın (2017: 77) TÜİK 2015 İşgücü Anketi Mikro Veri Seti'nden yararlanarak ve farklı yaklaşımlarla yaptıkları İkili Lojistik Regresyon analizlerinde; genç (15-24 yaş grubundakilerin %93,2'si kötü işte çalışmaktadır) ve 50 yaş ve üzerinde olmanın, '*kötü iş*'te çalışma olasılığını artırdığı görülmüştür.

Türkiye'de Covid-19'un etkilerinin '*ne istihdamda ne de eğitimde olan*' yerli (1000 kişi) ve mülteci (250 kişi) gençler üzerinde etkisinin nicel ve nitel yöntemlerle araştırıldığı ILO raporunda (2021b), her iki grubun da uzun sürelerle, düzensiz çalışma koşulları ve düşük ücretlerle çalıştıkları ve işletmelerden daha fazla beceri geliştirme fırsatı ve daha hijyenik çalışma ortamı sağlanması konularında beklenti içinde oldukları ifade edilmiştir.

Yazın incelemesinin sonucunda hem uluslararası ve hem de ulusal araştırmalarda benzer bulgulara ulaşıldığı görülmüştür. Bulgulara göre gençler çoğunlukla ücret düzeyi, işin gerektirdiği nitelik, kariyer fırsatı, iş güvencesi ve kayıtlı çalışma ve sektör açısından kötü iş olarak nitelenebilecek işlerde çalışmaktadır.

3. Yöntem

3.1. Veri Seti, İlgili Özet İstatistiki Bilgiler ve Kısıtlar

Çalışmada temel amaç 15-29 yaş grubu gençlerin çalıştıkları işlerin kalitesini incelemektir. Bu kapsamda TÜİK 2019 HİAMVS kullanılmıştır. HİAMVS, 15 yaş ve üzeri kişiler ile ilgili detaylı demografik ve mevcut dönemin işgücü bilgileri ile bir önceki dönemin işgücü bilgilerini içermektedir. Çalışmanın kapsamının 15-29 yaş grubu olmasının nedeni, ILO'nun "*Küresel Genç Nüfus İstihdamı Raporları*"nda gençlerin, 15-29 yaş grubu olarak belirlenmesidir (ILO, 2017, 2020).

Tablo: 1
Temel İşgücü İstatistikleri

Ferdin İşgücü Durumu	**15-64**			**15-29**		
	Cinsiyet			**Cinsiyet**		
	Erkek	**Kadın**	**Toplam**	**Erkek**	**Kadın**	**Toplam**
İşgücü (**Bin**)	21.215,04	10.456,60	31.671,60	6.042	3.399,09	9.441.00
İşgücüne Katılma Oranı (%)	78,16	38,72	58,48	67,73	38,62	53,27
İstihdam **(Bin)**	18.531	8.698,58	27.229,70	4.861,85	2.491,69	7.353,54
İstihdam Oranı (%)	68,27	32,21	50,28	54,5	28,31	41,49
İşsiz **(Bin)**	2.683,94	1.758,00	4.441,94	1.180,06	907,395	2.087,46
İşsizlik Oranı (%)	12,65	16,81	14,02	19,53	26,7	22,11
İşgücüne Dahil Olmayanlar **(Bin)**	5.930,14	16.552,40	22.482,50	2.878,70	5.403,76	8.282,46
İşgücüne Dahil Olmayanlar (%)	21,85	61,28	41,52	31,87	62,7	47,14
Çalışma Çağındaki Nüfus (Bin)	**27.145,20**	**27.008,90**	**54.154,10**	**8.920,60**	**8.802,85**	**17.723,50**

Kaynak: 2019 HİAMVS.

Veri Seti'ne göre 30 yaş ve üzeri yetişkinlerde işgücüne katılma oranı %52,82; çalışma oranı %47,38; işsizlik oranı ise %10,31 iken, 15-29 yaş arası gençlerde ise sırasıyla bu oranlar %53,27; %41,49 ve %22,11 biçimindedir. Genç nüfus ile çalışma çağındaki nüfus temel işgücü göstergeleri açısından karşılaştırıldığında, genç olmanın daha fazla işsizlik, daha az çalışma ve daha çok işgücünde olmama riski taşıdığı görülmektedir. Üstelik genç kadın olmak, işgücü piyasasındaki dezavantajlı durumu daha da pekiştirmektedir (Tablo 1). Genç kadın işsizliği, genel işsizliğin yaklaşık 1,2 katı daha fazladır. İşgücündeki tüm bu göstergeler kuramın ayrımcılığın tabakalı yapıya neden olduğu varsayımını destekler niteliktedir. Aynı zamanda işsizlik oranı yüksek ve gelir düzeyi düşük grupta yer almak tabakalaşmayı belirginleştirmektedir.

İşgücü piyasasında dezavantajlı gruplar, kuramın sınıflamasına göre dışsal piyasada veya ikincil sektörde yani kötü işlerde çalışmaktadırlar. Bu bağlamda çalışmada kurama uygun biçimde işler iyi ve kötü olarak gruplandırılmış ve Türkiye işgücü piyasasının yapısına göre mikro veri setinden yararlanılarak iyi ve kötü işin özellikleri belirlenmiştir. İyi işler ortalama ücret düzeyinin üzerinde bir ücreti, düzenli, sürekli, kayıtlı, çalışma biçiminin tam zamanlı olduğu ve haftalık çalışma süresinin 31-45 saat olduğu işleri kapsamaktadır. Kötü iş ise iyi işin özelliklerinin en az bir tanesinin sağlanmadığı işlerdir.

Tabakalı İşgücü Piyasası Kuramında '*iyi veya kötü iş*'in gruplandırılmasında çalışma süresi bir özellik olarak tanımlanmamıştır. Bu durumda, çalışma süresi ile ücret düzeyi arasındaki anlamlı ilişki olasılığı, iyi işin tanımlanmasında araştırmacıya '*siyah-beyaz veya*

gri alanlar' üzerinden analiz yapma fırsatı sunmaktadır[3]. Aynı zamanda çalışmada, tam zamanlı çalışmanın *iyi iş* olarak belirlenmesinde, ILO'nun *standart* çalışmayı *tam zamanlı*, *standart dışı* çalışmayı ise *yarı zamanlı* çalışma (ILO, 2016: 18) ve 4857 Sayılı İş Yasası'nda tipik çalışmanın tam zamanlı çalışma olarak değerlendirilmesi yaklaşımlarından ve yazın bulgularından hareket edilmiştir. ILO'ya göre (2016: 138) standart olan ve olmayan çalışmanın bir arada bulunması, işgücü piyasasında tabakalaşmaya veya ikili yapıya yol açmaktadır. Bu durum, gençlerin düşük kaliteli işlerde savunmasız biçimde (ILO, 2016: 143) ve tam zamanlı çalışanlarla karşılaştırıldığında iş güvencesinin ve sosyal güvenlik haklarının kırılgan olduğu işlerde gönüllü veya gönülsüz olarak çalışmasına neden olabilmektedir (ILO, 2016: 226).

Modelde veri seti yapısından dolayı, işin niteliğini belirleyen tüm özellikler analize dahil edilememiştir. Kuramda iyi işin niteliğini belirleyen beceri özgüllüğü, verimlilik, sendikalaşma, işbaşı eğitimi, kariyer fırsatları, çalışma kurallarının yönetiminde eşitlik ve yasalara uygunluk ve iyi çalışma koşulları gibi tüm özellikler, veri setinde yer almadığı için bu unsurlar modelin dışında bırakılmıştır. HİAMVS'lerindeki değişkenler, işgücü arz yönünü yansıtan değişkenlerle sınırlıdır. Çalışmanın bir diğer kısıtı ise mikro veri setinde gelir bilgisinin sadece ücretli, maaşlı ve yevmiyeli (ÜMY) çalışanlara sorulmasından dolayı, kendi hesabına ve işveren olarak çalışan gençlerin çalışma kapsamına alınamamasıdır. 15-29 yaş arası ÜMY'lerin ağırlıklandırılmış örneklem sayısı, 5 milyon 874 bin kişi, ağırlıklandırılmamış örneklem sayısı ise 28.542 kişidir.

15-29 yaş arası çalışanların büyük çoğunluğunun işteki durumu, ÜMY'dir (%80). 2019 yılı için 15-64 yaş grubu ÜMY'lerin "*Geçen ay içinde esas işinizden elde ettiğiniz dönemsel olarak elde edilen ikramiye, prim vb. gelirler dahil toplam net nakdi gelir*"e göre ortalama gelir düzeyi, yaklaşık 2.749 TL'dir. Tüm yaş gruplarındaki erkeklerde söz konusu gelir, 2.833 TL iken, kadınlarda 2.563 TL'dir (Tablo 2). Farklı bir yaş grubundaki 30-64 yaş ÜMY'ler için geçen ay elde edilen net ortalama gelir, 2.993 TL; erkeklerde 3.096 TL, kadınlarda 2.755 TL'dir. Oysa 15-29 yaş grubundaki ÜMY'ler için geçen ay elde edilen net ortalama gelir hem kadınlar hem de erkeklerde bu rakamların çok altındadır (Tablo 2). Bulgular, yaş küçüldükçe cinsiyete dayalı ortalama ücret farklılığının azaldığını, yaş ilerledikçe farkın kadınların aleyhine artığını göstermektedir.

İyi işin bir diğer unsuru olan tam zamanlı çalışma biçimi, 15-29 yaş grubunda %88,5'tir; haftalık çalışma süresi ise ortalama, 48.3 saattir. Bu süre, 4857 sayılı İş Yasası'nın 63. maddesi ile '*genel haftalık çalışma süresi en çok 45 saattir*' biçiminde düzenlenmiş çalışma süresi sınırını aşmaktadır. Veri setine göre genç çalışanların %53'ü, haftada 45 saatin üzerinde çalışmaktadır. Gençlerin %11,5'i yarı zamanlı çalışmaktadır. Ancak çalışma

[3] *Çalışmada 'iş'in kalitesini belirleyen özellikler, 'İkili İşgücü Piyasası' kuramcılarından ve bu çalışmanın dayandığı temel eserin yazarlarından biri olan Michael Piore ile 01.03.2017 tarihinde yapılan görüşmeden sonra oluşturulmuştur. Kuramda, ücret çalışma süresinden bağımsız biçimde ele alınmıştır. Bu noktada çalışmada, mikro veri setinde yer alan verilerle işin kalitesi belirlenebilmiş ve çalışma süreleri açısından da kuramın geçerliliği incelenmiştir.*

biçimi yarı zamanlı olan gençlerin yarısından fazlası ilgili yasaya aykırı biçimde fazla çalışma yapmaktadır. Türkiye'de yarı zamanlı çalışan genç kadınların oranı erkeklerden yaklaşık iki kat daha fazladır (Tablo 2).

Tablo: 2
'İş'in Özelliklerinin Yaş Grubu ve Cinsiyete Göre Dağılımı (%)

	15-64			15-29		
	Cinsiyet			Cinsiyet		
	Erkek	Kadın	Toplam	Erkek	Kadın	Toplam
Esas İşteki Durum (%)						
ÜMY	71,09	67,83	70.05	80.14	79.37	79.88
İşveren	5,81	1,45	4.41	1.87	0.55	1.42
Kendi Hesabına	1,70	8,72	15.51	6.06	3.73	5.27
Ücretsiz Aile İşçisi	4,41	22,00	10.03	11.93	16.35	13.43
Esas İşten Elde Edilen Net Gelir (Geçen Ay)						
Ortalama Ücret (OÜ) (Bin TL)	2.833	2.563	2.749	2.121	2.135	2.131
OÜ'nün üstünde Çalışanlar (%)	0,72	0,28	0,39	0,66	0,34	0,24
OÜ'nün altında Çalışanlar (%)	0,67	0,33	0,61	0,66	0,34	0,76
Haftalık Çalışma Saati (%)						
30 Saate Kadar	12,14	25,97	16,53	14,06	24,94	17,70
31-45 Saat Arası	32,72	39,99	35,03	26,43	35,18	29,36
45 Saatin Üzeri	55,13	34,04	48,43	59,51	39,88	52,94
Çalışma Biçimi (%)						
Yarı Zamanlı	6,60	17,03	9,93	8,83	16,65	11,48
Tam Zamanlı	93,4	82,97	90,07	91,17	83,35	88,52
İşyerinin Durumu (%)						
Tarla/Bahçe	12,84	24,46	16,46	11,3	17,29	13,32
Düzenli İşyeri	79,04	67,53	75,45	82,63	79,12	81,45
Pazar Yeri	0,69	0,32	0,57	0,70	0,10	0,50
Seyyar/Sabit Olmayan İşyeri	7,00	0,61	5,00	5,04	0,36	3,47
Evde	0,44	7,07	2,51	0,33	3,13	1,27
SGK'ya Kayıtlılık Durumu (%)						
Evet	71,08	59,23	67,29	64,94	67,49	65,80
Hayır	28,92	40,77	32,71	35,06	32,51	34,20
İşyerinde Süreklilik Durumu (%)						
Sürekli iş	88,17	89,07	88,45	82,89	84,03	83,27
Geçici iş	11,83	10,93	11,55	17,11	15,97	16.73

Kaynak: 2019 HİAMVS.

15-29 yaş grubunun çoğunluğu (%81,45) iyi işin bir diğer özelliği olan '*düzenli işler*'de çalışmaktadır. 15-64 yaş grubu için söz konusu oran, %75,45 ile daha düşük düzeydedir (Tablo 2).

ILO (2020: 39) "*2020 Gençlik için Küresel İstihdam Eğilimleri*" raporuna göre, dünyada 15-29 yaş grubundaki gençlerin dörtte üçünden fazlası kötü işin özelliklerini barındıran ve tamamıyla kayıt dışı çalışmayı ve süreksiz bir işte çalışmayı içeren enformel sektörde çalışmaktadır. Diğer yandan TÜİK Mikro Veri Setine göre ise 15-29 yaş grubunun %66'sı '*kayıtlı'* bir işte ve yaklaşık %83'ü '*sürekli'* bir işte çalışmaktadır (Tablo 2). Veri setine göre kayıt dışı çalışan gençlerin %59'u, süreklilik gösteren bir işte çalışmaktadır.

Tablo 3, çalışmada kullanılan tüm değişkenlerin özet istatistik bilgilerini içermektedir. Çalışmada 15-29 yaş arası gençlerin iyi ve kötü işte çalışma durumları bağımlı değişken olarak alınmıştır. İşin kalitesinin analizinde, bireyin sosyo-demografik özellikleri, sektör, işletme ölçeği ve meslek grubu modelin açıklayıcı değişkenleri olarak belirlenmiştir. Analizde temel olarak, iyi işin özelliklerinin en az olduğu/görüldüğü grup referans olarak

alınmıştır. Analizde ilk bağımsız değişken olan yaş, 15-29 yaş için beş yıllık aralıklar biçiminde gruplandırılmış, bu kategoriler kukla değişkenlere dönüştürülerek, en genç yaş aralığı (15-19 yaş) referans olarak alınmıştır.

Tablo: 3
Özet İstatistiki Tablo

Değişkenler		Toplam		Erkek		Kadın	
		Ort.	Std. Sapma	Ort.	Std. Sapma	Ort.	Std. Sapma
Yaş Grubu	İyi İş	0,348	0,476	0,349	0,477	0,346	0,476
	15-19	0,170	0,376	0,184	0,388	0,144	0,351
	20-24	0,343	0,475	0,329	0,470	0,370	0,483
	25-29	0,487	0,500	0,487	0,500	0,486	0,500
Cinsiyet	**Erkek**	0,663	0,473				
	Kadın	0,337	0,473				
Medeni Durum	**Evli**	0,263	0,440	0,262	0,440	0,264	0,441
	Evli Değil	0,737	0,440	0,738	0,440	0,736	0,441
Bölge	İstanbul	0,269	0,443	0,257	0,437	0,293	0,455
	Batı Marmara	0,038	0,192	0,038	0,191	0,039	0,194
	Ege	0,121	0,326	0,117	0,322	0,129	0,335
	Doğu Marmara	0,107	0,309	0,102	0,303	0,115	0,319
	Batı Anadolu	0,098	0,297	0,102	0,303	0,089	0,285
	Akdeniz	0,113	0,317	0,114	0,318	0,113	0,316
	Orta Anadolu	0,041	0,198	0,045	0,207	0,033	0,179
	Batı Karadeniz* (Ref. Grup)	0,039	0,193	0,038	0,191	0,040	0,197
	Doğu Karadeniz* (Ref. Grup)	0,022	0,145	0,022	0,147	0,021	0,142
	Kuzeydoğu Anadolu	0,018	0,134	0,020	0,142	0,014	0,118
	Ortadoğu Anadolu	0,038	0,192	0,042	0,200	0,031	0,174
	Güneydoğu Anadolu	0,096	0,295	0,103	0,304	0,083	0,276
Eğitim Düzeyi	**Lise Öncesi (Ref. Grup)**	0,403	0,491	0,476	0,500	0,259	0,438
	Genel Lise	0,108	0,311	0,109	0,311	0,108	0,310
	Mesleki/Teknik Lise	0,161	0,368	0,168	0,374	0,149	0,356
	Yüksekokul/Fakülte	0,309	0,462	0,234	0,423	0,457	0,498
	Yüksek Lisans/Doktora	0,018	0,134	0,014	0,117	0,027	0,163
	Eğitime Devam	0,247	0,431	0,245	0,430	0,251	0,434
Ana Faaliyet Kolu (Nace Rev 2)	**Tarım, Ormancılık, Balıkçılık (Ref. Grup)**	0,032	0,176	0,031	0,172	0,035	0,183
	Madencilik, Taş Ocakçılığı	0,004	0,061	0,005	0,071	0,001	0,030
	İmalat	0,244	0,430	0,273	0,446	0,188	0,390
	Enerji	0,005	0,069	0,006	0,079	0,002	0,045
	Su Temini, Kanalizasyon, Atık	0,003	0,057	0,004	0,063	0,002	0,040
	İnşaat	0,066	0,248	0,095	0,293	0,009	0,094
	Toptan & Perakende Ticaret	0,171	0,377	0,166	0,373	0,181	0,385
	Ulaştırma & Depolama	0,037	0,188	0,046	0,210	0,018	0,134
	Konaklama ve Yiyecek Hizmetleri	0,091	0,288	0,107	0,309	0,061	0,239
	Bilgi ve İletişim	0,013	0,114	0,015	0,120	0,010	0,099
	Finans ve Sigorta Faaliyetleri	0,011	0,105	0,008	0,087	0,018	0,133
	Gayrimenkul Faaliyetleri	0,005	0,068	0,005	0,070	0,004	0,064
	Mesleki, Bilimsel ve Teknik Faaliyetler	0,040	0,196	0,029	0,168	0,061	0,240
	İdari ve Destek Hizmet Faaliyetleri	0,039	0,193	0,037	0,190	0,041	0,199
	Kamu Yönetimi, Savunma	0,064	0,245	0,074	0,262	0,044	0,205
	Eğitim	0,069	0,253	0,029	0,169	0,147	0,354
	İnsan Sağlığı ve Sosyal Hizmetler	0,064	0,245	0,028	0,166	0,134	0,341
	Kültür, Sanat, Eğlence, Dinlence Faaliyetleri	0,009	0,092	0,008	0,089	0,010	0,098
	Diğer Hizmet Faaliyetleri	0,031	0,174	0,032	0.177	0.029	0.167
Kamu/Özel	**Özel Sektör (Ref. Grup)**	0,846	0,361	0,874	0,332	0,792	0,406
	Kamu Sektörü	0,147	0,354	0,123	0,328	0,195	0,396
Meslek Grubu (Isco 08)	Yöneticiler	0,014	0,116	0,014	0,116	0,014	0,117
	Profesyonel Meslek Grupları	0,136	0,343	0,086	0,280	0,234	0,424
	Teknisyenler, Teknikerler ve Yrd. Meslek Grupları	0,080	0,271	0,072	0,259	0,095	0,294
	Büro Hizmetinde Çalışanlar	0,110	0,313	0,082	0,274	0,166	0,372
	Hizmet ve Satış Elemanları	0,265	0,441	0,252	0,434	0,290	0,454
	Nitelikli Tarım Orman ve Su Ürünleri (Ref. Grup)	0,008	0,089	0,010	0,098	0,005	0,068
	Sanatkârlar ve İlgili İşlerde Çalışanlar	0,154	0,361	0,210	0,408	0,042	0,200
	Tesis ve Makine Operatörleri ve Montajcılar	0,091	0,287	0,114	0,318	0,045	0,207
	Nitelik Gerektirmeyen İşlerde Çalışanlar	0,143	0,350	0,160	0,367	0,109	0,312

Firma Ölçeği	<=10 kişi	0,376	0,484	0,403	0,491	0,322	0,467
	11-19 kişi	0,082	0,274	0,077	0,267	0,091	0,288
	20-49 kişi	0,198	0,399	0,191	0,393	0,213	0,410
	>=50 kişi	0,342	0,474	0,327	0,469	0,371	0,483
	Bilmiyor, fakat 10'dan fazla kişi	0,002	0,046	0,002	0,044	0,002	0,049
Hanehalkındaki Kişi Sayısı	Hanehalkı Büyüklük	4,430	2,288	4,543	2,344	4,208	2,156
Çalışma Deneyimi**	Çalışma Deneyim	1,764	2,149	1,752	2,191	1,789	2,063

Kaynak: 2019 HİAMVS.

** İyi işin özelliklerini hemen hemen aynı oranda en az gösteren bölgeler Batı Karadeniz ve Doğu Karadeniz Bölgeleri olduğu için her iki bölge de referans grup olarak alınmıştır.*

*** Mevcut işteki çalışmaya başlama yılı, başlangıç yılı olarak belirlenmiştir.*

İstihdamdaki gençlerin %74'ünün bekâr olmasından dolayı medeni durumda referans grubunu, daha az sayıdaki '*evli'*ler oluşturmuştur. Kaliteli işin gerektirdiği en önemli niteliklerden biri olan eğitim düzeyi değişkeni; *'lise öncesi'* (okur-yazar olmayan, okur-yazar olup ilkokulu bitiremeyenler, ilkokul, ortaokul veya ilköğretim mezunu olanlar), '*lise ve sonrası'* biçiminde gruplandırılmıştır. Lise düzeyinde eğitime sahip olanlar '*genel lise ve mesleki/teknik lise'*; lise sonrası düzeyinde eğitime sahip olanlar ise '*yüksekokul, fakülte ve lisansüstü mezunu'* olarak belirlenmiş ve referans grup olarak lise öncesi grup alınmıştır. Analizde kullanılan diğer değişkenler HİAMVS'nde gruplandırıldığı biçimiyle belirlenmiştir. Modelde kullanılan devamlı (kategorik olmayan) değişkenler, '*hanehalkı büyüklüğü*' ve '*deneyim*'dir. Tablo 3'te koyu olarak gösterilen gruplar ilgili kategorik değişkenler referans grubu olarak belirlenmiş ve model tahmini yapılmıştır. İyi işin tüm özelliklerini barındıran işlerde çalışan gençlerin oranı yaklaşık %35'tir (Tablo 3).

3.2. Model

Çalışmanın kapsamını oluşturan 15-29 yaş grubundaki gençlerin çalıştıkları işlerin kalitesinin analizinde *probit modeli* kullanılmıştır. Probit modeli ikili ayrık seçim modeli olup, modelde bağımlı değişken 1 veya 0 değerini almaktadır. Modelin temeli en küçük kareler yönteminde kullanılan koşullu ortalamanın değil, koşullu olasılığın tahmin edilmesine dayanmaktadır. Dolayısıyla modeli doğrusal olasılık modeli kullanarak tahmin etmek sabit varyans, normal dağılım ve fonksiyonel form varsayımlarının bozulmasına neden olmaktadır. Ayrıca modelde katsayıların tahmininde mantıksız sonuçlar ortaya çıkmaktadır (Long, 2007). Bu sorunların giderilmesi için probit modeli hata terimlerinin normal dağıldığı varsayımı altında en çok olabilirlik yöntemi ile tahmin edilmektedir. İyi işte çalışma olasılığı aşağıdaki gibi modellenmektedir:

$$\Pr(y_i = 1) = P_i = \Phi(Z_i) = \Phi(x_i\beta) \tag{1}$$

İyi işte çalışma 1, kötü işte çalışma ise 0 değerini almaktadır. $\Phi(Z_i)$ kümülatif yoğunluk fonksiyonudur. Hata terimlerinin ortalamasının 0, $(E(\varepsilon|x) = 0)$ ve varyansının 1, $(var(\varepsilon|x) = 1)$ olduğu normal dağılım varsayımında elde edilen kümülatif yoğunluk fonksiyonu aşağıdaki gibidir:

$$\Phi(Z_i) = \Phi(x_i\beta) = \int_{-\infty}^{\alpha+\beta x} \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{(y_i - x_i\beta}{2\sigma^2}\right) dx \tag{2}$$

x_i açıklayıcı değişkenleri, β ise tahmini katsayıların vektörüdür.

Probit modeli ise normal kümülatif yoğunluk fonksiyonunun tersi alınarak elde edilir:

$$Z_i = F^{-1}(P_i) = x_i\beta. \quad (3)$$

Marjinal etki olasılık eğrisinin x_i'e göre türevi yani eğimidir. Sonuçların yorumlanmasında marjinal etki esas alınmış ve bir karakteristik özelliğin iyi işte çalışma olasılığının etkisine bakılırken, diğer değişkenler ortalamada tutulmuştur.

3.3. Ekonometrik Model Sonuçları

İkili ayrık seçim modellerinin en önemli avantajlarından birisi, 2019 HİAMVS çerçevesinde incelenen demografik ve sosyoekonomik unsurların iyi işte çalışma olasılığına etkisinin yüzdesel olarak yorumlanmasına olanak sağlamasıdır. Çalışmada istihdamın kalitesi, tabakalı işgücü piyasası kuramına göre ve cinsiyet farklılıkları dikkate alınarak modellenmiştir.

15-29 yaş grubundaki erkeklerin iyi işte çalışma olasılığı, kadınlara göre %10 daha fazladır. İyi işte çalışma olasılığını etkileyen faktörler kadın ve erkeğe göre farklılık göstermektedir (Tablo 4). Yaş arttıkça ücret ve deneyime bağlı olarak, iyi işte çalışma olasılığı da artmaktadır. Modele göre, '*25-29 yaş'* grubundaki kadın ve erkekte iyi işte çalışma olasılığı, *'15-19 yaş'* grubuna göre %25 daha fazladır. 15-29 yaş grubunda '*bekar'* olanların '*evli'* olanlara göre iyi işte çalışma olasılığı, %5,7 daha azdır. Bu oran kadınlar için yaklaşık %4 iken, erkekler için yaklaşık %7'dir. Erkek ve evli bireylerin iyi işlerde çalışma olasılığının yüksekliği toplumsal cinsiyetçi temelinde evi geçindirme yükümlülükleri ile açıklanabilir. Çalışmaya benzer biçimde, Dickens ve Lang (1992) ve Kumaş ve Çağlar'ın (2017), 15-64 yaş grubunda işin kalitesini inceledikleri çalışmalarında, evli olanların bekar olanlara göre iyi işte çalışma olasılığı daha yüksek bulunmuştur.

Tablo: 4
Probit Model Sonuçları

	Toplam		Erkek		Kadın	
Değişkenler	**Katsayı**	**Marjinal Etki**	**Katsayı**	**Marjinal Etki**	**Katsayı**	**Marjinal Etki**
Yaş Grubu ***(Ref. 15-19)***						
20-24	0,665***	0,142***	0,718***	0,162***	0,585***	0,138***
	(13,343)	(14,873)	(13,904)	(15,608)	(6,552)	(7,325)
25-29	0,901***	0,203***	1,054***	0,254***	0,999***	0,254***
	(17,493)	(19,506)	(19,761)	(22,556)	(10,965)	(12,646)
Cinsiyet (Ref Erkek)	0,381***	0,089***				
	(14,528)	(14,747)				
Medeni Durum ***(Ref. Evli)***	-0,193***	-0,046***	-0,273***	-0,0683***	-0,164***	-0,0426***
	(-7,268)	(-7,147)	(-9,120)	(-8,950)	(-3,778)	(-3,727)
Bölge ***(Ref. Batı ve Doğu Karadeniz)***						
İstanbul	0,676***	0,157***	0,721***	0,164***	0,585***	0,138***
	(15,885)	(15,949)	(13,205)	(13,299)	(8,608)	(8,591)
Batı Marmara	0,317***	0,074***	0,366***	0,083***	0,248***	0,059***
	(5,780)	(5,780)	(5,153)	(5,155)	(2,868)	(2,867)
Ege	0,384***	0,089***	0,472***	0,108***	0,218***	0,051***
	(8,533)	(8,532)	(8,201)	(8,217)	(3,012)	(3,006)
Doğu Marmara	0,438***	0,102***	0,545***	0,124***	0,253***	0,059***
	(9,573)	(9,598)	(9,294)	(9,350)	(3,439)	(3,435)
Batı Anadolu	0,371***	0,086***	0,448***	0,102***	0,211***	0,049***
	(8,064)	(8,070)	(7,794)	(7,813)	(2,726)	(2,722)

Akdeniz	-0,015	-0,004	0,055	0,012	-0,126*	-0,029*
	(-0,324)	(-0,324)	(0,933)	(0,932)	(-1,682)	(-1,684)
Orta Anadolu	0,146**	0,034**	0,210***	0,048***	-0,007	-0,002
	(2,554)	(2,553)	(2,935)	(2,935)	(-0,068)	(-0,068)
Kuzeydoğu Anadolu	0,052	0,012	-0,025	-0,006	0,204**	0,048**
	(0,877)	(0,877)	(-0,333)	(-0,333)	(2,063)	(2,064)
Orta Doğu Anadolu	-0,058	-0,014	-0,100	-0,023	0,041	0,010
	(-1,052)	(-1,052)	(-1,367)	(-1,367)	(0,480)	(0,480)
Güney Doğu Anadolu	-0,113**	-0,026**	-0,204***	-0,047***	0,094	0,022
	(-2,234)	(-2,235)	(-3,117)	(-3,123)	(1,153)	(1,153)
Eğitim ***(Ref. Lise Öncesi)***						
Genel Lise	0,111***	0,026***	0,082*	0,019*	0,241***	0,054***
	(2,805)	(2,775)	(1,761)	(1,744)	(2,910)	(2,893)
Mesleki/Teknik Lise	0,387***	0,094***	0,345***	0,083***	0,522***	0,124***
	(11,641)	(11,401)	(9,139)	(8,905)	(6,956)	(7,049)
Yüksekokul/Fakülte	0,573***	0,143***	0,544***	0,134***	0,710***	0,174***
	(16,603)	(15,872)	(13,248)	(12,480)	(9,711)	(9,883)
Yüksek Lisans/Doktora	0,959***	0,248***	0,854***	0,216***	1,162***	0,302***
	(9,978)	(9,365)	(6,510)	(6,159)	(7,751)	(7,164)
Eğitime Devam	-0,118***	-0,027***	-0,124***	-0,028***	-0,115**	-0,027**
	(-4,199)	(-4,200)	(-3,534)	(-3,535)	(-2,406)	(-2,404)
Sektör ***(Ref. Tarım, Ormancılık, Balıkçılık)***						
Madencilik, Taş Ocakçılığı	1,270***	0,296***	1,284***	0,293***	0,426	0,101
	(6,423)	(6,426)	(5,626)	(5,631)	(0,874)	(0,874)
İmalat	0,748***	0,174***	0,694***	0,158***	0,932***	0,220***
	(4,812)	(4,810)	(3,668)	(3,667)	(3,065)	(3,064)
Enerji	1,035***	0,241***	1,027***	0,234***	0,978**	0,231**
	(5,403)	(5,401)	(4,569)	(4,569)	(2,339)	(2,338)
Su temini, Kanalizasyon, Atık	0,767***	0,179***	0,632**	0,144***	0,990**	0,234**
	(3,636)	(3,636)	(2,506)	(2,51)	(2,216)	(2,216)
İnşaat	0,640***	0,149***	0,554***	0,126***	1,110***	0,262***
	(3,980)	(3,980)	(2,861)	(2,860)	(3,209)	(3,210)
Toptan & Perakende Ticaret	0,777***	0,181***	0,671***	0,153***	1,103***	0,260***
	(5,024)	(5,024)	(3,558)	(3,559)	(3,670)	(3,669)
Ulaştırma & Depolama	0,806***	0,188***	0,646***	0,147***	1,453***	0,343***
	(4,934)	(4,932)	(3,273)	(3,271)	(4,489)	(4,495)
Konaklama ve Yiyecek Hizmetleri	0,748***	0,174***	0,715***	0,163***	0,892***	0,211***
	(4,755)	(4,753)	(3,741)	(3,740)	(2,885)	(2,886)
Bilgi ve İletişim	0,778***	0,181***	0,676***	0,154***	1,227***	0,290***
	(4,344)	(4,346)	(3,111)	(3,111)	(3,573)	(3,576)
Finans ve Sigorta Faaliyetleri	1,095***	0,255***	1,030***	0,235***	1,317***	0,311***
	(6,019)	(6,028)	(4,534)	(4,536)	(3,984)	(3,994)
Gayrimenkul Faaliyetleri	0,826***	0,192***	0,761***	0,173***	1,033***	0,244***
	(4,035)	(4,035)	(3,041)	(3,040)	(2,704)	(2,704)
Mesleki, Bilimsel ve Teknik Faaliyetler	0,760***	0,177***	0,724***	0,165***	0,942***	0,223***
	(4,664)	(4,666)	(3,561)	(3,562)	(3,055)	(3,057)
İdari ve Destek Hizmet Faaliyetleri	0,906***	0,211***	0,882***	0,201***	1,074***	0,254***
	(5,657)	(5,657)	(4,522)	(4,523)	(3,445)	(3,444)
Kamu Yönetimi, Savunma	0,997***	0,232***	0,633***	0,144***	1,379***	0,326***
	(6,030)	(6,029)	(3,034)	(3,033)	(4,412)	(4,412)
Eğitim	0,069	0,016	-0,147	-0,033	0,397	0,094
	(0,424)	(0,424)	(-0,692)	(-0,693)	(1,297)	(1,297)
İnsan Sağlığı ve Sosyal Hizmetler	0,512***	0,119***	0,306	0,069	0,793***	0,187***
	(3,191)	(3,190)	(1,471)	(1,470)	(2,608)	(2,606)
Kültür, Sanat, Eğlence, Dinlence Faaliyetleri	0,342*	0,079*	0,172	0,039	0,690*	0,163*
	(1,736)	(1,735)	(0,704)	(0,703)	(1,895)	(1,893)
Diğer Hizmet Faaliyetleri	0,462***	0,108***	0,469**	0,107**	0,432	0,102
	(2,700)	(2,699)	(2,275)	(2,275)	(1,230)	(1,229)
Kamu-Özel ***(Ref. Özel)***	0,774***	0,180***	1,120***	0,255***	0,516***	0,122***
	(16,050)	(16,231)	(13,924)	(14,135)	(8,346)	(8,379)
Meslek Grubu ***(Ref. Tesis ve makine operatörleri ve montajcılar)***						
Yöneticiler	1,178***	0,285***	1,127***	0,267***	1,085***	0,268***
	(10,378)	(10,487)	(7,536)	(7,614)	(5,744)	(5,792)
Profesyonel Meslek Grupları	0,661***	0,160***	0,623***	0,147***	0,532***	0,132***
	(11,450)	(11,602)	(8,583)	(8,689)	(4,140)	(4,172)
Teknisyenler, Teknikerler ve Yrd. Meslek Grupları	0,399***	0,097***	0,401***	0,095***	0,269**	0,067**
	(7,356)	(7,404)	(6,309)	(6,350)	(2,093)	(2,100)
Büro Hizmetinde Çalışanlar	0,035	0,008	0,045	0,011	-0,108	-0,027
	(0,679)	(0,679)	(0,735)	(0,735)	(-0,865)	(-0,864)

Hizmet ve Satış Elemanları	0,091*	0,022*	0,138**	0,033*	-0,145	-0,036
	(1,896)	(1,898)	(2,569)	(2,572)	(-1,150)	(-1,149)
Sanatkârlar ve İlgili İşlerde Çalışanlar	0,013	0,003	0,044	0,011	-0,317**	-0,078**
	(0,282)	(0,282)	(0,894)	(0,895)	(-2,248)	(-2,244)
Nitelik Gerektirmeyen İşlerde Çalışanlar	-0,363***	-0,088***	-0,358***	-0,085***	-0,457***	-0,113***
	(-7,234)	(-7,232)	(-6,470)	(-6,466)	(-3,458)	(-3,454)
İşletme Büyüklüğü ***(Ref. 11-19 kişi)***						
<=10 kişi	-0,259***	-0,060***	-0,294***	-0,067***	-0,164**	-0,039**
	(-5,973)	(-5,986)	(-5,357)	(-5,376)	(-2,294)	(-2,295)
20-49 kişi	0,170***	0,039***	0,182***	0,042***	0,135*	0,032*
	(3,775)	(3,778)	(3,159)	(3,163)	(1,833)	(1,834)
>=50 kişi	0,416***	0,097***	0,430***	0,098***	0,386***	0,091***
	(9,664)	(9,746)	(7,842)	(7,898)	(5,470)	(5,520)
Hanehalkı Büyüklüğü	-0,083***	-0,019***	-0,074***	-0,017***	-0,110***	-0,026***
	(-11,519)	(-11,824)	(-8,603)	(-8,822)	(-8,039)	(-8,256)
Çalışma Deneyim	0,118***	0,028***	0,110***	0,025***	0,142***	0,033***
	(21,012)	(21,722)	(16,038)	(16,525)	(13,895)	(14,557)
Sabit	-2,959***		-2,747***		-2,422***	
	(-15,776)		(-11,890)		(-8,143)	
N	28.542		19.085		9.457	
Pseudo R^2	0,358		0,372		0,348	

Not: Parantez içindekiler t istatistikleri olup hem katsayı hem de marjinal etkinin yanında yer alan
** %10 seviyesinde anlamlı;*
*** %5 seviyesinde anlamlı;*
**** %1 seviyesinde anlamlı olduğunu göstermektedir.*

İşin kalitesi, bölgesel özelliklere veya farklılıklara göre değişebilmektedir (Tablo 4). Küresel boyutta gelişmiş bölgelerde işgücü piyasası temel göstergelerine göre gençlerin iyi iş bulma olasılığı daha yüksektir. Ancak her gelişmiş bölge genç kadın ve erkek için aynı oranda iyi işte çalışma olasılığı sunmamaktadır (ILO, 2016: 73-143). Tarımda çalışmanın yaygın ancak sanayileşmenin daha az olduğu '*Batı ve Doğu Karadeniz Bölgelerine*' göre, erkekler için iyi işte çalışma olasılığının en yüksek olduğu bölgeler sırasıyla, '*İstanbul, Doğu Marmara, Ege, Batı Anadolu* ve *Batı Marmara*'dır. *İstanbul Bölgesi*, erkeklere benzer biçimde kadınlar için de iyi işte çalışma olasılığının en yüksek olduğu işgücü piyasasıdır. Ancak İstanbul gibi sanayileşmiş bölgeler olan '*Doğu Marmara, Batı Anadolu, Ege ve Batı Marmara Bölgeleri*'nde iyi işte çalışma olasılığı kadınlarda erkeklere göre çok daha düşüktür. *Batı ve Doğu Karadeniz Bölgeleri* ile karşılaştırıldığında gelişmişlik düzeyi daha yüksek bir bölge olan '*Akdeniz Bölgesi*'nde kadınların iyi işte çalışma olasılığı %3 azalmıştır. Bu durum '*Akdeniz Bölgesi*'nde genç kadınların ortalama ücretlerinin referans gruba göre daha düşük olması ile açıklanabilir (Akdeniz Bölgesi'nde geçen ay elde edilen net ortalama gelir ÜMY kadın için 1.832 TL iken, referans gruptaki kadınlar için 2.071 TL'dir).

Tabakalı işgücü piyasası kuramına göre, eğitim düzeyi ile birincil piyasada çalışma olasılığı arasında anlamlı bir ilişki vardır (Doeringer & Piore, 1970). İnan ve Aşık (2015), Türkiye'de lise ve üzeri eğitim düzeylerinin özellikle kadınlarda işgücüne katılımı artırmada belirgin kazanımlar yarattığını vurgulamıştır. Modele göre de her iki cinsiyet için de eğitim düzeyinin artması iyi işte çalışma olasılığını artırmaktadır. Bu olasılık, genç erkeklere göre genç kadınlarda çok daha fazladır ve eğitim düzeyi arttıkça fark da artmaktadır. Örneğin; '*lisansüstü*' eğitime sahip erkeklerin, '*lise öncesi*' eğitime sahip erkeklere göre iyi işte çalışma olasılıkları %21,6 daha fazla iken, kadınlar için bu olasılık %30 daha fazladır.

İşin kalitesi sektör ve meslekler açısından farklılıklar göstermektedir. Analiz sonuçlarına göre iyi işte çalışma olasılığının en yüksek olduğu sektörler sırasıyla; '*Maden ve Taş Ocakçılığı, Finans ve Sigorta Hizmetleri, Enerji ve Kamu Yönetimi ile Savunma*'dır. '*Tarım, Ormancılık ve Balıkçılık Sektörü*' ile karşılaştırıldığında, kadınların iyi işte çalışma olasılığının en yüksek olduğu sektör, %34 ile *"Ulaştırma ve Depolama'*dır: '*Ulaştırma ve Depolama Sektörü*'ndeki kadınlar için net ücret, 2.331 TL iken, referans grup için çalışan yoksul olduklarını gösterir biçimde, 679 TL'dir. *"Ulaştırma ve Depolama'* sektöründeki kadınların %59'unun eğitim düzeyi en az ön lisans iken, referans grupta bu oran %7'dir. 15-29 yaş grubu erkek çalışanların *iyi işte* çalışma olasılığının en yüksek olduğu sektör %29 ile '*Maden ve Taş Ocakçılığı*' sektörüdür. Bu sektörde çalışanların büyük çoğunluğu erkektir. Çünkü sektördeki işlerin ağır ve tehlikeli olması, iş yasaları gereği erkeğin çalışmasına olanak vermektedir. Yine iş yasalarına göre sektörde haftalık çalışma süresinin daha kısa olması (37,5 saat), sektörde çalışanların daha fazla ortalama ücret (2.543 TL) almalarına neden olmaktadır (15-29 yaş grubundaki ÜMY'ler için geçen ay elde edilen net ortalama gelir 2.131 TL'dir). Sektör açısından kadın ve erkek arasında iyi işte çalışma olasılığının, kadının lehine en yüksek oranda farklılık gösterdiği sektörler, '*Ulaştırma ve Depolama'* (fark, %19,6) ile '*Kamu ve Savunma*' (fark %18,2)'dır.

Modelin göre, *özel sektöre* göre *kamu sektöründe* çalışmak, iyi işte çalışma olasılığını her iki cinsiyet için de anlamlı düzeyde artırmaktadır. Kamu sektöründe iyi işte çalışma olasılığı, erkeklerde (%26), kadınlara göre (%12) iki kat daha fazladır. Bu durum, özel sektöre göre kamu sektörünün, kuramın belirttiği gibi iyi iş göstergelerini ve özellikle uzun süreli ve güvenceli işleri daha fazla sağlamasından kaynaklanmaktadır. Verilere göre, kamu sektöründe çalışanların ortalama ücretleri 3.553 TL iken, özel sektörde çalışanların ise 1.834 TL'dir. Kamu sektöründe çalışanların %67'sinin en az ön lisans düzeyinde eğitime sahip olması (özel sektörde %24), kamu sektöründeki işlerin niteliğinin yüksek beceri getirmesi ile açıklanabilir. Nitekim kamu sektöründe çalışanların %45'i '*Profesyonel Meslek*', %21'i *'Hizmet ve Satış Elemanları*' ve %13'ü '*Teknisyenler, Teknikler ve Yardımcı Meslek*' gruplarında yer almaktadır.

Modelin bir diğer bulgusu, meslek grupları ile iyi işte çalışma olasılığı arasında anlamlı bir ilişki olduğudur: Kadın ve erkek için iyi işte çalışma olasılığını en yüksek oranda artıran meslekler '*Tesis, Makine Operatörleri ve Montajcılar Meslek Grubu*'na göre, '*Yönetici*' ve '*Profesyonel Meslek Grubu*' ve '*Teknisyenler, Teknikerler ve Yardımcı Meslekler*'dir. Geçen ay esas işten elde edilen ortalama net gelir '*Yönetici*' için 3.674 TL, '*Profesyonel Meslek Grubu*' için 3.615 TL ve '*Teknisyenler, Teknikerler ve Yardımcı Meslekler*' için 2.497. Söz konusu meslekler, yüksek eğitim, beceri ve nitelik gerektirdiği için ücretler de ortalamanın üzerindedir. Dolayısıyla bulgular, iyi işin yüksek nitelik gerektiren işler olduğu iddiasını desteklemektedir.

Bu çalışmada yazınla örtüşür biçimde, işletme ölçeği ile işin kalitesi arasında anlamlı bir ilişki gözlenmiştir: '*11-19 Çalışanın Olduğu Küçük Ölçekli İşletme Ölçeği*'ne göre '*10'dan Az Çalışanın Olduğu Mikro İşletmeler*'de çalışmak iyi işte çalışma olasılığını kadın ve erkekte yaklaşık %6 oranında azaltmaktadır. Referans gruba göre her iki cinsiyet içinde

iyi işte çalışma olasılığının en fazla gözlendiği işletme büyüklüğü, '*50 ve daha fazla çalışanın olduğu*' işletmelerdir. İşletme ölçeğinin büyümesinin iyi işte çalışma olasılığını artırmasında en belirgin unsur, çalışma saatleri ve ücret arasındaki ilişki olarak tespit edilmiştir. Haftalık çalışma süreleri, işletme ölçeklerine göre yaklaşık değerlerde olmasına rağmen, ortalama ücretlerde ciddi bir fark bulunmaktadır. Çalışan sayısı 10'dan az olan işletmelerde haftalık çalışma süresi 43 saat, ortalama ücret 1.579 TL iken, 50'den fazla çalışanın olduğu işletmelerde haftalık çalışma süresi 45 saat, ortalama ücret ise 2.697 TL'dir.

Modele göre hanehalkı büyüklüğü '*bir*' kişi arttıkça, iyi işte çalışma olasılığı, yaklaşık %2 oranında azalmaktadır: Dört kişiden daha fazla kişinin olduğu hanelerde yaşayan ve ÜMY olarak çalışan 15-29 yaş arası gençlerin, '*geçen ayki esas işlerinden elde ettikleri ortalama net gelirleri*', 1.624 TL'dir. Söz konusu gençlerin ortalama ücretleri, 2019 yılı için '*eşi çalışmayan ve eşi çalışan ve en az iki çocuklu bir kişinin*' net asgari ücretinin ortalaması olan 2.133 TL'nin altındadır. Bu noktada, kuramın *gelir dağılımının alt gruplarında yaşayan bireylerin dışsal piyasada çalıştıkları iddiası* desteklenmektedir.

Çalışma kapsamındaki gençlerin ortalama '*deneyim*' süreleri, bir yıl yedi ay'dır: '*İyi iş*'te çalışanların deneyim süresi ortalama yaklaşık *üç* yıl, '*kötü iş*'te çalışanların ise ortalama yaklaşık *bir* yıldır. Çalışma deneyiminin bir yıl artması, iyi işte çalışma olasılığını %3 artırmaktadır.

4. Sonuç ve Değerlendirme

Tabakalı işgücü piyasaları genellikle gelişmekte olan ülkelerin temel özelliklerinden biri olarak kabul edilmektedir (Pages & Stampini, 2009: 387). Bu çalışmada 'Tabakalı İşgücü Piyasası Kuramı'nın işlerin özelliğine bağlı olarak ayırdığı ikili işgücü piyasası yapısı genç çalışanlar üzerinden test edilmiş ve kuramın iddiasını geçerli kılacak biçimde, Türkiye işgücü piyasasının 15-29 çalışan yaş grubu açısından tabakalaştığı tespit edilmiştir. 2019 HİAMVS'nden elde edilen probit modeli sonuçlarına göre referans gruplarla karşılaştırıldığında; *25-29 yaş grubunda olmak, evli olmak, lisansüstü eğitim düzeyine sahip olmak, Maden ve Taş Ocakçılığı, Finans ve Sigorta Faaliyetleri ve Enerji sektörlerinde çalışmak, İstanbul'da yaşamak, yöneticilik meslek grubunda, en az 50 çalışanın olduğu işletmelerde ve kamu sektöründe çalışmak*, iyi işte çalışma olasılığını en fazla artıran faktörlerdir. '*İş*'te deneyim artıkça, iyi işte çalışma olasılığı artmaktadır. Diğer yandan, hanehalkı büyüklüğünün artması, iyi işte çalışma olasılığını azaltmaktadır. Hanehalkı büyüklüğünün geleneksel bakış açısı ile erken yaşta eve katkı veya evi geçindirme sorumluluklarını artırması, gençlerin kötü işleri kabul etmelerine neden olabilir. Bu durum ayrıca, Türkiye işgücü piyasasının yeterince kurumsallaşmamış ve gelişmemiş yapısı ile de açıklanabilir. Model sonuçlarına göre gençlerin sosyo-demografik özelliklerinin, iyi ve kötü işte çalışmalarını belirlediği gözlenmiştir.

Elde edilen bulgular çalışmanın temel eseri olan Doeringer ve Piore (1970) ve Ashton et al. (2009), López-Roldán ve Fachelli (2020) ve López-Roldán et al. (2021), Stavik ve

Hammer (2000), Lukac et al. (2019), Aydın (2009), Kumaş vd. (2014) ve Kumaş ve Çağlar'ın (2017) bulguları ile örtüşmektedir.

İşgücü piyasasındaki tabakalaşmayı uygulamalar ile belirlemek araştırmacılar için bazı zorluklara neden olmaktadır (Hodson & Kaufman, 1982: 732-735; Hudson, 2007: 291): Birincisi, bu çalışmanın da temel kısıtlarından birisi olan işin kalitesini ölçen tüm değişkenlerin veri tabanlarında yer almamasıdır. Dolayısıyla bu durum, analizlerin sektör veya meslek eşdeğerliliklerine göre yapılmasına, neden ve sonuçların karışıklığına yol açmaktadır. Ancak tüm sınırlıklara rağmen kuram işgücünün doğası ve işleyişi hakkında bilgi verebilmekte ve araştırmalarda kuramın sunmuş olduğu ikili yapı gözlenebilmektedir (Hudson, 2007: 291). Tabakalı İşgücü Piyasası Kuramı (Doeringer & Piore, 1970: 271), birincil/içsel piyasadaki işleri, iyi işlerin belirtilen tüm özellikleri içerisinden birkaç özelliği bir arada barındıran işler olarak tanımlamıştır. Mikro Veri Setine göre Türkiye'de 15-29 yaş grubundaki gençlerin yaklaşık %65'i, iyi işin özelliklerinden birini barındırmamayı ifade eden '*kötü iş'* lerde çalışmaktadır.

İlgili yazındaki araştırmaların çoğu, *Tabakalı İşgücü Piyasası Kuramı*'nı arz yönüyle test etmektedir. Gelecekteki çalışmalarda işin kalitesinin gruplandırılması arz yönlü, zaman ve piyasaya göre değişebilen unsurlara bağlı olarak incelenebileceği gibi (Daw & Hardie, 2012: 1182; Kumaş & Çağlar, 2017: 59), talep yönlü biçimde firma düzeyinde mikro veri setleri aracılığı ile incelenebilir. Kuramın geçerliliğini talep yönüyle analiz eden çalışmaların artması, ilgili yazına katkı sağlayabilecek ve işgücü piyasasına yönelik politikaların da başarısını artırabilecektir. Ayrıca, iyi işin özelliklerinin hepsinin aynı anda aranmadığı ve kötü iş ve iyi işin özelliklerini aynı anda barındıran '*gri alan*' üzerinden analizlerin yapılması kuramın Türkiye işgücü piyasası açısından farklı boyutları ile test edilmesini sağlayabilecektir.

Kaynaklar

Anderson, K. et al. (1987), "Labour Market Segmentation: A Cluster Analysis of Job Groupings and Barriers to Entry", *Southern Economic Journal*, 53(3), 571- 590.

Anselme, M. & R. Weisz (1985), "Good jobs and Bad: A Differentiated Structuring of the Labour Market", *Acta Sociologica*, 28(1), 35-53.

Ashton, D. et al. (1990), *The Segmentation of the Youth Labour Market*, Cambridge: Cambridge Studies in Sociology.

Averitt, R.T. (1968), *The Dual Economy: The Dynamics of American Industry Structure*, New York: Norton.

Aydın, E. (2009), "Formel ve Enformel Sektör Ücret Farklılıkları: Katmanlı İşgücü Piyasası Kuramının Türkiye Emek Piyasasına Uygulanması", İstanbul Teknik Üniversitesi, Sosyal Bilimler Enstitüsü, *Yüksek Lisans Tezi*.

Bauder, H. (2001), "Culture in The Labour Market: Segmentation Theory and Perspectives of Place", P*rogress in Human Geography*, 25(1), 37-52.

Berndt, C. (2014), "Labour Market Segmentation", in: *The Wiley-AAG International Encyclopaedia of Geography*, <https://www.researchgate.net/publication/263444678_Berndt_C_2014_Labor_Market_Segmentation_Submitted_for_publication_in_The_Wiley-AAG_International_Encyclopedia_of_Geography>, 15.04.2021.

Bosanquet, N. (1987), "Internal Labour Markets and Education", in: G. Psacharopoulos (ed.), *Economics of Education Research and Studies* (164-166), Oxford, New York: Pergamon.

Cain, G.G. (1976), "The Challenge of Segmented Labour Market Theories to Orthodox Theory: A Survey", *Journal of Economic Literature*, 14, 1215-1257.

Daw, J. & J.H. Hardie (2012), "Compensating Differentials, Labour Market Segmentation, and Wage Inequality", *Social Science Research*, 41(5), 1179-1197.

Dickens, W.T. & K. Lang (1988), "The Reemergence of Segmented Labour Market Theory", *American Economic Review*, 78(2), 129-134.

Dickens, W.T. & K. Lang, (1992), "Labour Market Segmentation Theory: Reconsidering the Evidence", *NBER Working Paper* No. 4087, Cambridge.

Doeringer, P.B. & M.J. Piore (1970), *Internal Labour Markets and Manpower Analysis*, USA Department of Labour: Eric.

Eriksson, T. & A. Werwatz, (2005), *The Prevalence of Internal Labour Markets- New Evidence from Panel Data*, <https://core.ac.uk/download/pdf/7107253.pdf>, 10.04.2021.

Fishman, E. & A. Kimhi (2013), "Is the Israeli Labour Market Segmented?", *Taub Centre for Social Policy Studies in Israel Research Paper Series*, No:13.01.

Hodson, R. & R.L. Kaufman (1982), "Economic Dualism: A Critical Review", *American Sociological Review*, (47), 727-739.

Horn, R.N. (1980), "A Case Study of the Dual Labour Market Hypothesis", *Journal of Economic Issues*, 14(3), 615-630.

Hudson, K. (2007), "The New Labour Market Segmentation: Labour Market Dualism in the New Economy", *Social Science Research*, 36, 286-312.

ILO (2016) *Non-Standard Employment Around the World: Understanding Challenges, Shaping Prospects*, <https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_534326.pdf>, 03.12.2021.

ILO (2017) *Global Employment Trends for Youth 2017- Paths to a Better Working Future*, <https://www.ilo.org/wcmsp5/groups/public/---dgreports/---dcomm/---publ/documents/publication/wcms_598669.pdf>, 15.03.2021.

ILO (2020), *Global Employment Trends for Youth 2020 Technology and the Future of Jobs*, <https://www.ilo.org/global/publications/books/WCMS_737648/lang--en/index.htm>, 18.03.2021.

ILO (2021a), *Employment Security, Labour Market Segmentation*, <http://www.ilo.org/global/topics/employment-security/labour-market-segmentation/lang--en/index.htm>, 16.03.2021.

ILO (2021b), *Youth and COVID-19: Access to Decent Jobs amid the Pandemic*, <https://www.ilo.org/wcmsp5/groups/public/---europe/---ro-geneva/---ilo-ankara/documents/publication/wcms_771428.pdf>, 04.04.2021.

ILO (N/A), *ILO Glossary of Statistical Terms*, <https://www.ilo.org/ilostat-files/Documents/Statistical%20Glossary.pdf>, 03.12.2021.

İnan, F. & G. Aşık (2015) *Making Economies Work for Women: Female Labour Force Participation in Turkey*, Ankara: TEPAV.

Jakštienė S. (2010), "Labour Market Segmentation: Theoretical Aspect", *Ekonomika ir Vadyba: Aktualijos ir Perspektyvos*, 4(20), 53-63.

Kalleberg, A.L. & S. Vaisey (2005), "Pathways to a Good Job: Perceived Work Quality among the Machinists in North America", *British Journal of Industrial Relations*, 43(3), 431-454.

Kalleberg, A.L. (2003), "Flexible Firms and Labour Market Segmentation", *Work and Occupations*, 30(2), 154-175.

Kalleberg, A.L. (2012), "Job Quality and Precarious Work: Clarifications, Controversies, and Challenges", *Work and Occupations*, 39(4), 427-448.

Kalleberg, A.L. et al. (1981), "Economic Segmentation, Worker Power, and Income Inequality", *American Journal of Sociology*, 87(3), 651-683.

Kalleberg, A.L. et al. (2000), "Bad Jobs in America: Standard and Nonstandard Employment Relations and Job Quality in the United States", *American Sociological Review*, 65(2), 256-278.

Kalleberg, A.L. et al. (2009), "Is Participation Good or Bad for Workers? Effects of Autonomy, Consultation and Teamwork on Stress Among Workers in Norway", *Acta Sociologica*, 52(2), 99-116.

Karaalp-Orhan, H.S. & D. Aksoylu (2018), "Ücret Farklılıklarına Neden Olan Faktörler ve İşgücü Piyasasında Tabakalaşma: Ankara İli İnşaat Sektörü Üzerine Bir Alan Araştırması", *Yönetim ve Ekonomi Araştırmalar Dergisi*, 16(2), 1-20.

Kumaş, H. & A. Çağlar (2017), "Tabakalı İşgücü Piyasası Teorisine Göre Türkiye'de Özel-Hizmet Sektöründe İstihdamın Kalitesi", *İş, Güç Endüstri İlişkileri ve İnsan Kaynakları Dergisi*, 19(1), 53-86.

Kumaş, H. et al. (2014), "Firm Size and Labour Market Segmentation Theory: Evidence from Turkish Micro Data", *10th International Strategic Management Conference, Procedia - Social and Behavioral Sciences*, (150), 360-373.

Lamotte, B. & J.B. Zubiri-Rey (2008), "New Forms of Labour Market Segmentation, Insecurity and Professional Relations", *The 29th Conference of the International Working Party on Labour Market Segmentation*, Faculty of Economics University of Porto, 8-10 September, Porto.

Lazear, E.P. & P. Oyer (2004), "Internal and External Labour Markets: A Personnel Economics Approach", *Labour Economics*, 11(5), 527-554.

Leontaridi, M. (1998), "Segmented Labour Markets: Theory and Evidence", *Journal of Economic Surveys*, 12(1), 63-101.

López-Roldán P. & S. Fachelli (2020), "Measuring Labour Market Segmentation for a Comparative Analysis Among Countries", *Social Indicators Research*, 154, 857-892.

López-Roldán, P. et al. (2021), "Comparing Inequalities in the Labour Market from a Segmentation Perspective", in: P. López-Roldán & S. Fachelli (eds.), *Towards a Comparative Analysis of Social Inequalities between Europe and Latin America* (65-104), Switzerland: Springer.

Loveridge, R. & A. Mok (1980), "Theoretical Approaches to Segmented Labour Markets", *International Journal of Social Economics*, 7(7), 376-411.

Lukac, M. et al. (2019), "Developing a Cross-National Comparative Framework for Studying Labour Market Segmentation: Measurement Equivalence with Latent Class Analysis", *Social Indicators Research*, 145, 233-255.

Marshall, A. (2013), *Principles of Economics*, England: Palgrave Macmillan.

McNabb, R. (1987), "Testing for Labour Segmentation in Britain", *The Manchester School*, 55(3), 257-273.

Osterman, P. (1975), "An Empirical Study of Labour Market Segmentation", *Industrial and Labor Relations Review*, 28(4), 508-523.

Pagés, C. & M. Stampini (2009), "No Education, No Good Jobs? Evidence on the Relationship between Education and Labour Market Segmentation", *Journal of Comparative Economics*, 37(3), 387-401.

Piore, M.J. (1972), *Notes for A Theory of Labour Market Stratification*, <https://dspace.mit.edu/bitstream/handle/1721.1/64001/notesfortheoryof00pior.pdf?sequence=1&isAllowed=y>, 14.03.2021.

Rebitzer, J.B. & M.D. Robinson (1991), "Employer Size and Dual Labour Markets", *The Review of Economics and Statistics*, 73(4), 710-715.

Reich, M. et al. (1973), "Dual Labour Markets: A Theory of Labour Market Segmentation", *American Economic Review*, 2, 359-365.

Şenel, D. (2021), "İnşaat Sektöründe Tabakalı İşgücü Piyasasının İncelenmesi: Denizli İli Örneği", *Ankara Üniversitesi SBF Dergisi*, 76(1), 349-385.

Smith, A. (1997), *Ulusların Zenginliği*, (Çev. A. Yunus), İstanbul: Alan Yayıncılık.

Smith, D.R. & E. Noma (1985), "Scaling Labour Markets: An Approach to Segmentation Research", *Sociological Perspectives*, 28(2), 145-173.

Stavik, T. & T. Hammer (2020), *Unemployment in a Segmented Labour Market? A Study of Youth Unemployment in Norway*, NOVA - Norwegian Social Research, <https://fagarkivet.oslomet.no/bitstream/handle/20.500.12199/5138/4379_1.pdf?sequence=1&isAllowed=y>, 07.12.2020.

Taubman, P. & M.L. Watcher (1986), "Segmented Labour Markets", in: O.C. Ashenfelter & R. Layard (eds.), *Handbook of Labor Economics Vol. 1* (1183-1217), Amsterdam: Elsevier.

Wachter, M.L. (1974), "Primary and Secondary Labour Markets: A Critique of The Dual Approach", *Brookings Papers on Economic Activity*, 3, 637-693.

Sosyoekonomi

2022, Vol. 30(51), 449-470

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.22
Date Submitted: 19.04.2021
Date Revised: 06.12.2021
Date Accepted: 23.01.2022

Enflasyon-Gelir Eşitsizliği İlişkisi: Gelişmiş ve Gelişmekte Olan Ülkeler için Panel Eşik Değer Analizi

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Inflation-Income Inequality Nexus: Panel Threshold Analysis for Developed and Developing Countries

Abstract

Most of the studies focusing on the differences between countries in income inequality indicate that the explanatory power of empirical analysis can be increased by including monetary policy variables such as inflation level, inflation level flexibility and interest rate into economic models. Particularly, the distributional effects of inflation have become a major topic. The aim of the study is to analyze the non-linear effects of inflation on income inequality. In this context, panel threshold analysis has been implemented for 40 developed and developing countries in the period of 1993-2019. It is concluded that the aspect of the income inequality is determined by the inflation level. The consumer price index (2010 = 100) has been defined as the inflation indicator, and significant levels with single (49,300) and double (45,000) thresholds have been detected. Besides, estimates have been repeated with another inequality indicator for robustness check and similar results have been obtained. The relationship between inflation and income inequality is in the inverse (negative) aspect below the threshold inflation level and in the same (positive) aspect above it. The analysis confirms the existence of nonlinear effects and contributes to literature samples.

Keywords : Income Inequality, Inflation, Panel Threshold Analysis.

JEL Classification Codes : D63, E31, C24, C33.

Öz

Gelir eşitsizliğine ilişkin ülkeler arası farklılıkların konu edildiği çalışmaların çoğu ampirik analizlerin açıklayıcılık gücünün enflasyon seviyesi, enflasyon oranı esnekliği ve faiz oranı gibi para politikası değişkenlerinin iktisadi modellere dâhil edilerek artırılabileceğine işaret etmektedir. Özellikle, enflasyonun dağıtımsal etkileri önemli bir konu haline gelmiştir. Çalışmanın amacı, enflasyonun gelir eşitsizliği üzerindeki doğrusal olmayan etkilerinin analiz edilmesidir. Bu çerçevede, 1993-2019 yıllarını kapsayan dönemde 40 adet gelişmiş ve gelişmekte olan ülke grubu için panel eşik değer analizi gerçekleştirilmiştir. Gelir eşitsizliğinin yönünü enflasyon seviyesinin belirlediği sonucuna ulaşılmıştır. Enflasyon değişkeni olarak tüketici fiyatları endeksi (2010 = 100) tanımlanmış olup tek (49,300) ve çift (45,000) eşikli anlamlı seviyeler tespit edilmiştir. Ayrıca, sağlamlık kontrolü adına tahminler bir diğer eşitsizlik göstergesi ile yinelenmiş ve benzer sonuçlara ulaşılmıştır. Enflasyonun gelir eşitsizliği ile ilişkisi, eşik enflasyon seviyesinin altında ters (negatif) yönlü, üzerinde ise aynı (pozitif) yönlüdür. Analiz, doğrusal olmayan etkilerin varlığını doğrulamakta olup literatür örneklerine katkı sağlamaktadır.

Anahtar Sözcükler : Gelir Eşitsizliği, Enflasyon, Panel Eşik Değer Analizi.

1. Giriş

Gelir dağılımına ilişkin çok sayıda çalışmada Kuznets (1955) ile ortaya koyulan hipotezin ülkeler arası gelir eşitsizliği farklılıklarının sınırlı bir bölümünü açıklayabildiği; vergi ve harcama politikaları, sosyal transferler, beşeri sermaye ve kamu istihdamı gibi politik ve yapısal değişkenlerin söz konusu farklılıkları açıklamakta daha etkili olduğu ortaya koyulmuştur (Milanovic, 1994; Chu et al., 2000). Özellikle, politik iktisat literatüründe gelirin yeniden dağıtımı, kamunun vergi ve transfer ödemeleri aracılığıyla gerçekleşen maliye politikası uygulamaları ile ilişkilendirilmiştir (Atkinson, 1996; Gottschalk & Smeeding, 1997; Caminada et al., 2017). Bununla birlikte, yapışkan fiyatların, ücret katılıklarının, eksik piyasaların ve hanehalkları arasındaki heterojenliğin analizlere dâhil edilmesiyle birlikte makroekonomik politikaların ve şokların gelir eşitsizliği üzerinde yarattığı etkilere ilişkin yeni bir paradigma ortaya çıkmıştır. Böylece para politikasının da dağıtımsal etkileri önem kazanmıştır (Ribba, 2003; Balcılar et al., 2018; Colciago et al., 2019). Bu çerçevede, para politikası enflasyon, tasarrufların yeniden dağılımı, faiz oranı riski, portföy kompozisyonu, hanehalklarının heterojen yapısı ve gelir kompozisyonu gibi kanallar ile gelir ve servet eşitsizliği üzerinde etkiler yaratmaktadır (Colciago et al., 2019: 1213).

Paranın satınalma gücünde meydana gelen azalışı ifade eden enflasyonun önemi, paranın ekonomilerdeki rolünden kaynaklanmaktadır. Paranın ekonomik faaliyetleri koordine etmekte oynadığı rol nedeniyle zaman içerisinde değerinde meydana gelen değişimler, hanehalklarının refahını etkilemektedir. Diğer yandan, enflasyon vergisinin asimetrik yansımaları önemli dağıtımsal etkiler yaratmaktadır. İktisadi şoklar veya hükümet politikalarında meydana gelen değişimler, genellikle gelir ve servetin yeniden dağılımı ile sonuçlanmakta; hatta bu yeniden dağılım süreci ılımlı enflasyon dönemlerinde bile gerçekleşebilmektedir. Dolayısıyla, enflasyonun dağıtımsal sonuçlarının ihmal edilmesi, enflasyonun ekonomideki etkilerinin değerlendirilmesinde yanıltıcı sonuçlar doğurabilmektedir (Erosa & Ventura, 2002; Doepke & Schneider, 2006).

Pek çok çalışma, enflasyonun borç alanlar-kredi sağlayıcılar, işçi-işveren, kamu sektörü-özel sektör arasındaki yeniden dağıtım etkilerini ele almıştır. Genellikle, enflasyonun düşük gelir gruplarının alım gücünü düşürdüğü, işsizlik oranlarını artırdığı, finansal piyasalarda yüksek gelir gruplarından düşük gelir gruplarına doğru geliri yeniden dağıttığı kabul görmektedir (Blejer & Guerrero, 1990; Chatterjee & Corbae, 1992; Ribba, 2003; Meh et al., 2010). Ancak; enflasyon oranına, enflasyonun artış hızına ve eşik değerine, gelirin kaynağına, ülkelerin gelişmişlik düzeyine, kurumsal ve politik yapısına, vergi sistemlerine bağlı olarak söz konusu dağıtımsal etkiler farklılaşmaktadır (Romer & Romer, 1998; Sun, 2011; Menna & Tirelli, 2017; Galli & van der Hoeven, 2001).

Çalışmamız, enflasyonun gelir eşitsizliği üzerindeki etkisini ortaya koymayı amaçlamaktadır. Bu çerçevede, 40 adet gelişmiş ve gelişmekte olan ülkenin yer aldığı örneklem grubuna yönelik olarak doğrusal model ile önce sabit etkili panel veri analizi gerçekleştirilecek; sonrasında enflasyon oranlarında meydana gelen değişimlerin ve

başlangıç enflasyon oranının eşitsizlik seviyesini etkileyebileceği düşünüldüğünden panel eşik değer analizi ile enflasyon-gelir eşitsizliği ilişkisinin farklı rejimlerdeki yönü tespit edilecektir. Analizde, 1993-2019 dönemi için 40 adet gelişmiş ve gelişmekte olan ülkenin seçilmesinin nedeni bağımlı değişken olan gelir eşitsizliği göstergesine ilişkin veri kısıtıdır. Çalışmanın, enflasyonun doğrusal olmayan dağıtımsal etkileri ile ilişkili yerli ve yabancı literatürdeki az sayıdaki çalışmalardan birisi olması bakımından literatüre katkı sağlayacağı düşünülmektedir.

2. Teorik Çerçeve

Enflasyon, gelir gruplarını homojen olmayan biçimde ve farklı kanallardan etkilemektedir. Enflasyon; iş gücü gelirleri, sermaye gelirleri ve kamunun transfer ödemeleri üzerinden geliri yeniden dağıtmaktadır. Bu bağlamda, enflasyonun yüksek gelir gruplarına kıyasla düşük gelir gruplarını daha fazla olumsuz yönde etkilediği söylenebilmektedir (Fischer & Modigliani, 1978; Monnin, 2014). Genellikle düşük gelir gruplarında yer alan hanehalklarının birçoğunun geliri iş gücü ücretlerine dayanmaktadır. Özellikle, pazarlık gücü düşük olan grupların varlığında, enflasyona endekslenmeyen ücretler erozyona uğramakta; enflasyon düşük gelir gelir gruplarının satın alma güçlerini azaltmaktadır (Kane & Morisett, 1993). Enflasyonun, gelir eşitsizliğini etkilediği bir diğer kanal ise gelir gruplarının finansal varlıklara olan taleplerinin farklılaşmasıdır. Sturzenegger (1992)'ye göre enflasyona endekslenmiş finansal varlıklara ve yabancı para cinsinden araçlara erişim gelir düzeyi ile aynı yönde ilişkili olduğundan enflasyonist süreçlerde düşük gelir grupları nominal gelirlerini korumakta daha yetersiz kalmaktadır. Kamunun transfer ödemelerinin reel değerinin enflasyona bağlı olarak azalması ve söz konusu ödemelerin düşük gelir gruplarına yönelik olması nedeniyle de enflasyon gelir eşitsizliğini artırabilmektedir. Bununla birlikte, enflasyonun kamu gelirlerini aşındırması olarak tanımlanan Olivera- Tanzi etkisi ise örtük bir gelir transferine neden olabilmektedir. Bunun nedeni, vergi ödemelerinin tüm vergi mükellefleri için aynı gecikme sürelerine tabi olmamasıdır (Kane & Morisett, 1993). Artan oranlı vergi sistemlerinin varlığı da enflasyonist süreçlerde gelir dağılımını bozucu etkilerin ortaya çıkmasına neden olabilmektedir. Enflasyonist dönemlerde, reel gelirlerinde artış gerçekleşmeyen hanehalklarının, bir üst vergi dilimine girerek daha yüksek oranda vergilendirilmesiyle sonuçlanan süreç gelir dağılımını olumsuz yönde etkileyebilmektedir (Sieroń, 2017).

Diğer yandan, beklenmeyen enflasyon gelir dağılımını düzeltici etkilere de neden olabilmektedir. Literatürde, "borçlu-alacaklı hipotezi" olarak ifade edilen yaklaşıma göre beklenmeyen enflasyon nominal yükümlülüklerin reel değerini azaltmakta ve borçlu ile alacaklı arasında geliri borçlu lehine yeniden dağıtmaktadır. Genellikle, borçlu kesimin düşük ve orta gelir gruplarından; alacaklı kesimin ise yüksek gelir gruplarından olduğundan hareketle enflasyonun gelir dağılımını iyileştirebileceği sonucuna ulaşılabilmektedir. Benzer koşullar, kamunun nominal yükümlülükleri için de geçerlidir (Meh & Terajima, 2009).

Enflasyon ve gelir eşitsizliği arasındaki ilişki paranın nötr olmadığı varsayımına dayanan Cantillon Etkisi ile de açıklanmıştır. Buna göre para arzının artırılması enflasyonu

kademeli biçimde artırmakta; yeni paranın ilk alıcıları ve son alıcıları arasında gelirin yeniden dağıtımına neden olmaktadır. Yeni paranın piyasaya sürüldüğü süreçte fiyat artışları hemen gerçekleşmediğinden yeni paranın ilk alıcıları son alıcılarına göre daha avantajlı olmaktadır. Düşük gelir grupları yeni paranın son alıcıları olduğundan; yeni paraya ulaşmaktaki söz konusu zaman farkı geliri düşük gelir grupları aleyhine yeniden dağıtmaktadır (Sieroń, 2017).

3. Ampirik Literatür

Literatürde yer alan çalışmaların bir çoğu gelir eşitsizliğini etkileyen mali veya yarı-mali kanallar ile ilişkili iken; enflasyonun geliri yeniden dağıtıcı etkisinin konu edildiği çalışmalara da sıklıkla rastlanmaktadır. Nominal ücret katılıkları, yapışkan fiyatlar, ekonominin yapısal özellikleri, gelir ve servet kaynağındaki farklılıklar, gelişmişlik düzeyi, politik ve kurumsal yapı gibi değişkenler enflasyon - gelir eşitsizliği ilişkisinin ülkeler arasında farklılaşmasına neden olmaktadır.

Bach & Ando (1957), enflasyonun gelirin yeniden dağıtımına ilişkin etkilerine dair çok az gösterge bulunduğunu; söz konusu etkinin ise karmaşık ve belirsiz süreçlerle ilişkili olduğunu ifade etmiştir. Nolan (1988), İngiltere için; Björklund (1991) ise İsveç için enflasyonun gelir eşitsizliği üzerinde anlamlı bir etkisinin bulunmadığı sonucuna ulaşmıştır. Benzer şekilde, Jäntti & Jenkins (2010) 1961-1990 yıllarını kapsayan dönemde İngiltere için enflasyon ve işsizliğin gelir eşitsizliği üzerinde herhangi bir anlamlı etki yaratmadığı; Ang (2010) ise Hindistan için parasal istikrarsızlığın gelir eşitsizliği üzerinde herhangi bir negatif etkisinin bulunmadığı sonucuna ulaşmıştır.

Diğer yandan, Wolff (1979) 1969-1975 yıllarını kapsayan dönemde Amerika'daki enflasyonist sürecin artan oranlı vergileme etkisi göstererek daha eşit bir servet dağılımına neden olduğu sonucuna ulaşmıştır. Achdut (1996) ile 1979-1993 yıllarını kapsayan dönemde İsrail için ortaya koyulan analizde gelir eşitsizliğindeki dalgalanmalar 2 ayrı dönemde ele almıştır. 1979-1984 yılları yüksek enflasyon dönemi iken 1985-1993 yılları fiyat istikrarı dönemi olarak analize konu edilmiştir. Fiyat istikrarı dönemi, yüksek işsizlik rakamları ile ilişkilendirilmiş ve bu dönemde gelir eşitsizliğinin arttığı sonucuna ulaşılmıştır. Ayrıca, çalışmada vergilerin enflasyonist dönemde geliri yeniden dağıtıcı etkisinin parasal istikrar döneminde zayıfladığı ortaya koyulmuştur. Mumtaz & Theophilopoulou (2017) ile 1969-2012 yılları arasında İngiltere'de gelir eşitsizliğinde meydana gelen artışların para politikası şoklarıyla ilişkili olup olmadığı analiz edilmiştir. Çalışmada, para politikası şoklarının İngiltere'deki kazanç, gelir ve tüketim eşitsizliğini etkileyip etkilemediği ele alınmıştır. Yapısal Vektör Otoregresyon Modeli (SVAR) kullanılarak daraltıcı para politikası şoklarının kazanç, gelir ve tüketim eşitsizliğinde artışa yol açtığı sonucuna ulaşılmıştır. Zheng (2020) ise enflasyonun gelir eşitsizliği üzerindeki etkisini analiz etmek için heterojen haneleri menü maliyetleri yoluyla parasal bir Schumpeterci büyüme modeline dâhil etmiş; enflasyonun ekonomik büyümeyi ve gelir eşitsizliğini azalttığı sonucuna ulaşmıştır.

Bununla birlikte, Romer & Romer (1998) ile 1970-1990 yıllarını kapsayan dönemde 76 ülke için ülkelerarası regresyon analizi gerçekleştirilmiş, enflasyonun gelir dağılımını kötüleştirdiği sonucuna ulaşılmıştır. Easterly & Fischer (2001), 38 ülke için hanehalkı verilerine dayanarak enflasyonun gelir eşitsizliğini artırdığı, düşük gelir gruplarının refahının enflasyonla doğrusal olmayan bir biçimde ters yönlü ilişkide olduğu sonucuna ulaşmıştır. Erosa & Ventura (2002) ABD'de enflasyonun azalan oranlı bir vergi gibi etki yarattığını tespit ederek enflasyon vergisinin bireylerin tüketim düzeyine bağlı olması ve düşük gelirli larının varlıklarının daha büyük bir bölümünü nakit olarak tutmaları nedeniyle enflasyonun gelir eşitsizliğini artırdığını ortaya koymuştur. Albanesi (2007), enflasyon vergisinin asimetrik biçimde düşük gelir gruplarına yansımasını politik iktisat modelleri ile göstermiş, 51 gelişmiş ve gelişmekte olan ülke için 1966-1990 yıllarını kapsayan dönemde enflasyonun gelir eşitsizliğini artırdığı bulgusuna ulaşmıştır. Çalışmada, ortalama enflasyon oranı ile gelir eşitsizliği arasında gözlemlenen korelasyonun, maliye politikasının belirlenmesinin altında yatan bir dağıtım çatışmasının sonucu olarak gerçekleştiği ifade edilmektedir. Buna göre alt gelir gruplarının yüksek enflasyon dönemlerinde politik pazarlık gücü zayıflamakta, böylece gelir eşitsizliği artmaktadır. Thalassinos, Uğurlu & Muratoğlu (2012) ise 2000-2009 yıllarını kapsayan dönemde 13 Avrupa ülkesi için enflasyon gelir eşitsizliği ilişkisini panel veri metodu ile analiz etmiş, gelir eşitsizliğinin belirleyicileri olarak istihdam düzeyi, büyüme oranı ve dışa açıklık değişkenlerini kontrol değişkeni olarak kullanmış ve enflasyonun gelir eşitsizliğini anlamlı ve pozitif yönde etkilediği hipotezini doğrulamıştır.

Enflasyon - gelir eşitsizliğine dair ilişki *merkez bankası bağımsızlığı* çerçevesinden de değerlendirilmiştir. Dolmas, Huffman, & Wynne (2000) merkez bankasının bağımsız olmadığı ülkelerde geliri yeniden dağıtıcı kamu politikalarına yönelik politik baskıların; yüksek enflasyonist süreçlerle sonuçlanacağına işaret etmektedir. Buna göre bağımsız olmayan merkez bankalarının varlığında, yeniden dağıtıcı politikaların finansmanı para arzının kontrolsüz olarak artırılmasıyla gerçekleşmekte; böylece yeniden dağıtıcı kamu politikalarının neden olduğu enflasyon paradoksal biçimde gelir dağılımını daha da bozucu etkiler yaratmaktadır.

Literatürde, enflasyonun gelir eşitsizliği üzerindeki etkisinin başlangıç enflasyon oranına göre değişim gösterdiği çalışmalar da mevcuttur. Buna göre başlangıç enflasyon oranı yüksekse, enflasyonu düşürmek gelir eşitsizliğini azaltabilmekte; ancak düşük ise enflasyonu düşürmek daha yüksek eşitsizlik seviyesine neden olabilmektedir. Bu çerçevede, enflasyonun neden yalnızca düşük enflasyon oranlarına sahip ülkelere ilişkin zaman serisi analizlerinde gelir dağılımını iyileştirdiği; ancak çoğu ülkeler arası karşılaştırmalarda ve yüksek enflasyona sahip ülkelerin dâhil edildiği panel veri analizlerinde gelir dağılımını bozucu etkiler yarattığı açıklanabilmektedir (Galli & van der Hoeven, 2001: 2). Bulíř (2001) fiyat istikrarının gelir dağılımı üzerindeki etkisinin doğrusal olmadığını ortaya koymuş, Kuznets (1955)'in gelir dağılımı ile ilişkili hipotezine enflasyonu da dâhil etmiştir. Buna göre 75 ülke için yapılan çalışmada, enflasyon gelir eşitsizliğini artırmakta ve söz konusu etki hiperenflasyonist ülkelerde daha güçlü gerçekleşmektedir. Çalışmada, %5 oranında bir enflasyon eşiği tespit edilmiştir. Eşik değerin altında enflasyonda meydana gelen düşüş gelir

eşitsizliğini artırmakta, eşik değerin üzerinde ise gelir eşitsizliğini azaltmaktadır. Galli & van der Hoeven (2001), enflasyondaki bir artışın gelir eşitsizliğini hem azaltabileceğini hem artırabileceğini ve bunun büyük ölçüde başlangıçtaki enflasyon düzeyine bağlı olduğunu göstermiştir. Çalışmada, bu eşik değerin Amerika için %6 olduğu sonucuna ulaşılmıştır. Monnin (2014), 10 OECD ülkesi için 1971-2010 yıllarını kapsayan döneme ilişkin panel veri analizi gerçekleştirmiş, uzun dönemde enflasyon ile gelir eşitsizliği arasında minimum eşik değer enflasyon oranı yaklaşık %13 olan ve doğrusal olmayan bir ilişki tespit edilmiştir. Eşik enflasyon oranın altında enflasyon ile gelir eşitsizliği arasında ters yönlü bir ilişki, üzerinde ise aynı yönlü bir ilişki ampirik olarak doğrulanmıştır. Balcılar vd. (2018) ise gelir eşitsizliği ve enflasyon oranı arasındaki ilişkiyi değerlendirmek için 1976-2007 yıllarını kapsayan dönemde 50 Amerikan eyaleti için bir analiz gerçekleştirmiştir. Buna göre eşik bir enflasyon değerinin üzerinde, enflasyon ve gelir eşitsizliği arasında aynı yönlü ilişki, eşik değerin altında ise ters yönlü bir ilişki tespit edilmiştir. %3 olarak tespit edilen eşik enflasyon oranı ile enflasyonun ekonomik büyüme, ücret geliri ve borçlu-alacaklı ilişkisi üzerindeki etkisi nedeniyle gelir dağılımını farklı yönde etkilediği gösterilmektedir.

4. Veri ve Yöntem

Çalışmada; 40 adet gelişmiş ve gelişmekte olan ülkenin[1] 1993-2019 yılları arası yıllık verilerinden faydalanılmıştır. Ülkelerin seçimindeki en önemli zorluk veriye ilişkin kısıttır. Gini gelir eşitsizliği katsayısı, çalışmada tercih edilen Hansen (1999) panel eşik değer analizi çerçevesinde kayıpsız bir şekilde elde edilmek zorundadır. Diğer tüm değişkenlerin de dengeli panel oluşturulması bakımından eksiksiz elde edilmesi gerekmektedir. Gelir eşitsizliği katsayıları ile ilişkili zorluk güncel, güvenilir ve kayıpsız göstergelere ulaşamamaktan kaynaklanmaktadır. Standardize Edilmiş Dünya Gelir Eşitsizliği Veritabanından (Version 9.1) elde edilen gelir eşitsizliği katsayısı 0 (en düşük eşitsizlik katsayısı) ile 100 (en yüksek eşitsizlik katsayısı) arasında değer almaktadır (Solt, 2020: 1184-1186). Vergi ve transferler sonrası hanehalkı harcanabilir gelirinin göstergesi olan gelir eşitsizliği katsayısı, modelde kullanılan bağımlı değişkeni göstermektedir. Sağlamlık kontrolu için vergi ve transferler öncesi hanehalkı harcanabilir gelirinin göstergesi olan gelir eşitsizliği katsayısı da analize dâhil edilmiştir. Enflasyon değişkeni, eşik değişken olarak tanımlanmıştır ve değişken Dünya Bankası Veritabanı'ndan elde edilmiştir. Enflasyon değişkeni tüketici fiyatları cinsinden (2010=100) regresyona dâhil edilmiştir. Verilere ilişkin özet bir bilgi niteliğindeki Tablo 1'de değişkenler, göstergeler ve değişkenlerin elde edildiği kaynaklar yer almaktadır. Kontrol değişkenler de Dünya Bankası Veritabanından elde edilmiştir. Kontrol değişkenlere ilişkin özet bilgi de Tablo 1'de yer almaktadır. Bu değişkenler ***ISSIZLIK***, ***ACIKLIK***, ***TUKETIM***, ***BUYUME*** ve ***YATIRIM*** değişkenleridir.

[1] *Ermenistan, Belçika, Brezilya, Bulgaristan, Kanada, Çin, Kolombiya, Kosta Rika, Danimarka, Dominik Cumhuriyeti, El Salvador, Estonya, Finlandiya, Gürcistan, Honduras, Macaristan, Endonezya, İtalya, İrlanda, Kazakistan, Kırgızistan, Malezya, Moldova, Hollanda, Norveç, Panama, Paraguay, Peru, Polonya, Romanya, Rusya, Singapur, Tayland, Türkiye, Ukrayna, Birleşik Krallık, Amerika Birleşik Devletleri, Uruguay, Vietnam, Ekvator.*

Değişkenler, enflasyon-eşitsizlik ilişkisi açısından önemli etkilere sahip olduğu öngörülen göstergeler arasından önceki literatür (Balcilar vd. 2018) ile uyumlu olarak tercih edilmiştir.

Tablo: 1
Veriye İlişkin Bilgi

Değişken	Gösterge	Kaynak
Bağımlı Değişken: *GINI_NET* ve *GINI_MKT* (Sağlamlık kontrolü için)	Vergi ve transferler öncesi ve sonrası hanehalkı geliri ile denkleştirilmiş gelir eşitsizliği göstergesi	Frederick Solt Standardize Edilmiş Dünya Gelir Eşitsizliği Veritabanı
Eşik Değişken: *ENFLASYON*	Tüketici Fiyatları Endeksi (TÜFE) 2010 = 100	Dünya Bankası Veritabanı
Kontrol Değişkenler		
ISSIZLIK	İşgücünün toplam yüzdesi cinsinden toplam işsizlik oranı (Uluslararası Çalışma Örgütü yöntemine göre)	Dünya Bankası Veritabanı
ACIKLIK	GSYH yüzdesi olarak mal ve hizmetlerin ihracat ve ithalat toplamı	Dünya Bankası Veritabanı
TUKETIM	cari fiyatlarla ($) hükümetin nihai tüketim harcamaları	Dünya Bankası Veritabanı
BUYUME	cari fiyatlarla ($) kişi başına düşen gayri safi yurtiçi hâsıla	Dünya Bankası Veritabanı
YATIRIM	cari fiyatlarla ($) gayri safi sabit sermaye oluşumu	Dünya Bankası Veritabanı

Tablo 2'den de görülebileceği gibi Gini katsayısı ölçümleri ülkeler arasında çok fazla farklılık göstermemektedir. Eşik değişken olan ve tüketici fiyatları cinsinde tanımlanan enflasyon değişkeni ise ülkeler arasında önemli ölçüde farklılaşmaktadır. Kontrol değişkenlerden *BUYUME* ve *ACIKLIK* değişkeni hariç değişkenlerin ülkeler özelinde birbirine yakın seyrettiği; serilerin standart sapmalarının ve ortalamalarının da ihmal edilebilir düzeyde farklılaştığı görülmektedir.

Tablo: 2
Tanımlayıcı İstatistikler

Değişken	Gözlem	Ortalama	Standart Sapma	Minimum Değer	Maksimum Değer
GINI_NET	1080	37,01	8,23	21,90	54,30
GINI_MKT	1080	46,16	6,53	21,90	63,20
ENFLASYON	1080	84,97	36,71	0,20	281,659
ISSIZLIK	1080	7,11	3,69	0,21	20,71
ACIKLIK	1080	91,88	59,50	15,63	437,32
BUYUME	1080	15018,65	18789,25	182,30	102913,00
YATIRIM	1080	1,91e+11	6,40e+11	6,70e+07	6,10e+12
TUKETIM	1080	1,29e+11	3,73e+11	1,50e+08	3,00e+12

4.1. Doğrusal Sabit Etkili Model

Sabit etkili panel veri modelleri birim etkilerinin, başka bir ifade ile birimler arası farklılıkların sabit olduğu durumlarda kullanılmaktadır. Bu etki, tahmin sonuçları içerisinde sabit parametre ile ifade edilmektedir. Gözlemlenemeyen birim etkilerinin modelde yer alan açıklayıcı değişkenlerle ilişkili olduğu sabit etkili panel veri modellerinde eğim parametreleri tüm birimler için aynı olsa da sabit panel birimlere göre değişmektedir. Birim etkilerinin analiz edildiği regresyon sabiti deterministik olmamakla birlikte örnek birimlerin üzerine yoğunlaşıldığı gözlemlenmektedir. Örnek birimlerin büyük bir anakütleden gelmediği durumlarda bu modeller kovaryans modelleri olarak tanımlanmaktadır. Belirli bir *N* sayıdaki panel birim tahminlere konu olmaktadır (Ün, 2018: 60).

$$Y_{it} = \alpha_{it} + \beta_{2it}X_{2it} + \beta_{kit}X_{kit} + U_{it} \quad (1)$$

$\alpha_{it} = \alpha_i$ tüm t'ler için

$\beta_{kit} = \beta_k$ tüm i ve t'ler için (k=2,3,….,K)

Birimlere göre meydana gelen farklılıkların eğim katsayılarını etkilediği durumlar için sabit katsayılı modeller kullanılmaktadır (Ün, 2018: 60).

$\alpha_{kit} = \alpha_{ki}$ tüm i'ler için J=1,,…N; t=1,….T; k=1,….k

Sabit etkili modellerde bağımsız değişkenlerin hata terimi bileşenleri ile ilişkisiz olduğu varsayımı bulunmamaktadır. Tesadüfi etkili modellerde ise hata terimi bileşenleri ile modeldeki bağımsız değişkenlerin ilişkisiz olduğu varsayılmaktadır. Sabit etkili model ile tesadüfi etkili modelin kullanılması konusunda bir önbilgi var ise buradan hareketle tahminler gerçekleştirilebilir. Enflasyonun gelir eşitsizliği üzerindeki eşik etkisinin tahmin edildiği çalışmada bu önbilginin varlığını ihtiva eden Hansen (1999) analizi kullanılmaktadır. Öte yandan, sabit etkili modeller serilerde içsellik, değişen varyans, otokorelasyon ve yatay kesit bağımlılığı olup olmamasına bağlı olarak farklı tahmincilerin kullanılabileceğini önermektedir. Çalışmada, Hansen (1999) yaklaşımı sözü edilen durumları bertaraf eden bir analiz olması ve yöntemsel üstünlük sağlaması sebebiyle tercih edilmiştir. İlişkinin doğrusal olup olmadığının test edildiği çalışmada Hansen (1999) eşik analizinden önce doğrusal model ile öntahmin niteliğinde bulgulara ulaşılması hedeflenmiştir.

4.2. Tek Eşikli Model

Hansen (1999) eşik regresyon modellerinin tahminini sağlayacak bir asimptotik dağılım teorisi sunmaktadır. Önyükleme (bootstrap) yöntemi kullanarak geleneksel yöntemlerden farklılaşmaktadır ve eşik regresyon modellerinin tahmin edilmesine olanak tanımaktadır. Bir örneklemdeki tüm gözlemler içerisinde regresyona ilişkin fonksiyonların aynı mı, yoksa ayrık mı olduklarını belirlemek için yöntem geliştirmiştir. Bireysel gözlemlerin gözlemlenen bir değişkenin değerine göre ayrı rejimlerde değerlendirilip değerlendirilemeyeceği eşik regresyon modelleri ile tespit edilmektedir. Hansen (1999) ekonometrik tekniklerin eşik regresyonu için yöntemsel algılarının avantajına karşın etkili sonuçlar ortaya koymadığını iddia etmektedir. Eşik regresyonu için panel veriler ile etkili ekonometrik teknikleri kullanmaktadır. Bir asimptotik dağılım teorisi geliştirdiği çalışmasında seriler için güven aralıkları oluşturmuştur. Bootstrap (önyükleme) yöntemini de eşik etkisinin istatistiksel değerini ifade etmek için kullanmaktadır. Eşik etkinin test edilebilmesi için iki aşamalı sıradan en küçük kareler yaklaşımından faydalanılmaktadır. Bunu yaparken ilk olarak her bir olası eşik değer için hata kareleri toplamının birbirinden bağımsız olarak hesaplandığı, sonra ise ilgili bu değerlerin minimize edildiği bir yöntem kullanılmaktadır. Nihayetinde, eşik parametresi tarafından belirlenen ayrı rejimlerde katsayı parametreleri tahmin edilmektedir (Hansen, 1999: 345-346). Hansen (1999) çoklu doğrusallık ve endojenite gibi sorunların çözümünde metodolojik üstünlük sağlayan bir yöntem olarak eşik değer analizlerinde son zamanlarda yaygın olarak kullanılmaktadır. Tanı testleri bakımından Hansen (1999) çalışmasında kısıtlara işaret etmekte olup gelecek çalışmaların heteroskedastisite (değişen varyans), bağımlı değişkenin gecikmeli değeri,

tesadüfü etkiler vb. unsurların gelecek çalışmalar açısından dikkate alınmasını önermektedir. Nitekim, dinamik panel eşik modelleri de bu çerçevede kullanılmaktadır. Ancak, mevcut istatistiki ve ekonometrik paket programlar vasıtası ile tanı testleri için yeterli destek sağlanamamaktadır ve testlerin manuel olarak çalıştırılması gerektiği düşünülmektedir. Bu çalışma ise sabit etkiler panel eşik analizini merkeze almaktadır. Hansen (1999) tek eşikli modeli şu şekilde belirtmektedir (Hansen, 1999: 347; Wang, 2015: 122):

$$y_{it} = \mu + X_{it}\,(q_{it} < \gamma)\beta_1 + X_{it}\,(q_{it} \geq \gamma)\beta_2 + u_i + e_{it} \tag{2}$$

Burada q_{it} eşik değişkendir. γ ise eşitliği β_1 ve β_2 olmak üzere iki rejime ayıran eşik parametresidir. u_i ve e_{it} sırasıyla bireysel etkileri ve hata terimini göstermektedir. (2) nolu denklemi aşağıda şekilde göstermek de mümkündür. I gösterge fonksiyonunu temsil etmektedir (Hansen, 1999: 347; Wang, 2015: 122):

$$y_{it} = \mu + X_{it}\,(q_{it}, \gamma)\beta + u_i + e_{it}$$
$$X_{it}\,(q_{it}, \gamma) = \begin{Bmatrix} X_{it}\, I\,(q_{it} < \gamma) \\ X_{it}\, I\,(q_{it} \geq \gamma) \end{Bmatrix} \tag{3}$$

γ eşik parametresi veri iken β'nin en küçük sıradan kareler tahmincisi (4) nolu denklemdeki gibidir (Hansen, 1999: 349; Wang, 2015: 122):

$$\hat{\beta} = \{X^*(\gamma)' X^*(\gamma)\}^{-1}\,\{X^*(\gamma)'\, y^*\} \tag{4}$$

y^* ve X^* grup içi sapmalardır. Artık kareler toplamı $\hat{e}^{*\prime}$ve $\hat{e}^{*\prime}$dir. γ eşik parametresini tahmin etmek için q_{it} eşik değişkenin alt kümesinin hesaplanması gerekmektedir. Tüm örneklemi test etmek yerine seri, $(\underline{\gamma}, \bar{\gamma})$ aralığında sınırlandırılmaktadır. Bu aralıklar q_{it} eşik değişkenin dağılımıdır. γ'nin tahmincisi artık kareler toplamını minimize eden değerdir ve (5) nolu denklemdeki gibidir (Hansen, 1999: 349; Wang, 2015: 122):

$$\hat{\gamma} = \arg\min_{\gamma} S_1\gamma \tag{5}$$

γ hesaplanıyorsa, model sıradan doğrusal modelden farklı değildir. Ancak, hesaplanamıyorsa γ tahmincisinin dağılımını standart dışı yapan rahatsız edici bir parametre (nuisance parameter) problemi vardır. Hansen (1999) $\hat{\gamma}$'nin γ için tutarlı bir tahminci olduğunu kanıtlamıştır. $\gamma = \gamma_0$'ı test etmenin en iyi yolunun en çok olabilirlik oranı *(LR)* ile *"reddedilmeyen bölge"* yönteminin kullanılarak güven aralığı oluşturmak olduğunu savunmuştur ve bu istatistik şu şekildedir (Hansen, 1999: 351; Wang, 2015: 122):

$$LR_1(\gamma) = \frac{\{LR_1(\gamma) - LR_1(\hat{\gamma})\}}{\hat{\sigma}^2} \xrightarrow{Pr} \xi$$
$$\Pr(\mathfrak{x} < \xi) = (1 - e^{\frac{-\mathfrak{x}}{2}})^2 \tag{6}$$

Güven aralığı α veri iken alt sınır, *LR* serisindeki maksimum değere karşılık gelir ve bu değer α dağılımından daha küçüktür. Üst sınır ise *LR* serisindeki α dağılımından daha küçük olan minimum değere karşılık gelir. α dağılımı (7) nolu denklemin aşağıdaki ters fonksiyonundan hesaplanmaktadır (Hansen, 1999: 352; Wang, 2015: 123):

$$c = -2\log(1-\sqrt{1-\alpha}) \tag{7}$$

Şöyle ki, 0.1, 0.05 ve 0.01 güven aralıkları için üç adet kritik değer hesaplanmaktadır. Eğer en çok olabilirlik oranı $LR_1(\gamma_0)$ dağılımın kritik değerleri *c(α)*'dan büyük ise boş hipotez reddedilmektedir. Bir eşik etkisinin test edilmesi, katsayıların her rejimde aynı olup olmadığının test edilmesiyle aynıdır. Boş hipotez ve alternatif hipotez (doğrusal ve tek eşikli model) (8) nolu eşitlikteki gibidir (Hansen, 1999: 351; Wang, 2015: 123):

$$H_0: \beta_1 = \beta_2 \; H_\alpha: \beta_1 \neq \beta_2 \tag{8}$$

F istatistiği ise (9) nolu eşitlikteki gibidir (Hansen, 1999: 350; Wang, 2015: 123):

$$F_1 = \frac{S_0 - S_1}{\hat{\sigma}^2} \tag{9}$$

Boş hipotezin (H_0) geçerliliği durumunda, γ eşik parametresi belirlenememektedir ve F_1 istatistiği standart olmayan asimptotik bir dağılım göstermektedir. Bu sebeple, eşik etkisinin anlamlılığının test edilmesi bakımından *F* istatistiğinin kritik değerleri için önyükleme (bootsrap) yöntemi kullanılmaktadır. *F* istatistiği testinin p-değeri anlamlılık düzeyi, eşik etkisinin anlamlı olup olmadığını belirtmektedir. Eğer anlamlı bir eşik test edilmiş ise *F* istatistik değerinin, dağılımın kritik değerleri *α*'nın güven aralıkları için tahmin edilen katsayılardan büyük olduğu gözlemlenmektedir.

4.3. Çok Eşikli Model

Hansen (1999) çok eşikli modeller için de tahmin yapılmasına olanak tanımaktadır. Çift eşikli örnek bir model şu şekildedir (Hansen, 1999: 353; Wang, 2015: 123):

$$y_{it} = \mu + X_{it}(q_{it} < \gamma_1)\beta_1 + X_{it}(\gamma_1 \leq q_{it} < \gamma_2)\beta_2 + X_{it}(q_{it} \geq \gamma_2)\beta_3 + u_i + e_{it} \tag{10}$$

γ_1 ve γ_2 eşik parametreleri olup eşitliği β_1, β_2 ve β_3 olmak üzere üç ayrı rejime ayırmaktadır. Pek fazla kullanılmayan grid aralığı (grid interval) yöntemi kullanılarak eşitliğin $(N \times T)^2$ defa hesaplanması gerekmektedir. Bai (1997) ve Bai ve Perron'a (1998) göre ardışık tahminci tutarlıdır; bu nedenle eşikler aşağıdaki gibi tahmin edilmektedir (Hansen, 1999: 353; Wang, 2015: 123):

$$\hat{\gamma}_2^r = \arg\min S_2^r(\gamma_2)$$

$$S_2^r = S\{\min(\hat{\gamma}_1, \gamma_2)\max(\hat{\gamma}_1, \gamma_2)\}$$

$$LR_2^r(\gamma_2) = \frac{\{S_2^r(\gamma_2) - S_2^r(\hat{\gamma}_2^r)\}}{\hat{\sigma}_{22}^2} \tag{11}$$

$$\hat{\gamma}_1^r = \arg\min\{S_1^r(\gamma_1)\}$$

$$S_1^r = S\{\min(\hat{\gamma}_1, \gamma_2)max(\hat{\gamma}_1, \gamma_2)\}$$

$$LR_1^r(\gamma_1) = \frac{\{S_1^r(\gamma_1) - S_1^r(\hat{\gamma}_1^r)\}}{\hat{\sigma}_{21}^2} \quad (12)$$

Eşik etkisi testi de ardışıktır; yani tek eşikli bir modelde sıfır hipotezi reddedilirse, çift eşikli model de test edilmelidir. Boş hipotez, tek eşikli bir modeldir ve alternatif hipotez, çift eşikli bir modeldir. *F* istatistiği ise şu şekilde oluşturulmaktadır (Hansen, 1999: 354; Wang, 2015: 124):

$$F_2 = \frac{\{S_1^r(\gamma_1) - S_1^r(\hat{\gamma}_1^r)\}}{\hat{\sigma}_{22}^2} \quad (13)$$

Tek eşikli modelde olduğu gibi bootstrap (önyükleme) yöntemi kullanılmaktadır. Boş hipotez veri iken $H_0\ DGP, X_{it}^*\beta_S + v_{it}^*$ şeklinde yeni bir seri oluşturulmaktadır. $\beta_S, H_a\ DGP$ veri iken tek eşikli modelin bir tahmincisidir. İkiden fazla eşik parametresine sahip modeller için de işlem benzerdir. Chan (1993) ve Hansen (1999), β (eğim parametresi) sonucunun ve tahminin güvenilirliğinin eşik tahminine bağımlılığının birinci dereceden asimptotik öneme sahip olmadığını, dolayısıyla β (eğim parametresi) tahminine γ veri olduğu için devam edilebileceğini ifade etmektedir (Hansen, 1999: 354-355; Wang, 2015: 124).

Bu çalışmanın verilerini ve amacını Hansen (1999) çerçevesinde değerlendirmek mümkün olup model, enflasyonun gelir eşitsizliği etkilerinin analizinde, içsel şekilde alt gruplara ayrılan örneklemin eşik değerlerinin tespitine yardımcı olmaktadır. Eşik değere bağlı olarak farklı yönlerde ilişki açıklanabilmektedir. (2) ve (10) nolu denklemlerden elde edilen model, dengeli panel veri seti ile oluşturulmuştur. Modelde *t* zaman etkilerini *i* bireysel etkileri temsil etmektedir. $GINI_{it}$ vergi ve transferler sonrası hanehalkı harcanabilir gelirinin temsili olan gelir eşitsizliği göstergesini, $ENFLASYON_{it}$ tüketici fiyatları endeksi ile temsil edilen enflasyon göstergesi olan açıklayıcı değişkeni göstermektedir. X_{it} ise yine beşeri, demografik, kurumsal, makro ve mali göstergeleri içeren kontrol değişkenler vektörünü belirtmektedir. Enflasyonun gelir eşitsizliğinin tahmininde kullanılan temel model (14) nolu denklemdeki gibidir:

$$GINI_{it} = \begin{cases} \delta_i + \alpha_1 X_{it} + \beta_1 ENFLASYON_{it} + e_{it}, ENFLASYON_{it} \leq \lambda \\ \delta_i + \alpha_2 X_{it} + \beta_2 lnENFLASYON_{it} + e_{it}, ENFLASYON_{it} > \lambda \end{cases} \quad (14)$$

e_{it} sonsuz varyans ve sıfır ortalama ile özdeş ve bağımsız dağıldığı varsayılan hata terimini göstermektedir. $ENFLASYON_{it}$ aynı zamanda eşik değişken olarak tanımlanmış olup δ_i farklı enflasyon oranlarına sahip panel ülkelerinin heterojen yapısını gösteren sabit etkileri içermektedir. λ şik değer tahminini temsil etmektedir. β_1, β_2 enflasyonun farklı rejimlerde, başka bir deyişle tahmin edilen eşik değerin altında ve üstünde farklılaşan gelir eşitsizliği etkilerini ortaya çıkarmaktadır.

Buraya kadar yapılan açıklamalardan hareketle ilişkinin boş hipotezini enflasyon gelir eşitsizliği ilişkisi doğrusaldır; alternatif hipotezi ise enflasyon gelir eşitsizliği ilişkisi

doğrusal değildir ve anlamlı (tek) eşik etkisi tespit edilmektedir şeklinde ifade etmek mümkündür. Model kısmında da belirtildiği üzere, eşik değer etki testi (threshold effect test) olasılık değerinin anlamlılığına ve *F* istatistik katsayısının güven aralıkları için tahmin edilen kritk değerlerin katsayıdan büyük olup olmamasına bağlı olarak tahmin edilen eşik değer, söz konusu ilişkinin öncelikle doğrusallığını, sonrasında eşiğin altında ve üzerinde yönünü tayin etmektedir. Bununla birlikte tek eşik tahminini takiben çok eşikli tahmin de analize dâhil edilmiştir. Hansen (1999) panel sabit etkili eşik analizinin, 40 adet gelişmiş ve gelişmekte olan ülke grubu özelinde enflasyon gelir eşitsizliği ilişkisine dair etkili ve güvenilir bulgular ortaya koyabileceği varsayılmaktadır. Doğrusal olmayan ilişkilerin tahmininde kullanılan bir yöntem ile görece heterojen yapıdaki panel ülkelerin tahminine olanak tanıyan analizin literatüre katkı sağlayacağı öngörülmektedir.

5. Bulgular ve Tartışma

İlk olarak, doğrusal model ile sabit etkili panel veri analizi gerçekleştirilmiştir. Tahminlere ilişkin bulgular Tablo 3'de paylaşılmaktadır. Bağımlı değişken olarak tanımlanan her iki gelir eşitsizliği göstergesinin diğer değişkenler ile ilişkisi, bir değişken (*YATIRIM*) hâriç istatistiki olarak anlamlıdır. Bununla birlikte, anlamlı ya da anlamsız tüm değişkenlerin etkilerinin yönü (pozitif ve negatif) beklentiler ile literatüre uygun ve öngörülebilirdir. Ang (2010), Shahbaz ve Islam (2011), Jalil (2012), Shahbaz, Loganathan, Tiwari ve Sherafatian-Jahromi (2015), Franco ve Gerussi (2013), Gülmez ve Altıntaş (2015), Park (2015), Argun (2016) ve Topuz ve Dağdemir (2016) gibi literatür örnekleri doğrusal zaman ve panel seri analizleri ile enflasyon ile gelir eşitsizliği arasında negatif ilişki tespit etmişlerdir. *(ISSIZLIK) ve (BUYUME)* değişkenlerinin gelir eşitsizliği ile ilişkisi pozitif, kamunun nihai tüketim harcamaları olarak tanımlanan *(TUKETIM)* ile *(YATIRIM) ve (ACIKLIK)* değişkenlerinin gelir eşitsizliği ile ilişkisi negatiftir. *(GINI_MKT)* değişkeni ile yapılan sağlamlık kontrolü bulguları da tüm değişkenler için benzer katsayıları, anlamlılık seviyelerini, ilişki yönünü tespit etmektedir.

Tablo: 3
Doğrusal Model Tahmin Bulguları

Bağımlı değişken: ***GINI_NET***			
Değişken	**Katsayı (standard sapma)**	**Anlamlılık**	**Etkinin işareti**
ENFLASYON	-0,0176 (0,0025)	√ (0,000)	(-)
ISSIZLIK	0,1665 (0,0235)	√ (0,000)	(+)
ACIKLIK	-0,0202 (0,0029)	√ (0,000)	(+)
TUKETIM	-1,4462 (0,3153)	√ (0,000)	(-)
BUYUME	1,5872 (0,4483)	√ (0,000)	(+)
YATIRIM	-0,2657 (0,2777)	X (0,339)	(+)
Bağımlı Değişken: ***GINI_MKT***			
ENFLASYON	-0,0189 (0,0026)	√ (0,000)	(-)
ISSIZLIK	0,2107 (0,0245)	√ (0,000)	(+)
ACIKLIK	-0,0279 (0,0030)	√ (0,000)	(+)
TUKETIM	-1,4975 (0,3280)	√ (0,000)	(-)
BUYUME	1,9424 (0,4663)	√ (0,000)	(+)
YATIRIM	-0,2658 (0,2889)	X (0,358)	(+)

Not: X ilişkinin anlamsız olduğunu, √ ilişkinin anlamlı olduğunu göstermektedir.

Yalnızca doğrusal bir analiz ile böylesi değerlendirmeler yapmak oldukça eksik ve dahası yanlış olacaktır. Nitekim, enflasyon değişkeninin gelir eşitsizliği ile anlamsız ilişkisi, başka modellemeler ile ilişkinin test edilmesini zorunlu kılmaktadır. Enflasyon oranlarının farklılaşmasının (azalmasının ya da artmasının) eşitsizlik seviyesini de etkileyebileceği düşünülmektedir. Bu sebeple, enflasyon değişkeni üzerinden tanımlanabilecek bir eşik ile ilişkinin farklı rejimlerdeki yönünü tespit etmek önem arz etmektedir. 40 adet gelişmiş ve gelişmekte olan ülkedeki enflasyon gelir eşitsizliği arasındaki panel eşik en küçük kareler yöntemi ile tahmin edilen ilişkiye ait (2) nolu denkleme ilişkin tek eşikli etki test sonuçları Tablo 4'den görülebilmektedir.

Tablo: 4
Tek Eşikli Etki Test Sonuçları

Eşik değer	*F* istatistiği	*p* değeri	Kritik değerler		
			%10	%5	%1
49,300	188,85	√ 0,003*	91,243	113,821	144,232

*Not: * bootstrap (300) tekrarlı olasılık dağılımını göstermektedir. √ ilişkinin anlamlı olduğunu göstermektedir.*

Tüketici fiyatları endeksi cinsinden tanımlanan enflasyon değişkenine ilişkin eşik değer 49,300 olup *p* değeri (0,003)'dür. *F* istatistiği katsayısı olan (188,85) değerinden de görülebileceği üzere %10, %5 ve %1'lik tüm kritik değerler bu değerden küçüktür. Bu itibarla, boş hipotez %1 düzeyinde reddedilmektedir. Bir başka ifadeyle, enflasyon ve gelir eşitsizliği arasında doğrusal bir ilişki bulunmamaktadır ve bu ilişki güçlü anlamlı eşik etkisine sahiptir. Enflasyon değişkenine Hansen (1999)'un önerdiği şekliyle çoklu eşik analizi de uygulanmıştır. (10) nolu denklemdeki model ile yapılan test sonuçları, üç ayrı eşik değer parametresi, bu parametrelere ilişkin olasılık değeri, *F* istatistiği ile kritik değerleri Tablo 5'de yer almaktadır.

Tablo: 5
Çok Eşikli Etki Test Sonuçları

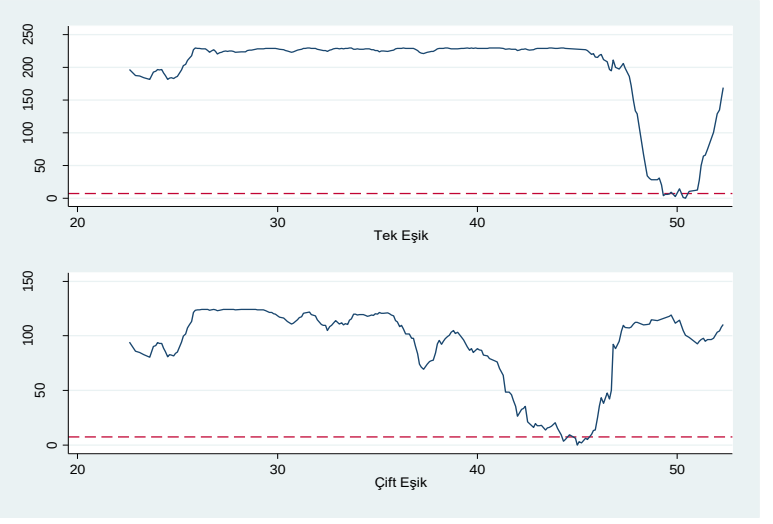
Eşik değer	*F* istatistiği	*p* değeri	Kritik değerler		
			%10	%5	%1
49,300	188,85	√ 0,003*	91,243	113,821	144,232
45,000	129,93	√ 0,010*	83,793	100,555	121,909
24,800	46,53	X 0,666*	125,097	141,026	187,632

*Not: * bootstrap (300) tekrarlı olasılık dağılımını göstermektedir. X ilişkinin anlamsız olduğunu, √ ilişkinin anlamlı olduğunu göstermektedir.*

İkinci eşik değer parametresi *F* istatistik katsayısı (129,93), dağılımın güven aralıkları tarafından belirlenen kritk değer katsayılarından büyüktür ve olasılık değerlei de anlamslıdır. (0,010) Bu bulgular, modelde çift eşikli etkinin olduğunu, ama üç eşikli etkinin olmadığını göstermektedir. Zira, üçüncü eşiğin olasılık değeri (0,666)'dır. (46,53) olan *F* istatistik katsayısı tüm kritik değerlerden küçüktür. Tek ve çift eşik değeri (49,300) ve (45,000) üzerinden yapılan enflasyon oranı tahmin bulgusuna göre enflasyon oranının bu iki seviyeden sonra gelir eşitsizliği üzerinde bir rejim değişikliğine sebep olduğunu söylemek gerekmektedir. Ek-1'de *(GINI MKT)* göstergesi ile yapılan tek ve çok eşikli etki test sonuçları da gösterilmektedir. Bu bulgular da benzer paralellikte olup tek eşik için kaydedilen (126,55)'lik değer, dağılımın %5'lik değerinden; çift eşik için tespit edilen

(115,10)'luk değer dağılımın %1'lik kritik değerinden daha küçüktür. Yani, boş hipotez tek eşik için %5, çift eşik için %1 anlamlılık seviyesinde reddedilmektedir. Sağlamlık kontrolü için tercih edilen *(GINI_MKT)* değişkeni de enflasyon ile doğrusal olmayan bir ilişki içerisindedir.

Şekil: 1
Tek ve Çift Eşik için LR En Çok Olabilirlik İstatistikleri



LR en çok olabilirlik istatistikleri, eşik değer testinde dağılımın güven aralıklarını tespit etmek için kullanılmaktadır. Şekil 1'deki kırmızı kesikli yatay çizgi, %95 anlamlılık seviyesinin kritk değerini temsil etmektedir. Bu değer (7,35) olarak gösterilmektedir. Modelde %95 güven aralığı alt (lower) ve üst (upper) seviyeleri tek eşik için [49,200 ve 49,400] olarak tespit edilmektedir. En çok olabilirlik fonksiyonunu minimize eden ve en küçük kareler toplamı ile tahmin edilen eşik değer ise (49,300)'dür. Çift eşik için alt ve üst seviyeler [44,750 ve 45,100] olarak tespit edilmektedir. En çok olabilirlik fonksiyonunu minimize eden ve en küçük kareler toplamı ile tahmin edilen çift eşik değer ise (45,000)'dir. Bu eşik değerler her iki eşik için iki farklı rejimin varlığına dair kanıt sunmaktadır. Şekil 1'de tek ve çift eşik parametre değerini temsil eden bu grafikler gösterilmektedir. Ek-2'de *(GINI_MKT)* değişkeni için alt ve üst seviyelerin resmedildiği LR en çok olabilirlik istatistikleri grafiği de yer almaktadır. Bu seviyeler tek eşik için [42,350 ve 42,600], çift eşik için [51,650 ve 51,900] olarak tespit edilmektedir. En çok olabilirlik fonksiyonunu minimize eden ve en küçük kareler toplamı ile tahmin edilen eşik değerler ise tek eşik için (42,500), çift eşik için (51,800)'dür.

Tablo 6'da β_1 ve β_2, enflasyonun gelir eşitsizliği üzerindeki rejime bağlı etkisini temsil eden parametrelere karşılık gelen katsayılardır. Tek eşik için (49,300), çift eşik için

(45,000) olan eşik enflasyon değerlerinin altında enflasyon gelir eşitsizliği ilişkisi ters yönlü (negatif) iken bu değerin üzerinde bir enflasyon oranı gelir eşitsizliğini aynı yönde (pozitif) etkilemektedir. Her iki parametre de istatistiki olarak güçlü derecede anlamlıdır (0,003 ve 0,010). Elde edilen bulguların Bulíř (2001), Galli & Van der Hoeven (2001), Monnin (2014) ve Balcılar vd. (2018) ile ortaya koyulan ve Şekil 1'de de temsil edilen U -şekilli enflasyon-gelir eşitsizliği ilişkisi ile paralel olduğu görülmektedir. Ek-3'de (*GINI_MKT*) göstergesi ile gerçekleştirilen sağlamlık kontrolü analiz bulguları da yer almaktadır ve sonuçlar kontrol değişkenlerden biri olan *(YATIRIM)* değişkeni hariç paralellik göstermektedir. Bu sonuç, panele konu olan 40 adet ülke için bu değerlerin altında bir enflasyon (tüketici fiyat endeksi) oranının gelir elde eden bireyler ve/veya gelir grupları arasında (göreli) adil dağılımı sağladığına işaret etmektedir. Gerçekten de düşük bir enflasyon oranı hanehalkının ya da bireylerin satın alma gücünü olumlu etkileyebilir. Satın alma gücü artan bireylerin tüketim veya transferler yoluyla gelirin bireyler/gelir grupları arasında (adil) dağılımını veya birbirine aktarımını sağlaması, gelir eşitsizliğinin azaltılmasında rol oynayabilir.

Tablo: 6
Enflasyonun Gelir Eşitsizliği Üzerindeki Rejim ve Kontrol Değişken Tahmini Sonuçları

Eşik Değer Tahmini		
Tek Eşik Değer Parametresi	49,300***	√ 0,003
%95 Güven Aralığı	[49,200 ve 49,400]	
Çift Eşik Değer Parametresi %95 Güven Aralığı	45,000** [44,750 ve 45,100]	√ 0,010
Tek Eşik için Rejim Katsayıları *(Enflasyonun Gelir Eşitsizliği Üzerindeki Etkisi)*		
β_1	-0,048*** (0,004)	√ 0,000
β_2	0,022*** (0,002)	√ 0,000
Çift Eşik için Rejim Katsayıları *(Enflasyonun Gelir Eşitsizliği Üzerindeki Etkisi)*		
β_1	-0,003*** (0,002)	√ 0,000
β_2	0,057*** (0,004)	√ 0,000
Kontrol Değişkenler		
BUYUME	2,216*** (0,385)	√ 0,000
ISSIZLIK	0,145*** (0,020)	√ 0,000
ACIKLIK	-0,020*** (0,002)	√ 0,000
TUKETIM	-1,954*** (0,270)	√ 0,000
YATIRIM	-0,404*** (0,238)	√ 0,090
N	1080	
R-sq	0,043 [0,031 ve 0.397]	

*Not: ***, **, * sırasıyla %1, 5 ve 10 anlamlılık seviyesini göstermektedir. √ ilişkinin anlamlı olduğunu belirtmektedir. Parantez içindeki değerler standart sapmaları, parantezden önceki değerler katsayıları ifade etmektedir.*

Panele konu olan ülkelerin homojen tüketici fiyat endeski oranlarına sahip olmadıkları göz önüne alındığında, ülkelerin gelişmişlik seviyelerinin de önemli olduğu düşünülmektedir. Eşik tüketici fiyat endeksi seviyelerinin altında enflasyonun gelir eşitsizliği ile ters (negatif) yönlü ilişkisi, bu değerin üzerindeki pozitif yönlü ilişkisi, panele konu olan ülkeler için düşük ve yüksek enflasyon değerlerine politika yapıcıların farklı şekillerde önem vermesi gerekliliğini doğrulamaktadır. Yüksek bir enflasyon paranın satın alma gücünü düşürerek yaşam maliyetlerini artırmaktadır. Öte yandan, gelişmiş ve gelişmekte olan ülkeler açısından enflasyonun gelir eşitsizliği ile olan ilişkisi noktasında dikkate alınması gereken bazı hususlar vardır. Enflasyonun geliri, borçlu kesime doğru alacaklı kesimden alarak dağıttığını öngören borçlu-alacaklı hipotezi bu hususlardan bir

tanesidir. Gelişmekte olan ülkelerdeki düşük ve orta gelir grupları genel olarak borçlu kesimi oluşturmaktadır. Yüksek gelirliler ise bu ülkelerde alacaklı durumdadır. Bireyler yaşları ilerledikçe birikim yaparak ekonomik refah seviyelerini yükseltmektedir. Bireyler, görece gençken çalıştıkları için bu dönemde birikim yapıp borçlanmaktadır. Yani, bu kesimin enflasyona endeksli olmayan borçlarının reel değeri yüksek enflasyon sebebiyle azalabilmektedir. Başka bir deyişle enflasyon, ileri yaştaki kesimden orta yaştaki daha genç guruba; alacaklı kesimden borçlu kesime geliri yeniden dağıtmaktadır. Hâliyle her ne kadar yüksek enflasyon oranlarının gelir eşitsizliği ile ilişkisi önemli olsa da özellikle gelişmekte olan ülkelerin içlerinde bulunduğu yapısal durum, hem yüksek hem düşük enflasyon durumlarında dâhi bu hususların göz önünde bulundurulmasını gerekli kılmaktadır. Öte yandan, gelişmekte olan ülkelerde kamu borcu seviyesi de çok yüksek olabilir. Hükümetler bu durumda borcun reel değerini düşürmek için para basma yolunu tercih edebilmektedir. Bu durumda enflasyon yükselebilmektedir ve gelir, alacaklı konumundaki yüksek gelirlilerden hükümete doğru aktarılmaktadır.

(TUKETIM), (ACIKLIK) ve (YATIRIM) değişkenleri ise gelir eşitsizliği ile negatif ilişkilidir. İktisat disiplini açısından önemli olan bireylerin tüketimi ya da harcamaları değil, tüm toplumun/devletin yaptığı tüketimlerdir/harcamalarıdır (Şengür & Taban, 2016: 50). Bu sebeple, GSYH yüzdesi olarak nihai tüketim harcamaları analize dâhil edilmiştir. Bu harcama kalemi içinde larının gelir, tüketim, tasarruf tercihlerini önemli ölçüde etkileyen sosyal nitelikli harcamalar da bulunmaktadır. Bu noktada, hükümetin hangi gelir gruplarına dönük harcama yaptığı önem kazanmaktadır. Söz gelimi devletler, büyüme ve yatırım gibi çeşitli makroekonomik göstergelerde iyileşme sağlamak adına, geliri yüksek gelirlilere aktarabilir. Oysa ki, gelir eşitsizliğinin azaltılmasını hedefleyen bir politika, gelirin düşük ve orta gelir gruplarına aktarılarak bu gelir gruplarının harcama veya tüketim kararlarını etkilemeyi öncelemelidir. *(ACIKLIK)* ve *(YATIRIM)* değişkenlerinin negatif yönlü bulguları ve *(BUYUME)* değişkeninin pozitif yönlü bulgusu da dikkate değerdir. Ekonomik büyümenin gelir eşitsizliği ile ilişkisi, Simon Kuznets'in ters U şekilli teorisinden bu yana sıklıkla tartışılmaktadır. Bazı gelişmekte olan ülkelerde büyüme ile gelir eşitisizliği arasında pozitif yönlü, bazı ülkelerde ve gelişmiş ekonomilerde negatif yönlü ilişki tespit edilmekte olup analiz bulgularının önceki literatür ile uyumlu olduğu görülmektedir. Dışa açıklığın ve sabit sermaye oluşumunun gelir eşitsizliği ile negatif yönlü ilişkisi; ihracat-ithalat dengesi, üretim faktörlerinin niteliği ve niceliği, işgücünün vasıflı olup olmaması, emeğin verimliliği, ekonominin emek ya da sermaye yoğun üretim yapısı, tarım veya sanayi sektöründeki yoğunlaşma, teknoloji transferi, ücretlerin seviyesi gibi pek çok kanal ile ilişkili değerlendirilmesi gereken bir bulgudur. Panele konu olan ülkelerin gelişmiş ve gelişmekte olan heterojen yapısı göz önüne alındığında, söz konusu kanalların ilişkiyi farklı yönde etkileyeceği açıktır. Her ne kadar bulgular, önceki literatür ile uyumlu olsa da gelecek çalışmalar açısından bu hususların araştırılması da önem arz etmektedir.

Öte yandan, *(ISSIZLIK)* değişkeninin gelir eşitsizliği üzerine etkisi pozitiftir. Artan gelir eşitsizliği bireylerin yoksullaşmasına sebep olur. Yoksullaşan bireyler ise işsizliğe karşı duyarlı hâle gelecektir ve işgücüne katılma konusunda daha istekli olabileceklerdir. Ancak, eşitsizliğin azaltılması için gerekli olan istikrar politikalarının türü ve bu politikalar ile

işgücü piyasası politikaları arasındaki etkileşim hususunda belirsizlikler vardır. Birincisi, istikrar araçlarının seçimi gelecekteki ekonomik büyüme ve istihdam yaratma etkileri bakımından farklı sonuçlara sahip olabilir. İkincisi, gelir eşitliği, siyasi belirsizlikten ve istikrar ömlemlerinden kimin fayda sağlayacağıyla ilgili anlaşmazlıkların çözülmesine katkıda bulunduğu için başarılı istikrar politikalarının gelir eşitsizliğinin azaltılmasına yardımcı olacağı hususudur (Van der Hoeven, 2000: 28). Rodrik (1998), ülkeler arası regresyon analizi aracılığıyla sosyal çatışma ve gelir dağılımı gibi değişkenlerin ülkelerin dış şoklar ile başa çıkma yetenekleri hakkında güçlü bir açıklama gücüne sahip olduğunu göstermiştir (Rodrik, 1998: 156). Bununla birlikte, işgücü piyasası esnekliği, kayıt dışı sektör istihdamının artması, asgari ücretlerin düşmesi, yüksek büyüme oranlarına sahip bazı ülkeler dışında gelir eşitsizliğini artırabilir. Bu nedenle, reform sürecinde işgücü piyasasında daha fazla eşitsizliğe yol açan, işgücü piyasasının yeniden dağıtım işlevine verilen önemin, büyümeyi teşvik etmek ve yoksulluğu azaltmak için tercih edilen politika aracı olmaması gerektiği sonucuna varılabilir. Esnek olmayan ücretler, (merkezi bir ücret politikası) işgücü piyasasının yeniden dağıtım işlevi üzerinde bir engel olarak düşünülebilir. Buna karşın, merkezi ücret belirlemenin daha düşük eşitsizliği ve daha düşük enflasyon oranlarını desteklediğine (eğer gerçek bir toplu pazarlık sürecinin sonucuysa) dair kanıtlar da mevcuttur (Van der Hoeven, 2000: 29-30). Fanelli & Frenkel (1995), enflasyondaki bir düşüşün endüstrileri ve kurumları etkilediğini, bunun istihdam kapasitesine zarar verdiğini ve yenilenen enflasyon eğilimlerini güçlendirdiğini ileri sürmektedir (Fanelli & Frenkel, 1995: 21). Amadeo (1996), enflasyonu düşürmek için döviz kurunu aşırı değerli tutmanın ve döviz kuru-baz istikrarının endüstriyel rekabet gücünde ve istihdamda bir kayba yol açabileceğini ileri sürmektedir (Amadeo, 1996: 1).

6. Sonuç ve Değerlendirme

Geçtiğimiz yıllar içerisinde makroekonomik politikaların gelir dağılımı boyutunu inceleyen çalışmaların sayısı artmıştır. Maliye ve para politikaları farklı makroekonomik hedeflere ulaşmada kullanılmakla birlikte yarattıkları sonuçlar ile gelir dağılımını değiştirebilmektedir. Literatürde gelirin yeniden dağıtımı olarak ifade edilen piyasa geliri ile harcanabilir gelirin farklılaşması durumu, genellikle hükümetlerin transfer, harcama, vergi ve istihdam politikaları ile ilişkilendirilmektedir. Söz konusu mali ve yarı-mali kanalların yanı sıra para politikası da enflasyon, gelir kompozisyonu, tasarruflar, faiz oranı, portföy kompozisyonu gibi kanallar ile geliri yeniden dağıtmaktadır. Özellikle son yıllarda enflasyonun gelir eşitsizliğini açıklayan bir değişken olarak sıklıkla analizlerde yer aldığı gözlemlenmektedir. Bazı çalışmalarda, bu etki belirsiz ve anlamsız olarak değerlendirilmiştir. Diğer yandan, enflasyonun gelir eşitsizliğini azalttığı veya artırdığı yönündeki bulgulara ulaşan çalışmalar da mevcuttur. Bununla birlikte, enflasyonun dağıtımsal etkilerinin doğrusal olmadığına işaret eden çalışmalar söz konusu etkinin dikkate alınmadığı durumlarda eksik veya tutarsız sonuçlar elde edilebileceğine işaret etmektedir.

Bu bağlamda, çalışmamız enflasyonun gelir dağılımı üzerindeki etkisini, 40 adet gelişmiş ve gelişmekte olan ülke ve 1993-2019 yıllarını kapsayan dönem için ortaya koymaktadır. İlk olarak, sabit etkiler modeli kullanılarak panel veri analizi gerçekleştirilmiş;

elde edilen bulguların doğrusal olmayan bir ilişkinin varlığına işaret edebileceği düşüncesiyle devamında Hansen (1999) panel sabit etkiler eşik değer analizi uygulanmıştır. Analiz sonuçları, enflasyon ve gelir eşitsizliği arasındaki doğrusal olmayan ilişkiyi doğrulamış ve tüketici fiyat endeksi cinsinden tanımlanan enflasyon değişkeni bakımından (49,300) ve (45,000) eşik değerleri saptanmıştır. Analizde bağımlı değişken olarak tanımlanan vergi ve transferler sonrası gelir eşitsizliği katsayısının yanında, sağlamlık kontrolü için vergi ve transferler öncesi gelir eşitsizliği katsayısı da yer almaktadır. Buna göre enflasyon-gelir eşitsizliği arasında, kritik eşiklerin altında ve üzerinde söz konusu ilişkinin yönü farklılaşmaktadır. Bir başka ifadeyle, enflasyon ve gelir eşitsizliği ilişkisinin yönünü enflasyon seviyesi belirlemektedir. Eşik değerin altında, enflasyon ve gelir eşitsizliği arasında ters yönlü, üzerinde ise aynı yönlü bir ilişkinin varlığı ortaya koyulmuştur. Panele konu ülkelerin gelişmiş ve gelişmekte olan, özdeş bir yapıda olmadığı göz önüne alındığında, analiz bulgularının dikkatli yorumlanması gerekmektedir. İster gelişmiş ister gelişmekte olan ülke olsun, herhangi bir ekonomide genel ekonomik denge ile makroekonomik göstergelerde bozulmaya yol açabilecek enflasyon olgusu, politika yapıcıların yoğunlaşması gereken önemli bir iktisadi husustur. Satın alma gücünü olumsuz etkileyip yaşam maliyetlerini artıran enflasyon, önlem alınmazsa başka birçok sorunu beraberinde getirebilmektedir. Öte yandan, fiyatlardaki artış, yeniden dağıtım etkisi yoluyla eşitsizliğin azalmasına da neden olabilir. Bu etkinin, daha müreffeh olan borç verenlerden daha az varlıklı borçlulara gerçek servet transferiyle sonuçlanan enflasyon kanalıyla ilişkili olup olmadığının tespiti gerekmektedir. Para otoritelerinin uygulayacağı enflasyon hedeflemesi politikası, enflasyondaki oynaklığı azaltmakta ve bu kanalın gelir eşitsizliği üzerindeki işleyişini sınırlandırmada önemli rol oynamaktadır. Aynı zamanda, fiyat istikrarının sağlanmasının bir sonucu olarak eşitsizlikteki artışın nicel tahminleri ülkeden ülkeye nispeten düşük kalabilmektedir. Bununla birlikte, enflasyonun yeniden dağıtım etkileri oldukça karmaşık olduğundan enflasyonun gelir dağılımı etkilerini yalnızca alacaklılardan borçlulara yeniden dağıtım şeklinde değerlendirmek de eksik olacaktır. Bunun nedeni, gelirin (ve servetin) enflasyona bağlı olarak yeniden dağıtılmasının kurumsal faktörler, paraya erişim, tüketim ve harcama sepetlerindeki farklılıklar veya ekonomik birimlerin varlık ve yükümlülüklerinin yapısı gibi birçok şeye bağlı olmasıdır. Başka bir deyişle, farklı grupların göreli gelir (ve servet) konumundaki değişiklikler, büyük ölçüde, malların ve varlıkların göreli fiyatlarındaki hareketlere, mal ve varlıkların mülkiyetindeki farklılıklara bağlıdır. Bu sebeple analize, diğer kontrol değişkenler de eklenmiştir ve bu değişkenlerin de bağımlı değişken gelir eşitsizliği ile ilişkisi beklentilere ve öngörülere uygundur. Gelecek çalışmaların, gelir eşitsizliği göstergesi ile ilişkili kısıtları gözeterek başka örneklemler için analizler gerçekleştirmesi, yeterli gözlem sayısına ulaşılması durumunda gelişmiş ve gelişmekte olan ülkelerin ayrı panellerde analiz edilmesi, metodolojik avantaj sağlayan başka yöntemlerin de analizlere dâhil edilmesi araştırma alanına olan katkıyı geliştirebilecektir. Gelir eşitisizliği gibi dağıtımsal etkileri ekonomi üzerinde farklı sonuçlar doğuran ve gecikme etkisi ile başka iktisadi göstergeleri etkilemesi muhtemel kanalların dinamik yapıdaki panel eşik modelleri ile tahminlenmesinin de araştırma alanını genişletebileceği düşünülmektedir.

Kaynaklar

Abdul, J. (2012), "Modeling Income Inequality and Openness in the Framework of Kuznets Curve: New Evidence from China", *Economic Modelling*, 29(2), 309-315.

Achdut, L. (1996), "Income Inequality, Income Composition and Macroeconomic Trends: Israel, 1979-93", *Economica*, 63(250), 1-27.

Albanesi, S. (2007), "Inflation and Inequality", *Journal of Monetary Economics*, 54(1), 1088-1114.

Amadeo, E.J.S. (1996), "The Knife-Edge of Exchange Rate-Based Stabilization Impacts on Growth, Employment and Wages", *UNCTAD Review*, 361, UN Conference on Trade and Development, Cenova.

Ang, J.B. (2010), "Finance and Inequality: The Case of India", *Southern Economic Journal*, 76(3), 738-761.

Argun, A.İ. (2016), "Gelişmekte Olan Ülkelerde Finansal Gelişme ve Gelir Eşitsizliği", *İstanbul Üniversitesi Sosyal Bilimler Dergisi*, 2016(1), 61-74.

Atkinson, A. (1996), "Seeking to Explain the Distribution of Income", in: J. Hills (ed.), *New Inequalities* Cambridge: Cambridge University Press, 19-48.

Bach, G.L. & A. Ando (1957), "The Redistributional Effects of Inflation", *The Review of Economics and Statistics*, 39(1), 1-13.

Bai, J. & P. Perron (1998), "Estimating and Testing Linear Models with Multiple Structural Changes", *Econometrica*, 66(1), 47-78.

Bai, J. (1997), "Estimating Multiple Breaks One at a Time", *Econometric Theory*, 13(3), 315-352.

Balcılar, M. et al. (2018), "The Relationship between the Inflation Rate and Inequality Across US States: A Semiparametric Approach", *Quality & Quantity*, 52(5), 2413-2425.

Björklund, A. (1991), "Unemployment and Income Distribution: Time-Series Evidence from Sweden", *Scandinavian Journal of Economics*, 93(3), 457-465.

Blejer, M. & I. Guerrero (1990), "The Impact of Macroeconomic Policies on Income Distribution: An Empirical Study of the Philippines", *The Review of Economics and Statistics*, 72(3), 414-423.

Bulíř, A. (2001), "Income Inequality: Does Inflation Matter?", *IMF Staff Papers*, 48(1), 139-159.

Caminada, K. et al. (2017), "Income Inequality and Fiscal Redistribution in 47 LIS-Countries 1967-2014", *LIS Working Paper Series*, 724, Luxembourg Income Study Cross-National Data Center, Luxembourg.

Chan, K.S. (1993), "Consistency and Limiting Distribution of the Least Squares Estimator of a Threshold Autoregressive Model", *Annals of Statistics*, 21(1), 520-533.

Chatterjee, S. & D. Corbae, (1992), "Endogenous Market Participation and the General Equilibrium Value of Money", *Journal of Political Economy*, 100(3), 615-646.

Chu, K.-Y. et al. (2000), "Income Distribution and Tax, and Government Social Spending Policies in Developing Countries", *UNI/WIDER Working Papers*, 214, UNU World Institute for Deevelopment Economics Research, Helsinki.

Colciago, A. et al. (2019), "Central Bank Policies and Income and Wealth Inequality: A Survey", *Journal of Economic Surveys*, 33(4), 1199-1231.

Doepke, M. & M. Schneider (2006), "Inflation and the Redistribution of Nominal Wealth", *Journal of Political Economy*, 114(6), 1069-1097.

Dolmas, J. et al. (2000), "Inequality, Inflation, and Central Bank Independence", *The Canadian Journal of Economics*, 33(1), 271-287.

Easterly, W. & S. Fischer (2001), "Inflation and the Poor", *Journal of Money, Credit and Banking*, 33(2), 160-178.

Erosa, A. & G. Ventura (2002), "On Inflation as A Regressive Consumption Tax", *Journal of Monetary Economics*, 49(4), 761-795.

Fanelli, J.M. & R. Frankel (1995), *Micro-Macro Interaction in Economic Development*, <https://repositorio.cedes.org/handle/123456789/3924>, 19.04.2021.

Fischer, S. & F. Modigliani (1978), "Towards An Understanding of the Real Effects and Costs of Inflation", *Review of World Economics*, 114(4), 810-833.

Franco, C. & E. Gerussi (2013), "Trade, Foreign Direct Investments (FDI) and Income Inequality: Empirical Evidence from Transition Countries", *The Journal of International Trade & Economic Development*, 22(8), 1131-1160.

Galli, R. & R. Van der Hoeven (2001), "Is Inflation Bad for Income Inequality: The Importance of the Initial Rate of Inflation", *ILO Employment Paper*, 2001/29, ILO, Cenova.

Gottschalk, P. & T. Smeeding (1997), "Cross-National Comparisons of Eamings and Income Inequality", *Journal of Economic Literature*, 35(2), 633-687.

Gülmez, A. & N. Altıntaş (2015), "Türkiye'de Ticari Açıklık ve Enflasyonun Gelir Dağılımına Etkisi: Ekonometrik Bir Analiz", *Kafkas Üniversitesi İİBF*, 6(9), 31-44.

Hansen, B.E. (1999), "Threshold Effects in Non-Dynamic Panels: Estimation, Testing, and Inference", *Journal of Econometrics*, 93(2), 345-368.

Jäntti, M. & S.P. Jenkins (2010), "The Impact of Macroeconomic Conditions on Income Inequality", *The Journal of Economic Inequality*, 8(2), 221-240.

Kane, C.T. & J. Morisset (1993), "Who Would Vote for Inflation in Brazil?: An Integrated Framework Approach to Inflation and Income Distribution", *Policy Research Working Paper Series*, 1183, The World Bank.

Kuznets, S. (1955), "Economic Growth and Income Inequality", *The American Economic Review*, 45(1), 1-28.

Meh, C. & Y. Terajima (2009), "Unexpected Inflation and Redistribution of Wealth in Canada", *Bank of Canada Review*, 2009(Spring), 45-52.

Meh, C. & Y. Terajima (2010), "Aggregate and Welfare Effects of Redistribution of Wealth under Inflation and Price-Level Targeting", *Journal of Monetary Economics*, 57(6), 637-652.

Menna, T. & P. Tirelli (2017), "Optimal Inflation to Reduce Inequality", *Review of Economic Dynamics*, 24(2), 79-94.

Milanovic, B. (1994), "Determinants of Cross-Country Income Inequality: An Augmented Kuznets Hypothesis", *World Bank Policy Research Working Paper*, 1246, World Bank Group, Washington, D.C.

Monnin, P. (2014), "Inflation and Income Inequality in Developed Economies", *CEP Working Paper Series*, 2014/1, Council on Economic Policies, Zurich.

Mumtaz, H. & A. Theophilopoulou (2017), "The Impact of Monetary Policy on Inequality in the UK: An Empirical Analysis", *European Economic Review*, 98(8), 410-423.

Nolan, B. (1988), "Macroeconomic Conditions and the Size Distribution of Income: Evidence from the United Kingdom", *Journal of Post Keynesian Economics*, 11(2), 196-221.

Park, C-Y. & R.V.Jr. Mercado (2015), "Financial Inclusion, Poverty, and Income Inequality in Developing Asia", *ADB Economics Working Paper Series*, 426, Asian Development Bank, Tokyo, Japan.

Ribba, A. (2003), "Short-Run and Long-Run Interaction Between Inflation and Unemployment in the USA", *Applied Economics Letters*, 10(6), 373-376.

Rodrik, D. (1998), "Globalisation, Social Conflict and Economic Growth", *The World Economy*, 21(2), 143-158.

Romer, C.D. & D.H. Romer (1998), "Monetary Policy and the Well-Being of the Poor", *NBER Working Paper*, 6793, National Bureau of Economic Research, Cambridge, Mass.

Şengür, M. & S. Taban (2016), "Gelir Dağılımı-Tasarruf İlişkisi: Türkiye'de Gelir Türünün Tasarruflar Üzerindeki Etkisi", *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 16(1), 49-71.

Shahbaz, M. & F. Islam (2011), "Financial Development and Income Inequality in Pakistan: An Application of ARDL Approach", *MPRA Paper Series*, 28222, Munich Personal RePEc Archive, Utah, USA.

Shahbaz, M. et al. (2015), "Financial Development and Income Inequality: Is there any Financial Kuznets Curve in Iran", *Social Indicators Research*, 124(2), 357-382.

Sieroń, A. (2017), "Inflation and Income Inequality", *Prague Economic Papers*, 26(6), 633-645.

Solt, F. (2020), "Measuring Income Inequality Across Countries and Over Time: The Standardized World Income Inequality Database", *Social Science Quarterly*, 101(3), 1183-1189.

Sturzenegger, F. (1992), "Inflation and Social Welfare in a Model with Endogenous Financial Adaptation", *NBER Working Paper*, 4103, National Bureau of Economic Research, Cambridge, Mass.

Sun, H. (2011), *Search, Distributions, Monetary and Fiscal Policy*, Kingston: Queen's University, Department of Economics, <https://www.chicagofed.org/events/2011/index>, 17.04.2021.

Thalassinos, E. et al. (2012), "Income Inequality and Inflation in the EU", *European Research Studies Journal*, 15(1), 127-140.

Topuz, S.G. & Ö. Dağdemir (2016), "Finansal Gelişme ve Gelir Eşitsizliği: Bir Panel Veri Analizi", *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 16(3), 19-34.

Ün, T. (2018), "Stata ve Panel Modellerinin Tahmini", içinde: S. Güriş (ed.), *Uygulamalı Panel Veri Ekonometrisi*, İstanbul: Der Yayınları, 43-72.

Van der Hoeven, R. (2000), "Labour Markets and Income Inequality What are the New Insights after the Washington Consensus?", *UNI/WIDER Working Papers*, 209, UNU World Institute for Deevelopment Economics Research, Helsinki.

Wang, Q. (2015), "Fixed-Effect Panel Threshold Model Using Stata", *The Stata Journal*, 15(1), 121-134.

Wolff, E.N. (1979), "The Distributional Effects of the 1969-75 Inflation on Holdings of Household Wealth in the United States", *Review of Income and Wealth*, 25(2), 195-207.

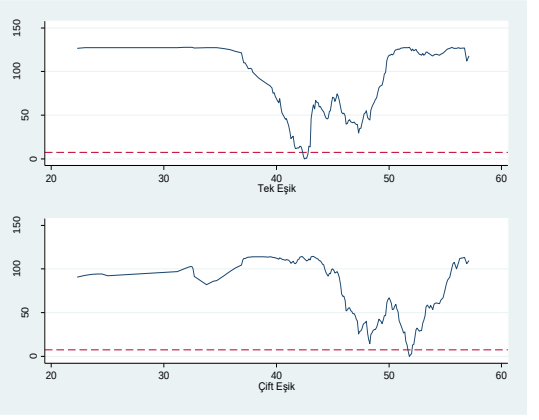
Zheng, Z. (2020), "Inflation and Income Inequality in a Schumpeterian Economy with Menu Costs", *Economic Letters*, 186(1), 1-5.

Ek: 1
(GINI_MKT) Bağımlı Değişkeni ile Yapılan Tek ve Çok Eşik Etki Testi Bulguları

Eşik Değer	*F* İstatistiği	*p* Değeri	Kritik Değerler		
			%10	%5	%1
42,500	126,55	√ 0,053*	104,855	128,141	168,325
51,800	115,10	√ 0,013*	76,911	92,149	115,586
47,300	69,16	X 0,483*	116,827	138,245	194,080

*Not: * bootstrap (300) tekrarlı olasılık dağılımını göstermektedir. X ilişkinin anlamsız olduğunu, √ ilişkinin anlamlı olduğunu göstermektedir.*

Ek: 2
(GINI_MKT) Bağımlı Değişkeni ile Yapılan Tek ve Çift Eşik için LR En Çok Olabilirlik İstatistikleri



Ek: 3
Enflasyonun Gelir Eşitsizliği Üzerindeki Rejim ve Kontrol Değişken Tahmini Sonuçları (*GINI_MKT*)

Eşik Değer Tahmini		
Tek Eşik Değer Parametresi	42,500**	√ 0,053
%95 Güven Aralığı	[42,350 ve 42,650]	
Çift Eşik Değer Parametresi %95 Güven Aralığı	51,800** [51,650 ve 51,900]	√ 0,013
Tek Eşik için Rejim Katsayıları *(Enflasyonun Gelir Eşitsizliği Üzerindeki Etkisi)*		
β_1	-0,032*** (0,002)	√ 0,000
β_2	0,013*** (0,002)	√ 0,000
Çift Eşik için Rejim Katsayıları *(Enflasyonun Gelir Eşitsizliği Üzerindeki Etkisi)*		
β_1	-0,000*** (0,002)	√ 0,000
β_2	0,023*** (0,003)	√ 0,000
Kontrol Değişkenler		
BUYUME	1,587*** (0,407)	√ 0,000
ISSIZLIK	0,153*** (0,021)	√ 0,000
ACIKLIK	-0,023*** (0,002)	√ 0,000
TUKETIM	-1,294*** (0,287)	√ 0,000
YATIRIM	-0,129 (0,251)	X 0,608
N	1080	
R-sq	0,187 [0,170 ve 0,383]	

*Not: ***, **, * sırasıyla %1, 5 ve 10 anlamlılık seviyesini göstermektedir. √ ilişkinin anlamlı olduğunu belirtmektedir. Parantez içindeki değerler standart sapmaları, parantezden önceki değerler katsayıları ifade etmektedir.*

Sosyoekonomi

2022, Vol. 30(51), 471-486

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.23
Date Submitted: 26.04.2021
Date Revised: 23.10.2021
Date Accepted: 24.01.2022

COVİD-19 ve Aşı Haberlerinin Borsa İstanbul Sektör Endekslerine Etkisi: Bir Olay Etüdü Analizi

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The Effects of Covid-19 and Vaccine News on The BIST Industrial Indexes: A Case Study Analysis

Abstract

The coronavirus (Covid-19) originated from China. It spread across the globe, and the news regarding the development of various vaccines has affected the economies of numerous countries and capital markets alongside the BIST industrial indexes. This study investigates how the declaration of the pandemic by the World Health Organization (WHO), the news of the first case of the virus, the first death caused by the virus and the first shipment of the vaccine for the virus impacted the BIST industrial indexes by way of using daily data and constructing a case study. According to the results obtained from the analysis, it was detected that the first event day and the second event day caused mostly abnormal losses on the sectors, and the third event day caused positive abnormal returns on the sectors. As a result of the news, it has been determined that the sector with the most abnormal returns and losses is tourism.

Keywords : Covid-19, Stock Markets, Borsa İstanbul, Sector Indices, Event Study.

JEL Classification Codes : I00, G10, G14.

Öz

Çin'de ortaya çıkan ve hızla dünyaya yayılan korona virüs (Covid-19) ve bu virüse yönelik geliştirilen aşı haberleri birçok ülke ve sermaye piyasası ile birlikte Borsa İstanbul sektör endekslerini de etkilemiştir. Bu çalışmada, Dünya Sağlık Örgütü (DSÖ)'nün pandemi ilanı ve Türkiye'de ilk vaka, Türkiye'de ilk ölüm ve Türkiye'ye ilk aşı geliş haberlerinin Borsa İstanbul sektör endeksleri üzerindeki etkisi günlük veriler kullanılarak olay etüdü yöntemi ile incelenmiştir. Analiz sonucunda ilk olay günü ve ikinci olay gününün sektörler üzerinde çoğunlukla anormal kayıplara, üçüncü olay gününün ise sektörler üzerinde pozitif anormal getirilere neden olduğu tespit edilmiştir. Haberler neticesinde en çok anormal getiri ve kayıpların yaşandığı sektörün turizm olduğu belirlenmiştir.

Anahtar Sözcükler : Covid-19, Hisse Senedi Piyasası, Borsa İstanbul, Sektör Endeksi, Olay Etüdü.

1. Giriş

İlk olarak 31 Aralık 2019'da nedeni bilinmeyen bir zatürre olarak Çin'den Dünya Sağlık Örgütü (DSÖ)'ne bildirilen vaka sonrasında, önce Çin'e sonra dünya ülkelerine yayılan ve Covid-19 olarak adlandırılan bulaşıcı hastalık, 30 Ocak 2020'de Dünya Sağlık Örgütü tarafından uluslararası halk sağlığı acil durumu olarak ilan edilmiştir. 11 Mart 2020 tarihinde ise DSÖ Genel Sekreteri'nin açıklamasıyla DSÖ tarafından pandemi olarak ilan edilmiştir.

Covid-19, hem coğrafik açıdan hem de etkilediği ekonomi, eğitim, sağlık, sosyal hayat, çevre, turizm gibi alanlar açısından değerlendirildiğinde oldukça geniş çaplı etkiler yaratmıştır. Bunlardan biri olan borsa getirileri de büyük olaylara tepki veren bir alan olarak Covid-19 gelişmelerinden olumsuz etkilenmiştir (Alam et al., 2020; Ashraf, 2020; Goodell & Huynh, 2020; He et al., 2020; Liu et al., 2020; Singh et al., 2020; Heyden & Heyden, 2021; Pandey & Kumari, 2021; Sun et al. 2021). Sektör ya da firma düzeyinde getirilere bakıldığında ise etkinin yönünün ve boyutunun birimler arasında farklılaştığı gözlemlenmiştir (Kılıç, 2020; Maneenop & Kotcharin, 2020; Göker, 2020; Peker & Demirhan, 2020; Öztürk, 2020; Tayar, 2020).

Literatürde yer alan çalışmalar genellikle Covid-19'un halk sağlığı acil durumu ilan edilişi, pandemi olarak ilan edilişi, ülkedeki ilk vakanın ve ilk ölümün ortaya çıkış tarihi gibi virüsün çıkışına yönelik tarihlerin etkilerini araştırmaktadır. Bu çalışmada virüsün çıkışına yönelik 11 Mart 2020 Türkiye'de ilk vaka ve DSÖ'nün pandemi ilanı vakası ile 17 Mart 2020 Türkiye'de Covid-19 kaynaklı ilk ölüm vakasının yanı sıra, literatürde bir eksiklik olan, aşı gelişmelerinin Borsa İstanbul sektör getirilerine olan etkisinin yönü ve büyüklüğünün ortaya konulması amaçlanmaktadır. Dünya'da ve Türkiye'de aşıyla ilgili birçok haber yayımlanmıştır. Fakat bu haberlerin Türkiye özelinde ilk somut etkisi 30 Aralık 2020 CoronaVac aşısının ilk partisinin Türkiye'ye gelmesidir. Üçüncü olay günü olarak alınan bu tarih normalleşme sürecine ışık yakan, vatandaşlara yönelik aşı uygulamasının başlayacağına ilişkin öncü bir gösterge niteliğindedir. Çalışmada, Covid-19 kaynaklı yaşanan finansal piyasalardaki negatif algının, bu olumlu nitelikte görülebilecek aşı haberi ile finansal piyasalardaki negatif algıyı azaltabileceği öngörülerek hangi sektör endeksleri üzerinde nasıl bir etkisi olacağının tespit edilmesi amaçlanmıştır.

Farklı olay günleri neticesinde hangi sektörlerin anormal getiri elde ettiği hangi sektörlerin anormal kayba uğradığı tespit edilmekte ve sektör özelinde değerlendirmelerde bulunulmaktadır. Yapılacak analiz ve değerlendirmeler neticesinde haberin niteliğine bağlı olarak hangi sektör endeksinde anormal getiri ve kayıpların oluştuğunun tespit edilmesi, daha sonra ortaya çıkacak benzer haberlerde yatırımcının öngörüsünün artmasına ve daha doğru yatırım kararları almasına yol gösterici nitelikte olacaktır.

Bu amaçla bir sonraki bölümde, literatürde yer alan çalışmalar özetlenmekte; üçüncü bölümde analizde kullanılan veri ve yöntem ortaya konmakta; dördüncü bölümde analizden elde edilen bulgular raporlanmakta; son bölümde ise sonuç ve çıkarımlar aktarılmaktadır.

2. Literatür Taraması

Çin ve ABD başta olmak üzere, Covid-19 ile ilgili gelişmelerin birçok gösterge üzerine etkisinin farklı ülkeler için incelendiği çok sayıda çalışma 2020 ve 2021 yılı literatüründe mevcuttur. Bu göstergeler arasında çok kısa dönemli, kısa dönemli ve uzun dönemli çıkarımların yapılabildiği hisse senedi piyasası da yer almaktadır. Covid-19 pandemisinin çeşitli ülkelerin borsalarına etkisi, araştırmanın amacına göre farklı yöntemler kullanılarak analiz edilmiştir. Bu başlık altında sırasıyla, Türkiye haricindeki ülkeler ve Türkiye için olay etüdü ve diğer yöntemleri kullanan ilgili önemli çalışmalar ve bu çalışmalardan elde edilen sonuçlar özetlenmektedir.

Chowdhury & Abedin (2020) Covid-19 pandemisinin Dow Jones ve S&P 500 endekslerine etkisini GARCH, VAR ve olay etüdü yöntemlerini kullanarak araştırmaktadır. 1 Ocak 2020-30 Nisan 2020 dönemi günlük verileri kullanılmıştır. Olay günü olarak ilk Covid-19 hastasının tespit edildiği gün olan 20 Ocak 2020 alınmıştır. Sonuç olarak ABD borsasının doğrulanmış vakalara ve ölüm vakalarına olumsuz tepki verdiği; ölüm vakalarının ayrıca borsa oynaklığı üzerinde önemli bir etkisinin olduğu sonucuna ulaşılmıştır. Salgının belirsizliği ve yarattığı ekonomik kayıpların, piyasayı ciddi şekilde değişken ve tepkisel hale getirdiği vurgulanmıştır.

ABD için araştırma yapan çalışmalardan biri olan Yong & Laing (2020), DSÖ'nün "halk sağlığı acil durumu ilanı" olayına Amerikan borsasına kayıtlı tüm firmaların tepkisini uluslararası etkilenme durumuna odaklanarak olay etüdü yöntemi ile incelemektedir. Elde ettikleri sonucuna göre yurtdışı satışlar, yurtdışı varlıklar, ihracat ve ithalat gibi uluslararası maruziyet yaratan durumlar, kısa vadede standartlaştırılmış kümülatif anormal getiriler ile negatif ilişkiliyken; bu etki uzun dönemde tersine dönmektedir. Uzun vadede uluslararasılaşma durumu, Covid-19'un yarattığı şoklara daha dirençli olunmasına etki etmektedir.

ABD için analiz yapan bir diğer çalışma Goodell & Huynh (2020)'dir. S&P 500 bileşik endeksine kayıtlı 49 sektörün günlük hisse senedi getirilerini kullanarak sektörlerin Covid-19 haberlerine tepkisini, yatırımcıların Covid-19'a olan ilgisinin düzeyi ile birlikte ele alarak olay etüdü analizi yöntemi ile incelemektedir. Çalışmada farklı olayların etkilerine bakılmıştır. 26 Şubat Kaliforniya'da doğrulanmış seyahat geçmişi olmayan ilk yerel vakaya göre etkiler araştırıldığında elde edilen sonuçlara göre 15 sektörün getirileri bu habere tepki vermiştir. Tüm sektörlerin yüzde otuzu negatif anormal getiri elde etmiştir. Özellikle, hizmetler ve kamu hizmetleri en hassas tepkiyi vermiştir. Restoranlar, oteller ve moteller de kamu hizmetlerinin yanı sıra olumsuz tepkiler yaşayan sektörlerin arasında tespit edilmiştir. Bu olayın dışında iki farklı tarih daha ele alınmıştır: i) ABD'de de doğrulanan ilk vakalar (20 Ocak 2020) ve ii) uluslararası öneme sahip halk sağlığı acil durum duyurusu (30 Ocak 2020)'dir. Fakat bu tarihlerde, beklenenin aksine, piyasaların tepkisiz olduğu ve 26 Şubat'a kadar da piyasanın tepkisiz kaldığı sonucuna varılmıştır.

He et al. (2020) Çin endüstrilerinin Covid-19 salgınına tepki eğilimlerini ve pazar performansını olay etüdü yöntemini kullanarak incelemektedir. Olay günü olarak Wuhan'ın kapatıldığı 23 Ocak 2020 tarihi alınmıştır. Bu amaçla Shanghai ve Shenzhen borsalarına kayıtlı 2895 firmanın 3 Haziran 2019- 13 Mart 2020 dönemi verileri kullanılmıştır. Analiz sonucu olarak ulaştırma, madencilik, elektrik ve ısıtma ve çevre endüstrilerinin pandemiden olumsuz etkilendiği; imalat, bilgi teknolojisi, eğitim ve sağlık sektörlerinin ise pandemiye karşı dirençli olduğu ortaya konmuştur.

Huo & Qiu (2020) Çin hisse senedi piyasasının 2020'de ani Covid-19 salgınına, özellikle de karantina duyurusuna nasıl tepki verdiğini incelemektedir. Çalışmada, yatırımcıların karantinaya aşırı tepkileri nedeniyle hem sektör düzeyinde hem de firma düzeyinde tersine dönüşler yaşandığı tespit edilmiştir. Wuhan'ın kapatıldığı 23 Ocak 2020 için olay penceresinde pozitif kümülatif anormal getirilere sahip endüstri ve firma seviyesindeki hisse senetleri için tersine çevirmelerin daha güçlü olduğu gözlemlenmiştir. Ayrıca daha düşük kurumsal mülkiyete (institutional ownership) sahip hisse senetleri için aşırı tepkilerin daha güçlü olduğunu ve bu sebeple perakende yatırımcıların Covid-19'a daha güçlü tepki verdiğini göstermişlerdir.

Al-Awadhi et al. (2020) Hang Seng endeksi ve Shanghai hisse senedi bileşik endeksinin Covid-19'a verdiği tepkiyi 10 Ocak-16 Mart 2020 dönemi için Hang Seng Endeksi ve Şanghay Kompozit Endeksi'nde yer alan firmaların verilerini kullanarak panel veri regresyonu ile araştırmaktadır. Analiz sonucuna göre Covid-19'un borsa getirilerini olumsuz etkilediğini tespit etmişlerdir. Hisse senedi getirilerinin, hem teyit edilen toplam vakalardaki günlük büyüme hem de Covid-19'un neden olduğu toplam ölüm vakalarındaki günlük büyüme ile önemli ölçüde negatif ilişkili olduğu ortaya konulmuştur.

Xiong et al. (2020) 23 Ocak 2020'de Wuhan'ın karantinaya alınmasına Çin hisse senedi piyasasına kayıtlı firmalarının nasıl tepki verdiğini araştırmaktadır. Bu amaçla tüm Çin hisse senedi piyasasındaki firmaları (eksik verisi olan firmalar hariç) örneklem olarak alınmıştır. Covid-19 salgınına karşı piyasa tepkisinin, virüse karşı savunmasız olan endüstrilerde ve kurumsal yatırımcıları yüksek olan firmalarda daha yoğun olduğu tespit edilmiştir. Daha büyük ölçekli, daha iyi karlılık ve büyüme fırsatı, daha yüksek birleşik kaldıraç ve daha az sabit varlığa sahip firmaların diğer firmalara oranla Covid-19'dan daha az etkilendikleri vurgulanmıştır.

Covid-19'un Çin borsasına etkisini inceleyen bir diğer çalışma olan Sun et al. (2021), bireysel yatırımcı duyarlılığının getiriler üzerindeki etkisini olay etüdü analizi ile incelemiştir. Elde edilen sonuçlara göre, olay günü sonrasında hem hisse senedi getirileri hem de bireysel yatırımcı duyarlılığı olumsuz tepki vermiştir. Olay penceresi boyunca standart sapmanın artması Çin borsa getirisinin azaldığı ve salgın nedeniyle oynaklığın arttığı şeklinde yorumlanmıştır. Ancak buna ek olarak bu etkinin tersine döndüğü çarpıcı bir sonuç da gözlemlenmiştir. Olay sonrası pencerede hem getiri hem de yatırımcı duyarlılığı yükselerek, Covid-19 olayı öncesi ortalama seviyeyi aşmıştır.

Alam et al. (2020) Covid-19'un sebep olduğu kısıtlama döneminin hisse senedi piyasası üzerindeki etkisini ve piyasa etkisinin kısıtlama öncesinde ve sonrasında aynı olup olmayacağını Hindistan için incelemektedir. Bombay Borsası'nda listelenen 31 şirketten oluşan bir örneklem rastgele seçilerek 24 Şubat 2020-17 Nisan 2020 dönemi verileri ile olay etüdü yöntemi kullanılarak analiz edilmiştir. Sonuç olarak kısıtlama öncesi dönemde yatırımcıların paniğe kapıldığı ve bu durumun olumsuz ortalama anormal getirilere yansıdığı; kısıtlama döneminde ise önemli ölçüde olumlu ortalama anormal getirilerle piyasanın ve yatırımcıların olumlu tepki verdiği gösterilmiştir. Böylece kısıtlamaların Hindistan hisse senedi piyasası performansı üzerinde olumlu bir etkisinin olduğu doğrulanmıştır.

AlAli (2020) çalışması DSÖ'nün Covid-19'u pandemi olarak ilan etmesinin beş büyük Asya hisse senedi piyasası üzerine etkisini 4 Mart 2019- 22 Nisan 2020 dönemi için olay etüdü yöntemi ile araştırmaktadır. Bu beş piyasa şu şekildedir: Şangay SE, Nikkei 225, Bombay SE, Hang Seng Endeksi ve Güney Kore KOSPI Bileşik Endeksi. Araştırmanın sonucu olarak pandemi ilanı öncesi ve sonrası dönemde istatistiki olarak anlamlı bir farklılık olduğu tespit edilmiştir. Büyük Asya hisse senedi piyasalarındaki getirilerin, bu ilandan büyük ölçüde negatif etkilendiği gösterilmiştir.

Rahman et al. (2021) Avustralya için iki negatif (i. Covid-19'un halk sağlığı acil durumu olarak ilan edildiği 30 Ocak 2020 ve ii. Covid-19'un pandemi olarak ilan edildiği 11 Mart 2020) ve iki pozitif (i. Avustralya Başbakanının 66,4 milyar AUD teşvik paketi açıkladığı 22 Mart 2020 ve ii. Avustralya hükümetinin 130 milyar AUD JobKeeper paketini açıkladığı 8 Nisan 2020) olayın Avustralya hisse senedi piyasası (ASX) getirilerine etkilerini olay etüdü analizi ile incelemiştir. Analiz, tüm piyasa için ve portföy düzeyinde yapılmıştır. Elde edilen sonuçlara göre Covid-19'un pandemi olarak ilan edilmesiyle ilgili ortalama CAR, firma başına ortalama 352 milyon Avustralya Doları piyasa değeri kaybına eşdeğer olan %-4,39'dur. Ancak JobKeeper paketinin açıklanması pozitif olayının etkisi ile piyasa %2,73 oranında yeniden değer kazanmıştır. En küçük, en az karlı ve değerli portföylerin pandemiye karşı daha savunmasız olduğu tespit edilirken, boyut ve likidite kesitsel anormal getirilerin ana itici güçleri olarak ortaya konulmuştur.

Liu et al. (2020), içlerinde Japonya, ABD, Almanya, Kore, İngiltere, Singapur gibi ülkelerin bulunduğu yirmi bir lider hisse senedi piyasasının 21 Şubat 2019- 18 Mart 2020 dönemi için Covid-19'a verdiği kısa dönemli tepkileri incelemektedir. Olay etüdü ve sabit etkili panel veri yöntemi kullanılmıştır. Olay günü olarak, Çin Halk Cumhuriyeti Ulusal Sağlık ve Fitness Komisyonu üst düzey uzman grup lideri Zhong Nanshan'ın röportaj verdiği 20 Ocak 2020 alınmıştır. Sonuçlar, etkilenen başlıca ülke ve bölgelerdeki borsaların virüs salgınından sonra hızla düştüğünü göstermiştir. Ancak Asya'daki ülkelerin, diğer ülkelere kıyasla daha fazla negatif anormal getiri elde ettiğini ortaya koymuştur. Ayrıca panel sabit etki regresyonlarından elde edilen sonuca göre de yatırımcıların, Covid-19 onaylı vakalarının hisse senedi endekslerinin anormal getirileri üzerinde olumsuz etki yarattığı bulgusunu desteklediği görülmüştür.

64 ülke için, Ashraf (2020) 22 Ocak 2020-17 Nisan 2020 dönemi için Covid-19'un hisse senedi piyasaları üzerindeki etkisini panel veri analizi yöntemi ile incelemiştir. Borsaların Covid-19 onaylı vakalarındaki büyümeye olumsuz tepki verdiğini, yani, teyit edilen vaka sayıları arttıkça borsa getirilerinin düştüğünü ortaya koymuştur. Bunun yanı sıra, hisse senedi piyasalarının, ölüm sayısındaki artışa kıyasla, teyit edilen vaka sayısındaki artışa daha proaktif tepki verdiğini tespit etmiştir.

Covid-19'un hisse senedi piyasaları üzerine etkisini araştıran bir diğer çalışma olan Singh et al. (2020), G20 ülkelerini kapsayan bir örneklem için olay etüdü ve panel veri analizi kullanmıştır. Zhong Nanshan'ın röportaj verdiği 20 Ocak 2020 olay günü olarak alınmıştır. 58 gün boyunca dört alt olay penceresinde istatistiksel olarak anlamlı negatif anormal getiriler tespit edilmiştir. Elde edilen negatif anormal getirilerin, gelişmiş ülkeler kadar gelişmekte olan ülkeler için de önemli olduğu bulunmuştur. Panel veri analizinden elde edilen sonuçlar ise, hisse senedi piyasalarının Covid-19'un olumsuz etkisinden kurtarıldığı yönündedir.

Bash (2020), 30 ülke için Covid-19'un her bir ülkedeki ilk kayıtlı vakasının hisse senedi getirileri üzerine etkisini çalışmıştır. Bu amaçla olay etüdü yöntemini ve çeşitli olay penceresi zaman aralıklarını kullanmıştır. Sonuçlar, Covid-19'un getiriler üzerine istatistiki olarak anlamlı ve olumsuz bir etkisinin olduğunu ortaya koymuştur.

Maneenop & Kotcharin (2020) Covid-19'un küresel havayolu sektörü üzerindeki kısa vadeli etkisini olay etüdü ile araştırmaktadır. Bu amaçla dünya çapında listelenen 11 ülkede yer alan 52 havayolu şirketinin verileri ve ülkelerdeki ana borsa endeksi piyasa getirisini hesaplamak için kullanılmıştır. Üç önemli olay günü seçilmiştir: i) 13 Ocak 2020- Çin dışında ilk bildirilen vaka, ii) 21 Şubat 2020- İtalya salgını ve iii) 11 Mart 2020- Dünya Sağlık Örgütü'nün küresel salgın salgınına ilişkin bildirisi ve Başkan Trump'ın 26 Avrupa ülkesinden yolcuları yasaklayacağını açıklaması tarihleri. Elde edilen sonuçlara göre birinci olaydan sonra az tepki, üçüncü olaydan sonra ise aşırı tepki geldiği görülmüştür. Avustralya, Kanada, İngiltere ve ABD'deki havayolu hisseleri üçüncü olay sonrası en kötü performans gösteren şirketlerdir. Bulgular, Batı ülkelerindeki yatırımcıların gelen haberlere dünyanın geri kalanından daha duyarlı olduğu yönünde yorumlanmıştır.

ABD ve Avrupa borsalarının Covid-19'a verdiği kısa dönemli tepkileri inceleyen Heyden & Heyden (2021) olay etüdü yöntemini kullanmıştır. Veri olarak Ocak 2018'den itibaren S&P 500 ve S&P Europe 350'nin bileşenleri olan tüm firmaların logaritmik hisse senedi getirilerini ve literatürde yer alan standart kontrol değişkenleri kullanmışlardır. Ele aldıkları ülkelerde gerçekleşen ilk ölüm ilanına hisse senetlerinin önemli ölçüde olumsuz tepki verdiğini ortaya koymuşlardır. Ayrıca ülkelere özgü maliye politikası önlemlerinin açıklanmasının hisse senedi getirilerini olumsuz etkilediğini gösterirken, para politikası önlemlerinin piyasaları sakinleştirme potansiyeline sahip olduğunu tespit etmişlerdir. Elde edilen bir diğer sonuca göre de bu tepkiler, maddi varlıklar, likidite ve kurumsal varlıklar gibi firmaya özgü özelliklere bağlı olarak yoğunlaşır ya da azalır.

Pandey & Kumari (2021) olay etüdü yöntemini kullanarak Covid-19 salgınının dünyadaki gelişmiş ve gelişmekte olan ülkelerden oluşan 49 borsa endeksi üzerindeki etkilerini incelemektedir. Elde edilen sonuçlar, salgınının küresel borsaları önemli ölçüde etkilediği ve salgından en çok da Asya borsalarının etkilendiği ama Amerikan borsaları üzerindeki etkilerin hem uzun pencerede hem de kısa pencerede anlamlı olmadığını ortaya koymaktadır. Bunun yanı sıra gelişmiş piyasaların uzun vadede gelişmekte olan piyasalara göre daha sert bir şekilde etkilendiğini; ancak kısa vadede gelişmiş ülkeler üzerindeki etkinin anlamlı olmadığını göstermektedir. Ayrıca, ulusların getirdiği erken kısıtlamaların virüsün yayılmasını kontrol altına alma konusunda olumlu sonuçlar verdiğini, böylece yatırımcının güvenini yeniden inşa ettiğini ve borsa getirilerinde keskin bir tersine dönüş yaşandığını vurgulamaktadır.

Uluslararası literatürde yer alan çalışmalar genellikle Covid-19'un halk sağlığı acil durumu ilan edilişi, pandemi olarak ilan edilişi, ülkedeki ilk vakanın ve ilk ölüm vakasının tarihleri ile kısıtlama tarihleri gibi virüsün çıkışına yönelik genel olayların etkilerini araştırmaktadır. Bu çalışmalardan elde edilen sonuçlar özellikle sektör düzeyinde getirilere etkilerin farklılaşabileceğini göstermektedir. Uluslararası literatürden ayrı olarak Türkiye'de yapılan çalışmaların özeti ise Tablo 1'de sunulmuştur.

Tablo: 1
Türkiye için Yapılan Çalışmaların Özeti

Çalışma	Değişken(ler)	Periyod	Yöntem	Sonuç
Kılıç (2020)	Borsa İstanbul sektör endeksleri	02.01.2018-30.04.2020	Olay Etüdü	Çin'de yaşanan ilk ölüm ve DSÖ'nün Covid-19 tanımlaması anormal getiriye sebep olmamıştır. DSÖ'nün pandemi ilanı ve Türkiye'de ilk vakanın görülmesi sektörlerin çoğunda negatif anormal getiriye sebep olmuştur. Ticaret, mali ve banka sektörlerinde pozitif anormal getiri tespit edilmiştir. İlk sokağa çıkma kısıtlaması anormal getiriye sebep olmamıştır.
Keleş (2020)	BIST 30'da yer alan firmaların fiyat verisi	02.03.2020-29.04.2020	Olay Etüdü	İlk vaka sonrası 11 Mart'ta düşüş tespit edilmiştir. Ancak istatistiki olarak anlamlı değildir. 12 Mart'ta düşüş devam etmiştir ve anlamlıdır. 12 Mart'ta eğitime ara verildikten sonraki gün 13 Mart'ta piyasa önlemlere olumlu tepki vermiştir. Ölüm sayısının 1000'in üzerine çıkması negatif tepki yaratmıştır. Otomobiller ve Bileşenleri grubu ile Taşımacılık grubu, Covid-19'un yarattığı finansal iniş çıkışlardan incelenen diğer sanayi gruplarına göre daha çok etkilenmiştir. Ara ve sermaye malları gruplarının tepkileri sınırlı kalmıştır.
Göker vd. (2020)	BIST'te yer alan 26 sektör endeksi	02.01.2019-09.04.2020	Olay Etüdü	11 Mart 2020 günü spor, turizm ve yatırım ortaklığı sektörleri negatif kümülatif anormal getiri almışken, yiyecek-içecek, toptan ve perakende sektörleri pozitif kümülatif anormal getiri almıştır. Genel olarak spor, turizm ve tekstil sektörleri Covid-19'dan en çok negatif etkilenen sektörler olmuştur.

Çetin (2020)	**Açıklanan değişkenler:** BIST 100 kapanış fiyatı, açılış fiyatı, en düşük fiyatı, en yüksek fiyatı ve genel ekonomi faaliyetlerinin düzeyi **Açıklayıcı değişkenler:** Sokağa çıkma kısıtlaması uygulanan gün sayısı, yurt içi ve yurt dışı seyahat kısıtlaması uygulanan gün sayıları, para politikası kararları, kamu harcamaları, yeni vaka sayısı	23.03.2020-24.04.2020	En Küçük Kareler	Sokağa çıkma kısıtlaması genel ekonomi faaliyetlerini negatif etkilemiştir. Yurt içi seyahat kısıtlaması BIST 100 kapanış fiyatını ve genel ekonomi faaliyetlerini pozitif etkilemiştir. Yurt dışı seyahat kısıtlaması BIST 100 kapanış fiyatını, en düşük fiyatını ve genel ekonomi faaliyetlerini negatif etkilemiştir. Para politikası kararları tüm açıklanan değişkenleri pozitif etkilemiştir. Kamu harcamaları tüm açıklanan değişkenleri pozitif etkilemiştir. Yeni vaka sayısı, genel ekonomi faaliyetlerinin düzeyini etkilememiş, diğer tüm açıklanan değişkenleri pozitif etkilemiştir.
Peker & Demirhan (2020)	BIST 100 hisse senetlerinin sektörel bazdaki getiri oranları ve volatilite	**1)** 7.01.2020 (öncesi ve sonrası 5, 10, 20, 30, 45 gün) **2)** 11.03.2020 (öncesi ve sonrası 5 ve 10 gün) **3)** 21.03.2020 (öncesi ve sonrası 5 ve 10 gün)	GARCH	Küresel salgın, Borsa İstanbul sektörlerinin getirileri ve volatiliteyi etkilemiştir. Çin'de salgının başladığı 7 Ocak'ta Holding ve mali hizmetler gibi küresel ticaretin gelişmesine bağlı sektörlerin getirileri düşmüştür. 7 Ocak'tan sonra düşük teknolojili sektörlerin (gıda, tekstil gibi) getirileri artmış, diğerlerinin ise sabit kalmıştır. Düşük teknolojili sektörler, salgının Türkiye'de görülmesinden olumsuz etkilenmiştir. 21 Mart'ta alınan önlemlerin açıklanması ile salgın öncesi düzeyine gelmiştir. Ulaştırma, bankacılık ve sigorta gibi ticarete konu olmayan sektörlerin ise eski düzeylerine gelemediği tespit edilmiştir.
Gülhan (2020)	BIST 100 Endeksi, Covid-19 Ölüm Oranı, Dolar Kuru, Enfeksiyon Hastalıkları ile Sermaye Piyasaları Oynaklık Endeksi, MSCI ve VIX indeksi	31.12.2019-28.05.2020	Robust En Küçük Kareler ve Hata Düzeltme Modeli	Kısa dönemde, borsa endeksi ve değişkenler arasında anlamlı ilişkiler tespit edilmiştir. Borsa endeksi ile ölüm oranı, dolar kuru ve VIX arasında negatif; enfeksiyon hastalıkları ile sermaye piyasaları oynaklık endeksi ve MSCI arasında pozitif ilişki bulunmuştur. Uzun dönemde, borsa endeksi ve ölümlülük oranı ve MSCI arasında anlamlı ve sırasıyla negatif ve pozitif ilişkiler tespit edilmiştir.
Öztürk vd. (2020)	BIST Sektör Fiyat Endeksleri (21 alt sektör ve 7 ana sektör), Covid-19 Vaka Sayısı, CDS Risk Primi, VIX Volatilite İndeksi	02.01.2020-15.04.2020	Sabit Etkiler Tahmin Metodu	Sektör endeksleri, Dünya ve Avrupa vaka sayılarından çok Türkiye'deki vaka sayılarından etkilenmiştir. Metal ürünleri ve makine sektörleri en çok etkilenen sektörler olmuştur. Spor, bankacılık ve sigortacılık da bu endüstrileri takip etmektedir. Yiyecek-içecek, toptan-perakende satış ve gayrimenkul yatırım sektörleri salgından en az etkilenen sektörlerdir.
Tayar vd. (2020)	BIST Temel Sektör Verilerinde Bir Gün Önceye Göre Meydana Gelen Değişim Oranı ve Aktif Covid-19 Sayısında Bir Gün Önceye Göre Meydana Gelen Değişim Oranı	17.03.2020-29.04.2020	En Küçük Kareler Yöntemi	Covid-19 aktif vaka sayısındaki değişim sektörel endekslerden elektrik, ulaşım, finansal kuruluşlar, teknoloji ve sanayi üzerine negatif ve istatistiki olarak anlamlı etkiye sahiptir. Gıda, ticaret, tekstil, turizm ve hizmet sektörlerine etkisi istatistiki olarak anlamlı değildir.
Çoban vd. (2020)	BİST100 Endeksi, Covid-19 Günlük Vaka Sayısı, Altının Gram Fiyatı, CDS Risk Pirimi, Euro ve Dolar Döviz Kuru	16.03.2020-21.08.2020	Toda-Yamamoto Nedensellik Testi	Covid-19 vaka sayılarından Euro ve Dolar kuruna doğru bir nedensellik ilişkisi tespit edilmiştir.
Saka-Ilgın & Sarı (2020)	6 ülkenin hisse senedi kapanış fiyatı verileri (Türkiye için BIST100 endeksi kapanış fiyatları) Ülkelerdeki Covid-19 günlük toplam vaka sayıları ve toplam ölüm sayıları	18.02.2020-30.09.2020	Toda-Yamamoto Nedensellik Testi	Türkiye için elde edilen sonuca göre toplam vaka ve ölüm sayılarından endekse doğru nedensellik ilişkisi tespit edilmiştir. Analiz edilen diğer ülkeler olan ABD, Hindistan, Brezilya, Rusya, Kolombiya için de aynı sonuç elde edilmiştir.
Yıldız-Contuk (2021)	BIST Toplam İşlem Hacmi, Covid-19 pozitif vaka sayısı	11.03.2020-16.06.2020	ARDL Yöntemi	Covid-19 pozitif vakalar ile borsa işlem hacmi arasında kısa vadede negatif bir ilişki tespit edilmiştir. Vakalardaki artış kısa vadede borsayı negatif etkilemiştir. Uzun dönemde, iki değişken arasında pozitif bir ilişki tespit edilmiştir.

Türkiye için literatürden görülebileceği üzere hisse senedi getirilerine ve sektör endekslerine olan etkiler hem farklı yöntemler hem de farklı olay günleri baz alınarak araştırılmıştır. Uluslararası literatür ile paralel olarak, Türkiye için de anormal getiri/kayıp

sonuçlarının sektörel düzeyde farklılaştığı görülmektedir (Kılıç, 2020; Göker vd., 2020). Bu çalışmada önceki çalışmalarla ortak olan 11 Mart 2020 tarihinden farklı olarak, bilindiği kadarıyla etkileri daha önce olay etüdü yöntemiyle incelenmemiş olan Türkiye'de ilk ölüm vakası ve CoronaVac aşısının ilk partisinin Türkiye'ye geliş tarihlerinin sektör endeksleri üzerine etkilerinin analiz edilmesi ve bu alandaki boşluğun kapatılması amaçlanmaktadır.

3. Veri ve Yöntem

Etkin piyasalar hipotezine dayanan olay etüdü, belirli bir tarihte gerçekleşen olayın firmaların hisse senedi üzerinde anormal getirilere neden olup olmadığını belirlemede kullanılan yöntemlerden birisidir. Bu özelliği olay etüdü yöntemini güçlü kılan en önemli unsurdur. Etkin piyasalar hipotezine göre yatırımcıların piyasaya düşen haberleri dikkate aldığı varsayılmaktadır (Fama, 1970: 414). Eğer haber yatırımcılar tarafından olumlu algılanırsa pozitif hisse senedi getirileri beklenirken, piyasanın olumsuz bir haber olarak değerlendirmesi durumunda ise negatif hisse senedi getirileri oluşması beklenmektedir. Dolayısıyla, hisse senetlerinin genel seyrini gösteren endekslerde de olay etüdü yöntemiyle anormal getirilerin ortaya çıkıp çıkmadığın tespiti yapılabilir ve bu sayede hangi sektörün nasıl etkilendiğine ilişkin fikir edinilebilmektedir (Schwert, 1981). Bu kapsamda 11 Mart 2020 DSÖ tarafından pandemi ilanı ve Türkiye'de ilk vaka, 17 Mart 2020 Covid-19 kaynaklı Türkiye'de ilk ölüm vakası ve 30 Aralık 2020 Türkiye'ye anlaşması yapılan ilk parti aşının gelmesi haberinin Tablo 2'de belirtilen 23 Borsa İstanbul sektör endeksi üzerinde etkisi araştırılmıştır ve kullanılan veriler Foreks FxPlus programından alınmıştır.

Tablo: 2
Borsa İstanbul Sektör Endeksleri

ENDEKS KODU	ENDEKS ADI	ENDEKS KODU	ENDEKS ADI
XBANK	Banka	XSGRT	Sigorta
XBLSM	Bilişim	XSPOR	Spor
XELKT	Elektrik	XTAST	Taş, Toprak
XFINK	Finansal Kiralama, Faktöring	XTCRT	Ticaret
XGIDA	Gıda, İçecek	XTEKS	Tekstil, Deri
XGMYO	Gayri Menkul Yatırım Ortaklığı	XTRZM	Turizm
XHOLD	Holding ve Yatırım	XULAS	Ulaştırma
XILTM	İletişim	XUHIZ	Hizmetler
XKAGT	Orman, Kâğıt, Basım	XUMAL	Mali
XKMYA	Kimya, Petrol, Plastik	XUSIN	Sınai
XMANA	Metal Ana	XUTEK	Teknoloji
XMESY	Metal Eşya, Makina		

Kaynak: <https://www.kap.org.tr/tr/Endeksler>, 23.04.2021.

Olay etüdü analizinde aşırı getiriler hesaplanırken genellikle kullanılan üç temel model bulunmaktadır: Ortalama düzeltilmiş getiri modeli, piyasaya göre ayarlanmış getiri modeli ve piyasa modeli. Dyckman et al., (1984: 28-29)'ne göre üç modelin anormal getirinin varlığını doğru bir şekilde tespit etme yetenekleri açısından, piyasa modelinin küçük de olsa tercih edilebilirliği bulunsa bile, modeller benzerdir. Bu fark istatistiksel olarak anlamlı olmakla birlikte önemli bulunmamıştır. Bu çalışmada Chen & Siems, (2004) ve Brown & Warner, (1985) tarafından kullanılan ortalama düzeltilmiş getiriler yöntemi kullanılmıştır.

$$AR_t = R_t - \bar{R} \quad (1)$$

Formülde AR_t anormal getiriyi, t alt indisi zamanı temsil ederken, $\bar{R}$ ise tahmin penceresi (-110, -11)[1] için ilgili sektör endekslerinin ortalama getirisini ifade etmektedir ve şu şekilde hesaplanmaktadır:

$$\bar{R} = \frac{1}{100}\sum_{t=-110}^{-11} R_t \quad (2)$$

Elde edilen anormal getirilerin istatistiki olarak anlamlılığını test etmek için Brown & Warner, (1985) tarafından kullanılan standartlaştırılmış anormal getiriler yöntemi kullanılmıştır.

$$SAR_t = \frac{AR_t}{SD(AR_t)} \quad (3)$$

$$burada\ SD(AR_t) = \sqrt{\frac{1}{T_0-1}\sum_{t=1}^{T_0} AR_t^2} \quad (4)$$

Piyasada olay günü anormal getirinin ortaya çıkıp çıkmadığının tespitinin ardından ilgili olayın etkisinin devam edip etmediğini incelemek için kümülatif anormal getiri (CAR6 ve CAR11) hesaplanmıştır. Sonuçların istatistiki olarak anlamlılığının belirlenmesi için elde edilen CAR standart sapma değerlerine bölünerek t-istatistiği değerleri elde edilmiştir.

$$CAR6 = \sum_{t=0}^{5} AR_t \quad (5)$$

$$t_{CAR6_t} = \frac{CAR6_t}{SD(CAR6_t)} \quad (6)$$

$$CAR11 = \sum_{t=0}^{10} AR_t \quad (7)$$

$$t_{CAR11_t} = \frac{CAR11_t}{SD(CAR11_t)} \quad (8)$$

4. Bulgular

11 Mart 2020, 17 Mart 2020 ve 30 Aralık 2020 olay gününün etkilerinin incelendiği analizden elde edilen sonuçlar Tablo 3,4,5'te sunulmuştur.

11.03.2020 tarihli birinci olayın etkisine Tablo 3'ten bakıldığında, olay gününde 4 pozitif ve 19 negatif anormal getiri (AR) tespit edilmiştir. Bu anormal getirilerden 15'i

[1] *Uygulamada tahmin penceresi olarak 100 gün yerine 20 gün tercih eden çalışmalar (Chen & Siems, 2004; Aksoy, 2014) ve 230-250 gün arası tercih eden çalışmalar (Brown & Warner, 1985; Keleş, 2020; Göker vd., 2020) bulunmaktadır. Bu çalışmada 20 gün alınmamasının nedeni, 20 gün içerisinde gerçekleşmiş ve piyasanın aşırı tepki vermesine sebep olacak anormal olayın ortalama getiriyi, 100 günlük getiriler kullanılarak hesaplanacak ortalamaya göre daha çok etkileyecek ve kısa tahmin penceresi neticesinde sonucun yanlı bulunacak (He et al., 2020: 2202) olmasıdır. Aynı şekilde, uygulamada tercih edilen 230-239-250 vb. alınmamasının sebebi de He et al. (2020: 2202) tarafından da açıklandığı üzere daha uzun tahmin penceresinin tahmin yapısını değiştirebilecek olmasıdır. Xiong et al. (2020), Kılıç (2020), Sun et al. (2021) çalışmaları takip edilerek tahmin penceresi 100 gün olarak alınmıştır.*

istatistiki olarak anlamlıdır. Bunların 2'si (XTCRT, XUHIZ) pozitif anormal getiri ve 13'ü (XBLSM, XELKT, XFINK, XGMYO, XHOLD, XKAGT, XMANA, XMESY, XSPOR, XTEKS, XTRZM, XULAS, XUSIN) negatif anormal getiriye sahiptir. En fazla getiri ve kayıp sırasıyla ticaret ve spor endekslerinde yaşanmıştır. Ticaret endeksi %8 pozitif anormal getiri sağlarken, spor endeksinde -%10 anormal kayba neden olmuştur.

Tablo: 3
11.03.2020 için Anormal Getiri, Kümülatif Anormal Getiri ve t İstatistiği

ENDEKS	AR	SAR	CAR_6	t_{CAR6}	CAR_{11}	t_{CAR11}
XBANK	0,0050	0,2690	-0,13653	-1,60579	-0,1791**	-2,4335
XBLSM	-0,0595**	-2,4943	-0,39114*	-2,41867	-0,1611	-1,3654
XELKT	-0,0580***	-3,0698	-0,19783	-1,97494	-0,1840**	-2,3790
XFINK	-0,0519*	-1,8035	-0,07409	-0,31541	0,0192	0,1099
XGIDA	-0,0007	-0,0432	-0,21208*	-2,46206	-0,0894	-1,3872
XGMYO	-0,0398**	-2,3985	-0,22677	-1,41928	-0,1841	-1,5455
XHOLD	-0,0307**	-2,3484	-0,19933	-1,77958	-0,1442	-1,6773
XILTM	0,0206	1,3414	-0,10445	-1,38951	-0,0382	-0,6214
XKAGT	-0,0390*	-1,8362	-0,26759	-1,57615	-0,1731	-1,4190
XKMYA	-0,0198	-1,5984	-0,2211	-1,64019	-0,1075	-1,0908
XMANA	-0,0334**	-2,3439	-0,17359**	-2,85898	-0,1545**	-3,0148
XMESY	-0,0247**	-2,0108	-0,30422**	-2,58545	-0,3075***	-3,7477
XSGRT	-0,0096	-0,9825	-0,2183**	-3,67626	-0,1880***	-3,9890
XSPOR	-0,0951**	-2,4039	-0,46959	-1,53806	-0,4931*	-2,2002
XTAST	-0,0227	-1,2900	-0,20005	-1,32702	-0,1770	-1,6187
XTCRT	0,0762***	7,2424	-0,0821	-1,5405	0,0068	0,1849
XTEKS	-0,0569***	-3,1825	-0,32337	-1,56763	-0,2885*	-1,9838
XTRZM	-0,0774***	-3,2985	-0,3966	-1,6177	-0,4151**	-2,2784
XULAS	-0,0429**	-2,0920	-0,26288	-0,97247	-0,1737	-0,8693
XUHIZ	0,0212*	1,8642	-0,14104	-1,87435	-0,0700	-1,1437
XUMAL	-0,0111	-0,7218	-0,1657	-1,64617	-0,1672*	-2,0615
XUSIN	-0,0222*	-1,9766	-0,22564	-1,97369	-0,1577*	-1,8806
XUTEK	-0,0140	-0,7212	-0,24935*	-2,34025	-0,1427	-1,7835

*Not: *, ** ve *** sırasıyla %10, %5 ve %1 anlamlılık düzeyini temsil etmektedir. SAR için $t_{99,\ 0,005}$=2,626, $t_{99,\ 0,025}$=1,984 ve $t_{99,\ 0,05}$=1,660; CAR_6 için $t_{5,\ 0,005}$=4,032, $t_{5,\ 0,025}$=2,571 ve $t_{5,\ 0,05}$=2,015; CAR_{11} için $t_{10,\ 0,005}$=3,169 $t_{10,\ 0,025}$=2,228 ve $t_{10,\ 0,05}$=1,812.*

Tablo 3'te raporlanan kümülatif anormal getirilere bakıldığında, 23 negatif CAR_6'dan 6 sektör endeksinin değerinin (XBLSM, XGIDA, XMANA, XMESY, XSGRT, XUTEK) istatistiki olarak anlamlı olduğu görülmüştür. En fazla kümülatif anormal kayıp yaşayan %39 ile bilişim sektör endeksidir. En düşük kayıp yaşayan ise %21 ile gıda endeksidir. CAR_{11} değerleri incelendiğinde ise 2 pozitif ve 21 negatif sonuçtan sadece 10 sektörün (XBANK, XELKT, XMANA, XMESY, XSGRT, XSPOR, XTEKS, XTRZM, XUMAL, XUSIN) negatif kümülatif anormal getirisinin istatistiki olarak anlamlı olduğu sonucuna varılmıştır. Spor endeksi -%49, turizm endeksi -%41 kümülatif anormal kayıp ile en çok etkilenen sektör endeksleri olmuşlardır. En düşük kümülatif anormal kayıp ise -%15 ile metal ana sanayi endeksinde gerçekleşmiştir.

17.03.2020 olay gününün etkisine Tablo 4'ten bakıldığında, toplamda ilk olay gününde olduğu gibi 4 pozitif ve 19 negatif anormal getiri (AR) tespit edilmiştir. Ancak, bunlardan sadece 2 pozitif (XFINK, XILTM) ve 14 negatif (XBLSM, XELKT, XGIDA, XGMYO, XHOLD, XKMYA, XMESY, XSGRT, XTAST, XTCRT, XTRZM, XULAS, XUSIN, XUTEK) anormal getirinin istatistiki olarak anlamlı olduğu görülmüştür. Olay günü finansal kiralama endeksi %5 pozitif anormal getiri elde ederken, turizm sektör endeksi

yaklaşık -%7 anormal kayıp yaşamıştır. CAR değerleri incelendiğinde olayın istatistiki olarak anlamlı kümülatif anormal getirisi olmadığı belirlenmiştir.

Tablo: 4
17.03.2020 için Anormal Getiri, Kümülatif Anormal Getiri ve t İstatistiği

ENDEKS	AR	SAR	CAR_6	t_{CAR6}	CAR_{11}	t_{CAR11}
XBANK	0,0235	1,1831	-0,0377	-0,36709	-0,0258	-0,3232
XBLSM	-0,0457*	-1,8705	0,097887	0,244374	0,1873	0,6954
XELKT	-0,0352*	-1,7636	-0,02308	-0,09661	-0,0027	-0,0164
XFINK	0,0537*	1,7748	0,246643	0,689986	0,1751	0,7190
XGIDA	-0,0482***	-3,0658	0,035104	0,195252	0,0267	0,2202
XGMYO	-0,0364**	-2,0090	0,006531	0,022974	0,0468	0,2431
XHOLD	-0,0255*	-1,6994	-0,00617	-0,03353	0,0258	0,2060
XILTM	0,0337**	2,1914	0,10029	0,90258	0,0313	0,3808
XKAGT	-0,0226	-1,0200	0,001191	0,00346	0,1788	0,7615
XKMYA	-0,0524***	-4,0345	0,005548	0,027765	0,0526	0,3843
XMANA	-0,0160	-1,0324	0,044765	0,358861	-0,0045	-0,0525
XMESY	-0,0494***	-3,8166	-0,08725	-0,32028	-0,0755	-0,4078
XSGRT	-0,0416***	-3,8761	-0,00939	-0,0735	-0,0421	-0,4874
XSPOR	-0,0654	-1,6204	-0,21745	-0,36246	0,0941	0,2322
XTAST	-0,0534***	-2,8863	-0,00415	-0,01581	0,0676	0,3784
XTCRT	-0,0384***	-3,5347	0,122428	1,766308	0,0871	1,3628
XTEKS	-0,0390**	-2,1416	-0,04818	-0,12199	0,0334	0,1238
XTRZM	-0,0679***	-2,6547	-0,12241	-0,28103	0,0298	0,1011
XULAS	-0,0472**	-2,0857	-0,03984	-0,12234	0,0940	0,4208
XUHIZ	-0,0185	-1,5230	0,069282	0,542824	0,0643	0,7215
XUMAL	0,0016	0,0951	-0,02115	-0,14435	-0,0017	-0,0167
XUSIN	-0,0409***	-3,3502	0,004859	0,023492	0,0195	0,1390
XUTEK	-0,0457**	-2,3023	0,00845	0,034806	0,0436	0,2637

*Not: *, ** ve *** sırasıyla %10, %5 ve %1 anlamlılık düzeyini temsil etmektedir. SAR için $t_{99,\ 0,005}$=2,626, $t_{99,\ 0,025}$=1,984 ve $t_{99,\ 0,05}$=1,660; CAR_6 için $t_{5,\ 0,005}$=4,032, $t_{5,\ 0,025}$=2,571 ve $t_{5,\ 0,05}$=2,015; CAR_{11} için $t_{10,\ 0,005}$=3,169 $t_{10,\ 0,025}$=2,228 ve $t_{10,\ 0,05}$=1,812.*

Tablo: 5
30.12.2020 için Anormal Getiri, Kümülatif Anormal Getiri ve t İstatistiği

ENDEKS	AR	SAR	CAR_6	t_{CAR6}	CAR_{11}	t_{CAR11}
XBANK	0,0261	1,0672	0,061149***	15,18661	0,0265***	4,3705
XBLSM	0,0031	0,1674	0,021502	0,360658	0,0651	1,5243
XELKT	0,0062	0,2821	0,040224**	3,754366	0,0076	0,6642
XFINK	0,0023	0,1021	0,023188	0,835119	0,0049	0,2454
XGIDA	0,0147	0,8829	0,020057	1,295341	0,0736***	5,7880
XGMYO	-0,0059	-0,3091	0,078868***	5,388011	0,0645***	3,7339
XHOLD	0,0066	0,3899	0,024736	1,46133	0,0479***	3,7434
XILTM	0,0156	0,7870	0,047237	1,434923	0,0490*	1,8232
XKAGT	-0,0218	-0,9394	-0,0932	-0,63976	-0,1067	-0,9214
XKMYA	0,0109	0,6377	0,020256	0,531523	0,0112	0,3749
XMANA	0,0074	0,3722	-0,03027	-1,0624	-0,0179	-0,5485
XMESY	-0,0078	-0,4128	0,044769	1,7907	0,0936***	3,7009
XSGRT	0,0150	0,9136	0,067921**	2,689601	0,0701***	3,8974
XSPOR	-0,0070	-0,1707	0,070563	0,957434	0,0852	1,5319
XTAST	0,0230	1,0061	0,045617	1,86574	0,0401*	1,9428
XTCRT	0,0122	0,8084	0,016719	0,463576	0,0244	0,9388
XTEKS	0,0024	0,1329	0,002469	0,3172	0,0510***	4,7649
XTRZM	0,0147	0,5432	0,117664***	7,559239	0,1759***	8,6095
XULAS	0,0100	0,3900	-0,0118	-0,26457	0,0226	0,5885
XUHIZ	0,0102	0,7646	0,031475	1,109819	0,0408*	2,0191
XUMAL	0,0138	0,7356	0,04723***	4,546067	0,0395***	4,5466
XUSIN	0,0063	0,4341	0,014843	1,377047	0,0353*	2,0644
XUTEK	0,0193	0,9144	0,042694	1,489486	0,0467**	2,2546

*Not: *, ** ve *** sırasıyla %10, %5 ve %1 anlamlılık düzeyini temsil etmektedir. SAR için $t_{99,\ 0,005}$=2,626, $t_{99,\ 0,025}$=1,984 ve $t_{99,\ 0,05}$=1,660; CAR_6 için $t_{5,\ 0,005}$=4,032, $t_{5,\ 0,025}$=2,571 ve $t_{5,\ 0,05}$=2,015; CAR_{11} için $t_{10,\ 0,005}$=3,169 $t_{10,\ 0,025}$=2,228 ve $t_{10,\ 0,05}$=1,812.*

30.12.2020 olay gününde ise istatistiki olarak anlamlı anormal getiri (AR) tespit edilmemiştir. Olayın kümülatif anormal getirisi incelendiğinde, 20 pozitif CAR_6'dan 6 sektör endeksinin (XBANK, XELKT, XGMYO, XSGRT, XTRZM, XUMAL) değerlerinin anlamlı olduğu görülmüştür. Bu endekslerden yaklaşık %12 ile en çok kümülatif anormal getiri elde eden turizm sektör endeksi olurken, ardından %8 ile gayrimenkul yatırım ortaklığı gelmektedir. CAR_{11} değerlerinde ise 21 pozitif kümülatif anormal getirinin sadece 14'ün (XBANK, XGIDA, XGMYO, XHOLD, XILTM, XMESY, XSGRT, XTAST, XTEKS, XTRZM, XUHIZ, XUMAL, XUSIN, XUTEK) anlamlı olduğu sonucuna varılmıştır. Pozitif en çok kümülatif anormal getiri sağlayan sektör endeksleri %18, %9 ve %7 ile sırasıyla turizm, metal eşya makina ve gıda sektör endeksi olmuştur.

5. Sonuç ve Çıkarımlar

Bu çalışma, DSÖ tarafından pandeminin ilanı ve Türkiye'de ilk vakanın görüldüğü olay günü olan 11 Mart 2020, Türkiye'de Covid-19 kaynaklı ilk ölümün gerçekleştiği 17 Mart 2020 ve Türkiye'ye CoronaVac aşının ilk partisinin geldiği olay günü olan 30 Aralık 2020 tarihlerinin Borsa İstanbul sektör endeksleri üzerindeki etkisini incelemektedir. Beklenildiği üzere ilk olay günü ve ikinci olay gününün hisse senetleri üzerinde anormal kayıplara neden olduğu ortaya konulmuştur. Üçüncü olay gününün ise beklentiler doğrultusunda hisse senetleri üzerinde pozitif anormal getirilere neden olduğu tespit edilmiştir.

11 Mart 2020 gününün 10 günlük olay penceresinden kümülatif anormal kayba neden olduğu sektörlere bakıldığında, spor (-%49) ve turizm sektörün (-%42) en fazla kayıp yaşayan sektörler olduğu tespit edilmiştir. Bunun sebebinin pandeminin ilanı ile gelen seyahat kısıtlamaları olduğu düşünülmektedir. Spor ve turizmin yanı sıra Türkiye'nin sanayi sektöründe ara mal ithal eden pozisyonda olan bir ülke olması nedeniyle süreçte yaşanabilecek tedarik sorunu endişesi metal eşya makina, sınai ve metal ana endekslerinde de hem olay gününde anormal kayıplara hem de ilerleyen günlerde kümülatif anormal kayıplara sebep olduğu görülmüştür. Diğer taraftan aynı olayın ticaret (%8) ve hizmetler (%2) sektöründe olayın ilk gününde pozitif anormal getiriler yarattığı görülmüştür. Ortaya çıkan bu sonucun nedenin ise pandeminin etkisiyle birlikte arzda yaşanabilecek kısıtlamaların endişesiyle alışveriş taleplerini artıran tüketici davranışları kaynaklı olduğu düşünülmektedir.

Covid-19 kaynaklı ilk ölümün yaşandığı 17 Mart 2020 gününün yarattığı anormal kaybın 11 Mart 2020 gününe kıyasla daha düşük olduğu ve hatta kümülatif etkisine bakıldığında istatistiki olarak anlamlı bir anormal getirinin ya da kaybın yaşanmadığı görülmektedir. Turizm, taş toprak, kimya ve ulaştırma gibi sektör endekslerinde olay günü anormal kayıplar ortaya çıkmış olsa da olayın ertesi günü açıklanan "Ekonomik İstikrar Kalkanı" paketinin olumlu etkisi ile birlikte kümülatif anormal kayıpların oluşmasının engellendiği tahmin edilmektedir.

Pandemi sürecinin bitirilmesine yönelik önemli bir adım olan aşı süreci ile ilgili Türkiye için somut bir gelişmenin yaşandığı 30 Aralık 2020 tarihinin beklentiler doğrultusunda sektör endeksleri üzerinde kümülatif anormal getirilere neden olduğu görülmektedir. Çalışmada ele alınan ilk iki olumsuz olay gününde en çok anormal kayıp yaşayan sektörlerden birisi olan turizm endeksinin olumlu aşı haberi ile birlikte en çok anormal getiri elde eden sektör endeksi olduğu tespit edilmiştir. Seyahat kısıtlamalarının belirli tedbirler ölçüsünde gevşetilmesi ve aşılamanın tüm dünya genelinde yaygınlaşması sektöre ilişkin olumlu beklentileri artırmıştır. Çin'den sipariş edilen aşının ilk partisinin gelişi ve yurt içinde de süren yerli aşı çalışmaları turizmden sonra en çok metal eşya makina, gıda ve sigorta endeksinde kümülatif anormal getirilere neden olmuştur.

Tüm dünyayı etkisi altına alan ve önceden tahmin edilemeyen pandemi gibi ani olayların hisse senedi piyasası üzerinde anormal getiri ve kayıplara neden olduğu literatürde yer alan çalışmalardan da görülmektedir. Dolayısıyla Borsa İstanbul'da işlem yapan yatırımcıların piyasaya düşecek olağan dışı haberlerin olası etkilerini doğru yorumlaması piyasada ortaya çıkacak anormal getiri ve kayıplara karşı hazırlıklı olmasını sağlayacaktır. Haberin niteliği ve sektörlere olası etkilerinin ön görülmesi ortaya çıkacak anormal getirileri el etmek için bir fırsat, yaşanabilecek anormal kayıpların önlenmesi için ise bir olanaktır. Böyle bir durumda doğru bir analiz sonucunda anormal kayıpların yaşanılacağı düşünülüyorsa alternatif yatırım araçları tercih edilebilir veya anormal getirilerin ortaya çıkacağı düşünülüyor ise bu araçlardan hangisinin daha yüksek getiri potansiyeli sağlayacağı kıyaslanarak bu doğrultuda işlem yapılabilir.

Kaynaklar

Aksoy, M. (2014), "The Effects of Terrorism on Turkish Stock Market", *Ege Academic Review*, 14(1), 31-41.

AlAli, M.S. (2020), "The Effect of WHO COVID-19 Announcement On Asian Stock Markets Returns: An Event Study Analysis", *Journal of Economics and Business*, 3(3), 1051-1054.

Alam, M.N. et al. (2020), "Stock Market Response During COVID-19 Lockdown Period in India: An Event Study", *The Journal of Asian Finance, Economics, and Business*, 7(7), 131-137.

Al-Awadhi et al. (2020), "Death And Contagious Infectious Diseases: Impact of the COVID-19 Virus On Stock Market Returns", *Journal of Behavioral and Experimental Finance*, 27, 100326.

Ashraf, B.N. (2020), "Stock markets' reaction to COVID-19: Cases or Fatalities?", *Research in International Business and Finance*, 54, 101249.

Bash, A. (2020), "International Evidence of COVID-19 and Stock Market Returns: An Event Study Analysis", *International Journal of Economics and Financial Issues*, 10(4), 34-38.

Brown, S.J. & J.B. Warner (1985), "Using Daily Stock Returns: The Case of Event Studies", *Journal of Financial Economics*, 14(1), 3-31.

Chen, A.H. & T.F. Siems (2004), "The Effects of Terrorism on Global Capital Markets", *European Journal of Political Economy*, 20, 349-366.

Chowdhury, E.K. & M.Z. Abedin (2020), "COVID-19 Effects on the US Stock Index Returns: An Event Study Approach", *Accounting, Auditing & Accountability Journal*, 1-31.

Çetin, A.C. (2020), "Koronavirüs (Covid-19) Salgınının Türkiye'de Genel Ekonomik Faaliyetlere ve Hisse Senedi Borsa Endeksine Etkisi", *Mehmet Akif Ersoy Üniversitesi Uygulamalı Bilimler Dergisi*, 4(2), 341-362.

Çoban, O. vd. (2020), "Covid-19 Krizinin Finansal Piyasalara Etkisi: Türkiye Örneği", *Gaziantep University Journal of Social Sciences*, (Special Issue), 506-519.

Dyckman, T. et al. (1984), "A Comparison of Event Study Methodologies Using Daily Stock Returns: A Simulation Approach", *Journal of Accounting Research*, 1-30.

Fama, E.F. (1970), "Efficient Capital Markets: A Rewiew of Theory and Emprical Work", *Journal of Finance*, 25(2), 383-417.

Goodell, J.W. & T.L.D. Huynh (2020), "Did Congress trade ahead? Considering the reaction of US industries to COVID-19", *Finance Research Letters*, 36, 101578.

Göker, İ.E. et al. (2020), "The Impact of the COVID-19 (Coronavirus) on The Borsa Istanbul Sector Index Returns: An Event Study", *Gaziantep University Journal of Social Sciences*, (Special Issue), 14-41.

Gülhan, Ü. (2020), "Covid-19 Pandemisine BIST 100 Reaksiyonu: Ekonometrik Bir Analiz", *Turkish Studies*, 15(4), 497-509.

He, P. et al. (2020), "COVID-19's Impact on Stock Prices Across Different Sectors: An Event Study Based on the Chinese Stock Market", *Emerging Markets Finance and Trade*, 56(10), 2198-2212.

Heyden, K.J. & T. Heyden (2021), "Market Reactions to the Arrival and Containment of COVID-19: An Event Study", *Finance Research Letters*, 38, 101745.

Huo, X. & Z. Qiu (2020), "How does China's Stock Market React to the Announcement of the COVID-19 Pandemic Lockdown?", *Economic and Political Studies*, 8(4), 436-461.

Kılıç, Y. (2020), "Borsa İstanbul'da COVID-19 (Koronavirüs) Etkisi", *Journal of Emerging Economies and Policy*, 5(1), 66-77.

Liu, H. et al. (2020), "The COVID-19 Outbreak and Affected Countries Stock Markets Response", *International Journal of Environmental Research and Public Health*, 17(8), 2800.

Maneenop, S. & S. Kotcharin (2020), "The impacts of COVID-19 on the Global Airline Industry: An Event Study Approach", *Journal of Air Transport Management*, 89, 101920.

Öztürk, Ö. et al. (2020), "Effect of COVID-19 Outbreak on Turkish Stock Market: A Sectoral-Level Analysis", *Hitit University Journal of Social Sciences Institute*, 13(1), 56-68.

Pandey, D.K. & V. Kumari (2021), "Event study on the Reaction of the Developed and Emerging Stock Markets to the 2019-nCoV Outbreak", *International Review of Economics & Finance*, 71, 467-483.

Peker, Y. & E. Demirhan (2020), "COVID-19 Küresel Salgınının Borsa İstanbul'daki Sektörel Etkileri", *TEPAV Değerlendirme Notu*, N202012, <https://www.tepav.org.tr/upload/files/1586752188-0.COVID_19_Kuresel_Salgininin_Borsa_ Istanbuldaki_Sektorel_Etkileri.pdf>, 28.01.2021.

Rahman, M.L. et al. (2021), "The COVID-19 Outbreak and Stock Market Reactions: Evidence from Australia", *Finance Research Letters*, 38, 101832.

Saka-Ilgın, K. & S.S. Sarı (2020), "COVID-19 Pandemisinin Hisse Senedi Piyasalarına Etkisi: Vaka ve Ölümlerin Yoğun Olduğu Ülkeler ile Türkiye İncelemesi", *Karadeniz Sosyal Bilimler Dergisi*, 12(23), 434-453.

Schwert, G.W. (1981), "Using Financial Data to Measure Effects of Regulation", *Journal of Law and Economics*, 24, 121-158.

Singh, B. et al. (2020), "The Outbreak of COVID-19 and Stock Market Responses: An Event Study and Panel Data Analysis for G-20 Countries", *Global Business Review*, 1-26.

Sun, Y. et al. (2021), "The impact of COVID-19 on the Chinese Stock Market: Sentimental or Substantial?", *Finance Research Letters*, 38.

Tayar, T. vd. (2020), "Covid-19 Krizinin Türkiye'deki Sektörler Üzerinde Etkileri: Borsa İstanbul Sektör Endeksleri Araştırması", *Van Yüzüncü Yıl Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, (Salgın Hastalıklar Özel Sayısı), 293-320.

Xiong, H. et al. (2020), "Which Firm-Specific Characteristics Affect The Market Reaction of Chinese Listed Companies to the COVID-19 Pandemic?", *Emerging Markets Finance and Trade*, 56(10), 2231-2242.

Yıldız-Contuk, F. (2020), "Covid-19'un Borsa İstanbul Üzerindeki Etkisi: Bir ARDL Sınır Testi Modeli", *Muhasebe ve Finansman Dergisi*, 89, 101-112.

Yong, H.H.A. & E. Laing (2020), "Stock Market Reaction to COVID-19: Evidence from U.S. Firms' International Exposure", *International Review of Financial Analysis*, 76, 101656.

Zeren, F. & A.E. Hızarcı (2020), "The Impact of Covid-19 Coronavirus on Stock Markets: Evidence From Selected Countries", *Muhasebe ve Finans İncelemeleri Dergisi*, 3(1), 78-84.

Sosyoekonomi

2022, Vol. 30(51), 487-510

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.24
Date Submitted: 10.05.2021
Date Revised: 30.11.2021
Date Accepted: 25.01.2022

Türkiye'de Emek, Sermaye ve Tüketim Üzerindeki Efektif Vergi Yükü: 2006-2019

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Effective Tax Burden on Labour, Capital, and Consumption in Turkey: 2006-2019

Abstract

This article aims to measure the effective tax burden on labour, capital, and consumption in Turkey for the 2006-2019 period. In this study, we use the MRT method to measure the effective tax burden with some improvements. According to this method, the effective tax burden is calculated as tax revenues divided by the associated tax base taken from national accounts. The research results show that the effective tax burden on labour is higher than the effective tax burden on capital and consumption in Turkey. In addition, it turns out that taxes on labour and consumption are more sensitive to economic cycles. However, it is revealed that taxes on capital fluctuate according to changes in tax laws.

Keywords : Effective Tax Burden, Effective Average Tax Rate, Implicit Tax Rate, Tax Ratio.

JEL Classification Codes : H20, H22, H29.

Öz

Bu makalenin amacı, Türkiye'de 2006-2019 dönemi için emek, sermaye ve tüketim üzerindeki efektif vergi yükünü ölçmektir. Bu çalışmada efektif vergi yükünü ölçmek için bazı düzeltmelerle MRT metodu kullanılmaktadır. Bu metoda göre, efektif vergi yükü, vergi gelirlerinin ulusal hesaplardan alınan ilişkili vergi matrahına bölünmesiyle elde edilen oran olarak hesaplanmaktadır. Araştırma sonuçları Türkiye'de emek üzerindeki efektif vergi yükünün sermaye ve tüketim üzerindeki efektif vergi yükünden daha yüksek olduğunu göstermektedir. Ayrıca emek gelirleri ve tüketim harcamaları üzerinden alınan vergilerin ekonomik çevrimlere daha duyarlığı olduğu anlaşılmaktadır. Ancak sermaye üzerinden alınan vergilerin ise vergi yasalarında yapılan değişikliklere göre dalgalanma gösterdiği ortaya çıkmaktadır.

Anahtar Sözcükler : Efektif Vergi Yükü, Ortalama Efektif Vergi Oranı, Örtük Vergi Oranı, Vergi Rasyosu.

1. Giriş

Maliye teorisinde vergilemenin mali, ekonomik ve sosyal işlevlerinden sıklıkla söz edilir. Ancak vergilemenin söz konusu işlevleri ne derece yerine getirdiğini değerlendirebilmek için makroekonomik faktörler üzerindeki efektif vergi yükünün bilinmesi gerekir. Vergi yükü, vergi gelirinin ilgili vergi matrahına oranını ifade eder (Sørensen, 2004: 2). Ancak efektif vergi yükü hesaplanması vergi beyannamelerinde görülen vergi ve bununla ilişkili vergi matrahlarıyla yapılamaz. Bunun yerine devletin tahsil ettiği vergiler ile söz konusu vergilere kaynaklık eden gelirlerin veya tüketim harcamalarının kullanılması gerekir. Böylece hesaplamaya hem vergi kanunlarında nihai vergi tutarının oluşmasına etki eden parametrelerin hem de ekonomide yaşanan gelişmelerin reel etkileri dahil edilmiş olur (Papageorgiou et al., 2012: 13-14). Literatürde efektif vergi yükü; efektif vergi oranı, ortalama efektif vergi oranı, örtük/zımni vergi oranı ve vergi rasyosu gibi kavramlarla ifade edilmektedir (Volkerink & De Haan, 2001: 13; European Commission, 2020: 256). Ancak aynı ölçüm tekniğini tanımlamak için kullanılan söz konusu ifadelerin kavram kargaşasına neden olduğu da bir gerçektir. Söz konusu karışıklığı aşmak için bu çalışmada yukarıdaki ifadeler yerine *efektif vergi yükü* kavramının kullanılması tercih edilmektedir.

Bu çalışmada Türkiye'de 2006-2019 yılları arası dönemde emek, sermaye ve tüketimden oluşan makroekonomik faktörler üzerindeki efektif vergi yükü araştırılmaktadır. Araştırmanın temel amacı, makroekonomik faktörler üzerindeki efektif vergi yükünün dağılımını incelemektir. Türkiye'de makroekonomik faktörler üzerindeki efektif vergi yükünü ölçmek için Mendoza et al. (1994) tarafından geliştirilen ölçüm metodu[1] temel alınmaktadır. Ancak literatürde MRT metoduna önemli eleştiriler yöneltilmiş ve metot üzerinde bazı düzeltmeler yapılmıştır. Bunlar arasında başlıca Carey & Tchilinguirian, (2000), Volkerink et al. (2002) ve Carey & Rabesona (2004) tarafından yapılan eleştiri ve düzeltmeler sayılabilir. Söz konusu eleştiriler ve düzeltme önerileri çalışmanın literatür incelemesi bölümünde ele alınmaktadır. Ayrıca veri setlerinin yeterince ayrıntılı olmaması da MRT metodolojisinin olduğu gibi uygulanmasına engel teşkil edebilmektedir. Bununla birlikte MRT metodolojinin makroekonomik faktörler üzerindeki efektif vergi yükünü hesaplamaya getirdiği yaklaşım literatürde genel olarak benimsenmiş görünmektedir. Öyle ki yapılan bir çalışmada farklı araştırmacıların orijinal MRT metodu ile düzeltilmiş metotlara göre yapılan ölçümler arasında ihmal edilebilir düzeyde farklar olduğu; hatta bu farkların kullanılan metodolojilerden ziyade, hesaplamaya temel oluşturan veri setlerindeki farklılıklardan kaynaklandığı ifade edilmektedir (Martinez-Mongay, 2000: 5, 11, 57). Dolayısıyla bu çalışmada hem literatürde orijinal MRT metodolojinde yapılan düzeltmeler dikkate alınarak hem de kullandığımız veri setinin sağladığı olanaklardan yararlanarak efektif vergi yükü ölçülecektir.

[1] *Literatürde Mendoza & Razin & Tesar (1994) tarafından geliştirilen metot, bu çalışmada kısaca MRT metodu olarak kullanılacaktır.*

Türkiye'de makroekonomik faktörler üzerindeki efektif vergi yükü araştırmasına gösterilen ilgi oldukça düşük düzeydedir. Zira yaptığımız literatür taramasında makroekonomik faktörler üzerindeki efektif vergi yükünü ölçen iki çalışmaya ulaşabildik. Bunlardan ilki Ünlükaplan & Arısoy (2011) tarafından yapılan çalışmadır. Bu çalışma Türkiye'de 1980-2006 yılları arası döneme odaklanmıştır. Diğer çalışma ise Simon & Harding (2020) tarafından yapılmıştır. Bu çalışmada ise seçilmiş bazı yıllar için sadece tüketim harcamaları üzerindeki efektif vergi yükü hesaplanmıştır. Dolayısıyla Türkiye'de 2006 yılı sonrası dönemde emek, sermaye ve tüketimden oluşan makroekonomik faktörler üzerindeki efektif vergi yükünün ne kadar olduğu hakkında kapsamlı bir araştırma yapılmamış görünmektedir. Dolayısıyla bu çalışmada 2006-2019 yılları arası dönemde emek, sermaye ve tüketim üzerindeki efektif vergi yükü hesaplanarak literatürdeki söz konusu eksikliği gidermeye dönük bir katkı yapılmaktadır.

Bu çalışmada ulaşılan bulgular, 2006-2019 yılları arasında, Türkiye'de emek ve tüketim üzerindeki efektif vergi yükünün sermaye üzerindeki efektif vergi yüküne göre oldukça yüksek olduğunu göstermektedir. Ayrıca tüketim üzerindeki efektif vergi yükünün ekonominin içinde bulunduğu konjonktürden daha fazla etkilendiği görülmektedir. Aynı şekilde ekonomik kriz ve durgunluk dönemlerinde yüksek seyreden işsizlik oranlarının emek üzerindeki efektif vergi yükünün düşmesine sebep olduğu sonucu ortaya çıkmaktadır. Öte yandan sermaye üzerindeki efektif vergi yükünün daha istikrarlı bir seyir izlediği anlaşılmaktadır. Ancak emek ve tüketim üzerindeki efektif vergi yükündeki dalgalanmalar daha çok ekonomik nedenlerle ilişkili iken, sermaye üzerindeki efektif vergi yükündeki küçük çaplı salınımların ise vergi parametrelerinde meydana gelen değişliklerle ilişkili olduğu görülmektedir.

Çalışmanın geri kalanı şu şekilde organize edilmiştir. İlk bölümde makroekonomik faktörler üzerindeki efektif vergi yükünü araştırmış olan çalışmalar incelenmektedir. İkinci bölümde çalışmada kullanılan veri seti ve ölçüm metodu ele alınmaktadır. Üçüncü bölümde ampirik bulgular sunulmaktadır. Dördüncü bölümde ulaşılan bulgular tartışılmaktadır. Son bölümde ise sonuçlara ilişkin genel bir değerlendirme yapılmaktadır.

2. Literatür İncelemesi

Efektif vergi yükü araştırmalarını farklı özelliklerine göre tasnif etmek literatürü incelemek için iyi bir başlangıç noktası oluşturabilir. Bu amaçla Tablo 1'de efektif vergi yükü hesaplamalarına ilişkin literatür sınıflandırılarak sunulmaktadır. Bu bağlamda literatür, *ileriye doğru* (forward-looking) ve *geriye doğru* (backward-looking) efektif vergi yükü araştırmaları olarak ikiye ayırılabilir. Bunlardan ileriye doğru efektif vergi yükü araştırmaları kullanılan verilerin hipotetik olması nedeniyle tahmini efektif vergi yükü göstergeleri sağlamaktadır. Örneğin vergi kanunlarındaki hükümlerden hareketle yapılan efektif vergi yükü tahminleri böyledir. Geriye doğru efektif vergi yükü hesaplamaları ise gerçek veya gözlemlenebilir verilerle yapılmaktadır. Örneğin devletin fiilen tahsil ettiği vergi hasılatı istatistikleri ile ulusal hesaplardan alınan bir ekonomik değişken üzerindeki efektif vergi yükünün hesaplanması gibi. Böyle bir hesaplamayı bir firmanın veya sektörün

gerçek muhasebe verilerinden hareketle de yapmak mümkündür. Bu durumda da geriye doğru efektif vergi yükü göstergeleri hesaplanmış olur (Nicodème, 2001: 6-13).

Tablo: 1
Efektif Vergi Yükü Araştırmalarına İlişkin Literatürün Sınıflandırılması

➢ İleriye doğru (ex-ante) efektif vergi yükü hesaplamaları yapan çalışmalar.	➢ Geriye doğru (ex-post) efektif vergi yükü hesaplamaları yapan çalışmalar.
➢ **Mikro ölçekli çalışmalar** *(Efektif marjinal vergi oranları üretir):*	➢ **Makro ölçekli çalışmalar** *(Ortalama efektif vergi oranları üretir):*
➢ King & Fullerton (1984) ➢ OECD (1991) ➢ Devereux & Griffith (1999) ➢ Jacobs & Spengel (1999)	Ulusal Hesaplar Verileri ve OECD Vergi Hasılatı İstatistikleri: ➢ Mendoza et al. (1994) ➢ Carey & Tchilinguirian (2000) ➢ Volkerink & De Haan (2002) ➢ Ünlükaplan & Arısoy (2011) ➢ Papageorgiou et al. (2012) ➢ Kostarakos & Varthalitis (2020) ➢ European Commission (2020) ➢ Simon & Harding (2020) Firma Verileri: ➢ Nicodème (2001) ➢ Clark (2004)
➢ **Mikro ya da makro ölçekli çalışmalar** *(Efektif ortalama vergi oranları üretir)*	➢ **Mikro ölçekli çalışmalar** *(Marjinal efektif vergi oranları üretir)*
➢ Devereux & Griffith (1999); ➢ Jacobs & Spengel (2002).	Vergi Hasılatı Verileri: ➢ Gordon et al. (2003).

Kaynak: Bellak & Leibrecht (2007:16, Şekil 2.1)'den yararlanarak yazarlar tarafından oluşturulmuştur.

Öte yandan araştırma ölçeğine göre ise literatür, *mikro* ve *makro ölçekte* yapılan çalışmalar olarak tasnif edilebilir. Mikro düzeyde yapılan hesaplamalar temsili bir mükellef veya yatırım tutarı üzerindeki efektif vergi yükünü göstermektedir. Makro ölçekte yapılan araştırmalar ise ulusal ölçekte efektif vergi yükü tahminleri üretmektedir. Bununla birlikte ister mikro isterse makro ölçekte yapılsın, ileriye doğru vergi yükü ölçümleri, *ex-ante* efektif vergi yükü göstergeleri üretmektedir. Bunun tersine geriye dönük efektif vergi yükü araştırmaları ise mikro ya da makro ölçekte *ex-post* efektif vergi yükü göstergeleri hesaplamaya imkân vermektedir. Ayrıca mikro ölçekte vergi miktarındaki değişmenin vergi matrahındaki değişmeye oranı olarak *marjinal efektif vergi yükü* ölçümü de yapılabilmektedir (Jacobs & Spengel, 1999: 4-6; OECD, 2000: 10-11; Leibrecht & Römisch, 2002: ii, 4-6). Bu çalışma makro ölçekte gerçek veriler kullanılarak efektif vergi yükünü araştırmayı amaçladığından hem mikro ölçekte yapılan araştırmalar hem de hipotetik verilere dayanan çalışmalar literatür incelememizin dışında bırakılmıştır.

Makro ölçekte ve gerçek veriler kullanılarak efektif vergi yükünü araştıran ilk çalışma Mendoza et al. (1994) tarafından yapılmıştır. Yazarlar 1965-1998 yılları arası dönem için 7 ülkenin verilerini kullanarak devletin emek, sermaye ve tüketim gibi makroekonomik faktörler üzerinden topladığı vergi gelirleri ile ulusal hesaplardan aldıkları gelir ve harcama verilerini kullanarak makro ölçekte emek, sermaye ve tüketim harcamaları üzerindeki efektif vergi yükünü hesaplamışlardır. MRT metodolojisi efektif vergi yükünü devletin fiilen tahsil ettiği vergi hasılatı verileriyle ölçtüğü için vergi yasalarında mevcut olan veya zaman içinde mevzuata eklenen/değiştirilen bütün parametrelerin etkilerinin hesaplamaya dahil edilmesini sağlamaktadır. Aynı şekilde ulusal hesaplardan alınan gelirler ve tüketim harcamaları potansiyel vergi matrahı olarak kullanılarak, ekonomide meydana

gelen gelişmelerin etkileri de hesaba katılmış olmaktadır (Volkerink & De Haan, 2001: 14). Bu olumlu özelliklerine rağmen MRT metodolojisinin bazı eksik yönleri de vardır. Örneğin fiyatlar genel seviyesindeki sürekli artışlardan kaynaklanan vergi tahsilatındaki artış (dilim sürüklenmesi, maktu tutarların aşınması) veya azalışlar (verginin doğumuyla tahsilatı arasında geçen süreye bağılı olarak vergi alacağının reel değerinin düşmesi gibi) hesaplamaya dahil edilememektedir.

Carey & Tchilinguirian (2000) tarafından yapılan çalışmalarda 29 OECD ülkesi için efektif vergi yükü ölçümü yapılmıştır. Carey & Tchilinguirian (2000)'in MRT metodunu iki temel konuda eleştirdikleri görülmektedir. Bunlardan biri sermaye kazançları üzerindeki efektif vergi yükü hesaplanırken kapital kazançlarına (hisse senedi, bono, tahvil vb.) ilişkin varsayımlarla ilgilidir. Mendoza et al. (1994: 305) sermaye kazançları üzerindeki efektif vergi yükünü hesaplarken ulusal gelir hesaplarından aldıkları işletme artığını vergi matrahı olarak kullanmışlardır. Hâlbuki kapital kazançlarının dayandığı tasarruf araçları katma değer yaratmadığı için ulusal gelir hesaplarında dikkate alınmamaktadır. Bu yüzden Mendoza et al. (1994) sermaye kazançları üzerindeki efektif vergi yükünü gerçekte olduğundan daha düşük hesaplamışlardır (Carey & Tchilinguirian, 2000: 7). Carey & Tchilinguirian (2000)'in MRT metodunu eleştirdikleri ikinci husus serbest meslek kazançlarının sermaye kazançlarına dahil edilmiş olmasıyla ilgilidir. Yazarlara göre serbest meslek kazançlarının önemli bir bölümü ücret sayılabilecek emek gelirlerine dayanır. Dolayısıyla hesaplamanın daha gerçekçi olabilmesi için ara bir formülle serbest meslek kazançları üzerinden alınan vergilerin emek ve sermaye kazançları arasında dağıtılması gerekir (Carey & Tchilinguirian, 2000: 13).

Volkerink et al. (2002) 9 OECD ülkesi için MRT metodunu uygulayarak efektif vergi yükü hesaplaması yapmışlardır. Yazarlar, ulaştıkları bulgulara dayanarak, emek üzerindeki efektif vergi yükünün Kıta Avrupası'nda işsizlik oranlarının artmasında etkili olduğunu, fakat aynı zamanda sermaye üzerindeki efektif vergi yükünün ise ekonomik büyümeyi negatif yönde etkilediğini belirtmektedirler (Volkerink et al., 2002: 221). Ancak yazarların MRT metoduna önemli eleştirileri olmuştur. Bunlardan ilki hane halklarının emek ve sermaye gelirleri üzerinden ödedikleri vergilerin ayrıştırılmasıyla ilgilidir. Mendoza et al. hane hakları için ortalama bir vergi oranı belirleyerek bunu emek ve sermaye gelirleri üzerinden ödenen vergilerin ayrıştırılmasında kullanmıştır (1994: 305). Oysa çeşitli gelir unsurları için vergi sisteminde sağlanan vergi kolaylıkları farklıdır. Keza artan oranlı gelir vergisi tarifesi içinde hane halklarının tümü aynı vergi diliminde vergi ödemezler. Dolayısıyla Mendoza et al. (1994)'nin kullandığı ayrıştırma katsayısı emek ve sermaye gelirleri arasında gelir/kazanç üzerinden ödenen vergilerin dağıtılmasında yanıltıcı sonuçlara neden olabilir.

Ayrıca Volkerink et al. (2002) hane halklarının ödediği vergilere sosyal güvenlik katkılarının da dahil edilmesi gerektiğini söylerler. Öte yandan yazarlar emek üzerindeki efektif vergi yükü hesaplanmasında Mendoza et al. (1994)'den farklı olarak formülün paydasına işgücü ödemelerini koyarlar. Böylece hesaplama tüm emek gelirlerini kapsayacak şekilde genişletilmiş olur. Ancak harcama üzerinden alınan vergi yükünün hesaplanmasında

oldukça hatalı bir biçimde hane halkları nihai tüketim harcamalarının yanı sıra devletin tüketim harcamalarını da ölçüme dahil etmişlerdir (Volkerink et al., 2002: 212). Oysa birçok ülkede devletin kamu personeli için yaptığı maaş ve ücret ödemeleri katma değer vergisinin kapsamı dışındadır. Bu yüzden Volkerink et al. (2002)'nin tüketim üzerindeki efektif vergi yükü hesaplaması olduğundan daha küçük hesaplanma riskiyle karşı karşıyadır.

Carey & Rabesona (2004) MRT metodunu kullanarak 25 OECD ülkesi için efektif vergi yükü ölçümü yapmışlardır. Ancak Carey & Rabesona (2004) MRT metodu üzerinde bazı değişiklikler yapmışlardır. Bunlardan biri Mendoza et al. (1994) çalışmalarında emek üzerinden alınan vergiler arasında sayılan sosyal güvenlik katkılarının emek ve sermaye arasında ayrıştırılmasıdır. Bu tercih emek gelirleri üzerinden alınan vergi miktarının düşmesine neden olmuştur. Öte yandan Carey & Rabesona (2004) potansiyel vergi matrahı olan ücret ve maaş gelirlerine parafiskal gelirler ile işgücü üzerindeki diğer vergileri de ekleyerek emek gelirleri üzerindeki efektif vergi yükünü hesaplamak için kullanılan potansiyel vergi matrahını (paydayı) büyütmüşlerdir. Bunun sonucunda Mendoza et al. (1994) tarafından hesaplanan emek gelirleri üzerindeki efektif vergi yüküne göre Carey & Rabesona (2004)'nın hesapladıkları emek gelirleri üzerindeki efektif vergi yükü daha düşük çıkmıştır. Carey & Rabesona (2004)'nın sermaye kazançları üzerindeki efektif vergi yükünü hesaplarken yaptıkları düzeltmeler ise sermaye kazançları üzerindeki efektif vergi yükünün Mendoza et al. (1994)'nin çalışmalarında ulaştıkları sonuçlara göre daha yüksek çıkmasına neden olmuştur. Zira yazarlar hem sosyal güvenlik işveren katkılarını hem de taşınmaz varlıklar üzerinden alınan vergileri sermaye kazançları üzerinden alınan vergilere eklemişlerdir (Carey & Rabesona, 2004: 217, 250).

Ünlükaplan & Arısoy (2011) Türkiye'de 1980-2006 yılları için hane halkı gelirleri, emek, sermaye ve tüketim harcamaları üzerindeki efektif vergi yükünü hesaplamışlardır. Yazarlar üç farklı ölçüm metodu kullanmışlardır. Bunlardan ilki orijinal MRT metodudur. Diğer ikisi ise MRT metodunun Carey & Rabesona (2004) tarafından düzeltilmiş sürümleridir. Ünlükaplan ve Arısoy (2011)'un bulguları incelendiğinde Carey & Rabesona metodolojisine göre yapılan her iki hesaplamada efektif vergi yükü sonuçları arasında dikkate değer büyüklükte bir fark yoktur. Ancak MRT metodolojisi ile Carey & Rabesona metodolojisine göre yapılan hesaplamalarda ise özellikle tüketim üzerindeki efektif vergi yükü sonuçlarında bariz farklılıklar göze çarpmaktadır. Bununla birlikte işgücü, hane halkı gelirleri ve sermaye üzerindeki efektif vergi yükü ise her üç metodolojide de birbirine oldukça yakın görünmektedir. Sadece sermaye üzerindeki efektif vergi yükü 1999 yılından sonra Carey & Rabesona metodolojisine göre yapılan hesaplamalarda daha büyük çıkmaya başlamıştır. Ayrıca Ünlükaplan & Arısoy tarafından yapılan ölçümler Türkiye'de emek gelirleri üzerindeki vergi yükünün her üç metoda göre de sermaye ve tüketim üzerindeki efektif vergi yükünden daha fazla olduğunu göstermektedir (2011: 21-22, Tablo 4, 5, 6).

Papageorgiou et al. (2012) Yunanistan'da 2000-2009 yılları arası dönemde efektif vergi yükünü araştırmışlardır. Yazarlar efektif vergi yükünü ölçmek için MRT metodolojisini takip etmişlerdir. Söz konusu çalışmada emek, sermaye, tüketim, serbest meslek kazançları, kurum kazançları ile sosyal güvenlik katkıları (bağımlı çalışanlar,

işverenler ve kendi adına çalışanların sosyal güvenlik katkıları ayrı ayrı ele alınmıştır) için efektif vergi yükü tahminleri yapılmıştır. Ulaşılan sonuçlar yazarlar tarafından Euro bölgesi ülkeleri için yapılan hesaplamada ulaşılan ortalama efektif vergi yükü göstergeleri ile karşılaştırılmıştır. Araştırma sonuçları Yunanistan'da emek ve sosyal güvenlik katkıları için hesaplanan efektif vergi yükünün oldukça yüksek olduğunu, ancak tüketim üzerindeki efektif vergi yükünün ise bariz biçimde düşük olduğunu ortaya koymaktadır. Ayrıca Euro bölgesiyle Yunanistan karşılaştırıldığında özellikle serbest meslek kazançlarında Yunanistan'ın daha yüksek efektif vergi yükü göstergesine sahip olduğu ifade edilmektedir.

Kostarakos & Varthalitis (2020) 1995-2017 yılları arası dönem için İrlanda ve 27 AB üyesi ülke (Hırvatistan hariç) verilerini kullanarak efektif vergi yükünü araştırmışlardır. Orijinal MTR metodolojisini takip eden yazarlar emek, sermaye, tüketim ve kurumlar üzerindeki efektif vergi yükünü hesaplamışlardır. Bunun yanında aynı dönem için İrlanda ve 27 Avrupa Birliği ülkesi ortalaması olarak sosyal sigorta katkıları ile birleşik emek ve tüketim harcamaları için efektif vergi yükü ölçmüşlerdir. Yazarların İrlanda için ulaştıkları bulgular, üretim faktörleri üzerindeki bozucu etkileri daha yüksek vergilerin (emek ve sermayeden alınan vergiler) nispeten daha düşük olduğunu, ancak tüketim üzerinden alınan ve bozucu etkileri görece daha düşük vergilerin ise daha yüksek efektif vergi yükü büyüklüğüne sahip olduğunu göstermektedir. Ancak 27 AB ülkesi ortalaması olarak ulaşılan bulgular İrlanda için yukarıda ifade edilen efektif vergi yükü göstergelerinin tam tersi bir sonuca işaret etmektedir. Yapılan karşılaştırmalarda 27 AB ülkesinin emek ve sermaye gibi üretim faktörleri üzerindeki vergilerin İrlanda'dan daha fazla olduğu, ancak tüketim üzerindeki vergilerde ise İrlanda'nın 27 AB ülkesinin efektif vergi yükü ortalamasından daha yüksek olduğu sonucuna ulaşılmıştır.

European Commission (2020) 28 Avrupa Birliği üyesi ülke ile İzlanda ve Norveç'i de kapsayan çalışmalarında emek, sermaye, tüketim, kurum kazançları, enerji ve çevre vergileri için efektif vergi yükü ölçümleri yapmıştır. 2006-2018 yıllarını kapsayan söz konusu çalışmada MRT metodu belli konularda değiştirilerek uygulanmıştır. Kullanılan metotlar arasındaki önemli fark, gelir vergisinin emek ve sermaye arasında ayrıştırılması noktasında ortaya çıkmaktadır. Mendoza et al. (1994) toplam gelir vergisi hasılatını maaş, ücret, mülk ve girişim gelirleri ile kurumsal olmayan işletme gelirleri toplamına bölerek hane halklarının ortalama vergi oranını hesaplamışlardır. Literatürde bu oran farklı vergi matrahlarına tabi olanlar ile çeşitli vergi kolaylıklarından faydalananlar arasında ayrım yapmadığı için gerçekçi olmadığı yönünde eleştirilmiştir. European Commission (2020: 287) ise ücret gelirlerini (W) toplam kişisel gelirlere (Y) oranlayarak bulduğu emek payı katsayısı ile kişisel gelir vergisi hasılatından emek ve sermaye gelirleri üzerinden ödenen payları ayrıştırmaktadır. Bu ayrıştırma yöntemi de en az Mendoza et al. (1994)'nin uyguladıkları hesaplama metodu kadar genel bir katsayı olmaktadır. Öte yandan European Commission (2020) tüketim üzerindeki efektif vergi yükünü ölçerken sadece nihai hane halkı tüketim harcamalarını esas almıştır. Ayrıca tüketim vergilerinin sınıflandırmasında da Mendoza et al. (1994) tarafından kullanılan metoda uygun davranmamıştır. Dolayısıyla European Commission (2020)'un tüketim üzerindeki efektif vergi yükü Mendoza et al. (1994)'nin ölçümlerine göre daha büyük çıkma eğilimindedir. Zira European Commission

(2020) tüketim vergilerinin potansiyel matrahını olduğundan daha küçük bir değer olarak hesaplamaya almıştır. European Commission ölçümlerine göre 2018 yılında 28 Avrupa Birliği üyesi ülkenin emek üzerindeki efektif vergi yükü %36,3 olarak hesaplanmıştır. Aynı yıl tüketim üzerindeki efektif vergi yükü %16,9 ve sermaye üzerindeki efektif vergi yükü ise %21,2 olarak tahmin edilmiştir (European Commission, 2020: 28, 29, 33).

Simon & Harding (2020) ise OECD ülkelerini esas alarak 1995-2017 yılları arası tüketim üzerindeki efektif vergi yükünü hesaplamıştır. Yazarlar MRT ölçüm metodunu takip etmişlerdir. Dolayısıyla Simon & Harding (2020) tarafından yapılan ölçümler tüm harcama vergileri ve hane halkları nihai tüketim harcamaları, kâr amacı gütmeyen kurumların nihai tüketim harcamaları ve devletin kamu çalışanları maaş ve ücretleri hariç nihai tüketim harcamalarını kapsamaktadır. Ayrıca harcamalar toplamından MRT metoduna uygun olarak harcama vergileri düşülerek net harcamalara ulaşılmıştır (Simon & Harding, 2020: 19). Yazarlar ekonomide yaşanan gerilemenin tüketim üzerinden alınan vergileri nasıl etkilediğini saptayabilmek için OECD ülkelerindeki tüketim harcamaları üzerindeki efektif vergi yükünü hesaplamışlardır. Ayrıca katma değer vergisi verimliliğindeki ve katma değer vergisi oranlarındaki değişikliklerin efektif vergi yükü üzerindeki etkilerini araştırmışlardır. Böylece OECD üyesi ülkelerde tüketim üzerinden alınan vergi gelirlerinde gözlemlenen istikrarın hem tüketim harcamaları hem de vergi parametrelerindeki değişikliklerinden kaynaklandığı sonucuna varmışlardır (Simon & Harding, 2020: 39-40).

3. Veri Seti ve Ölçüm Metodu

3.1. Veri Seti

Bu çalışmada iki farklı veri seti kullanılmaktadır. Bunlardan ilki vergi, harç ve sosyal güvenlik gelirlerine ilişkin mali istatistiklerdir. İkincisi ise ulusal hesaplar gayri safi yurt içi hâsıla tahmini verileridir. 2006-2019 yılları arası dönem için vergi, harç ve sosyal güvenlik gelirlerine ilişkin veriler, Hazine ve Maliye Bakanlığı (2020a; 2020b; 2020c; 2020d), Sosyal Güvenlik Kurumu (2020) ve Türkiye İş Kurumu (2020) mali istatistiklerinden alınmıştır. Söz konusu kamu gelirlerinin tasnifinde genel yönetim bütçe gelirleri (Ekod4) sınıflandırması esas alınmıştır. Ancak genel yönetim bütçe sisteminde (2000) sınıflandırma koduyla izlenen sosyal güvenlik prim gelirleri bağımlı (ücret ve maaş karşılığı çalışanlar) ve bağımsız (kendi işinde çalışanlar veya çalışmayanlar) istihdam edilenler açısından yeniden sınıflandırmayı gerektirmektedir. Bu nedenle veri setinde sosyal güvenlik primlerinin alt kalemlerinden yararlanarak bağımlı çalışanların ödediği sosyal güvenlik primleri (2000a) sınıflandırma koduyla; bağımsız istihdam kapsamında kalanların ödediği sosyal güvenlik primleri ise (2000b) sınıflandırma koduyla gösterilmektedir. Ayrıca çalışanların ödediği sosyal güvenlik primlerine işveren hissesi de eklenmiştir. Ancak sosyal güvenlik kurumlarına devlet katkısı veri seti dışında bırakılmıştır. Zira sosyal güvenlik kurumlarına devlet katkısı bir gelir kalemi değil bir kamu transfer harcamasıdır. Genel yönetim bütçe sınıflandırmasında yer almayan işsizlik sigortası fonu prim gelirleri (devlet katkısı hariç) ise veri setine ayrıca eklenmiştir. Tablo 2'de vergi, harç, sosyal güvenlik katkısı ve işsizlik sigortası prim gelirlerine ilişkin verilerin tasnifi sunulmaktadır.

Tablo: 2
Vergi, Harç, Sosyal Güvenlik Katkıları ve İşsizlik Sigortası Fonu Kesintilerinin Sınıflandırılması

Sınıflama Kodları				Gelir Türleri
1	0	0	0	Vergi Gelirleri
1	1	0	0	Gelir, Kar ve Sermaye Kazançları Üzerinden Alınan Vergiler
1	1	1	0	Gelir Vergisi
1	1	1	3	Gelir Vergisi Tevkifatı
1	1	1	3a	Maaş ve Ücretlerden Kaynakta Kesinti Yoluyla Tahsil Edilen Gelir Vergisi
1	1	2	0	Kurumlar Vergisi
1	2	0	0	Mülkiyet Üzerinden Alınan Vergiler
1	2	1	0	Veraset ve İntikal Vergisi
1	2	2	0	Motorlu Taşıtlar Vergisi
1	2	9	0	Mülkiyet Üzerinden Alınan Diğer Vergiler
1	2	9	51	Bina Vergisi
1	2	9	52	Arsa Vergisi
1	2	9	53	Arazi Vergisi
1	2	9	54	Çevre Temizlik Vergisi
1	3	0	0	Dahilde Alınan Mal ve Hizmet Vergileri
1	3	1	0	Dahilde Alınan Katma Değer Vergisi
1	3	2	0	Özel Tüketim Vergisi
1	3	3	0	Banka ve Sigorta Muameleleri Vergisi
1	3	4	0	Şans Oyunları Vergisi
1	3	5	0	Özel İletişim Vergisi
1	3	9	0	Dahilde Alınan Diğer Mal ve Hizmet Vergileri
1	3	9	1	6113 sayılı Kanun Kapsamında Alınan Vergiler
1	3	9	51	Eğlence Vergisi
1	3	9	52	Yangın Sigortası Vergisi
1	3	9	53	İlan ve Reklam Vergisi
1	4	0	0	Uluslararası Ticaret ve Muamelelerden Alınan Vergiler
1	4	1	0	Gümrük Vergileri
1	4	1	1	Gümrük Vergileri
1	4	1	2	Ek Mali Yükümlülük
1	4	2	0	İthalde Alınan Katma Değer Vergisi
1	4	3	0	Diğer Dış Ticaret Gelirleri
1	5	0	0	Damga Vergisi
1	5	1	0	Damga Vergisi
1	5	2	0	Eğitime Katkı Payı Ayrılması Gereken Damga Vergisi
1	6	0	0	Harçlar
1	9	0	0	Başka Yerde Sınıflandırılmayan Vergiler
1	9	1	0	Kaldırılan Vergi Artıkları
1	9	2	0	Bazı Varlıkların Milli Ekonomiye Kazandırılması. Hakkındaki Kanunu U. Alınan Vergiler
1	9	9	0	Başka Yerde Sınıflandırılmayan Diğer Vergiler
2	0	0	0	Sosyal Güvenlik Prim Gelirleri
2	1	0	0	Sosyal Sigortalar Prim Gelirleri
2	1	1	0	Malullük, Yaşlılık ve Ölüm Sigortası Prim Gelirleri
2	1	1	2	Bağımsız Çalışanlardan veya Çalışmayanlardan Prim Gelirleri
2	2	0	0	Genel Sağlık Sigortası Prim Gelirleri
2	2	1	2	Bağımsız Çalışanlardan veya Çalışmayanlardan Alınan GSS Prim Gelirleri
2	2	1	4	Primi Devletçe Karşılanan GSS Primi Gelirleri
2	3	0	0	İş Kazaları ve Meslek Hastalıkları Prim Gelirleri
2	3	1	2	Bağımsız Çalışanlardan ve Çalışmayanlardan Al. İş K. ve M. H. Prim Gelir
2	4	0	0	Diğer Sosyal Güvenlik Prim Gelirleri
2	5	0	0	Devlet Katkısı
2	6	0	0	5510 Öncesi Sosyal Sigorta Prim Gelirleri
2	6	1	2	Bağımsız Çalışanlardan veya Çalışmayanlardan Alınan Prim Gelirleri
2	0	0	0a	Bağımlı İstihdam Edilenler (2112+2212+2312+2612+2214+2500 hariç)
2	0	0	0b	Bağımsız İstihdam Edilenler veya Çalışmayanlar (2112+2212+2312+2612)
2	9	0	0	İşsizlik Sigortası Fonu Primleri (Devlet Katkısı Hariç)

Kaynak: Hazine ve Maliye Bakanlığı (2020a)'dan faydalanarak tarafımızdan düzenlenmiştir.

Bu çalışmada faydalandığımız makroekonomik değişkenler Tablo 3'te sunulmaktadır. Tablo 3'teki ulusal hesaplara ilişkin değişkenler ile büyüme ve işsizlik oranları Türkiye İstatistik Kurumu (2020) veri tabanından alınmıştır. Devletin kamu

personel ücretlerine ilişkin yaptığı harcamaları (GW) Hazine ve Maliye Bakanlığı (2020b) genel yönetim bütçe giderlerinden alınmıştır. Ancak 2006-2010 yılları kamu personeli maaş ve ücret ödemeleri Merkezi yönetim ve yerel yönetimler bütçelerinden alınan harcama kalemleri toplamından oluşmaktadır. Sosyal güvenlik kurumları personel giderleri 2006-2010 yılları arasında kamu personel giderlerine dahil değildir. Öte yandan ücret ve maaş gelirlerinden yapılan gelir vergisi tevkifat oranları ise Gelir İdaresi Başkanlığı (2006-2018) yıllık faaliyet raporlarından derlenmiştir. Söz konusu yıllık faaliyet raporlarında kesinti yoluyla ödenen vergilere ilişkin muhtasar beyanname özetleri bulunmaktadır. Faaliyet raporlarında ücretler başta olmak üzere yedi gelir unsurunun her birine ilişkin kesinti oranlarını bulmak mümkündür. Tablo 3'te görülen semboller literatüre uyum sağlamak amacıyla İngilizce terimlerin kısaltmalarından oluşmaktadır.

Tablo: 3
Makro Ekonomik Değişkenler ve Sembolleri

CoE	İşgücü Ödemeleri
Net OS	Net İşletme Artığı
C	Hane Halklarının Nihai Tüketim Harcamaları ile Hane Halkına Karşılıksız Yardım Eden Kâr Amacı Gütmeyen Kurumların Nihai Tüketim Harcamaları
GC	Devlet Nihai Tüketim Harcamaları
GW	Devletin kamu çalışanları için ödediği maaş ve ücretler harcamaları
T	Ücret ve Maaş Gelirlerinden Yapılan Gelir Vergisi Kesintisi Payı (%)
GR	Büyüme Oranı
UE	İşsizlik Oranı

Kaynak: Ulusal hesap verileri TÜİK (2020a; 2020b; 2020c; 2020d)'den, ücretlerden gelir vergisi kesintisi oranları ise Gelir İdaresi Başkanlığı, (2006-2020) Yıllık Faaliyet Raporlarından alınmıştır.

3.2. Ölçüm Metodu

Bu bölümde öncelikle MRT metodunun kuramsal çerçevesi sunulmaktadır. Ardından söz konusu ölçüm metodundan faydalanarak oluşturduğumuz hesaplama metodu açıklanmaktadır.

3.2.1. Mendoza, Razin ve Tesar Metodu

Mendoza et al. (1994) vergi yükünü değer (ad-valorem) olarak ölçerler. Yazarlar ölçüm metodunu geliştirirken üç maldan (emek, sermaye, tüketim) oluşan bir ekonomi soyutlaması yapmışlardır. Ardından her bir malın vergi öncesi fiyatı ile vergi sonrası fiyatı arasındaki farkı ad-valorem vergi yükü olarak tarif etmişlerdir (Mendoza et al., 1994: 301-302). Mendoza et al. (1994: 304-306) mikro ölçekte temsili üç mal için kurdukları modeli daha sonra makro ölçekte emek, sermaye ve tüketim üzerinden toplanan vergilere uygulamışlardır. Vergi yükünün makro ölçekte hesaplanması emek, sermaye ve tüketim üzerinden alınan vergilerle söz konusu vergilere kaynaklık eden vergi matrahlarının toplulaştırılmış olarak ele alınmasını gerektirmektedir. Mendoza et al. (1994) ölçüm için kullandıkları vergi hasılatlarını OECD veri setinden çekmişlerdir. Kavramsal olarak tanımladıkları vergi matrahlarını ise ulusal hesaplardan almışlardır. Dolayısıyla Mendoza et al. (1994)'nin kullandığı vergi matrahları vergi beyannamelerinde görünen vergi matrahları değildir. Onun yerine potansiyel vergi matrahı olarak makroekonomik değerler

kullanılmıştır. Mendoza et al. (1994) vergi yükünü değer olarak ölçmelerine rağmen efektif vergi yükünü oran (rasyo) biçiminde ifade etmişlerdir.

Burada ilk olarak Mendoza et al. (1994)'nin tüketim üzerindeki vergi yükü (τcon) hesaplama metodu ele alınmaktadır. Yazarlar tüketim üzerindeki ad-valorem vergi yükünü tüketimin vergi öncesi değeri ile vergisi sonrası değeri arasındaki fark olarak tanımlamışlardır. Bu bağlamda devletin tahsil ettiği tüketim vergileri ad-valorem vergi yükünü göstermektedir. Vergi yükünün dayandığı vergi matrahı ise söz konusu vergilerin dahil edilmediği harcamalardan oluşmaktadır. Aşağıdaki formül (1)'de tüketim üzerindeki efektif vergi yükünün oransal (rasyo) ifadesi gösterilmektedir.

$$\tau con = \left[\frac{(5110+5121)}{C+G-GW-(5110+5121)}\right] x100 \quad (1)$$

Formül (1)'de payda yer alan vergiler OECD sınıflandırma kodlarıyla ifade edilmiştir. Söz konusu vergilerden ilki mal ve hizmetler üzerindeki genel vergileri (5110) ikincisi ise gider vergilerini (5121) göstermektedir. Formül (1)'in paydasında yer alan kavramsal vergi matrahı ise hane halkları nihai tüketim harcamaları (C) ile devletin nihai tüketim harcamalarından (G) toplamından oluşmaktadır. Ancak yazarlar harcama vergilerine tabi bir gider olmadıkları için devlet bütçesinden kamu çalışanları için ödenen maaş ve ücretleri (GW) devletin nihai tüketim harcamalarından düşmüşlerdir. Keza tüketimin vergi öncesi değerini kullanmak maksadıyla payda yer alan tüketim vergileri (5110+5121) de paydadaki tüketim tutarından düşülmüştür.

Mendoza et al. (1994) emek üzerindeki efektif vergi yükünü hesaplamak için iki ayrı formül oluşturmuştur. Bunlardan ilki hane halklarının ödediği gelir vergisi efektif vergi yüküdür (τh). Burada devletin hane halklarından topladığı gelir vergisi hasılatı vergi yükünün ad-valorem tutarını göstermektedir. Söz konusu vergi yüküne dayanak teşkil eden kavramsal vergi matrahı ise hane halklarının (gerçek kişilerin) çeşitli gelir, kazanç ve iratları toplamından oluşmaktadır. Aşağıdaki formül (2)'nin payında yer alan gelir vergisi OECD vergi sınıflandırma koduyla ifade edilen gerçek kişilerden alınan gelir vergisini göstermektedir. Formülün paydasında yer alan gelir türleri ise sırasıyla ücretler (W), gerçek kişilere ait firmaların işletme artığı (OSPUE) ile hane halklarının ücret ve girişim dışında kalan (kira, faiz vb.) gelirleri (PEI) toplamından oluşmaktadır.

$$\tau h = \left[\frac{1100}{W+OSPUE+PEI}\right] x100 \quad (2)$$

Yukarıdaki formül (2)'nin sonucu hane halklarının efektif gelir vergisi yükünü (τh) gösterir. Ancak formül (2)'ye göre hesaplanan efektif vergi yükü hane halkının emek gelirleri ya da sermaye gelirleri üzerindeki vergi yükünü açıklamaya yetmez. Zaten Mendoza et al. (1994)'nin buradaki asıl amacı hane halklarının gelir vergisinden kaynaklanan efektif vergi yükünü ölçmek değildir. Yazarlar hane halklarının emek ve sermaye gelirleri üzerinden ödedikleri vergileri hesaplayabilmek için formül (2)'de ifade edilen hane halkı vergi yükü (τh) ölçümünü yapmışlardır. Mendoza et al. (1994)'e göre

ekonomide hane halklarının emek ve sermaye gelirleri bilindiğinde, söz konusu oran uygulanarak gelir vergisi hasılatı emek ve sermaye üzerinden alınan gelir vergi payına ayrıştırılabilir.

Mendoza et al. (1994)'ne göre emek üzerindeki vergiler; ücret gelirleri üzerinden hane halkları ortalama gelir vergisi oranına (τh) göre hesaplanan gelir vergisi (τh.W), sosyal güvenlik primleri (2000) ile maaş ve ücret bordroları üzerinden kesilen diğer vergiler (3000) toplamından oluşur. Emek gelirleri üzerinden alınan vergilerin kavramsal matrahı ise toplam ücretlere (W) sosyal güvenlik primleri işveren hissesinin (2200) eklenmesiyle bulunan değerdir. Söz konusu verilerden hareketle, Mendoza et al. emek üzerindeki efektif vergi yükü ölçümünü aşağıda formül (3)'de görüldüğü gibi ölçmüşlerdir (1994: 305).

$$\tau lab = \left[\frac{(\tau h.W+2000+3000)}{W+2200}\right] x100 \qquad (3)$$

Mendoza et al. (1994) sermayeden alınan vergilerin ise gerçek kişilere ait firmaların işletme atığı (OSPUE) ile hane halklarının ücret ve girişim dışında kalan (kira, faiz vb.) gelirleri (PEI) üzerinden hane halkları ortalama gelir vergisi oranına (τh) göre hesaplanan gelir vergisi, kurumlara vergisi (1200), taşınmaz varlıklar üzerinden alınan servet vergileri (4100), sermaye intikalleri üzerinden alınan vergilerden (4400) oluştuğunu varsaymışlardır. Kavramsal olarak işletme artığını (OS) ise sermaye üzerinden alınan vergilerin matrahı olarak kabul etmiştir. Söz konusu verilerden hareketle Mendoza et al. (1994)'nin sermaye üzerindeki efektif vergi yükünü ölçmek için geliştirdikleri formül ise şu şekildedir:

$$\tau cap = \left[\frac{(\tau h.(OSPUE+PEI)+1200+4100+4400)}{OS}\right] x100 \qquad (4)$$

Çalışmanın takip eden bölümünde Mendoza et al. (1994) tarafından geliştirilen formüllerde (özellikle 1, 3 ve 4 no'lu formüllerde) yapılan düzeltmeleri açıklayarak, Türkiye'de emek, sermaye ve tüketim üzerindeki efektif vergi yükü hesaplamak için kullanılan formüller ortaya konulmaktadır.

3.2.2. Emek Üzerindeki Efektif Vergi Yükü

Emek üzerindeki efektif vergi yükünü hesaplayabilmek için öncelikle ücret, maaş, yevmiye gibi emek gelirleri üzerinden alınan dolaysız vergilerin tasnif edilmesi gerekir. Ücret ve maaş gelirleri üzerinden alınan vergilerin en başında gelir vergisi vardır. Ancak gelir vergisi çeşitli gelir unsurlarından alındığı için her bir gelir unsuru üzerinden ödenen gelir vergisi payına ilişkin ayrıntılı veri bulunmamaktadır. Bu nedenle ilkin ücret ve maaşlar üzerinden alınan gelir vergisi tutarının belirlenmesi gerekir. Mendoza et al. (1994) yukarıda formül (2) ifade edildiği gibi hane halkları ortalama gelir vergisi (τh) oranına göre ücret ve maaşlar üzerinden alınan gelir vergisini hesaplamışlardır. Ancak bu hesaplama biçimi her bir mükellefin aynı oranda vergi istisna ve muafiyetlerinden yararlandığını örtük olarak varsayar. Aynı zamanda gelir veya iratların gelir vergisi tarifesinin farklı dilimlerine göre vergilendirildiği gerçeğini de görmezden gelir. Dolayısıyla hane halkları gelir vergisi oranı

(τh) emek ve sermaye üzerinden alınan gelir vergisinin doğru bir ölçüsünü vermekten uzaktır.

Bu nedenle yukarıda bahsi geçen hesaplama metodundan farklı bir yol izleyerek Türkiye'de emek üzerinden alınan gelir vergisi tutarı hesaplanmıştır. Ülkemizde gelir vergisi tahsilatının yaklaşık %90'ı kaynakta kesinti yoluyla tahsil edilmektedir. Kaynakta tevkif yoluyla tahsil edilen gelir vergisi payları Gelir İdaresi Başkanlığı yıllık faaliyet raporlarında sunulan muhtasar beyanname özetlerinde mevcuttur. Bu çalışmada muhtasar beyanname özetlerinde sunulan maaş ve ücretlerden yapılan gelir vergisi kesinti payı, emek gelirleri üzerinden ödenen gelir vergisi olarak kabul edilmektedir. Muhtasar beyanname özetlerindeki ücret ve maaşlardan kesilen gelir vergisi payına (T) göre veri setimizde (1113) sınıflandırma koduyla görülen kaynakta tevkif yoluyla tahsil edilmiş gelir vergisi hasılatı iki alt bölüme ayrılmaktadır. Veri setinde (1113a) sınıflandırma koduyla görülen vergi tutarı, ücret gelirleri üzerinden alınan gelir vergisini göstermektedir[2]. Bu vergi tutarı aşağıda formül (5)'in payına emek üzerinden alınan gelir vergisi olarak eklenmiştir.

$$\tau Emek = \left[\frac{(1113a+2000a+2900)}{CoE}\right] x100 \quad (5)$$

Emek üzerinden alınan ikinci önemli vergi kalemi ise sosyal güvenlik primleridir. Veri setinde bağımlı ve bağımsız istihdam edilenler bakımından ikiye ayırdığımız sosyal güvenlik primlerine devlet katkısı dahil değildir. Burada bağımlı istihdam edilenlerin ödediği sosyal güvenlik primleri esas alınmaktadır. Ancak bağımlı istihdam edilenlerin ödediği sosyal güvenlik primlerine (2000a) muhasebe sisteminde işveren hissesi olarak izlenen sosyal güvenlik primleri de dahildir. Her ne kadar işveren hissesi olarak adlandırılsa da gerçekte söz konusu sosyal güvenlik primleri ücret maliyetlerinin bir parçası olarak çalışan kişiler tarafından ödenmektedir.

Emek gelirleri üzerinden ödenen vergilere eklenen son kalem ise işçi statüsünde çalışanlar tarafından ödenen işsizlik sigortası fonu primleridir. Söz konusu primlere devlet katkısı dahil değildir. Ancak işsizlik sigortası fonu işveren hissesi dahildir. Zira yukarıda belirtildiği gibi işsizlik sigortası fonu primleri de ücret maliyetinin bir parçası olarak çalışan kişi tarafından ödenmektedir. Yukarıdaki formül (5)'in payında görülen vergiler emek üzerinden alınan vergileri göstermektedir[3]. Paydada ise ulusal gelir hesaplarından alınan işgücü ödemeleri (CoE) bulunmaktadır. Söz konusu formül (5) emek üzerindeki efektif vergi yükünü göstermektedir. Paydada yer alan işgücü ödemeleri ücret ve maaşlar üzerinden tahsil edilen dolaysız vergilerin tümünü kapsadığı için ayrıca buraya Mendoza et al. (1994)'nin yaptığı gibi sosyal güvenlik primleri işveren hissesini eklemeye gerek kalmamıştır.

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[2] *Türkiye'de ücret gelirleri ağırlıklı olarak kaynakta tevkif yoluyla vergilendirilmektedir. Dolayısıyla ücretler üzerinden alınan gelir vergisi içinde yıllık gelir vergisi beyannamesi verilmek suretiyle tahsil edilen gelir vergisinin ihmal edilebilir düzeyde olduğunu varsayıyoruz.*

[3] *Burada ücret ve maaş bordroları üzerinden tevkif edilen damga vergisi hesaplamaya dahil edilmemiştir.*

3.2.3. Sermaye Üzerindeki Efektif Vergi Yükü

Sermaye üzerindeki efektif vergi yükünü hesaplamak için iki farklı vergi türünü dikkate almak gerekir. Bunlardan ilki gelir üzerinden alınan vergilerdir. Örneğin bireysel kazançlardan alınan gelir vergisi ile kurumsal kazançlardan alınan kurumlar vergisi ilk gruba girmektedir. İkincisi ise hane halkları ve kurumların taşınır veya taşınmaz varlıkları üzerindeki servet vergileridir. Bu çalışmada sermaye üzerindeki efektif vergi yükünü hesaplamak için her iki vergi grubu da dikkate alınmaktadır. Ancak kişisel kazançlar üzerinden alınan gelir vergisinin bir bölümü ücret ve maaş gelirleri üzerinden ödenmektedir. Yukarıda da açıklandığı gibi emek gelirlerinden ödenen gelir vergisi payının toplam gelir vergisi tutarından düşülmesi gerekir. Dolayısıyla burada (1100) koduyla ifade edilen gelir vergisi toplamından yukarıda ücretliler tarafından ödendiği ifade edilen (1113a) kodlamasıyla görülen tutarın düşülmesi gerekir. Böylece sadece ücretli olmayanların ödediği kişisel gelir vergisi tutarı elde edilmiş olur.

Ayrıca aşağıdaki formül (6)'nın payına veri setinde (1120) koduyla ifade edilen kurumlar vergisinin eklenmesi gerekir. Veri setinde (1200) sınıflandırma koduyla ifade edilen mülkiyet üzerinden alınan vergiler (veraset ve intikal vergisi, motorlu taşıtlar vergisi, bina vergisi, arsa vergisi, arazi vergisi, vb.) ile (1900) sınıflandırma koduyla ifade edilen vergilerin formülün payına eklenmesi gerekir. Ayrıca veri setimizde (2000b) sınıflandırma koduyla ifade edilen bağımsız çalışanların kendileri adına ödedikleri primler de sermaye üzerinden ödenen vergiler olarak dikkate alınmıştır. Aşağıdaki formül (6)'nın paydasında ise net işletme artığı bulunmaktadır. Net işletme artığı ulusal gelir hesaplarında işletme artığından sabit sermaye tüketimi tutarı düşüldükten sonra kalan miktardır. Bu tutar yaklaşık olarak kâr, faiz ve kira gelirleri toplamına karşılık gelmektedir.

$$\tau Sermaye = \left[\frac{((1100-1113a)+1120+1200+1900+2000b)}{Net\ OS}\right] x100 \quad (6)$$

Yukarıda sermaye üzerindeki efektif vergi yükünü ölçmek için kullandığımız formül (6) Mendoza et al. (1994)'nin geliştirdikleri formül (4)'ten sadece iki noktada ayrılmaktadır. Birincisi formül (6)'nın payında yer alan (1100) sınıflandırma koduyla ifade edilen gelir üzerinden alınan vergilerden ücret ve maaş gelirleri üzerinden ödenen (1113a) kodlu gelir vergisi düşülmüştür. Oysa Mendoza et al. (1994) bu hesaplama için hane halkının ortalama vergi oranını gösteren (formül 2)'yi kullanmışlardır.

Öte yandan sermaye üzerindeki vergi yükünün ölçülmesinde paydada yer alan kavramsal vergi matrahı da Mendoza et al. (1994) tarafından kullanılan kavramsal vergi matrahından farklıdır. Zira Mendoza et al. (1994) sermaye üzerindeki efektif vergi yükünü ölçmek için işletme artığını olduğu gibi paydaya yazmışlardır. Bu, sermaye üzerindeki vergi yükünün olduğundan düşük hesaplanması anlamına gelir. Zira vergi sistemleri genel olarak amortisman giderlerinin kazançlardan indirilmesine izin verir. Dolayısıyla burada net işletme artığının kavramsal vergi matrahı olarak kullanılması kanımızca daha gerçekçi bir ölçüm yapmaya imkân tanımaktadır.

Bu haliyle sermaye üzerindeki efektif vergi yükünü ölçmek için oluşturduğumuz formül (6) Carrey & Rabesona (2004:217) tarafından uygulanan metodolojiden de farklılaşmaktadır. Zira Carrey & Rabesona (2004) sermaye üzerindeki efektif vergi yükünün ölçülmesinde MRT metodolojisiyle oldukça yakınlaşmaktadır. Öyle ki neredeyse tek fark, sermaye üzerinden alınan vergilerin kavramsal matrahını oluşturan işletme artığından (OS) sadece bordo vergisi ile işgücü üzerinden ödenen vergilerin düşülmesidir. Oysa her ülkede uygulanmayan söz konusu vergilerin işletme artığından (OS) düşülmesi yerine kavramsal vergi matrahı olarak net işletme artığının (net OS) alınması daha uygun bir yaklaşım olacaktır.

3.2.4. Harcamalar Üzerindeki Efektif Vergi Yükü

Harcamalar üzerindeki efektif vergi yükünün ölçülmesinde MRT metodolojisinden farklı iki yol izlenmektedir. İlki hesaplamaya dolaylı vergilerin tümünün dahil edilmesi ve bu vergilerin paydadaki harcama tutarlarından düşülmesi şeklinde yapılmaktadır. Burada kavramsal vergi matrahı vergi tutarları kadar küçültülmüş olmaktadır. İkincisi ise paydaki dolaylı vergi sayısını artırmakla birlikte paydadaki harcama tutarlarından söz konusu vergileri düşmeden vergi yükünün hesaplanması şeklinde uygulanmaktadır. Bu ikinci yöntem Carrey & Rabesona (2004: 217) tarafından uygulanmıştır. Ancak bu yöntem MRT metodolojisine göre daha fazla sayıda dolaylı vergiyi hesaplamaya dahil etmesi bakımından gerçekçi iken, söz konusu dolaylı vergilerin kavramsal vergi matrahı olan tüketim harcamaları toplamından düşülmemesi hesaplamanın gerçekçi olmasına engel teşkil etmektedir. Zira Türkiye'de olduğu gibi birçok ülkede dolaylı vergiler tüketim harcamalarına dahil edilmektedir. Bu nedenle aşağıda daha geniş bir dolaylı vergi kategorisi dikkate alınarak MRT metodolojisine daha yakın bir hesaplama biçimi tercih edilmektedir.

Bu amaçla veri setinde (1300) sınıflandırma kodu altında toplanmış olan dahilde alınan mal ve hizmet vergileri, (1400) sınıflandırma kodu altında toplanmış olan uluslararası ticaret ve muamelelerden alınan vergileri, (1500) sınıflandırma koduyla ifade edilen damga vergisi ve (1600) sınıflandırma koduyla ifade edilen harçlar hesaplamaya dahil edilmiştir. Aşağıdaki formül (7)'nin payında yer alan söz konusu vergiler harcamalar ve muameleler üzerinden alınan vergilerin tamamını kapsamaktadır.

$$\tau T\ddot{u}ketim = \left[\frac{(1300+1400+1500+1600)}{C+GC-GW-(1300+1400+1500+1600)}\right] x100 \quad (7)$$

Formül (7)'nin paydasında ise hane halklarının ve hane halklarına karşılıksız yardım eden kâr amacı gütmeyen kurumların nihai tüketim harcamaları bulunmaktadır. Ayrıca paydaya devletin kamu çalışanları için ödediği maaş ve ücretleri düştükten sonra kalan devletin nihai tüketim harcamaları eklenmiştir. Ancak dolaylı vergilerin dahil olmadığı net vergi matrahına ulaşabilmek için formül (7)'nin payına yazılmış olan vergilerin paydadaki harcamalar toplamından düşülmesi gerekmektedir.

4. Ampirik Bulgular

Bu çalışmada ulaşılan bulgular Tablo 4 ve Şekiller (1-2-3) aracılığıyla sunulmaktadır. Tablo 4 Türkiye'de 2006-2019 yılları arası dönemde emek, sermaye ve tüketim üzerindeki efektif vergi yüklerini göstermektedir. Ölçüm sonuçları Türkiye'de emek üzerindeki efektif vergi yükünün sermaye ve tüketim üzerindeki efektif vergi yüküne göre daha yüksek olduğunu göstermektedir. Tüketim üzerindeki efektif vergi yükünün emek üzerindeki efektif vergi yüküne göre daha düşük olduğu, ancak tüketim üzerinde de önemli miktarda efektif vergi yükü olduğu görülmektedir. Sermaye üzerindeki efektif vergi yükü ise diğerlerine göre oldukça düşük düzeyde çıkmıştır. Öte yandan bulgular emek üzerindeki efektif vergi yükünün incelediğimiz dönemde en düşük değere 2006 yılında (%26,27), en yüksek değere ise 2013 yılında (%31,69) ulaştığını göstermektedir. Sermaye üzerindeki efektif vergi yükünün ise aynı dönemde en düşük değere 2013 yılında (%8,59), buna karşılık en yüksek değere ise 2018 yılında (%10,92) ulaştığı anlaşılmaktadır. Öte yandan tüketim üzerindeki efektif vergi yükünün 2006-2019 yılları arasında en düşük değere 2019 yılında (%17,40), en yüksek değere ise 2013 yılında (%22,19) ulaştığı görülmektedir.

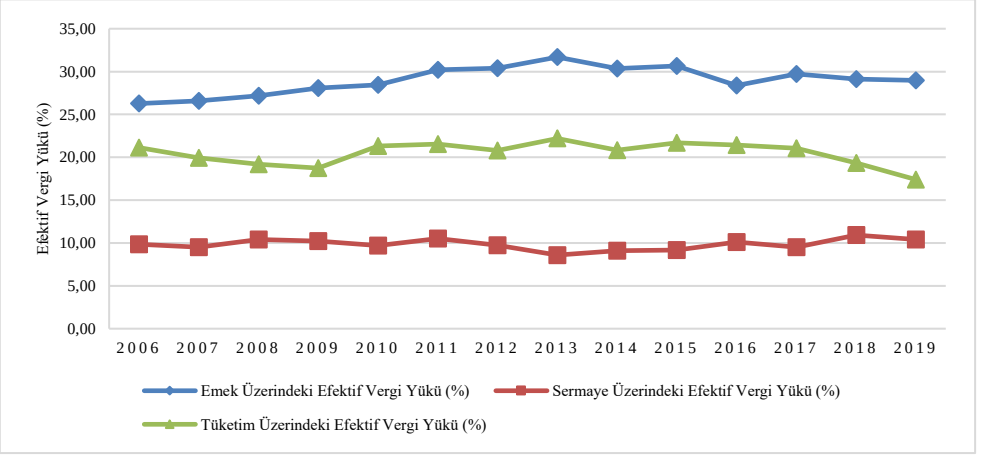
Tablo: 4
Türkiye'de Emek, Sermaye ve Tüketim Üzerindeki Efektif Vergi Yükü (%)
(2006-2019)

Yıllar	Emek Üzerindeki Efektif Vergi Yükü (%)	Sermaye Üzerindeki Efektif Vergi Yükü (%)	Tüketim Üzerindeki Efektif Vergi Yükü (%)
2006	26,27	9,84	21,13
2007	26,58	9,50	19,93
2008	27,20	10,40	19,17
2009	28,08	10,23	18,74
2010	28,46	9,70	21,32
2011	30,20	10,52	21,54
2012	30,38	9,75	20,79
2013	31,69	8,59	22,19
2014	30,36	9,09	20,84
2015	30,67	9,18	21,68
2016	28,36	10,11	21,43
2017	29,72	9,50	21,05
2018	29,12	10,92	19,34
2019	28,96	10,40	17,40
Ort.	**29,00**	**9,84**	**20,47**

Kaynak: Yazarlar tarafından hesaplanmıştır.

Tablo 4'teki verilerden hareketle oluşturulan Şekil 1 ise emek, sermaye ve tüketim üzerindeki efektif vergi yükünün seyrini daha kolay izlemeye imkân sağlamaktadır. Şekil 2'de emek üzerindeki efektif vergi yükünün 2006-2013 arasında artış gösterdiği, ancak 2014-2019 yılları arasında ise daha dalgalı bir seyir izlediği görülmektedir. Tüketim üzerindeki efektif vergi yükünün emek ve sermaye üzerindeki vergi yüküne göre incelenen dönemde daha fazla dalgalanma gösterdiği anlaşılmaktadır. Tüketim üzerindeki efektif vergi yükünün 2006-2009 yılları arasında azalış yönünde seyrettiği, ancak 2010-2015 yılları arasında daha küçük dalgalanmalar göstererek genel olarak artış yönünde bir seyir izlediği görülmektedir. 2016 yılından sonra hafif gerileme seyrine giren tüketim üzerindeki efektif vergi yükünün 2017-2019 yılları arasında bariz biçimde gerilediği anlaşılmaktadır.

Şekil: 1
Türkiye'de Emek, Sermaye ve Tüketim Üzerindeki Efektif Vergi Yükü (%)
(2006-2019)

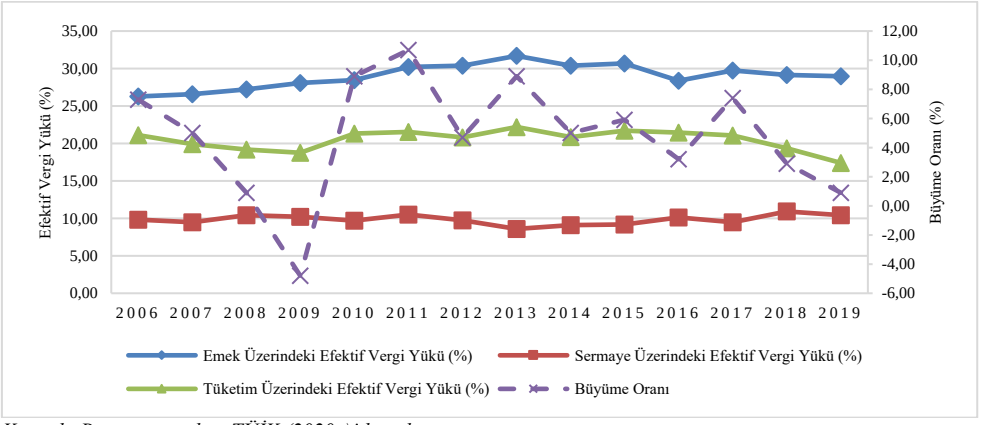


Kaynak: Tablo 4'te sunulan verilere dayanmaktadır.

Sermaye üzerindeki efektif vergi yükü ise 2006-2019 yılları arasında daha istikrarlı bir seyir izlemiş durumdadır. Ancak 2013 yılında emek ve tüketim üzerindeki efektif vergi yükü dönemin en yüksek seviyelerine ulaşırken, sermaye üzerindeki efektif vergi yükünün düşmüş olması dikkat çekicidir. Aynı ters yönlü ilişki bu sefer 2018-2019 yılları arasında tüketim üzerindeki efektif vergi yükü ile sermaye üzerindeki efektif vergi yükü arasında gözlemlenmektedir. Söz konusu dönemde tüketim üzerindeki efektif vergi yükü düşerken, sermaye üzerindeki efektif vergi yükü artış yönünde bir seyir izlemektedir.

Şekil 2 ekonominin performansıyla ile efektif vergi yüklerinin seyri arasındaki ilişkiyi göstermektedir. Burada ekonomik daralma ve genişlemeye en duyarlı verginin tüketim üzerinden alınan vergiler olduğu sonucu ortaya çıkmaktadır. Şekil 2 üzerinde görüldüğü gibi 2008-2009 ekonomik krizi sırasında ve daha sonra 2017-2019 arasında yaşanan ekonomik daralma (büyüme oranlarının düşmesi) tüketim üzerindeki efektif vergi yükünün de düşmesiyle sonuçlanmış görünmektedir. Oysa aynı ilişki 2006-2007 arasında ve ardından 2010-2016 yılları arasında ters yönde gelişmiştir. Zira ekonomik büyüme oranları pozitif yönde seyrederken tüketim üzerindeki efektif vergi yükü artış yönünde ivme kazanmıştır. Benzer bir gelişme emek üzerindeki efektif vergi yükü için gözlemlenmektedir. Özellikle 2010-2013 yıllarında ekonomi genişlerken emek üzerindeki efektif vergi yükü de artış yönünde bir eğilim içinde olmuştur. Öte yandan Şekil 2'deki sermaye üzerindeki efektif vergi yükünün seyrine bakıldığında, sermaye üzerinden alınan vergilerin ekonomik genişleme veya daralmaya daha az duyarlı olduğu görülmektedir.

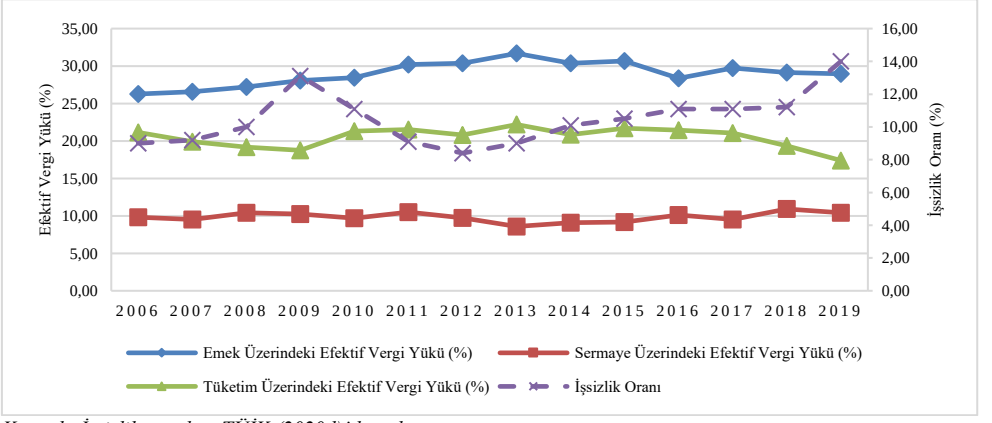
Şekil: 2
Efektif Vergi Yükleri ve Büyüme Oranlarının Seyri (2006-2019)



Kaynak: Büyüme oranları TÜİK (2020c)'den alınmıştır.

Ekonominin içinde bulunduğu durumu kavramaya imkân sağlayan makroekonomik göstergelerden biri de işsizlik oranlarıdır. Şekil 3'te 2006-2019 yılları arasında işsizlik oranları ile efektif vergi yükleri arasındaki ilişki gösterilmektedir. Burada emek üzerinden alınan vergilerin işsizlik oranlarındaki dalgalanmaya daha duyarlı olduğu görülmektedir. Zira işsizlik oranlarının düşme eğilimi gösterdiği 2010-2013 yılları arasında emek üzerindeki vergi yükünün arttığı gözlemlenmektedir. Oysa işsizlik oranlarının yeniden artış yönünde ivme kazandığı 2014-2019 yılları arasında ise emek üzerindeki vergi yükünün küçülme yönünde bir seyir izlediği ortaya çıkmaktadır.

Şekil: 3
Efektif Vergi Yükleri ve İşsizlik Oranlarının Seyri (2006-2019)



Kaynak: İşsizlik oranları TÜİK (2020d)'den alınmıştır.

Ekonominin daraldığı ve işsizlik oranlarının arttığı dönemlerde tüketim üzerindeki efektif vergi yükünün düştüğü tersine ekonominin genişleme dönemlerinde ise tüketim üzerindeki efektif vergi yükünün artış yönünde seyrettiği görülmektedir. Örneğin 2010-2014 yılları arası işsizlik oranı düşerken tüketim üzerindeki efektif vergi yükü artış yönünde bir seyir izlemiş durumdadır. Ancak 2008-2009 yılları ile 2015-2019 yılları arasında ise işsizlik oranları artarken tüketim üzerindeki vergi yükünün düşme eğilimine girdiği gözlemlenmektedir. Sermaye üzerindeki efektif vergi yükünün ise ekonominin içinde bulunduğu konjonktürden fazla etkilenmemiş olduğu görünmektedir. İşsizlik oranındaki dalgalanmalara rağmen Şekil 3'te sermaye üzerindeki efektif vergi yükünün yatay bir seyir izlediği anlaşılmaktadır.

5. Bulguların Tartışılması

Bulguların tartışmasına emek üzerindeki efektif vergi yükü sonuçlarını değerlendirerek başlıyoruz. Daha sonra sırasıyla sermaye ve tüketim üzerindeki efektif vergi yükü ele alınacaktır. Türkiye'de 2006-2019 döneminde emek üzerindeki efektif vergi yükünün sermaye ve tüketim üzerindeki efektif vergi yüküne göre oldukça yüksek olduğu sonucu ortaya çıkmıştır. Daha önce belirtildiği gibi emek üzerindeki efektif vergi yükünün 2006 yılından 2013 yılına kadar artış yönünde 2014 yıldan 2019 yılına doğru ise azalış yönünde bir eğilim gösterdiği görülmektedir. Bununla birlikte emek üzerindeki 14 yıllık ortalama efektif vergi yükü %29,00'dır (Bkz. Tablo 4 son satır). Ortaya çıkan bu sonucun genel olarak Türk vergi sisteminin yapısından kaynaklandığı düşüncesindeyiz. Gelir vergisi hasılatının 2006-2019 yılları arasında yaklaşık %58,14'ü ücret ve maaş gelirlerinden kesinti yoluyla tahsil edilen gelirlerden oluşmaktadır[4].

Emek üzerindeki efektif vergi yüküne etki eden bir diğer vergi ise sosyal güvenlik primleridir. Sosyal güvenlik primleri işçi ve memurların maaş ve ücretleri üzerinden işveren tarafından kaynakta kesinti yoluyla ödenmektedir. Sosyal güvenlik prim oranları iş kollarına göre değişmekle birlikte çalışan ve işveren hissesi toplamı %20 civarındadır. Dolayısıyla sosyal güvenlik primleri emek üzerindeki vergi yükünün artmasına katkı sağlayan önemli vergisel faktörlerden biridir. Ayrıca 2000 yılından itibaren uygulana gelen işsizlik sigortası fonu primleri ise işçi ve işveren payı (devlet katkısı hariç) toplamı %3 olarak ücretlere yansıyan bir yükümlülüktür. Öte yandan incelediğimiz dönemde gerek 193 sayılı Gelir Vergisi Kanunu'nda gerekse 5510 sayılı Sosyal Sigortalar ve Genel Sağlık Sigortası Kanunu'nda ve gerekse de 4447 sayılı İşsizlik Sigortası Fonu Kanunu'nda emek üzerindeki vergi yükünü artırıcı veya azaltıcı yönde sonuç doğuran çok önemli değişiklikler yapılmamıştır. Buna rağmen emek üzerindeki efektif vergi yükünde gözlemlenen dalgalanmanın daha ziyade ekonomide yaşanan gelişmelerden kaynaklandığı anlaşılmaktadır.

[4] *Gelir İdaresi Başkanlığının Yıllık Faaliyet Raporlarında sunulan ücret gelirlerinden kaynakta kesinti yoluyla tahsil edilen gelir vergisinin toplam gelir vergisi hasılatına oranlarının (2006-2019 arası) 14 yıllık ortalaması.*

Zira işsizlik oranlarının azaldığı ve ekonomik büyüme oranlarının yüksek seyrettiği 2010-2013 yıllarında emek üzerindeki efektif vergi yükü artmıştır. Bu artışa aynı zamanda gayri safi yurtiçi hasıla içinde işgücü ödemelerinin payında görülen artış da eşlik etmiştir. Bunun tersine ekonomide daralmanın yaşandığı 2014-2019 arası dönemde ise emek üzerindeki efektif vergi yükünün aşağı yönlü bir seyir izlemeye başladığı görülmektedir. İncelenen dönemde ekonomik konjonktürle emek üzerindeki vergi yükünün etkileşim içinde olmadığını gösteren tek örnek 2008-2009 ekonomik krizi döneminde gerçekleşmiş görünmektedir. Zira bu dönemde ekonomik büyüme oranları negatif yönde seyrederken ve işsizlik oranları artmışken, emek üzerindeki efektif vergi yükü az da olsa artış yönünde seyretmiş durumdadır. Bu sonucun ekonomik sebeplerden ziyade dönemin tek parti iktidarının getirdiği siyasi istikrar nedeniyle toplumda ekonomik krizin kısa süreli olacağı beklentisinin güç kazanmış olmasından kaynaklandığını düşünüyoruz.

Sermaye üzerindeki efektif vergi yükü ise 2006-2019 yılları arasında daha istikrarlı bir seyir izlemiştir. Sermaye üzerindeki efektif vergi yükünün 14 yıllık ortalaması %9,84'tür (Bkz. Tablo 4). Sermaye üzerindeki efektif vergi yükü emek ve tüketim üzerindeki efektif vergi yüküne göre oldukça düşük çıkmıştır. Bu sonucun sermaye kazançları ile servet ve taşınmazlara uygulanan vergi kanunlarıyla ilgili düzenlemelerden kaynaklandığını düşünüyoruz. Zira kavramsal vergi matrahı olarak kullandığımız net işletme artığı (Net OS) incelediğimiz dönemde artış eğilimini sürdürmüştür. Önce sermaye üzerindeki vergi yükünü artırıcı yönde yapılan düzenlemelere ilişkin birkaç hususa değinelim. Bunlardan ilki kurumlar vergisi oranının 2018, 2019 ve 2020 yılıyla sınırlı olarak %20'den %22'ye çıkarılmış olmasıdır. İkincisi ise kayıt dışı ekonomiyle ilgili olarak alınan tedbirlerdir. Bu alanda çok fazla önlem alınmıştır[5]. Ancak yine de sermaye üzerinden alınan vergilerin genellikle mükellef tarafından beyan ediliyor olması önemli miktarda kazanç veya iradın beyan dışı bırakılmasına imkân sağlamaktadır.

Öte yandan vergi kanunlarında sermaye üzerindeki vergi yükünü azaltıcı yönde yapılan düzenlemelerin daha fazla olduğu görülmektedir. Örneğin indirimli kurumlar vergisi oranı uygulaması teşvik belgesi almış kurumların vergi yükünde önemli azalmalara sebep olmuştur. Bunun yanı sıra incelenen dönemde gelir ve kurumlar vergisi kanununda mükelleflere vergi avantajı sağlayan çok sayıda düzenleme yapılmıştır. Özellikle vergi istisna ve muafiyetleri ile vergi indirimlerini düzenleyen maddelerde bunu görmek mümkündür. Örneğin menkul sermaye iratları ile ilgili olarak gelir vergisi kanunun geçici 67. maddesindeki düzenlemeler sermaye üzerindeki vergi yükünü azaltıcı yöndedir. Ayrıca incelediğimiz dönemde gerçek usulde vergilendirilen gelir ve kurumlar vergisi mükelleflerine avantajlar sağlayan çok sayıda vergi af kanunu yürürlüğe konulmuştur[6].

[5] *Bu kapsamda nakit ödemelere getirilen kısıtlama, elektronik fatura düzenleme zorunluğu, BA ve BS formları, hazır beyanname uygulaması, pos cihazı kullanımının yaygınlaştırılması, muhtasar beyanname ile sosyal güvenlik bildiriminin birleştirilmesi, vb. birçok uygulama sayılabilir.*

[6] *2006-2019 döneminde 7 adet vergi af kanununun yürürlüğe konulduğu görülmektedir. Bunlar 22/11/2008 tarihli 5811 sayılı Kanun; 25/02/2011 tarihli 6111 sayılı Kanun; 29/05/2013 tarihli 6486 sayılı Kanun; 10/09/2014 tarihli 6552 sayılı Kanun; 19/08/2016 tarihli 6736 sayılı Kanun; 27/05/2017 tarihli 7020 sayılı Kanun ile 18/05/2018 tarihli 7143 sayılı Kanunlardan oluşmaktadır.*

Ayrıca vergi uzlaşma uygulamaları, vergi denetiminin yetersizliği, vergi cezalarının caydırıcı olmaması gibi faktörler de sermaye üzerindeki vergi yükünün düşük kalmasına katkı sağlayan unsurlardır. Öte yandan sermaye üzerinden alınan veraset ve intikal vergisi, emlak vergisi, çevre temizlik vergisi gibi vergiler yeterince vergi hasılatı sağlamaktan uzak, etkin olmayan vergilerdir.

Bu bölümde son olarak tüketim üzerindeki efektif vergi yükü değerlendirilecektir. Tüketim üzerindeki efektif vergi yükünün 2006-2019 yılları arası 14 yıllık ortalaması %20,47 olmuştur (Bkz. Tablo 4). Ancak tüketim üzerindeki efektif vergi yükünün diğer iki ekonomik faktör üzerindeki efektif vergi yüküne göre oldukça fazla dalgalandığı görülmektedir. Bu dalgalanmanın vergi mevzuatından ziyade ekonominin daralma ve genişleme dönemlerine göre hane halklarının nihai tüketim harcamalarından kaynaklandığını düşünüyoruz. Zira tüketim üzerinden alınan vergilere ilişkin mevzuatta vergi yükünü azaltıcı yönde çok az sayıda düzenleme yapılmıştır. Örneğin 2008 ekonomik krizi sırasında seçilmiş bazı ürünler üzerindeki katma değer vergisi ve özel tüketim vergisi geçici bir süre için indirilmiştir[7]. Keza tekstil ürünleri başta olmak üzere eğitim ve sağlık hizmetlerinde %18 olarak uygulanan katma değer vergisinin %8'e indirildiği bir gerçektir. Bununla birlikte özel tüketim vergisinde farklı kalemlerdeki mal teslimleri için çok sayıda vergi oranı artışı yapılmıştır. Ayrıca yukarıda sermaye üzerinden alınan vergileri değerlendirirken belirtildiği gibi vergi affı uygulamaları da tüketim üzerinden alınan vergilerin dalgalanmasına katkı sağlamıştır.

Ancak görebildiğimiz kadarıyla tüketim üzerindeki efektif vergi yükünün ekonomide yaşanan çevrimlere daha duyarlı olduğu anlaşılmaktadır. Zira daha önce bulguların sunulduğu bölümde belirtildiği gibi büyüme oranlarının düştüğü ve işsizlik oranlarının arttığı, yani ekonominin daraldığı dönemlerde tüketim üzerindeki efektif vergi yükü düşmüştür. Örneğin 2008-2009 yıllarında yaşanan ekonomik kriz dönemi ile 2017-2019 yılları arasında yaşanan ekonomik daralma döneminde tüketim üzerindeki efektif vergi yükünün düştüğü görülmektedir (Bkz. Şekil 2 ve Şekil 3). Öte yandan bu sonucu doğal karşılamak gerekir zira tüketiciler ekonomik kriz veya durgunluk dönemlerinde daha az harcama yapma yönünde davranışlar sergileyebilmektedir. Bununla birlikte ekonominin genişlediği dönemlerde ise tüketim üzerindeki efektif vergi yükü artış göstermektedir. Bu durum 2010-2016 yılları arasında açıkça görülmektedir (Bkz. Şekil 2 ve Şekil 3).

6. Sonuç

Bu çalışmada ulaşılan bulgular, Türkiye'de sermaye üzerindeki efektif vergi yükünün, tüketim ve emek üzerindeki efektif vergi yüküne göre oldukça düşük olduğunu göstermektedir. Sermaye üzerindeki efektif vergi yükünün düşük olmasının yatırım ve tasarrufların düşük vergilendirilmesi açısından olumlu bir gelişme olduğunun vurgulanması gerekir. Hatta sermaye üzerindeki efektif vergi yükü ölçüm yaptığımız dönem içinde

[7] *2008-2009 ekonomik krizi sırasında geçici olarak alınan vergisel tedbirlerin özetlendiği bir çalışma için bkz. Elele (2009).*

oldukça istikrarlı sayılabilecek bir seyir izlemiştir. Bu olumlu yönüne rağmen sermaye üzerindeki vergi yükünün düşük tutulması toplumda vergi yükünün adil dağılımı bakımından kendi içinde bir olumsuzluk da barındırmaktadır. Öyle ki sermaye üzerindeki efektif vergi yükü, 2006-2019 yılları arasında ortalama %9,84 düzeyindeyken; tüketim üzerindeki efektif vergi yükü ortalama %20,47 düzeyinde olmuş; emek üzerindeki efektif vergi yükü ise ortalama %29,00 olarak geçekleşmiştir. Böylesi bir vergi yükü dağılımının toplumda vergilemeye ilişkin adalet algısını olumsuz yönde etkileyerek uzun dönemde vergiye gönüllü uyumu azaltma riski taşıdığını belirtmek gerekir. Dolayısıyla ekonomide gönüllü tasarrufların önemini göz ardı etmeden zorunlu bir tasarruf aracı olarak vergilemenin sağlayacağı kamu yararını da düşünerek sermaye üzerinden alınan vergilerde düzenlemelerin yapılması gerektiği kanaatindeyiz.

Öte yandan bu çalışmada ulaşılan bulgular, emek üzerindeki efektif vergi yükünün sermaye ve tüketim üzerindeki efektif vergi yüküne göre oldukça yüksek olduğunu göstermektedir. Hatta emek üzerindeki efektif vergi yükünün, ölçüm yapılan dönem içinde meydana gelen ekonomik kriz veya durgunluk zamanları hariç, genel bir artış eğilimi içinde olduğu gözlemlenmektedir. Bunun temelde tercih edilen vergileme politikaları nedeniyle iki sebebi olduğunu düşünüyoruz. Birincisi küreselleşme ve sermaye hareketlerinin serbest dolaşımının önündeki engellerin kaldırılmasıyla birlikte devletler ister istemez emek gibi mobilite kapasitesi düşük vergi konularına odaklanmak zorunda kalmışlardır. İkincisi ise sosyal devlet anlayışındaki değişim sosyal harcamaların finansman yükünü ister istemez faydalananlara ödetme yönünde gelişmelere neden olmuştur. Bütün bunların neticesi olarak, Türkiye'de emek gelirleri üzerindeki efektif vergi yükünün arttığı görülmektedir. Ancak böyle bir gelişmenin istihdamı olumsuz yönde etkilemesi muhtemeldir. Zira emek maliyetlerinin istihdam üzerindeki vergiler nedeniyle sürekli yükselmesi her şeyden önce emek talebini olumsuz yönde etkileyecektir. Aynı şekilde emek gelirleri üzerindeki vergi yükünün ağırlığı çalışma arzusunu olumsuz yönde etkileyerek emek arzının kısılmasıyla sonuçlanabilecektir.

Son olarak tüketim üzerindeki efektif vergi yükünün sermaye üzerindeki efektif vergi yükünden daha yüksek olması (neredeyse bir kat fazla) yatırım ve tasarruf yerine tüketimin vergilendirmesi bakımından olumlu bir gelişme olarak değerlendirilmelidir. Zira tüketimin vergilerle baskılanması bir yerde kaynakların gönüllü tasarruf veya yatırıma kanalize olmasına olanak tanıyabilir. Ancak aynı zamanda tüketim üzerindeki efektif vergi yükünün yüksekliği tüketim vergilerinin tipik özellikleri nedeniyle vergi adaletini olumsuz yönde etkileyebilir. Zira katma değer vergisi veya özel tüketim vergisi gibi harcama vergileri düşük gelirli toplumsal kesimler üzerinde tersine artan oranlı etkiler yaratarak vergi yükünün adil dağılımı engelleyebilir. Ayrıca tüketim üzerindeki efektif vergi yükünün ekonominin içinde bulunduğu konjonktürden çok fazla etkilendiği görülmektedir. İnsanların ekonominin daralma döneminde tüketim harcamalarını kısarak daha tedbirli davrandıkları bir gerçektir. Hal böyle olunca tam da kriz dönemlerinde daha fazla gelir gereksinimi içinde olan devletin neredeyse otomatik olarak tüketim vergilerinde bir kayıpla ile karşı karşıya kalması muhtemeldir. Dolayısıyla vergi yapısı içinde tüketim üzerinden alınan vergilere fazla ağırlık vermek zaman zaman devletlerin gelir istikrarsızlığı ile karşılaşma olasılığını artırmaktadır.

Kaynaklar

Bellak, C. & M. Leibrecht (2007), "Corporate Income Tax Competition and the Scope for National Tax Policy in the Enlarged Europe", in: K. Andersson et al. (eds.) *National Tax Policy in Europe: To be or Not to Be?* (11-43), Berlin, Heidelberg: Springer.

Carey, D. & H. Tchilinguirian (2000), "Average Effective Tax rates on Capital, Labour and Consumption", *Economics Department Working Papers*, 258, Paris: OECD Economic Department.

Carey, D. & J. Rabesona (2004), "Tax Rations on Labor and Capital Income and on Consumption", in: P.B. Sørensen (ed.), *Measuring Taxes on Capital and Labor* (213-262), CESifo Seminar Series, London: The MIT Press.

Clark, W.S. (2004), "Using Micro-Data to Assess Average Tax Rates", in: P.B. Sørensen (ed.), *Measuring Taxes on Capital and Labor* (319-358), CESifo Seminar Series, London: The MIT Press.

Devereux, M.P. & R. Griffith (1999), "The taxation of discrete investment choices", *IFS Working Paper* Series No. W98/16.

Elele, O. (2009) "Küresel krize karşı Türkiye'de alınan önlemler", *Dünya Gazetesi* (29 Ağustos 2009), < https://www.dunya.com/gundem/gs039nin-avrupa039daki-rakipleri-panathinaikos-d-bukres-ve-s-haberi-88224 > 26.10.2021.

European Commission (2020), *Taxation Trends in the European Union Data For The EU Member States, Iceland and Norway*, (2020 Edition), Directorete-General for Taxation and Customs Union, European Commission, Publications Office of the European Union, Luxembourg.

Gelir İdaresi Başkanlığı (2007), *2006-2020 Yılı Faaliyet Raporları*, <https://www.gib.gov.tr>, 10.12.2020.

Gordon, R. et al. (2003), "Do we now collect any tax revenue from taxing capital income?", *Journal of Public Economics*, 88, 981-1009.

Hazine ve Maliye Bakanlığı (2020a), *Genel Yönetim Bütçe Gelirleri Ekod4 2019*, <https://muhasebat.hmb.gov.tr/genel-yonetim-butce-istatistikleri>, 15.12.2020.

Hazine ve Maliye Bakanlığı (2020b), *Genel Yönetim Bütçe Gelirleri Ekod4 2011-2018*, <https://muhasebat.hmb.gov.tr/genel-yonetim-butce-istatistikleri>, 15.12.2020.

Hazine ve Maliye Bakanlığı (2020c), *Merkezi Yönetim Bütçe Gelirleri Ekod4 2006-2010*, <https://muhasebat.hmb.gov.tr/genel-yonetim-butce-istatistikleri>, 15.12.2020.

Hazine ve Maliye Bakanlığı (2020d), *Mahalli İdareler Bütçe Gelirleri Ekod4 2006-2010*, <https://muhasebat.hmb.gov.tr/mahalli-idareler-butce-istatistikleri>, 15.12.2020.

Jacobs, O.H. & C. Spengel (1999), "The Effective Average Tax Burden in the European Union and the USA A Computer-based Calculation and Comparison with the Model of the European Tax Analyzer", *ZEW Discussion Papers*, No. 99-54, Zentrum für Europäische Wirtschaftsforschung (ZEW), Mannheim.

Jacobs, O.H. & C. Spengel (2002), "Effective Tax Burden in Europe", *ZEW Economic Studies*, 15, Heidelberg/ New York.

King, M.A. & D. Fullerton (1984), *The Taxation of Income From Capital: A Comparative Study of the United States, United Kingdom, Sweden, and West Germany*, Chicago: University of Chicago Press.

Kostarakos, I. & P. Varthalitis (2020), "Effective tax rates in Ireland", The Economic and Social Research Institute *Research Series* Number 110.

Leibrecht, M. & R. Römisch (2002), "Comparison of Tax Burdens", *wiiw Research Report*, No. 292, The Vienna Institute for International Economic Studies (wiiw), Vienna.

Martinez-Mongay, C. (2000), *ECFIN's Effective tax rates. Properties and Comparisons with other tax indicators*, <ttps://www.researchgate.net/publication/46447658_ECFIN%27s_effective_tax_ratesProperties_and_comparisons_with_other_tax_indicators>, 27.10.2021.

Mendoza, E.G. et al. (1994), "Effective Tax Rates in Macroeconomics Cross-country Estimates of Tax Rates on Factor Incomes and Consumption", *Journal of Monetary Economics*, 34, 297-323.

Nicodème, G. (2001), "Computing effective corporate tax rates: comparisons and results", Directorate General for Economic and Financial Affairs *Economic Paper*, No.153. <https://ec.europa.eu/economy_finance/publications/pages/publication942_en.pdf>, 29.11.2021.

OECD (1991), "Taxing Profits in a Global Economy: Domestic and International Issues", *Working Paper* No. 2, Tax Analysis and Tax Statistics of the Committee on Fiscal Affairs, Paris: OECD Publication.

OECD (2000), "Tax Burdens: Alternative Measures", *OECD Tax Policy Studies*, 2. Paris: OECD Publication.

Papageorgiou, D. et al. (2012), "Effective Tax Rates in Greece", Centre for Planning and Economic Research Discussion Papers, *Discussion Papers* no. 124.

Simon, H. & M. Harding (2020), "What Drives Consumption Tax Revenues? Disentangling Policy and Macroeconomic Drivers", *OECD Taxation Working Papers*, No: 47.

Sørensen, P.B. (2004), "Measuring Taxes on Capital and Labor: An Overview of Methods and Issues", in: P.B. Sørensen (ed), *Measuring Taxes on Capital and Labor* (1-33), CESifo Seminer Series, London: The MIT Press.

Sosyal Güvenlik Kurumu (2020), *Sosyal Güvenlik Prim Gelirleri 2006-2010*, <http://www.sgk.gov.tr/wps/portal/sgk/tr/kurumsal/istatistik>, 10.12.2020.

TÜİK (2020a), *Gelir Yöntemiyle Hesaplanmış Gayri Safi Yurtiçi Hâsıla*, <http://www.tuik.gov.tr/>, 15.12.2020.

TÜİK (2020b), *Harcamalar Yöntemiyle Hesaplanmış Gayri Safi Yurtiçi Hâsıla*, <http://www.tuik.gov.tr/>, 10.12.2020.

TÜİK (2020c), *Büyüme Oranları*, <http://www.tuik.gov.tr/>, 15.12.2020.

TÜİK (2020d), *İşsizlik Oranları*, <http://www.tuik.gov.tr/>, 15.12.2020.

Türkiye İş Kurumu (2020), *İşsizlik Sigortası Fonu Prim Gelirleri*, <https://www.iskur.gov.tr/kurumsal-bilgi/istatistikler/>, 12.12.2020.

Ünlükaplan, İ. & İ. Arısoy (2011), "Türkiye Ekonomisi İçin Efektif Vergi Oranlarının Hesaplanması", *Ege Akademik Bakış*, 11(1), 15-24.

Volkerink B. & J. De Haan (2001), "Tax Ratios: A Critical Survey", *Tax Policy Studies*, 5.

Volkerink B. et al. (2002), "Tax Ratios in Macroeconomics. Do Taxes Really Matter ?", *Empirica*, 29, 209-224.

Sosyoekonomi

2022, Vol. 30(51), 511-536

RESEARCH ARTICLE

ISSN: 1305-5577
DOI: 10.17233/sosyoekonomi.2022.01.25
Date Submitted: 29.05.2021
Date Revised: 30.12.2021
Date Accepted: 26.01.2022

Bhagwati Tarafından Önerilen Beyin Göçü Vergisinin Uygulanabilirliğinin Analizi

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Analysis of Applicability of Brain-Drain Tax Suggested by Bhagwati

Abstract

Immigrations for better employment opportunities are called 'brain-drain'. The brain-drain issue is vital, especially for developing countries. Brain drain does financial harm in employment and economic, financial, socio-cultural, and political costs. To reduce these costs, Bhagwati suggested a brain-drain tax in the 1970s. Bhagwati has focused on the justice of brain-drain tax and its possible benefits to the national budget. However, there are some difficulties in applying the brain-drain tax. Within the research framework, it has been focused on the idea of brain-drain tax suggested by Bhagwati to prevent brain-drain and the reasons why it cannot find an application area.

Keywords : Brain Drain, Brain-Drain Tax, Bhagwati Tax, International Migration.

JEL Classification Codes : E62, F22, H20.

Öz

Daha iyi istihdam fırsatları nedeniyle verilen göç kararı beyin göçü olarak tanımlanmaktadır. Özellikle de gelişmekte olan ülkelerin kalkınmasında beyin göçü konusu hayati bir öneme sahiptir. Beyin göçünün gelişmekte olan ülkelere olan maliyetleri sadece istihdam açısından değil, aynı zamanda ekonomik, mali, sosyo-kültürel ve politik maliyetler yoluyla da gerçekleşmektedir. Beyin göçü sonrası oluşan maliyetleri gidermek üzere 1970'lerde Bhagwati beyin göçü vergi önerisi getirmiştir. Bhagwati beyin göçü vergisinin adaletine ve toplanan gelirin gelişmekte olan devletinin bütçesi için sağlayabileceği faydalara odaklanmıştır. Ancak beyin göçü vergisinin uygulanmasında birtakım zorluklar bulunmaktadır. Araştırma kapsamında beyin göçünü engellemeye yönelik Bhagwati tarafından önerilen beyin göçü vergisine ve önerilen bu verginin uygulama alanı bulamamasının nedenlerine odaklanılmıştır.

Anahtar Sözcükler : Beyin Göçü, Beyin Göçü Vergisi, Bhagwati Tipi Vergileme, Uluslararası Göç.

1. Giriş

İkinci Dünya Savaşı'ndaki düşmanlıkların sona ermesini takip eden yıllarda, çok sayıda yüksek vasıflı bilim adamı Batı Avrupa'dan Amerika Birleşik Devletleri'ne göç etmiştir. Birleşik Krallık'ta, 1950'lerin başlarında çok önemsenmeyen bu durum, 1960'ların başlarında siyasallaşmış ve yüksek vasıflı işgücü göçü önemsenen bir konu haline gelmiştir (Plume, 2012). Küreselleşme sürecinin ve doğal olarak insan hareketliliğinin artışına yol açan bir başka gelişme de Soğuk Savaş'ın sona ermesidir. Soğuk Savaş'ın sona ermesinin bir sonucu olarak dünya, önemli sosyal, ekonomik, kültürel ve politik değişikliklere yol açan yeniden yapılanma sürecinden girmiştir. Soğuk savaşın sona ermesi küreselleşmenin hızlanmasına yol açmıştır. Küreselleşme süreci, dünyanın yeniden tanımlanmasını, devletlerarası ilişkileri ve yeni pazarlara erişimi hızlandırmıştır. Bu süreçte, bilgi teknolojilerinin yaygın kullanımı ve ülkeler tarafından benimsenen açık sınır politikalarının benimsenmesi uluslararası göçte bir artışa yol açmıştır (Espinoza-Pedraza, 2013: 30).

Birleşmiş Milletler'in 2020 yılı dünya göç raporuna göre[1], 270 milyondan fazla insanın diğer ülkelerde göçmen olarak yaşadığı tahmin edilmektedir. Giderek daha entegre hale gelen bir dünyada, göç, zamanla yatırım akışlarının, ticaretin ve bilgi dağıtımının hızlanmasını takip etmektedir. Yükselen uluslararası göç eğilimine ülkeler arasındaki demografik yapı farklılıklarının artması, ulaşım ve iletişim maliyetlerindeki düşüş eşlik etmektedir. Hal böyle olunca da ülkeler arasında farklılık gösteren işgücü arz ve taleplerinin karşılanması göçü teşvik etmektedir. Sonuç olarak, göçü önlemek ülkeler için giderek zorlaşmaktadır (Kristiaji, 2019: 20).

Göç insanlık kadar eski olmasına rağmen son on yıllarda göçün yoğunluğu, önemi ve karmaşıklığı artmıştır. Göç hareketi daha iyi yaşam ve çalışma koşulları arayışı (çekme faktörleri) gibi olumlu faktörlere gidiş ile şiddetten kaçış, çevresel felaketler, insan kaçakçılığı (itici faktörler) gibi olumsuz koşullardan kaçış nedenlerinden gerçekleşmektedir (Murru, 2008: 153). Göç süreçleri homojen değildir ve farklı göç türleri bulunmaktadır. Tarih boyunca insanlar çeşitli nedenlerle göç etmişlerdir. Ancak 20. yüzyılın ikinci yarısında üç ana uluslararası göç türünü belirlemek mümkün hale gelmiştir. Üç ana uluslararası göç türü emek ve yasadışı göç dahil geçici göçler, zorunlu göçler (mülteci hareketleri) ve uluslararası emeklilik göçleridir (Bell et al., 2010: 16).

Göç türlerinden biri olan emek göçü literatürde vasıflı insan göçü veya beyin göçü olarak adlandırılmaktadır[2]. Beyin göçü, 20. yüzyılda ön plana çıkan yeni bir kavramıdır. Beyin göçü, bir ülkede eğitim almış ancak başka bir ülkede ikamet eden ve başka bir ülkede çalışan yüksek vasıflı bireylerin göçü olarak tanımlanabilir. Beyin göçü başka bir tanım olarak, bir ülkenin edindiği beşerî sermayesinin uluslararası sınırlar üzerinden başka bir ülkeye aktarımı olarak da tanımlanabilir. Beyin göçü veya beşeri sermaye kaçışı genellikle eğitimli ve yetenekli bireylerin ücret yetersizlikleri, fırsat eksikliği, yaşadıkları yerdeki

[1] *UN International Organization for Migration, 2019.*

[2] *Çalışmada anlam bütünlüğü sağlamak için beyin göçü kavramı kullanımı tercih edilmiştir.*

sağlık tehlikeleri veya diğer nedenlerle gerçekleşmektedir (Mugo & Kamere, 2013: 165). 'Beyin göçü' kavramı 1960'larda gelişmekte olan birçok ülkenin, teknik becerilerin Batı ülkelerine kaybedilmesinden duydukları rahatsızlığı dile getirmek için kullandığı bir kavram olmuştur. Pek çok gelişmekte olan ülke lideri, bunu neo-kolonyal bir düşünce olarak değerlendirmiş ve ulus devlet kurmaya yardımcı olacak yetenekli gençlerin başka ülkelere göçüyle gelişmekte olan ülkelerin gelişmesini engellediği gerekçesiyle konuyu politik bakış açısıyla bakmıştır (Rizvi, 2005: 181).

20. yüzyılın ikinci yarısında, uluslararası vasıflı göç, Kuzey'deki ekonomik açıdan daha güçlü ülkeler ile Güney'deki ekonomik açıdan daha az varlıklı ülkeler arasındaki mevcut sosyoekonomik eşitsizlikleri büyük ölçüde artırmıştır. 21. yüzyılda hızlandırılmış ve daha uygun fiyatlı ulaşım olanakları, gelişmiş bilgi teknolojileri ve anlık uzun mesafeli iletişime dayalı artan küreselleşme ile birlikte, mekânsal ve zamansal olarak daha karmaşık ve çeşitli vasıflı işgücü hareketliliği, araştırmaların odak noktası haline gelmiştir (Jöns & Cranston, 2020: 385). Beyin göçü, küreselleşme sürecinin ayrılmaz bir parçasıdır. Bu kavram, modernleşme ve küreselleşme süreçlerinden geçen gelişmekte olan ülkeler için önemli bir zorluk teşkil etmektedir. Beyin göçü, ev sahibi ve kaynak ülkelerdeki olumlu ve olumsuz etkileri hakkında önemli bir tartışmaya yol açmıştır. Küreselleşmenin vasıflı işgücüne yönelik uluslararası talebin artmasına yol açması ve gelişmiş ülkelerin yoğun olarak bilim ve teknolojiyi kullanması, yüksek vasıflı göçün çoğunu gelişmiş ülkelerin çekmesine neden olmaktadır. Gelişmekte olan ülkelerde acil önlemler alınması ve uygun politikaların benimsenmesi yoluyla bu eşitsiz dağılım etkili bir şekilde geri alınabilir. Bu politikalar aynı zamanda beyin göçünün daha doğru bir şekilde yönetilmesini sağlayacaktır (Espinoza-Pedraza, 2013: 31). Gelişmekte olan ülkelerin beyin göçünün engellenmesine yönelik politikalar geliştirme gerekliliği bulunmaktadır. Dolayısıyla gelişmekte olan ülkeler beyin göçünün önüne geçebilmek için çeşitli politikalar uygulamaktadır. Ancak gelişmekte olan ülkelerin bu politikalarına karşın gelişmiş ülkeler artan yaşlanan nüfus süreçlerini telafi etmek ve yüksek vasıflı göçü çekmek için planlı politikalar uygulamaya başlamışlardır (Espinoza-Pedraza, 2013: 30).

Sınırlı istihdam fırsatları ve iş yapma konusunda kesinliğin olmaması, özellikle yüksek eğitimli bireylerin daha iyi ücretlere ve ekonomik koşullara sahip ülkelere göç etmesini teşvik etmektedir. Gelişmekte olan ülkelerde ekonomik kalkınmanın durgunluğunun nedenlerinden biri olarak beyin göçü sık sık eleştirilse de, yüksek vasıflı göçün kaynak ülke için yüksek işçi dövizleri, teknoloji transferi ve eğitime yatırımı teşvik etmek gibi faydalar sağladığı savunulmaktadır (Kristiaji, 2019: 18). Gelişmekte olan ülkelerden gelişmiş ülkelere vasıflı uluslararası göç süreci, son on yıllarda önemli ölçüde artmıştır. Beyin göçünün insan sermayesi stokunun azalması gelişmekte olan ekonomiler üzerinde olumsuz etkilere neden olmaktadır. Bununla birlikte, beyin göçü kaynak ekonomiler üzerinde birtakım olumlu etkileri olduğu kabul edilse de bu konu politik olarak tartışmalıdır. Bu çalışmada, beyin göçünün göçmen kaynağı gelişmekte olan ülkeler üzerindeki olumsuzluklarını telafi edici bir öneri olarak Bhagwati tarafından ortaya atılmış olan beyin göçü vergisinin incelemesi yapılmıştır. Vergiler beyin göçünü önlemenin araçlarından biri olarak nasıl çözümler üretebilir? 40 yıldan daha uzun bir süre önce o dönem

için oldukça 'gelişmiş' kabul edilen bir teklif sunan Bhagwati'nin rolü, bu konudaki çalışma için çok önemlidir. Bhagwati, yüksek vasıflı göçmenlerin anavatanının, adaleti garanti altına almak için bir vergi programı aracılığıyla göçmenlerin gelir elde ettiği ülkeden tazminat almasının beklendiğini savunmaktadır (Kristiaji, 2019: 18).

Bu çalışmada uluslararası göçün kavramsal çerçevesinde barındırdığı beyin göçü detaylı incelenmiştir. Beyin göçünün ülkelerin, toplumların ve bireyler üzerinde çeşitli etkileri olduğu tartışmasızdır. Ancak özellikle bu etkiler gelişmekte olan ülkeler üzerinde olumsuz olarak gerçekleşmektedir. Çalışmada beyin göçünün gelişmekte olan ülkeler üzerindeki olumsuz etkileri üzerinde de durulmuştur. Bu olumsuzlukları telafi etmeye yönelik olarak Bhagwati'nin önerdiği beyin göçü vergisinin uygulanmasında karşılaşılabilecek sorunlar incelenmiştir. Çalışmada beyin göçü vergisinin neden uygulanamadığı noktasında tespitler ortaya konması amaçlanmaktadır. Bu yüzden Bhagwati beyin göçü vergisi detaylı bir şekilde ele alınmıştır.

2. Uluslararası Göç

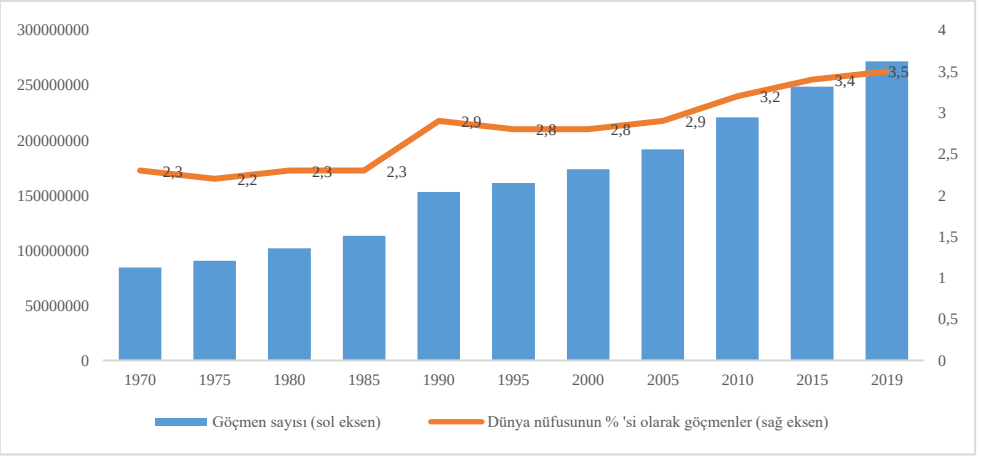
Küresel göç tarihi, Antik çağdan modern döneme kadar imparatorlukların ve devletlerin kurulmasına kadar etkisi olan insan dolaşımına bağlı siyasi tarihin kendisidir. Küresel göç tarihi aynı zamanda ekonomi tarihinin de bir parçasıdır. Antik çağ ve orta çağ Afro-Avrasya'daki ticari karışıklıklar, 17. ve 18. yüzyıl dünya sistemi, plantasyon kuşağı ve 20. ve 21. yüzyıl küresel kapitalizmi küresel göçten bağımsız düşünülemez. Göçmenlerin değiştirdikleri yaşamlar ve hatta yarattıkları toplumlar, göçün; kültürlerarası niteliğe sahip olup, kültür tarihinin de bir parçası olduğunun göstergesidir (Preiser-Kapeller et al., 2013). Uluslararası göç, ayrılmaz bir şekilde küreselleşme ile bağlantılıdır. Küreselleşme sürecindeki kalkınma ve demokrasideki eşitsizlikler de dahil olmak üzere küresel istihdam krizi; küresel işgücü piyasalarının bölünmesi, iletişim ve ulaşımdaki devrimler ile ulus ötesi sosyal ağlar uluslararası göçü yönlendirmektedir. Öte yandan, uluslararası göçün kendisi küresel para ve mal transferi de dahil olmak üzere, küresel şehirlerin ortaya çıkışı, artan sosyal ve kültürel çeşitlilik küreselleşme süreçlerini oluşturmaktadır (Koser, 2018).

Uluslararası göç ile küreselleşme arasındaki sıkı ilişki göçün nedenlerinin küreselleşmeden bağımsız olarak düşünülmemesi gerektiğini ortaya koymaktadır. Küresel eşitsizlik ve yoksulluk, bölgesel çatışmalar, baskı ve şiddet ile doğal afetler insanların ülkelerini terk etmelerinin en temel nedenleri arasında yer almaktadır. Göç, insanların yaşamlarını, refahlarını, iş fırsatlarını ve insan haklarını birçok boyutta etkilemektedir. Bu gerçeklik, uluslararası göçü, küresel ve tarihsel öneme sahip çağımızın en önemli insani sorunlardan biri haline getirmektedir. Yüzyıllar boyunca milyonlarca insan fiziksel, kültürel ve ekonomik engellere rağmen kendileri ve aileleri için daha iyi bir yaşam arayışıyla başka ülkelere göç etmişlerdir. Birleşmiş Milletlerin 2020 yılı Dünya Göç raporuna göre (UN International Organization for Migration, 2019) doğdukları ülke dışında yaşayan insanların sayısının 270 milyonun üzerinde olduğu ve göçmen nüfusun dünya nüfusunun %3,5'ini oluşturduğu tahmin edilmektedir. Bu göç hareketleri kaynak ülkeler ile hedef ülkeler üzerinde temelde ekonomik ve mali etkilere sahiptir. Aynı zamanda göç, kaynak ve hedef

ülkelerde güçlü bir muhalefet yaratabilecek sosyal, kültürel ve politik etkilere sahiptir. Hızla önemi artan ekonomik, politik ve sosyal göç sorunları çeşitli uluslararası platformlarda ilgi odağı haline getirmiştir (Özden & Schiff, 2007: 1).

Uluslararası göç hareketi tarih boyunca sürekli artış içerisinde olmuş ve artış eğilimi Grafik 1'de gösterilmiştir. Dünya Bankası[3] ve Birleşmiş Milletlerden[4] elde edilen verilere göre, uluslararası göçmenlerin sayısı 1960'ta 7 milyona, 1980'de 93 milyona, 2000 yılında 170 milyona ve 2019 yılında ise 270 milyona ulaşmıştır. 1960'tan 2019 yılına kadar uluslararası göçler 3,5 kat artmışken, dünya nüfusunun büyümesi 2,5 kat olarak gerçekleşmiştir. Uluslararası göç artış hızı ile dünya nüfusunun artış hızı karşılaştırıldığında uluslararası göçün artışının dünya nüfusunun artışının daha fazla olduğu görülmektedir. Bu durum uluslararası göç hareketinin dünyadaki doğum artış hızına göre daha fazla arttığını ifade etmektedir.

Grafik: 1
Uluslararası Göç Gelişimi ve Artış



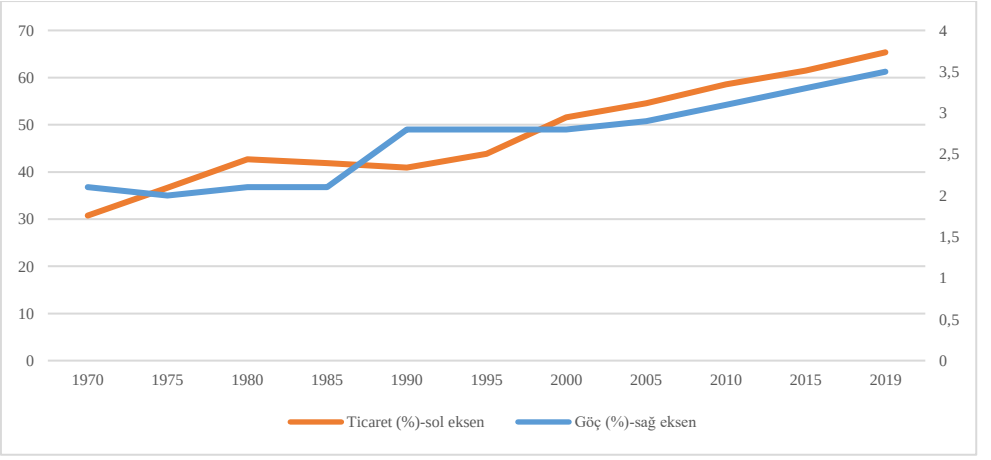
Kaynak: UN International Organization for Migration, 2019: 21.

Küreselleşmeyle birlikte emeğin küresel hareket esnekliğindeki artış; ticaret ve sermayenin hareketi ile karşılaştırıldığında sınırlı kalmıştır. Bunun nedeni, uluslararası göçün, ulusal kimlik, ekonomik rekabet gücü ve güvenlik dahil olmak üzere egemenlik için en önemli konuların merkezinde yer almasıdır. Bu nedenle, gelişmiş ülkelerin çoğunun işgücü piyasası boşluklarını doldurmak ve demografik eğilimleri ele almak için daha fazla göçmene ihtiyaç duymasına karşın, çoğu yine de siyasi ve popülist baskılara yanıt olarak görünürde göçü kısıtlar pozisyonda görülmüşlerdir (Koser, 2018). Ancak bu durum politikacıların beyan ettikleri gibi göçmenlerin tümden engellenmesine yönelik politikalar

[3] *International migrant stock, total | Data, 2021.*
[4] *UN International Organization for Migration, 2019.*

değildir. Aksine beyin göçü olarak adlandırılan vasıflı göçmen nüfusu kendi ülkelerine çekmek üzere, gelişmiş ülkeler, rekabet içerisine girmişlerdir.

Grafik: 2
Uluslararası Göç Stoklarının/Dünya Nüfusu ile Ticaret/GSYH İlişkisi (%)



Kaynak: International migrant stock, total | Data, 2021 ve United Nations Population Division | Department of Economic and Social Affairs, 2021.

İnsanlığın doğuşundan beri göç ve ticaret birbirlerine bağlı olmuşlardır. Ticaret yapmak için tüccarların seyahat etmesi gerekmiş ve bazı tüccarlar yabancı topraklara yerleşmiştir. Dahası, bölgelerin sömürgeleştirilmesi ve kolonilerin geliştirilmesi için işgücü gerekmiştir. Bu durum genellikle gönüllü veya zorunlu göçe yol açmıştır. 19. yüzyıldan bugüne kadar göç ve ticaret, küresel ekonomik entegrasyonun yakından bağlantılı öğeleri olmuştur. 1970'lerden beri dünya, artan mal ve hizmet ticareti, doğrudan yabancı yatırım (DYY) ve finansal akışlar uluslararası göç yoluyla daha fazla sınır ötesi entegrasyona neden olmuştur. Bu akışlar, daha düşük nakliye maliyetleri, hızlı bilgi ve iletişim teknolojisi gelişmeleri ve hükümetler tarafından engellerin kaldırılmasıyla kolaylaştırılmıştır (Poot, 2013: 1).

Uluslararası göç ile küresel ticaretin tarihsel bağımlılıkları bir grafik üzerinde daha açık şekilde görülebilir. Grafik 2'de küresel göç stokları ile dünya ticaret hacminin karşılaştırması yapılmıştır. Bu grafikte görüldüğü üzere uluslararası göç ve küresel ticareti temsil eden iki farklı göstergenin tarihsel olarak aynı hareketleri yapması birbirlerine olan bağımlılıklarının göstergesidir. Uluslararası göç hareketleri ile dünya ticaret hacminin gün geçtikçe artışını, küreselleşmeden bağımsız olarak düşünemeyiz. Ulaşım maliyetlerinin her geçen gün düşmesi sonrası kolaylaşan göç hareketleri ile sınırlar arası ticaret önündeki engellerin azaltılması sonrası artan ticaret hareketleri her iki göstergenin de artış eğiliminde olduğunu göstermektedir. Ayrıca uluslararası göç hareketlerinin ve dünya ticareti önündeki

engellerin olmadığını söylemek doğru olmayacaktır. Özellikle çalışmada küreselleşmeyle çelişki yaratan uluslararası göçü engellemeye yönelik önlemlere de değinilmiştir.

Küreselleşmenin bir unsuru olarak, malların ve sermayenin dolaşımının önündeki uluslararası engeller büyük ölçüde azalırken, özellikle vasıfsız insan dolaşımının önündeki engeller aynı hızla azaltılmamıştır (Murru, 2008: 158). Vasıfsız göçü engellemeye çalışan popülist yaklaşımlara rağmen göç hareketlerindeki artış eğilimi engellenememiştir. Bunun önemli iki nedeni bulunmaktadır. Birincisi artan teknolojiye bağlı olarak gelişen ulaşım olanaklarının artması, ikincisi ise gelişmiş ülkelerin ihtiyaç duyduğu vasıflı işgücü ihtiyacının gelişmekte olan ülkeler tarafından karşılanma ihtiyacıdır.

Göç, birbiriyle daha bağlantılı bir dünyanın önemli konularından biridir. Ekonomik ve sosyal sonuçlarıyla ilgili önemli endişelere rağmen, insanların dünyanın sınırlarını aşması küresel üretkenliği artırmaktadır. Küresel entegrasyona öncelik veren ülkeler bu potansiyelden en iyi şekilde yararlanarak ülkelerine ekonomik ve sosyal faydalar sağlarlar. Dünyadaki sınır ötesi göçmenlerin %90'ından fazlası, genellikle ekonomik nedenlerle gönüllü olarak göçmektedirler. Dünyadaki göç hareketlerinin yaklaşık yarısı, gelişmekte olan ülkelerden, göçün temel itici güçlerine sahip gelişmiş ülkelere yapılmıştır (Woetzel et al., 2016). Göç hareketleri tarihte olduğu gibi bugün de oldukça karmaşıktır. 21. yüzyılın başlarında göçün üç temel özelliği bulunmaktadır. Birincisi, 1980'lerden bu zamana kadar göç, artmaya devam etmektedir. Göçlerde yaşanan bu artış dünya genelinde giderek daha fazla sayıda insanı etkilemektedir. İkincisi, göç esasen insanların daha az gelişmiş ülkelerden gelişmiş ülkelere doğru hareketlerinden oluşmaktadır. Üçüncüsü ise, uluslararası göç, son yıllarda dünyayı dönüştürmeye yardımcı olan daha büyük sosyal ve ekonomik süreç olan küreselleşmenin bir parçasıdır. Mallar ve hizmetler sınırlar arasında daha özgür bir şekilde alınıp satılırken, giderek daha fazla insan yurtdışında yaşamak ve çalışmak istemektedir. Ayrıca, hareket özgürlüğünün artmasıyla birlikte küreselleşmenin bir bileşeni olarak göçün rolünün ve ulusal düzeyde göçmenlerin ekonomik büyümeyi yönlendirmedeki rolünün giderek daha fazla kabul gördüğü tartışmasız bir gerçektir. Günümüzde göç kavramı daha spesifik hale gelirken yüksek vasıflı göç hareketleri özellikle gelişmekte olan ülkeler ve gelişmiş ülkeler arasında giderek artan rekabet konusu haline gelmiştir (Keeley, 2009: 29-31). Dolayısıyla uluslararası göç hareketleri bu bölümden sonra daha spesifik hale getirilerek incelenmiştir. Çalışmanın odak noktasını oluşturan beyin göçü kavramı; sonraki bölümlerde daha detaylı şekilde beyin göçü vergisiyle ilişkilendirilecektir.

3. Beyin Göçünün Kavramsal Çerçevesi

Beyin göçü kavramı 1960'larda İngiliz bilim adamlarının Amerika Birleşik Devletleri'ne büyük ölçekli göçünü tanımlamak için ortaya çıkmış olsa da, yaygın olarak beşeri sermayenin gelişmekte olan ülkelerden gelişmiş ülkelere hareketi olarak tanımlanır (Varma & Kapur, 2013: 317). Beyin göçü, daha iyi bir gelir, daha iyi çalışma koşulları ve/veya araştırma fırsatları arayışında olan, yüksek vasıflı kişilerin bir ülkeden daha fazla olanağa sahip başka bir ülkeye göç etmesini ifade etmektedir (Dequiedt & Zenou, 2013: 62). Uluslararası göçün küreselleşmesi, yüksek yeteneklere sahip insanların uluslararası

hareketliliğini büyük ölçüde artırmıştır. Küresel bir beceri pazarında, beceriler (vatandaşlık ve milliyetten ziyade) bir ülkeden diğerine geçiş için pasaporttur. Bununla birlikte, beceriler tüm ülkeler arasında eşit olarak hareket etmez. Beceri göçünün mevcut coğrafi modellerinin altında, ülkeler arasındaki derin ekonomik, politik ve sosyal farklılıklar yatmaktadır. Bu farklılıklar genellikle Kuzey ve Güney, gelişmiş ve gelişmekte olan ekonomiler şeklinde iki büyük bloğu oluşturmaktadır.

Becerileri olan insanlar, çeşitli itme[5] ve çekme[6] faktörleri nedeniyle Güney'den Kuzeye doğru hareket halindedirler. Gelir, yaşam tarzı, kişisel güvenlik, politik katılım, kariyer ve profesyonel ilerleme beklentileri, çocuklarına daha iyi gelecek beklentileri gibi faktörler göç kararlarını etkilemektedir. Gelişmiş ülkelerde yaşlanan nüfus ve bunun sonucunda ortaya çıkan beceri eksiklikleri, Kuzey'in veya gelişmiş ülkelerin yeni işgücü arayışını hızlandıran ana faktörü oluşturmaktadır (Crush & Hughes, 2009: 342). 'Beyin göçü' kavramı, insan kaynaklarının uluslararası transferini ifade eder ve genel olarak yüksek eğitimli bireylerin gelişmekte olan ülkelerden gelişmiş olan ülkelere göçü için geçerlidir. Beyin göçü daha spesifik olarak mühendislerin, doktorların, bilim adamlarının ve üniversite eğitimi almış diğer yetenekli profesyonellerin, genellikle gelişmiş ülkelere doğru yapılan göçleri ile ilgilidir. Gelişmiş ülkeler için beyin göçüyle alakalı bir endişe olmamasına rağmen, beyin göçü uzun zamandır gelişmekte olan ülkelerin kalkınması üzerinde ciddi bir engel olarak görülmektedir (Docquier, 2014: 2).

Uluslararası göçmenlerin büyük bir çoğunluğu; göçmenler ve aileleri için en büyük fırsatları sunan ülkelerde yaşamaktadır. 2020 itibariyle, dünya çapındaki tüm uluslararası göçmenlerin %65'i olan 182 milyonu yüksek gelirli ülkelerde yaşamaktadır (Grafik 3). %31 olan 86 milyon göçmen orta gelirli ve üst orta gelirli ülkelerde yaşarken, düşük gelirli ülkeler nispeten az sayıda göçmen olan yaklaşık 12 milyon olan toplam göçmenlerin %4'üne ev sahipliği yapmaktadır. Göç edilen ülkelerin nüfusu içindeki uluslararası göçmenlerin oranı da gelir grupları arasında büyük farklılıklar göstermektedir. Göçmenler, yüksek gelirli bir ülkede ikamet eden her altı kişiden yaklaşık birini oluştururken, bu oran orta gelirli ve düşük gelirli ülkelerde %2'den azdır (United Nations, 2020: 6). Son 20 yılda yüksek gelirli ülkeler, uluslararası göçmenlerin başlıca destinasyonları olarak istikrarlı bir şekilde zemin kazanmıştır. 2000 ve 2020 yılları arasında yüksek gelirli ülkeler o dönemde dünya çapında eklenen 107 milyon uluslararası göçmenden 80 milyonunu olan %75'ine sahip olmuştur. Orta gelirli ülkelerde 22 milyon ve düşük gelirli ülkelerde 5 milyon göçmen eklenmiştir. Yüksek gelirli ülkelerdeki göçmen sayısındaki hızlı artış, bu ülkelerdeki göçmen işçi talebini yansıtmaktadır (United Nations, 2020: 6-7).

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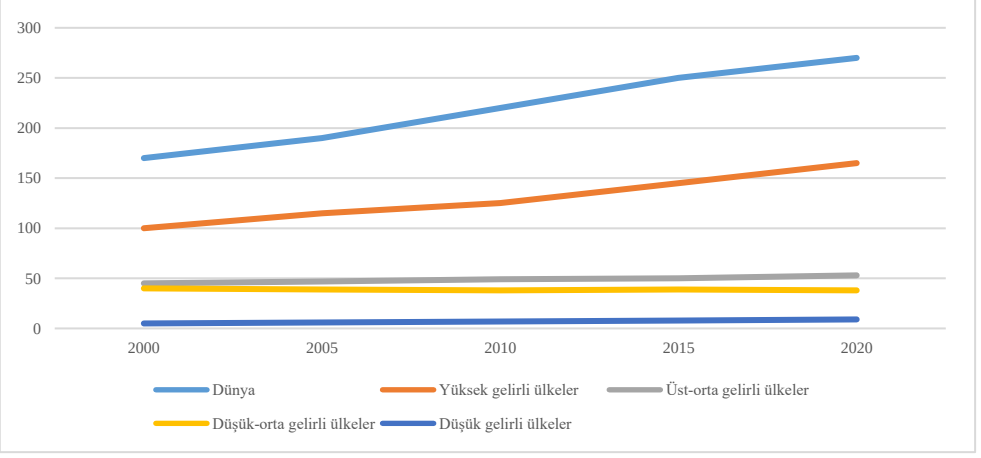
[5] *İtici faktörler, bir kişiyi farklı nedenlerle o yerden ayrılmaya ve başka bir yere gitmeye zorlayan faktörlerdir. Örneğin, düşük üretkenlik, işsizlik ve eksik istihdam, kötü ekonomik koşullar, ilerleme fırsatlarının olmaması ve doğal felaketler, insanları daha iyi ekonomik fırsatlar arayışında memleketlerini terk etmeye zorlayabilir (Kumar & Sidhu, 2005: 222).*

[6] *Çekme faktörleri, daha iyi istihdam fırsatları, daha yüksek ücretler, daha iyi çalışma koşulları ve kolaylıklar gibi göçmenleri bir bölgeye çeken faktörleri ifade eder (Kumar & Sidhu, 2005: 223).*

Menşe ülkesi dışında yaşayanların sayısı 2020'de 270 milyonu geçmiştir. Bu rakam kabaca dünyanın en kalabalık dördüncü ülkesi olan Endonezya'nın tüm nüfusunun büyüklüğüne eşittir. 2000 ile 2010 arasında, uluslararası göçmen sayısı küresel olarak yaklaşık 48 milyon artmış bu rakama 2010 ile 2020 arasında 60 milyon kişi daha eklenmiştir. Bu artışın çoğu emek veya aile göçünden kaynaklanmıştır. 2000 ile 2020 yılları arasında 17 milyon mülteci ve sığınmacının artmasıyla dünyanın farklı yerlerindeki insani krizler de bu duruma katkıda bulunmuştur.

Grafik: 3
Ülke (Varış Yeri) Gelir Gruplarına Göre Uluslararası Göçmen Sayısı, 2000-2020



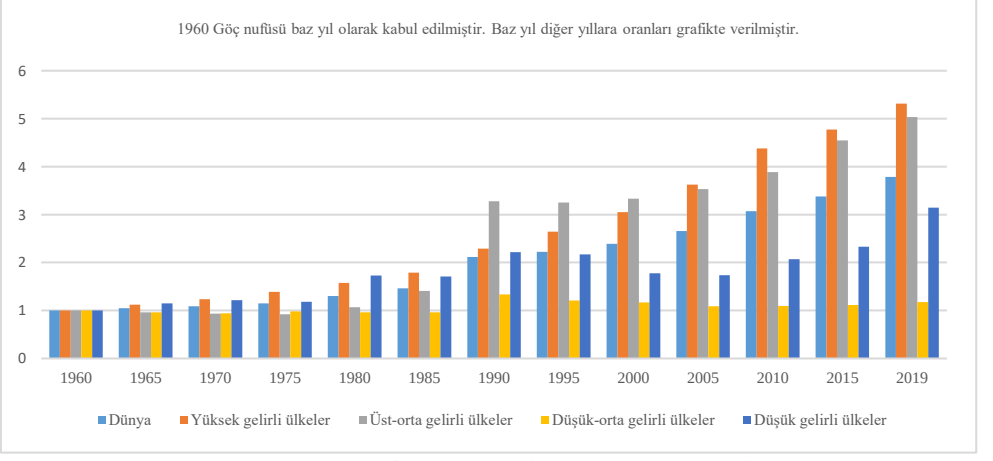
Kaynak: United Nations, 2020: 6.

2020 yılında, dünya çapında ulusal sınırların ötesinde zorla yerinden edilen kişilerin sayısı 34 milyon olarak gerçekleşmiş ve bu rakam 2000 yılındaki sayıyı ikiye katlamıştır. Son yirmi yılda mülteci ve sığınmacıların sayısı hızla artarken, küresel olarak toplam uluslararası göçmen sayısının nispeten küçük bir payını, %12'sini oluşturmaktadırlar. Buna karşılık, uluslararası göçmenler, dünya toplam nüfusunun %4'ünden daha azını temsil etmektedir. Bu oran küçük de olsa, son yirmi yılda istikrarlı bir şekilde artmaktadır (United Nations, 2020: 5-6). Sürdürülebilir bilgi ekonomilerinin temeli olarak tanımlanan bilgi yoğun ve yaratıcı sektörlerde sosyoekonomik refah ve kültürel çeşitliliği teşvik etmek amaçlı bölgesel ve ulusal ekonomiler için vasıflı işgücü mevcudiyeti politika yapıcıların gündeminde üst sıralarda yer almaktadır. Nitelikli işgücünün istihdamı genellikle uluslararası göçle bağlantılıdır. Çünkü işverenler uygun niteliklere sahip bireyler aramaktadırlar. Bununla birlikte vasıflı işgücü; sahip oldukları bilgi ve becerileri için yeterli ücret kazanımıyla ilgilenirler. Vasıflı işgücünün uluslararası hareketi, yalnızca küresel ekonomideki işgücü arz ve talebiyle değil, savaşlar, politik baskılar, çevresel felaketler, sosyoekonomik eşitsizlikler, değişen yaşam nitelikleri, belirli yerler ve bölgelerdeki kültürel yakınlıklar, topluluk gereksinimleri ve sosyal ağlarla da ilgilidir. Zamanla ekonomik olarak

daha gelişmiş bölgeler ve ülkeler, vasıflı işgücünü işe alma ve muhafaza etme konusunda gelişmekte olan ülkelere göre daha başarılı olmuşlardır. Özellikle uluslararası göçün kaynağı olan bölgelerde ve ülkelerde beyin göçü vasıflı insan kaynağının tükenmesine yol açmaktadır (Jöns & Cranston, 2020: 385).

Beyin göçünün ekonomik kalkınma için tehdit olduğu varsayımı, bir dışsallık olarak bir kişinin topluma katkısının değeri ile o kişinin ücreti arasında bir boşluk olduğu anlamını taşımaktadır. Toplumun göçten kaynaklanan net kaybını ölçen bu boşluk, toplumun sosyal marjinal faydasını azaltmaktadır (Sevilla, 2006: 61). Uluslararası göç içerisinde yer alan beyin göçünün daha anlamlı olabilmesi için yüksek vasıflı göçmen sayılarının analizde kullanılması daha doğru olacaktır. Gelir düzeylerine göre ayrılmış olan ülke gruplarının 1960 baz yılı alınarak dünya göçünden aldıkları paylar Grafik 4'te gösterilmiştir. Verilerin ülkelerin gelir gruplarına ayrılarak karşılaştırılması gerekmektedir. Bunun nedeni gelir gruplarına göre ayrılan ülkelerin, uluslararası göç eğilimindeki durumlarını gözleyebilmektir. Bu durum literatürde genel kabul gören vasıflı göçmenlerin gelişmiş ülkelere gitme eğilimini de ortaya koymaktadır. Yüksek vasıflı göçmenlerden gelişmiş ülkelerin aldığı payın daha yüksek olduğu bilgisi verilerle doğrulanmaktadır[7]. Grafik 4, ülkelerin gelir gruplarına göre sınıflandırılmış halinin uluslararası göçmenlere göre oransal değişimini göstermektedir.

Grafik: 4
Ülke (Varış Yeri) Gelir Gruplarına Göre Uluslararası Göç Eğilimi (1960-2019)



Kaynak: United Nations Population Division | Department of Economic and Social Affairs, 2021 ve International migrant stock, total | Data, 2021.

Grafik 4'te Dünya Bankasının gelir kriterlerine göre ayrılmış ülkelerin göçmen nüfuslarının, 1960'tan 2019'a kadar olan eğilimi göstermektedir. Söz konusu tabloda beş

[7] *Bu bilgiyi doğrulayıcı veriler Tablo 5'te gösterilmiştir.*

ülke grubu bulunmaktadır. Bu gruplar; Dünya, yüksek gelirli ülkeler, üst-orta gelirli ülkeler, düşük-orta gelirli ülkeler ve düşük gelirli ülkelerden oluşmaktadır. Tabloya göre dünyada, yüksek gelirli ülkelerin ve düşük gelirli ülkelerin analizleri yapıldığında en fazla yükselen göçmen yoğunluğunun yüksek gelirli ülkelere ait olduğu görülmektedir. Toplam nüfusun, göçmen nüfusa oran 1960'tan 2019 yılına gelene kadar 6 kat kadar artmıştır. Bu oran, düşük gelirli ülkeler için 3 kat kadar, dünya ortalamasında ise 3,5 kat kadar artış yaşanmıştır.

Dünya nüfusunun %3,5'i olan yaklaşık 270 milyondan fazla insanın (UN International Organization for Migration, 2019: 22) doğmadıkları ülkelerde yaşadığı tahmin edilen uluslararası göçmenler, genellikle iyi eğitimlidir: ABD'dekilerin %67'si ve OECD ülkelerindeki %88'i orta öğretim veya daha yüksek bir eğitime sahiptir. Ayrıca göçmenler, kendi ülkelerindeki nüfusun geri kalanından daha iyi eğitimli olma eğilimindedirler. Geleneksel olarak vasıfsız göç; göçmenler, aileler ve gönderen ülkeler için büyük kazanç olarak tanımlanırken, yüksek vasıflı göç genellikle daha az gelişmiş ülkeleri beşerî sermayeden mahrum bırakmakta, bu da ekonomik kalkınmayı engellemektedir. Beyin göçünün gerçekleştiği ev sahibi ülke açısından yeteneklerin iyi şekilde kullanması nedeniyle insan kaynaklarının verimli bir şekilde kullanılması yaklaşımı varken, diğer taraftan beyin göçünü kaynak ülkenin ekonomik, sosyal ve mesleki gelişimine zararlı olarak gösteren bir yaklaşım da bulunmaktadır (Espinoza-Pedraza, 2013: 35).

Tablo: 1
Eğitimli Göçmen Nüfusun Ülkelerin Gelir Grubuna göre Ayrımı (%Toplam Göç)

Gelir Grubu Ülkeler	Eğitimli Göç Oranı	
	2000	2010
Yüksek Gelirli Ülkeler	%6,3	%8,4
Üst Orta Gelir	%14,1	%23,6
Düşük Orta Gelir	%16,3	%31,8
Düşük Gelir	%8,1	%14,7

Kaynak: Kristiaji, 2019: 23.

Tablo 1, eğitimli göçmen nüfusun 2000 yılı ile 2010 yılı arasındaki ülke gruplarına göre değişimini göstermektedir. Bu tablo vasıflı göç hareketinin genellikle gelişmiş ülkelere doğru olduğu savının doğruluğunu ortaya koymaktadır.

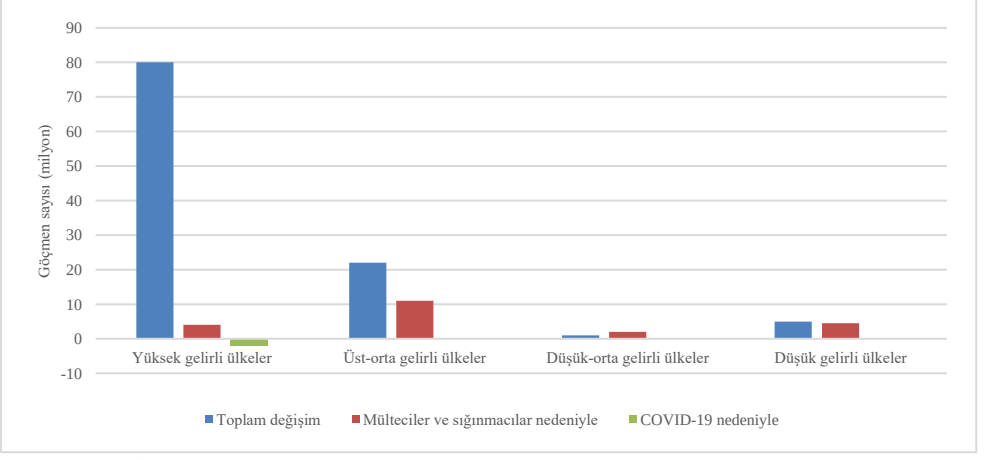
Genel olarak neredeyse her ülkede, yüksek öğrenim görmüş nüfusun göç yüzdesi zaman içerisinde artış göstermiştir. Tablo 1'de gösterildiği gibi yüksek öğrenim görmüş nüfusun göçü, 2000'den 2010'a kadar, düşük orta gelirli ve düşük gelirli ülkelerde en büyük artış yaşanmış ve neredeyse iki katına çıkmıştır. Özellikle yüksek eğitimli nüfusun, neredeyse üçte birinin yurt dışına göç ettiği düşük orta gelirli ülkelerde görülmektedir. Buna karşılık, yüksek gelirli ülkelerde, yüksek öğrenim görmüş nüfusun göçü, diğer ülkelere göre başka ülkelerden gelen yüksek öğrenim görmüş kişilerin göçü ile telafi edilebilir düzeydedir (Kristiaji, 2019: 23).

Grafik 5, 2000 ile 2020 yılları arasında en fazla sayıda göçmeni yüksek gelirli ülkeler çekerken, düşük ve orta gelirli ülkelerin; çatışma, zulüm, şiddet veya insan hakları ihlalleri nedeniyle ulusal sınırların ötesinde yerinden edilmiş insanların çoğunu kaybettiğini

göstermektedir. Düşük ve orta gelirli ülkeler 2020'de dünyadaki mülteci ve sığınmacıların beşte dördünden fazlasına ev sahipliği yapmaktadır. Dahası, mülteciler ve sığınmacılar, 2000 ile 2020 yılları arasında bu ülkelerde eklenen tüm göçmenlerin[8] en az yarısını oluşturmaktadır.

Buna karşılık, yüksek gelirli ülkelerde, son yirmi yılda toplam göçmen nüfustaki artışın çoğu, işgücü, aile birleşimi ve eğitim dahil olmak üzere diğer göç türlerinden kaynaklanmıştır. 2020'de mülteciler ve sığınmacılar, yüksek gelirli ülkelerdeki tüm göçmenlerin yaklaşık %3'ünü oluştururken, orta gelirli ülkelerde %25'ini ve düşük gelirli ülkelerde %50'sini oluşturmaktadır. 2020'de tüm göçmenlerin en az yarısının mülteci veya sığınmacı olduğu 22 ülkeden hiçbiri yüksek gelirli ülkelerden değildir. COVID-19 salgını, tüm gelir gruplarında göçmen stokundaki büyümeyi yavaşlatmıştır (United Nations, 2020: 7).

Grafik: 5
Ülke (Varış Yeri) Gelir Gruplarına Göre Uluslararası Göçmen Sayısındaki Değişim 2000-2020



Kaynak: United Nations, 2020: 7.

Beyin göçünün temel eleştirisi vasıflı işgücünün gelişmiş ülkeler tarafından alınmasının gelişmekte olan ülkeler üzerindeki olumsuz etkileri üzerine kuruludur. Elbette beyin göçünün hem kaynak hem de ev sahibi ülkeler açısından olumlu etkileri de bulunmaktadır. Ancak genelde literatürde ve bu çalışmada beyin göçünün gelişmekte olan ülkeler üzerindeki olumsuz etkileri üzerinde durulmuştur. Dolayısıyla beyin göçünün gelişmekte olan ülkeler üzerindeki olumsuz etkileri daha kapsamlı bir şekilde incelenmiştir.

[8] *Literatürde göçmen, mülteci ve sığınmacı kavramların her biri farklı anlamlara sahiptir. Ancak belirtilen verilerde toplam göçmen sayılarının içerisinde mülteciler ve sığınmacılar da yer almaktadır.*

4. Beyin Göçünün Gelişmekte Olan Ülkeler Üzerindeki Olumsuz Etkileri

Bir yerleşim yeri değişikliği olarak beyin göçünün ana akımı, bazı ülkelerdeki ekonomik, sosyal, kültürel ve psikolojik faktörler nedeniyle az gelişmiş ülkelerden gelişmiş ülkelere doğru gerçekleşmektedir. Beyin göçünün ana coğrafi yönü Güney'den Kuzey'e, Latin Amerika'dan Amerika Birleşik Devletleri'ne, Afrika'dan Avrupa'ya ve ABD'ye, Doğu'dan Batı'ya, Asya'dan Avrupa'ya doğrudur. Stratejik kaynak olarak beşerî sermayenin, insan refahına büyük katkı yapabileceği ekonomilerden, hâlihazırda iyi gelişmiş ve çok sayıda eğitimli, yetenekli, bilimsel ve idari personele sahip ekonomilere aktığı bir gerçektir. Geleneksel olarak, kaynak ülkelerde beyin göçü her zaman olumsuz etkileriyle, yani devlet yatırımlarında azalma ve yüksek nitelikli insan kaynaklarında bir kayıpla ilişkilendirilmiştir (Iravani, 2011: 285). Küreselleşme ile birlikte göçmenlik prosedürlerinin kolaylığı, yetenekli bireyleri çekmeye yönelik teşvikler ve ülkeler arasındaki ücret eşitsizliği gibi faktörler yüksek göç oranlarının oluşmasına neden olmaktadır. Beyin göçü, yüksek vasıflı insan kaynaklarının bir ülkeden diğerine aktarılması olarak tanımlanır ve bu durum da göçmenlerin geldiği ülkeler üzerinde olumsuz etkiler yaratmaktadır (Kristiaji, 2019: 17-18).

Genelde beşerî sermaye eksikliğinin, gelişmekte olan ülkelerin gelişmiş ülkelere göre daha az gelişmesinin ana nedenlerinden biri olduğu kabul edilmektedir. Bununla birlikte, gelişmekte olan ülkelerdeki vasıflı insan sermayesinin bir kısmı "beyin göçü" adı verilen vasıflı göç sızıntısı nedeniyle kaybedildiğinde, eksiklik daha da artmaktadır. Bir yandan, beyin göçünün, göçmen dövizleri, yurtdışında kazanılan ek becerilerle geri dönüş göçü ile bilimsel ve ticari ağların oluşturulması gibi olası olumlu geri bildirim etkilerine rağmen, geride bırakılan göçmen olmayanların refahını olumsuz etkilediği görüşü genel kabul gören görüştür (Ngoma & Ismail, 2013: 212). Beyin göçü, bakış açıları ulusal çizgilerden küresel bir perspektife kaydırıldığında ele alınması çok daha zor bir kavram haline gelir. Beyin göçünün etkileri, literatürde gelişmekte olan ülkeler üzerindeki olumsuz etkileri üzerine odaklanmıştır. Diğer tarafında, gelişmiş ülkeler kaybettiklerinden daha yetenekli bireyleri ülkelerine çekebildikleri için gelişmiş ülkeler için bu durum "beyin kazanımı"na yol sağlamaktadır. Gelişmiş ülkelerin, gelişmekte olan ülkelerin yetenekli işgücünün ülkelerine çekilmesine izin verilmesi durumunda, gelişmekte olan ülkeler sadece ekonomik olarak etkilenmekle kalmayıp aynı zamanda mali, sosyo-kültürel ve politik etkilere de maruz kalmaktadırlar.

4.1. Ekonomik Etkiler

Beyin göçünün, dünya gelir dağılımı üzerindeki etkileri, beyin göçünün artmasıyla doğru orantılı olarak refah ekonomisinin ilgi çeken bir konusu halini almıştır. 1990'lar boyunca, uluslararası vasıflı göçün büyüme oranı vasıfsız göçün neredeyse 3 katı olmuştur ve bu artışın çoğu, gelişmekte olan ülkelerden gelişmiş ülkelere yapılan vasıflı göçten kaynaklanmıştır. 2000 yılında genel göç, yüksek eğitimli ve vasıflı göçten 3 kat, düşük gelirli ülkelerden yapılan göçten 12 kat daha fazladır. Dünya göç hareketlerindeki bu gelişme, önemli ekonomik sorunlara yol açmaktadır. Göç oranları hem gönderen hem de

kabul eden ülkelerde eğitime dönüş oranını etkiler ve bu durum her iki ülkede de beşerî sermaye birikimi ve doğurganlık kararlarını etkileyecektir. Dolayısıyla göç, doğurganlık örüntüleri üzerindeki etkileri yoluyla hem doğrudan hem de dolaylı olarak dünya gelir dağılımını etkilemektedir (Mountford & Rapoport, 2011: 4-5).

Genelde beyin göçü olarak bilinen vasıflı ve profesyonel çalışanların uluslararası göçü, birçok ülkede uzun zamandır ekonomistler ve politika yapıcılar için önemli bir konu olmuştur. Pek çok devlet, özellikle vasıflı işgücü kaybeden ülkeler, beyin göçünün neden olduğu ekonomik büyüme, eğitim, gelir dağılımı ve refah üzerindeki olası olumsuz etkileri konusunda büyük endişelere sahiptirler. Bu endişeler, beyin göçünün birçok kaynak ülkedeki en kıt kaynaklardan biri olan insan sermayesi çıkışı olduğu gerçeğinden kaynaklanmaktadır. Zamanla, beyin göçü, kaynak ülkede beşeri sermaye oluşumunu olumsuz etkilemekte ve bu büyümeye ve ekonominin diğer önemli değişkenlerine zarar vermektedir (Wong & Yip, 1999: 699-700).

4.2. Mali Etkiler

Beyin göçü bireyin parçası olduğu sosyal sermayenin menşe ülkeden ayrılmasına neden olmaktadır. Bilim adamları, mühendisler, akademisyenler ve hekimler gibi kendi ülkeleri tarafından yetiştirilen vasıflı işgücü kendi ülkelerinin çıkarları ve gelişimi için, ülkenin az kaynaklarıyla eğitilmektedir. Ancak vasıflı işgücünün gelişmiş ülkelere göç etmesi gelişmekte olan ülkeleri çaresiz bırakmaktadır. Gelişmekte olan ülkeler tarafından oluşturulan sosyal sermayenin beyin göçü yoluyla gelişmiş ülkelere gidişi, gelişmekte olan ülkelerin kamu bütçelerinde verimsiz bir yatırıma neden olmaktadır (Mugo & Kamere, 2013: 166). Yüksek vasıflı göçmenlerin eğitimi için gereken kaynak, menşe ülke sakinleri üzerinden alınan vergilerle finanse edilmektedir. Ancak daha sonra yüksek vasıflı işgücünün edindikleri eğitimleri yanlarında götürmeleri menşe ülkeye bir maliyet unsuru oluşturmaktadır (Gibson & McKenzie, 2010: 20-21). Bu durum göç veren ülkelerin kaynak kullanımlarının verimsizleşmesine neden olmaktadır. Bazen cari harcamalar çoğu zaman da yatırım harcamaları kapsamında değerlendirilen eğitim faaliyetlerinin ülkeye geri dönüşü olamamakta ve bu durum kamu gelirlerinin verimsiz kullanımına neden olmaktadır.

Öte yandan, yüksek vasıflı bireylerin göç hareketi, vergi tabanı erozyonu ile ilişkilendirilebilir. Vasıflı işgücünün başka ülkelere gitme durumu, vergi tabanının küçülmesine neden olmakta ve bu durum kaynak ülkenin kalkınması için gerekli olan finansman kabiliyetinin azalmasıyla sonuçlanacaktır (Kristiaji, 2019: 18). Beyin göçü kamu finansmanı üzerinde olumsuz sonuçlar doğurmaktadır. Bu olumsuz durum yüksek öğretim kamu finansmanıyla etkileşime girdiğinde ortaya çıkmaktadır. Birçok ülkede, vasıflı işgücünün mesleki eğitimini içeren yüksek öğrenim, devlet tarafından sübvanse edilmektedir. Bu sübvanse genellikle dört nedenden dolayı yapılmaktadır. Bu nedenler, sosyal eşitliği sağlamak, eğitimin önündeki maliyet engellerini ortadan kaldırmak, eğitimin pozitif dışsallıklarının üretimini sağlamak ve sağlık hizmetleri gibi belirli kritik insan kaynaklarının yeterli tedarikini sağlamaktır. Son iki nedenle ilgili olarak, sübvansiyon aslında bir sosyal sözleşmenin ilk kısmıdır. Devlet bir kişinin eğitimine yatırım yapar ve

karşılığında o kişi toplumun üretken bir üyesi olur. Böylece bu üretken işgücü toplumsal faydaya katkı sağlamaktadır. Beyin göçü, bu sosyal sözleşmeyi zedelemekte ve kaynakların verimsiz şekilde dağıtılmasına neden olmaktadır.

Sübvansiyonun maliyetlerini üstlenen ortalama vergi mükellefi, ortalama yüksek vasıflı potansiyel göçmenden daha az varlıklıysa, kaynakların ortalama vergi mükellefinden, zaten daha iyi durumda olan göçmenin ücret kazançlarını sübvanse etmek için elinden alındığı anlamına gelir. Ayrıca, vasıflı göçmenlerin gelişmiş ülkelere yaptıkları pozitif dışsallıklara ek olarak gelişmekte olan ülkelerde bulunan ortalama vergi mükellefi de bu pozitifi dışsallığa katkı sağlamaktadır (Sevilla, 2006: 63).

4.3. Sosyo-Kültürel Etkiler

Beyin göçünün ekonomik ve mali etkilerine bilimsel araştırmalarda daha çok dikkat çekilse de aynı zamanda birçok alanda etkileri bulunmaktadır. Bu etkilerden biri de sosyo-kültürel etkidir. Beyin göçünün yüksek vasıflı insan gücü ihraç eden ülke toplumları ve kültürleri üzerindeki etkisi, sermayenin ekonomiden çekilmesinin etkisine benzemektedir. Bu etki uzun vadede, kaçınılmaz olumsuz sonuçlara yol açar. Güneydeki ülkelerle, Kuzeydekiler arasında birçok konuda farklılıklar bulunmaktadır. Bu farklılıklar eğitim, ekonomik, bilimsel-teknik, politik ve sanatsal düzeydeki somut farklılardır. Somut düzeydeki farklılıklar dışında sosyal ve kültürel farklılıklar gibi ölçülmesi mümkün olmayan soyut farklılıklar da bulunmaktadır (Terán-Dutari, 1994: 27).

Göç hem alıcı hem de kaynak ülkelerde önemli sosyal etkilere sahiptir. Çünkü göç sosyal değişim sürecinin bir parçasıdır. Bu süreç, yalnızca sosyal ağları geride bırakmayı değil, aynı zamanda kültürleşme sürecinin bir parçası olan, yani iki kültür temas kurduğunda ve değişiklikler meydana geldiğinde bir kayıp hissi, yerinden edilme, yabancılaşma ve izolasyon deneyimlerini de içerebilir. Dolayısıyla göç, çok boyutlu yönleri olan bir süreçtir. Bu nedenle göçün kültürler ve toplumlar üzerinde büyük bir etkisi vardır (Mapulanga-Hulston, 2014: 229). Göç hareketleriyle gittikçe artan sayıda yabancının herhangi bir ülkeye yerleşmek niyetliyle gelmesi karışık ve zıt tepkilere neden olabilir. Çok ve artan sayıda insanın aracılık ettiği farklı kültürlerin karşılaşması, yönetimi zor olan ve çoğu zaman ertelenen sorunları ortaya çıkarır (Murru, 2008: 153).

4.4. Politik Etkiler

Beyin göçü sorunu özellikle az gelişmiş ülkeler için, dünyanın pek çok yerinde II. Dünya Savaşı sonrası dünyadaki diğer sorunların çoğundan daha hızlı bir şekilde ilerlemiştir. Beyin göçünün gelişmekte olan ülkeler üzerindeki yıkıcı etkileri sonucu bu göç hareketlerini durdurmak için çok az sayıda gelişmiş ülke politikasının yürürlüğe konması ve bu politikaların neredeyse hiçbirinin yasama aşamasına ulaşmamış olması şaşırtıcı değildir (Grubel, 1968: 541). Gelişmiş ülkelerde yeniden canlanan "kalite seçici" göç politikaları, gelişmekte olan ülkelerdeki politika yapıcılar arasında, yüksek vasıflı işgücü göçünün net etkileri konusunda artan endişeleri tetiklemiştir. Nitelikli göçlerin kaynak ülkede eğitime

yatırımı ne ölçüde teşvik ettiği ve göçmen dövizlerinin kaynak ülkelerdeki ekonomik büyüme üzerindeki etkileri konusunda fikir birliği olmadığı düşünüldüğünde, bu endişeler gereksiz değildir (Ngoma & Ismail, 2013: 222). Beyin göçünü ortadan kaldırmak için her türlü seyahatin, yabancı öğrenci değişiminin ve göçün yasaklanmasını önerebilecek muhtemelen çok az kişi vardır. Bu tür akılcı olmayan önlemler hiçbir zaman basitçe önerilememiştir. Çünkü dünya refahında ortaya çıkan kayıpların, beyin göçünün durmasıyla ilişkili faydalardan çok daha ağır basacağı açıktır.

Bu durum, beyin göçü sorunuyla ilgilenen çoğu kişinin, hükümetler tarafından benimsenecek iyileştirici politikalar için belirli önerilerde bulunurken; üstü kapalı bir maliyet-fayda analizi yaptığını göstermektedir. Genel olarak, bu tür bir maliyet-fayda analizi örtük olarak değil de açık bir şekilde yapılırsa, sorunun çözümüne yardımcı olunur. Böylece refah hesabının ayrı ayrı bileşenleri kesin analize tabi tutulur. Bu maliyet ve faydaların pek çok türü en azından ilke olarak ölçülebilir, diğerleri belki de asla ölçülemeyen insani değerleri içerir. Hükümetler için, önerilen politikaların yasalaşmasına geçmeden önce, beyin göçünün yarattığı sorunların çözümüne yönelik böyle bir yaklaşım gereklidir (Grubel, 1968: 541-42). Beyin göçünün bir ülkenin iç politik refahı üzerinde olumsuz etkileri olmaktadır. Beyin göçü doktorlar, mühendisler, akademisyenler ve diğer profesyonellerden oluşan bir orta sınıf yaratmayı zorlaştırmaktadır. Entelektüel göç orta sınıf işgücünün örgütsel siyasi becerilerinden mahrum bırakmaktadır. Beyin göçü gelişmekte olan ülkelerde, yolsuzluğa ve yetersiz yönetişime karşı çıkan bir orta sınıfın oluşmamasına neden olmaktadır. Ayrıca beyin göçü hareketleri gelişmekte olan ülkelerde zayıf liderliğe ve yozlaşmaya yol açmaktadır (Gwaradzimba & Shumba, 2010: 229).

5. Beyin Göçüne Önlemeye Yönelik Vergi Dışı Çözüm Önerileri

Beyin göçü hakkındaki ilk ekonomi çalışmaları 1960'ların sonlarında başlamakta ve esas olarak standart ticaret-teorik çerçevelerdeki refah analizlerinden oluşmaktadır. Bu erken katkılar, genel olarak beyin göçünün kaynak ülkeler üzerindeki etkisinin esasen nötr olduğu göstermiş ve serbest göçün dünya ekonomisine faydalarını vurgulamıştır. Bu durum, yüksek vasıflı göçmenlerin genellikle varlıklarının bir kısmını, ev sahibi ülkelerinden kaynak ülkelere göndererek beyin göçünün neden olabileceği gerçek kayıplarını telafi edebileceği şeklinde açıklanmıştır (Docquier & Rapoport, 2012: 682). Ancak ilerleyen dönemlerde gelişmekte olan ülkelerin beyin göçünün getirilerinin kayıpları telafi edemediği; dolayısıyla gelişmekte olan ülkelerin kalkınamamasına neden olduğu gerçeği daha kabul edilebilir hale gelmiştir. Nitekim beyin göçünün gelişmekte olan ülkeler üzerindeki olumsuz etkileri ekonomik ve mali olarak ölçülebilse de ölçülemeyen bazı sosyo-kültürel ve politik olumsuzluklar da bulunmaktadır. Bu olumsuzlukları gidermek üzere birtakım kamu politikaları kullanılabilir.

Gelişmekte olan ülkelerde beyin göçünü engelleyecek kamu politikası önerileri getirilebilir. Bu önerilerin başında beyin göçünün kaynak ülkelerinde ücretlerin artırılması ve çalışma koşullarının iyileştirmesi gelmektedir. Ayrıca, gelişmekte olan ülkeler, yabancıları işe almak yerine, niteliklerine göre yerli işgücü için daha yüksek ücretler

sunmalıdır. Gelişmekte olan ülkeler özellikle eğitim amaçlı gönderdiği kişilere yurtdışından dönmelerini sağlayacak iş garantisi vermelidir (Mugo & Kamere, 2013: 173). Eğitim, özellikle artan uluslararası göç sorunlarında güçlü bir rol oynamaktadır. Bu nedenle, gelişmekte olan ülkeler, yüksek kaliteli eğitim hizmetleri sunarak ve daha iyi bir eğitim altyapısı oluşturarak, yurt dışında yüksek öğrenim görmek isteyen bireylerin beyin göçü yapmalarını önleyebilir (Mugo & Kamere, 2013: 174).

Diğer kamu politikası önerisi ise ülkelerin uygulamış oldukları vasıflı göçü engelleyici istihdam politikaların geliştirilmesidir. Bu politikaları uygulayan kaynak ülke örnekleri bulunmaktadır. Örneğin, Türkiye'de tıp doktorlarına yaptırılan zorunlu askerlik hizmetine benzer belirli kategorilerdeki personel için zorunlu kamu hizmeti istihdamı bulunmaktadır. Zimbabwe'de devlet yardımı alan mezunların, eğitimlerini tamamladıktan sonra yabancı bir ülkede çalışmayı seçmeleri halinde, maaşlarının üçte birini teslim etmeleri gereken bir sistem bulunmaktadır. Başka bir kamu politikası önerisi, gelişmiş ülkelerin gelişmekte olan ülkelerden insanları işe almama sözü vermelerini içeren, ülkeler arasında yapılan uluslararası anlaşmaların oluşturulmasıdır (Mugo & Kamere, 2013: 174-75).

Bu bölümde beyin göçünü engellemeye yönelik vergi dışı kamu politikalarına değinilmektedir. Vergi dışı politika önerileri, beyin göçünün kaynak ülkeyi terk etmeden önce uygulamaya koyulan politikalardan oluşmaktadır. Dolayısıyla Kamu maliyesi aracı olan vergilerin öncelikli hedeflerinden biri beyin göçünün engellenmesidir. Ayrıca çalışmanın merkezinde incelenen beyin göçü vergisinin önceliği, beyin göçünün kaynak ülkeler üzerinde neden olduğu olumsuzlukların telafi edilmesidir. Beyin göçü vergisinin vergi dışı uygulanan kamu politikalarından bir başka farkı ise kamu politikası önerileri beyin göçünün gerçekleşmesinden önceki uygulamalardan oluşurken, beyin göçü vergisi, göçün gerçekleşmesinden sonra uygulanmaktadır. Sonraki bölümde Bhagwati'nin öncülüğünü yaptığı beyin göçü vergisi incelenmiştir.

6. Bhagwati Tipi Beyin Göçü Vergisi

Nitelikli insan gücü, ekonomik kalkınmanın önemli bileşenlerindendir. Uzun yıllar boyunca birçok gelişmekte olan ülke "beyin göçü" olarak bilinen en yetenekli bireylerin gelişmiş ülkelere göç etmelerini deneyimlemiştir. Göç temelde, kısmen gelişmiş ülkelerde geçerli olan yüksek ücretlerden kaynaklanmaktadır. Ancak ücret farklılıkları dışında çeşitli sebepler de beyin göçünün nedeni olabilmektedir. Sebebi ne olursa olsun gerçekleşen beyin göçü gelişmekte olan ülkelerin vasıflı beşerî sermayelerini kaybetmelerine neden olmaktadır. Gelişmekte olan ülkeler, uluslararası pazarda sunulan ücretlerle rekabet edebilse bile başka sorunlar ortaya çıkmaktadır. Daha fazla vasıflı işgücünün kendi ülkelerinde kalmaları yüksek ücretler ile teşvik edilse bile ülke içerisinde gelir eşitsizliği ve sosyal baskılar da göçe engel olamamaktadır (Oldman & Pomp, 1975: 751).

Beyin göçünün ilgili taraflar üzerindeki etkileri ve bu etkilerin büyüklüğünün belirsizlikleri özelikle gelişmekte olan ülkeler için olumsuz bir durum yaratmaktadır. Çünkü gelişmekte olan ülkeler bu olumsuzlukları dengeleyecek politikalar tasarlama noktasında

zorlanmaktadırlar. Beyin göçünün gelişmekte olan ülkelere faydasından çok zarar verdiğine dair genel bir düşünce bulunmaktadır. Bu düşünce, gelişmekte olan ve gelişmiş ülkeler arasındaki artan eşitsizliklerle birleştiğinde, gelişmekte olan ülkelerin gelişimine yardımcı olan yerleşik bir ahlaki argümanı destekleyebilir. Bu argümanı beyin göçü kavramına bağlamak, gelişmiş ülkelerin gelişmekte olan ülkelere vasıflı göç tazminine kesin ve meşru bir destek sağlayacaktır (Brauner, 2010: 239).

1960'larda beyin göçü tartışması başladığından beri, vasıflı göçü düzenlemek için öneriler sunulmuştur. Bu öneriler iki temel gruba ayrılabilir. Bu önerilerden ilki gelişmekte olan ülkelerde kalma teşvikleri olarak tanımlayabileceğimiz ve bir önceki bölümde açıklanan vergi dışı kamu politikalarıdır. İkinci öneri ise göçün neden olduğu refah kaybının tazminatı olarak düşünülmektedir. Bhagwati tarafından önerilen vergi ikinci öneri grubuna girmektedir. Onun fikri, vasıflı göçü azaltmak yerine, artan beyin göçüne rağmen gelişmekte olan ülkelerin bu hareketlilikten bir fayda sağlaması üzerine kurulmuştur (Dumitru, 2012: 9). 1970'lerin başlarında, bu gözlem Bhagwati'yi beyin göçü için bir vergi önermeye yöneltmiştir. Öneri, hiçbir zaman ciddi bir şekilde uygulanmamasına rağmen, o zamandan beri beyin göçünün vergilendirilmesine ilişkin akademik tartışmanın odak noktası olmuştur (Brauner, 2010: 239). Bu nedenle, bu bölümde Bhagwati vergisi ve gelişiminin analizi yapılmıştır.

Gelişmekte olan ülkelerden gelişmiş ülkelere doğru gerçekleşen beyin göçünü telafi etmenin bir yolu da vergilerdir. Gelişmiş ülkelerdeki göçmenlerin kazançlarına ek bir gelir vergisi konulabilir; bu şekilde toplanan fonlar daha sonra kalkınma harcamaları için daha az gelişmiş ülkelere yönlendirilebilir. Bu öneri ilk kez 1972 yılında Daedalus'ta Bhagwati tarafından ortaya konulmuştur (Bhagwati, 1976: 34). Bhagwati, beyin göçünün neden olduğu sorunları hafifletmek için, daha az gelişmiş ülkelerden göç eden kişilerin gelişmiş ülkelerde kazandıkları gelirlerin üzerinden özel bir vergiye tabi tutulmasını önermiştir (Oldman & Pomp, 1975: 751).

Bhagwati, bu ek vergiyi, profesyonellerin göç etmeselerdi kaynak ülkeye yapacakları katkı için bir tazminat biçimi olarak gerekçelendirmiştir. Bu vergi önerisinin etik muhakemesi aşağıdaki şekillerde açıklanabilir (Dumitru, 2012: 10):

- Herkes, gönüllü eylemlerinin üçüncü şahıslara verdiği zararları tazmin etmelidir (Tazminat İlkesi).
- Yetenekli işgücü gönüllü olarak göç ederek ve artık ülkenin refahına katkıda bulunmayacağı için o ülkede bir refah kaybına neden olacağından (Kayıp İlkesi) vasıflı göçmenler ayrıldıkları ülkeye tazminat ödemelidir.

Bhagwati tarafından önerilen beyin göçü vergisi teklifi temelde çok geneldir. Bhagwati tipi beyin göçü vergisi göçmenlerin vergilendirilebilir gelirleri üzerinden, göç ettikleri ülkeler tarafından toplanması öngörülmüştür. Önerilen bu vergi oranı %15 olarak belirlenmiştir. Vergi bir taraftan göçün menşe ülkeler üzerindeki olumsuz etkilerini telafi ederken, diğer taraftan gelirlerini artırmak için yer değiştiren göçmenlerin göç kararlarını

etkileme potansiyeline de sahiptir (Bhagwati, 1972: 44). Beyin göçü vergisinin ilk olarak 1972 yılında teklif edilmesinin ertesi yılı Bhagwati, daha ayrıntılı bir teklif sunmak ve teklifi gerçek verileri kullanarak test etmek için William Dellalfar ile birlikte çalışmıştır. Az gelişmiş ülkelerden göç eden vasıflı göçmenlerin düzeltilmiş vergilendirilebilir gelirleri üzerinden %10'luk bir beyin göçü vergisinin 1969'da ABD'de uygulanması durumunda, 62 milyon dolar vergi geliri elde edileceği tahmin edilmiştir. Bu tutar, 1971'de Amerika Birleşik Devletleri'nden gönderilen net yardım akışının %10'undan fazladır (Bhagwati & Dellalfar, 1973: 96).

Bhagwati beyin göçü vergisinin vasıflı göçmenlere uygulanması önerisinin dışında ayrıca bu verginin kimin tarafından toplanacağı ve toplanan bu vergilerin nasıl dağıtılacağı konusunda da önerilerde bulunmuştur. Tercih edilen şekliyle vergi, gelişmiş ülkelerdeki vergi makamlarının yardımıyla "BM himayesinde" toplanacaktır. Bu, bir göçmenin ev sahibi ülkedeki ilk on yılı gibi, "makul bir süre" için tahsil edilecektir. BM, "yozlaşmış ve diktatör" ülkeler haricindeki gelişmekte olan ve göçmen ihraç eden ülkelere toplanan, beyin göçü gelirlerini yönlendirecektir. Dağıtım kanalının alternatifi olarak da, toplanan vergi gelirleri, gelişmiş ülkelere aktarılarak gelişmekte olan ülkelerin kalkınması için belirli kriterler çerçevesinde dağıtılacaktır (Bhagwati & Dellalfar, 1973: 96). Gelişmekte olan ülkelerin, prensip olarak yurtdışındaki vatandaşları üzerinde vergi yargı yetkisi uygulayabilecekleri gerçeği göz önüne alındığında, gelişmekte olan ülkelerin bu hakkı Birleşmiş Milletlere teslim etmeleri önerilmiştir. Aynı zamanda vergilerin toplanması aşamasında gelişmiş ülkelerin olanaklarından yararlanılması gerekliliği vergi önerisinde belirtilmiştir. Vergi gelirlerinin daha sonra gelişmekte olan ülkelere ödenmek üzere BM'ye aktarılması öngörülmüştür. Sonrasında bu gelirler Birleşmiş Milletler Kalkınma Programı tarafından kalkınma harcamaları için olağan kriterlere göre gelişmekte olan ülkelere aktarılabilecektir (Bhagwati, 1976: 38).

Bhagwati tipi beyin göçü vergisiyle, gelişmekte olan ülkeler üzerinde birtakım etkiler yaratması amaçlanmaktadır. Bunlardan birincisi, uluslararası pazarda vergi ile vasıflı işgücünün mevcut ücretlerini etkili bir şekilde düşürerek, gelişmekte olan ülkedeki yerleşik işgücünün ülkenin sosyal hedefleriyle daha tutarlı bir ücret ödemesine izin verecektir. Artan gelir eşitsizliğine yönelik eğilim bu durumda kısmen önlenebilir. İkincisi, vergiden elde edilen gelir gelişmekte olan ülkelere göçün getirdiği yüklerin, telafi edilmesine yardımcı olacaktır. Üçüncüsü, vergiyle beraber gelişmekte olan ülkelerin göçmenlerin artan gelirlerinden pay almasını sağlayacaktır. Son olarak, verginin ekonomik getirileri göçü düşürerek, insan gücü kaybını gelişmekte olan ülkeler açısından caydıracaktır (Oldman & Pomp, 1975: 751). Bhagwati tipi beyin göçü vergisi, vergilerin yalnızca tazmin yönünü vurgulamamaktadır. Ayrıca ahlaki bir eşitlik mantığı da ortaya koymaktadır. Temel fikir, vasıflı göçmenlerin gelişmiş ülkelerde elde ettikleri görece yüksek getirilerin üzerine kuruludur (Wilson, 2008b: 2385). Beyin göçü vergisi bireysel göç davranışlarını değiştirebilir. Bu verginin amacı bu davranışları tümden değiştirmek de değildir. Bu noktada bireysel davranışların ötesinde toplumsal çıkarlar ön plana çıkmaktadır.

Dolayısıyla dizayn edilecek bir beyin göçü vergisi, toplumun meşru çıkarlarını, bireyin çıkarlarına göre dengelemelidir. Gelişmiş ülkelerin ve gelişmekte olan ülkelerin farklı ekonomik, kültürel ve politik perspektifleri göz önüne alındığında sorun toplumsal dengenin nasıl sağlanacağıdır. Gelişmiş ülkelerde beyin göçü vergisi, vasıflı göçmenler tarafında dengeyi bozabilir ve vergiye karşı bir direnç söz konusu olabilir. Üstelik etki ihmal edilebilir olsa bile, vasıflı işgücünün gelişmekte olan ülkeleri terk etmelerinin birincil nedeni siyasi veya dini baskıdan kaçmaksa, bazıları vergiyi anti demokratik bulacaklardır. Gelişmekte olan ülkelerdeki zor ekonomik koşulların hafifletilmesi, bireylerin isteklerinden öncelikli olacaktır. Bu nedenle vasıflı göçmenler, ülkelerinin kalkınmasına katkıda bulunma yükümlülüğüne sahip olarak görülecektir (Oldman & Pomp, 1975: 752).

Beyin göçü vergisi gelişmiş ülkeler ile gelişmekte olan ülkeler arasındaki eşitliği sağlama konusunda önemli bir araç olarak görülmüştür. Verginin temel fikri, vasıflı göçmenlerin gelişmiş ülkelerde yüksek ekonomik gelirler elde etmeleri üzerine kurulmuştur. Bu gelirleri vergilendirmenin mantığı, modern refah ekonomisinin refah hesabı ile tutarlı olan ilerici vergilendirme argümanlarının arkasındaki düşüncelerden oluşmaktadır. Önerilen vergi göçmenlerin, varış ülkesinde kademeli vergi sistemine tabi tutarak menşe ülkesine karşı sorumluluklarını yerine getirmesini sağlamaktadır. Beyin göçü vergisi savunucuları, bu vergi gelirlerinin gelişmekte olan ülkelere aktarılmasının gerekçesini göçmenlerin menşe ülke vatandaşlık statülerine ve menşe ülkedeki oy kullanma hakkına sahip olmaları durumuyla da bağdaştırmışlardır (Wilson, 2008a: 255). Bu durumda beyin göçü vergisini ödemeyi kabul etmeyen göçmenlerin menşe ülke vatandaşlığından ve menşe ülkede oy kullanma haklarından feragat etmeyi kabul etmeleri sonucu çıkarılabilir. Beyin göçü vergisinin vatandaşlık statüsü ve oy kullanma hakkıyla birleştirilmesindeki sebep, verginin meşru zemine oturtulmak istenmesinden kaynaklanmaktadır. Bhagwati'nin önerdiği vergide, seçimlerde oy kullanabilen ve başka ülkede yaşayan vatandaşların ilgili vergiyi ödeme yükümlülüğünü yerine getirmesi hem vergi tahsilatını artıracak hem de verginin vatandaşlık çerçevesinde hukuki gerekçesini güçlendirecektir.

Bhagwati vasıflı göçmenlerin vergilendirilmesini refah kaybının telafisiyle ilişkilendirirken, aynı zamanda verginin kaynak ülkede "*vergisiz temsil*" durumunu ortadan kaldırmanın bir aracı olarak görmüştür. Bhagwati beyin göçü vergisi olmaksızın vasıflı göçmenlerin "vergilendirilmeden temsil edilmeleri" durumu ortaya çıkacağından beyin göçü vergisinin gerekliliğini savunmuştur. Başka bir deyişle, vasıflı göçmenler ülkelerinden ayrılmalarına rağmen menşe ülkelerinde söz sahibi olmaya devam etmektedirler ve bu nedenle menşe ülkeleri tarafından vergilendirilmeleri gereklidir (Balasubramanyam, Bates & Balasubramanyam, 1993: 114).

7. Beyin Göçü Vergisinin Hukuki Olarak Uygulanabilirliği

Bhagwati'nin beyin göçü vergisinin ortaya çıktığı ilk çalışma esasında direkt olarak bir vergiyi önermekten ziyade genel olarak Nixon yönetiminin dış politikasının ve özel olarak ticaret politikasının çok güçlü bir politik (veya politik ekonomi) eleştirisi niteliğindedir (Bhagwati, 1972). Bhagwati'nin argümanı öncelikle gelişmekte olan

ülkelerden gelişmiş ülkelerdeki göçmenlere uygulanacak bir vergi fikrine dayanan ahlaki bir argüman olarak ortaya çıkmıştır. Önerilen vergi, gelişmiş ülkeler tarafından toplanacak ve gelişmekte olan ülkelere aktarılacaktır. Bu, Amerika Birleşik Devletleri'nin gelişmekte olan ülkelere karşı ahlaki yükümlülüğünü yerine getirmek için benimseyebileceği bir fikir olarak düşünülmüştür. Bhagwati'ye göre, Birleşik Devletlerin ve onun çokuluslu işletmelerinin ekonomik büyüklüğü ve gücü, bu tür ahlaki yükümlülükler yaratmıştır (Brauner, 2010: 240).

Bhagwati'nin beyin göçünü vergilendirme önerisi yabancı emeğin ikamet ettiği ülkenin ayrımcı vergilendirmesi yasal, anayasal, insan hakları ve siyasi açılardan sayısız zorluklarla doludur. Bu zorluklardan biri ev sahibi ülkenin vergiyi koyduğu yerde (ev sahibi ülkelerde) ikamet eden göçmenler üzerinde ülke içerisinde vergi adaletini bozucu etkisi olacağıdır. Ayrıca, anavatanın vatandaşlık temelli bir beyin göçü vergisi koyması durumunda da yetkisiz vergilendirme olacağından uygulanması imkansızdır. Dahası, böyle bir vergi, vergilemeyi kabul eden veya uygulanmasına yardımcı olan ev sahibi ülkeler için de siyasi olarak çekici olmayabilir. Benzer şekilde, beyin göçü vergisi, insan hakları endişelerini de beraberinde getirmektedir (Brauner, 2010: 245). Nitekim insan hakları konusundaki endişeler Rockefeller Vakfı tarafından finanse edilen beyin göçü vergisinin tartışıldığı Şubat 1974'te Bellagio'da düzenlenen uluslararası konferansta tartışılmıştır. Ayrıca bu konferansta göç alan gelişmiş ülkelerdeki anayasallık, insan haklarıyla uyumluluk ve gelir olanakları açısından böyle bir verginin fizibilitesi ve optimal biçimi de ele alınmıştır (Bhagwati, 1976: 34).

Böyle bir verginin uygulanmasının ilk önerildiği ABD'de de ABD vergi makamlarını vergi tahsilatına dahil etme girişimlerinin, yabancılara karşı ayrımcılık yaptığı için anayasaya aykırı ilan edilmesi olasılığı da dahil olmak üzere, pratikte çok fazla zorlukla karşılaşılacağı ortaya çıkmıştır. Bhagwati beyin göçü vergisinin ev sahibi ülke tarafından tahsil edilmesi fikrini daha da genişleterek tahsilat zorluğunu gidermek için küresel vergi sistemi önermiştir. Böylece verginin gelişmiş ülkeler tarafından "küresel vergi tipi" olarak toplanabileceğini ve dolayısıyla göçmenlerin hem yurtiçi hem de yurtdışındaki gelirlerinin vergilendirilebileceğini savunmaktadır (Wilson, 2008a: 255).

Bu şekilde toplanan vergiler, küresel vergi sistemlerinin karşılaştırmasına dayanır ve vergileme vatandaşlık ölçütünden ziyade ikamet ölçütüne dayanmaktadır. Böyle bir vergileme, bireylerin yurtdışında elde ettikleri gelir üzerinden vergi ödemelerini azaltan veya ortadan kaldıran vergi kaçakçılık faaliyetlerinin tespiti için önemli fırsatlar sunmaktadır. Beyin göçünü vergilendirmek için küresel bir vergi sisteminin kullanılması, vergi bilgilerinin paylaşılması da dahil olmak üzere gelişmiş ülkeler arasında bazı işbirlikleri gerektirmektedir. Böyle bir işbirliğine ulaşmanın zor olduğu bilinmektedir (Wilson, 2008a: 255).

Verginin tahsiline ilişkinde de bazı problemler bulunmaktadır. Çünkü gelişmiş ülkelerin kendi çıkarları olmaksızın toplanan vergilerin diğer ülkelere kalkınma yardımları yoluyla aktarılması problemli bir durumdur. Vasıflı göç alan gelişmiş ülkeler böyle bir verginin toplanması konusunda ikna olmayabilirler. Beyin göçü vergisinin uygulanmasında

başka bir problem de toplanan verginin düzgün kullanılmaması durumunda ortaya çıkabilecektir. Aynı zamanda toplanan vergi miktarının refah eşitliğini sağlayacak düzeyde olmaması durumu da problemlere yol açacaktır. Başka bir çıkarıma göre toplanan vergi gelirleri miktarının gelişmekte olan ülkelerin kalifiye işgücü ihtiyaçlarını ve kalkınmanın diğer yönlerini karşılamalarına yardımcı olacak kadar olmaması durumunda ne olacağına Bhagwati tipi beyin göçü vergisi cevap verememektedir (Lister, 2017: 83-84). Vergi miktarının tahmin edilmesinde de problemler bulunmaktadır. Gerçek ve optimal göç seviyesi arasındaki bilinmeyen farklar, göçmenlerin becerilerine bağlı olarak göçmen vergilerinin belirlenmesi veya verginin beyin göçünden etkilenen ülkelere yeniden dağıtılması gibi problemler bulunmaktadır (Lowell, 2001: 12).

Pakistan, Ocak 1976'da Pakistan vatandaşları tarafından yurtdışında kazanılan gelirin %20'sine varan bir beyin göçü vergisi konulmasını bile önermiştir. Ancak hükümet protestolar nedeniyle ve tahsil etmenin çok zor olacağını anlayınca kısa bir süre sonra vergiyi askıya almak zorunda kalmıştır. Pakistan'daki deneyim, bu tür bir vergiyi yasalaştırmanın ve yönetmenin çok zor olduğunu gösteren somut bir örnektir (Bhagwati, 1976: 35).

8. Sonuç

Son on yıllarda, uluslararası göçün hızında ciddi bir artış yaşanmıştır. Birleşmiş Milletlerin 2020 yılı verilerine göre dünyada 270 milyondan fazla göçmen bulunmaktadır. Uluslararası göç hareketleri menşe ve varış ülkeleri üzerinde ekonomik, mali, sosyo-kültürel ve politik etkilere sahiptir. Dolayısıyla göç kavramı karmaşık bir yapıdadır. Bu nedenle göçün etkileri ülkeden ülkeye farklılık gösterir ve bu durum ülkeler üzerindeki etkiler hakkında genellemeler yapmayı zorlaştırır. Göçe her zaman eşlik eden bir kavram olan insan sermayesinin kaçışı 'beyin göçü' olarak adlandırılmaktadır. Bu kavram, daha iyi bir gelecek arayışı içinde gelişmekte olan ülkelerden gelişmiş ülkelere göç eden yüksek vasıflı kişilerin uluslararası hareketliliğini ifade etmek için kullanılmıştır. Vasıflı işgücü göçü (beyin göçü), göç tartışmalarının önemli bir parçasıdır. Yüksek eğitimli insanların gelişmekte olan ülkelerden gelişmiş ülkelere göçü, uluslararası göçün giderek daha önemli bir özelliği haline gelmiştir.

Beyin göçü kavramı, artan emek hareketliliğiyle birlikte özellikle gelişmekte olan ülkelerden gelişmiş ülkelere gelen vasıflı işgücünün artmasıyla araştırmacıların dikkatini çekmiştir. Küreselleşmeye bağlı olarak ekonomilerin ve sınırların açılması, ulaşım ve iletişim maliyetlerindeki çarpıcı düşüşle birlikte, çoğunlukla vasıflı göçü çekmek için özel programlar uygulayan gelişmiş ülkelere olan beyin göçünde artış yaşanmıştır. Beşerî sermaye eksikliğinin gelişmekte olan ülkelerin daha az kalkınmalarının başlıca nedeni olduğu konusunda güçlü bir fikir birliği bulunmaktadır. Beyin göçü ile mücadeleyi destekleyen en önemli argümanları beyin göçünün gelişmekte olan ülkeler üzerinde yarattığı gelir ve refah kayıplarıdır. Ayrıca, beyin göçü vasıflı işgücü eksikliğine neden olmaktadır. Bu eksiklik özellikle gelişmekte olan ülkelerde daha fazla olduğu varsayıldığında kalkınma problemlerine yol açmaktadır. Ayrıca beyin göçü gelişmekte olan ülkelerin işgücüne yaptıkları yatırımların kaybına yol açmaktadır. Bu kayıp işgücü eğitimini finanse eden

gelişmekte olan ülkelerin, bireyin göç edeceği gelişmiş ülkeye bir sübvansiyon olarak görülebilir. Beyin göçü ayrıca kurumsal yapı varlıklarının yayılma etkisini ve gelişimini engelleyebilir. Yüksek eğitimli insanlar daha çok demokrasi yanlısıdır, bu nedenle ülkeyi terk ettiklerinde demokrasiye yerel destek de azalabilir.

1970'lerde Bhagwati, beyin göçü sorunlarını gidermek üzere bir maliyet politikası aracı önermiştir. Ortaya koyduğu çözüm, gelişmekte olan ülkelerden gelişmiş ülkelere gelen vasıflı göçmenleri vergilendirmek ve bu geliri gelişmekte olan ülkelere geri göndermek üzerine kurulmuştur. Bu fikre beyin göçü vergisi veya Bhagwati vergisi adı verilmiştir. Vasıflı göçmenlerin ülkelerinin büyümesine katkıda bulunma sorumluluğunu üstlenmek ve aynı zamanda göç etme haklarına saygı duymak için küresel olarak alınan bir beyin göçü vergisinin gerekliliği, Bhagwati tarafından dile getirilmiştir. Bhagwati'nin önerisine göre göçmenler, göç edilen devletlerin kayıplarını telafi etmek için yeni ikamet ettikleri ülkede bir vergi ödemek zorundadırlar. Ancak gelişmekte olan ülkeye bireyin yurtdışına taşınmasına izin verdiği için ödeme olarak görülen bu vergi, bireylerin yurtdışına çıkma teşvikini de azaltacaktır. Vergi, göçmenlerin göç ettikleri diğer sakinlere göre daha yüksek bir vergi yükümlülüğüne tabi olması anlamında bir ek gider olacaktır. Bhagwati'ye göre vergi, göçten önce beklenen gelirin aksine, fiilen kazanılan gelir üzerinden göçten sonra alınmalı ve vergi, göçmeni alan gelişmiş ülke tarafından toplanmalıdır. Bhagwati, tahsilatın göçmenin tüm yaşamı boyunca gerçekleşmesi gerektiği fikrini desteklese de bu büyük olasılıkla gelişmiş ülkeler tarafından kabul edilmeyeceği için, beyin göçü vergisi ile göçmenlerin 10 yıla kadar vergilendirilmesini önermiştir. Ayrıca toplanan vergi gelirlerinin idaresinin ve gelişmekte olan ülkelere transferinin Birleşmiş Milletler tarafından yapılması gerektiğini savunmuştur.

Bhagwati'nin beyin göçü vergisi önerisi teoride beyin göçünü engelleme konusunda geliştirilen bir kamu politikası aracı olarak görülebilir. Ancak böyle bir verginin pratikte uygulanması bazı sorunlara yol açabilir. Böyle bir verginin uygulanmasındaki en büyük engel, tahsil edilmesiyle ilgili idari sorunlardır. Bu sorun yabancı kaynaklı gelire vergi uygulandığında ortaya çıkar. Ev sahibi ülke hükümetlerinin işbirliği olmadan, kaynak ülke için bu vergileri toplamak çok zordur. Bu tür bir işbirliğinin büyük bir unsuru, birçok farklı konuda yer alan ülkeler arasındaki bilgi paylaşımını içermektedir. Ülkelerarası bilgi paylaşımının çok da şeffaf olmaması beyin göçü vergisinin uygulanabilirliği önündeki engellerin başında gelmektedir. Beyin göçü vergisinin adaletli olmaması durumunda verginin uygulanmasına engeller oluşturacaktır. Bu verginin adaletli uygulanmaması durumuna örnek; vatandaşların becerilerini ülkelerinden bağımsız olarak elde etse de sadece vatandaşı olduğu için menşe ülke tarafından vergilendirilmesidir. Beyin göçü vergisinin uygulanması durumunda oluşacak bir diğer olumsuzluk da çifte vergilendirmeyle ilgilidir. Göçmen vergi yükümlülüğü açısından yerleştiği ülkeye karşı sorumludur. Ancak Bhagwati'nin önerdiği verginin uygulanması göçmenlere ek bir vergi yükü getirmesi açısından adaletsiz çifte vergilendirme anlamına gelmektedir. Beyin göçünün uygulanmasındaki engellerden biri de insan hakları yönüyle ilgilidir. Beyin göçü perspektifinden bakıldığında, yetenekli göçmenler az gelişmiş ülkeye zarar vermektedir. İnsan hakları açısından ise 'kendi ülkesi dahil herhangi bir ülkeden ayrılma', herkes için

korunan temel bir insan hakkıdır. Dolayısıyla bu vergi temel bir insan hakkı olan seyahat hakkının önünde engel olarak görülebilir.

Bhagwati'nin önerisi mevcut ekonomik, mali, sosyo-kültürel ve politik teorilere sağlam bir şekilde oturtulmuş değildir. Aynı zamanda Bhagwati'nin beyin göçü vergisi teorisinde doldurulması gereken boşluklar bulunmaktadır. Bu boşluklar bu verginin pratikte uygulanmasının önündeki en büyük engeli oluşturmaktadır. Elbette beyin göçü sorununun optimal çözümü yalnızca maliye politikası aracı olan vergilerle mümkün değildir. Dolayısıyla beyin göçü sorunun çözümü bireylerin kararlarını gönüllü olarak değiştirecek vergi dışı politikaların geliştirilmesine bağlıdır.

Kaynaklar

Balasubramanyam, V.N. et al. (eds.) (1993), "Economics of the Brain Drain: The Case for a Tax on Brains", in: *Topics in Policy Appraisal* (105-17), London: Palgrave Macmillan UK.

Bell, S. et al. (2010), "Migration and Land Use Change in Europe: A Review", *Living Reviews in Landscape Research*, 4(2), 1-49.

Bhagwati, J. & W. Dellalfar (1973), "The brain drain and income taxation", *World Development*, 1(1-2), 94-101.

Bhagwati, J. (1972), "The United States in the Nixon Era: The End of Innocence", *Daedalus*, 101(4), 25-47.

Bhagwati, J. (1976), "Taxing the Brain Drain", *Challenge*, 19(3), 34-38.

Brauner, Y. (2010), "Brain Drain Taxation as Development Policy", *Saint Louis University Law Journal*, 55, 221-68.

Crush, J. & C. Hughes (2009), "Brain Drain", in: *International Encyclopedia of Human Geography* (342-47), Elsevier.

Dequiedt, V. & Y. Zenou (2013), "International Migration, Imperfect Information, and Brain Drain", *Journal of Development Economics*, 102(Mayıs), 62-78.

Docquier, F. & H. Rapoport (2012), "Globalization, Brain Drain, and Development", *Journal of Economic Literature*, 50(3), 681-730.

Docquier, F. (2014), "The Brain Drain from Developing Countries", *IZA World of Labor*.

Dumitru, S. (2012), "Skilled Migration: Who Should Pay for What? A Critique of the Bhagwati Tax", *Diversities*, 14(1), 9-23.

Espinoza, P.L. (2013), "Brain Drain Social and Political Effects in Latin American Countries", *Revista Grafía*, 10(2), 29-48.

Gibson, J. & D. McKenzie (2010), *The Economic Consequences of 'Brain Drain' of the Best and Brightest: Microeconomic Evidence from Five Countries*, Institute for the Study of Labor, Ağustos.

Grubel, H.G. (1968), "The Reduction of The Brain Drain: Problems And Policies", *Minerva*, 6(4), 541-58.

Gwaradzimba, E. & A. Shumba (2010), "The Nature, Extent and Impact of the Brain Drain in Zimbabwe and South Africa", *Acta Academica*, 42(1), 209-41.

Iravani, M.R. (2011), "Brain drain Problem: A Review", *International Journal of Business and Social Science*, 2(15), 284-89.

Jöns, H. & S. Cranston (2020), "Brain Drain", in: *International Encyclopedia of Human Geography*, (385-89), Elsevier.

Keeley, B. (2009), *International Migration - The Human Face of Globalisation*, OECD.

Koser, K. (2018), "International Migration: A Canary in the Coalmine of Globalisation", *Global Challenges*, <https://globalchallenges.ch/issue/3/international-migration-a-canary-in-the-coalmine-of-globalisation/>, 20.05.2021.

Kristiaji, B. (2019), "Tax and Brain Drain: Justification, Policy Options and Prospect for Large Developing Economies", *Belgrade Law Review*, 67(4), 17-67.

Kumar, N. & A.S. Sidhu (2005), "Pull and Push Factors in Labour Migration: A Study of Brick-Kiln Workers in Punjab", *Indian Journal of Industrial Relations*, 41(2), 221-32.

Lister, M. (2017), "A Tax-Credit Approach To Addressing Brain Drain", *Saint Louis University Law Journal*, 62(1), 73-84.

Lowell, B.L. (2001), *Policy Responses to The International Mobility of Skilled Labour*, International Labour Office.

Mapulanga-Hulston, J.K. (2014), "The Migration of Professionals from Africa: Assessing the Impact of the 'Brain Drain' from the Continent", in: T. Falola & E.M. Mbah (eds.), *Contemporary Africa* (225-44), New York: Palgrave Macmillan US.

Mountford, A. & H. Rapoport (2011), "The brain drain and the world distribution of income", *Journal of Development Economics*, 95(1), 4-17.

Mugo, P. & I.M. Kamere (2013), "Brain Drain", in: C.C. Wolhuter et al. (eds.), *A Student Textbook in Comparative Education* (165-77), Potchefstroom: Platinum Press.

Murru, M. (2008), "Globalization, Migration and Brain Drain: A Reality Check", *Health Policy and Development*, 6(3), 153-63.

Ngoma, A.L. & N.W. Ismail (2013), "The Impact of Brain Drain on Human Capital in Developing Countries", *South African Journal of Economics*, 81(2), 211-24.

Oldman, O. & R. Pomp (1975), "The Brain Drain: A Tax Analysis of the Bhagwati Proposal", *World Development*, 3(10), 751-63.

Özden, Ç. & M. Schiff (2007), *International Migration, Economic Development&Policy*, Washington, DC: World Bank and Palgrave Macmillan.

Plume, A. (2012), "The Evolution of Brain Drain and Its Measurement: Part I", *Research Trends* (blog), <https://www.researchtrends.com/issue26-january-2012/the-evolution-of-brain-drain-and-its-measurement-part-i/>, 20.05.2021.

Poot, J. (2013), "Global Trade and International Migration", in: I. Ness (ed.), *The Encyclopedia of Global Human Migration*, Oxford, UK: Blackwell Publishing Ltd.

Preiser-Kapeller, J. et al. (eds.) (2013), *Studies in Global Migration History*, The Netherlands: Brill.

Rizvi, F. (2005), "Rethinking 'Brain Drain' in the Era of Globalisation", *Asia Pacific Journal of Education*, 25(2), 175-92.

Sevilla, J.P. (2006), "An Economic View on Brain Drain", in: J. Palme & K. Tamas (eds.), *Globalizing Migration Regimes*, Ashgate Publishing.

Terán, D. & C. Julio (1994), "The Socio-Cultural Impact of Brain Drain: Reflections from Latin America", *Higher Education Policy*, 7(4), 25-28.

United Nations (2019)," International Organization for Migration", *World Migration Report 2020*, Geneva: International Organization for Migration.

United Nations (2020), *International Migration 2020: Highlights*, New York: United Nations.

United Nations (2021), *United Nations Population Division | Department of Economic and Social Affairs*, <https://www.un.org/en/development/desa/population/migration/data/estimates2/estimates19.asp>, 20.05.2021.

Varma, R. & D. Kapur (2013), "Comparative Analysis of Brain Drain, Brain Circulation and Brain Retain: A Case Study of Indian Institutes of Technology", *Journal of Comparative Policy Analysis: Research and Practice*, 15(4), 315-30.

Wilson, J.D. (2008a), "Taxing the Brain Drain", in: E. Dinopoulos et al. (eds.), *Trade, Globalization and Poverty*, New York, NY: Routledge.

Wilson, J.D. (2008b), "A voluntary brain-drain tax", *Journal of Public Economics*, 92(12), 2385-91.

Woetzel, J. et al. (2016), *People on the Move: Global Migration's Impact and Opportunity*, McKinsey&Company.

Wong, K. & C.K. Yip (1999), "Education, Economic Growth, and Brain Drain", *Journal of Economic Dynamics and Control*, 23(5-6), 699-726.

World Bank (2021), *International migrant stock, total | Data*, <https://data.worldbank.org/indicator/SM.POP.TOTL>, 20.05.2021.

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Articles in edited books: Krugman, P. (1995), "The Move Toward Free Trade Zones", in: P. King (ed.), *International Economics and International Economic Policy: A Reader*, New York: McGraw-Hill, Inc., 163-82.

Other sources: Central Bank of the Republic of Turkey (2003), *Financial Stability*, Press Release, March 24, Ankara, <http://www.tcmb.gov.tr>.

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