Vizyoner Dergisi

Süleyman Demirel Üniversitesi Vizyoner Dergisi, Yıl: 2025, Cilt: 16, Sayı: 45, 227-246.
Süleyman Demirel University Visionary Journal, Year: 2025, Volume: 16, No: 45, 227-246.

ISSN: 1308-9552

ARAŞTIRMA MAKALESİ / RESEARCH ARTICLE

NATIONAL AND REGIONAL CONVERGENCE OUTCOMES OF THE GLOBAL FINANCIAL CRISIS (2008): THE CASE OF TÜRKİYE AND THE EU*

KÜRESEL FİNANSAL KRİZİN ULUSAL VE BÖLGESEL YAKINLANMA SONUÇLARI (2008): TÜRKİYE VE AB ÖRNEĞİ

Dr. Ömer DILER[1]
Prof. Dr. Yusuf BAYRAKTUTAN[2]

ABSTRACT

According to the convergence hypothesis, units (country, region, sector, etc.) with relatively lower incomes would converge to those with higher incomes. Reducing regional development disparities has been a key priority of European integration. Before full membership, candidate countries are expected to converge as much as possible to the EU average in terms of certain economic indicators. Financial crisis affects the differences in the level of income between regions and countries. The global crisis, which started in the USA and spread to the EU and the world as of 2007, was effective on national and regional scales; produced results worth discussing in the context of convergence. In the study, the convergence relationship between Türkiye and the EU member countries and their selected regions during the global financial crisis is investigated to see whether the global financial crisis is an opportunity for convergence in the relatively low-income level-2 regions. 81 regions of the EU and Türkiye for the period of 2004 - 2017 is used. Findings indicate that, Türkiye converged to the EU during the crisis. 26 regions converged positively and 18 negatively; 21 diverged positively and 11 negatively; there was no significant change in the relative position of 5 regions.

Keywords: Convergence, EU, Economic Crisis, Development.

JEL Classification Codes: O47, G01.

ÖZ

Yakınsama hipotezine göre, incelenen birimlerden (ülke, bölge, il, sektör vb.) göreli olarak daha düşük gelire sahip olanlar, zamanla daha yüksek bir büyüme performansıyla yüksek gelirli olanlara yakınsayacaktır. Bölgesel gelişme farklarının azaltılması, baştan itibaren Avrupa bütünleşmesinin temel önceliklerinden biri olmuştur ve tam üyelik öncesi aday ülkelerden de belirli iktisadi göstergeler bakımından AB ortalamasına olabildiğince yakınsamaları beklenmektedir. Finansal kriz, ana iktisadi değişkenlerde yüksek oranlı bozulmalar ile bölgeler ve ülkeler arasında gelişme düzeyi farklılıklarına sebep olmaktadır. 2007'den itibaren ABD'de başlayıp AB'ye yayılan küresel kriz, ulusal ve bölgesel ölçekte etkili olmuş; yakınsama bağlamında tartışmaya değer sonuçlar üretmiştir. Bu çalışmada, aday ülke statüsünde olan Türkiye'nin, AB üyesi ülkeler ile küresel finansal kriz sonrası yakınsama ilişkisi araştırılmış; küresel finansal krizin, görece düşük gelirli düzey-2 bölgeleri özelinde yakınsama bakımından bir fırsat olup olmadığı, makroekonomik göstergeler ışığında, 2004 - 2017 dönemi için analiz edilmiştir. Türkiye'nin kriz sürecinde AB'ye yakınsadığı; AB ve Türkiye'nin örneklemde yer alan 81 bölgesinden 26 bölgenin pozitif ve 18 bölgenin negatif yakınsadığı; 21 bölgenin pozitif ve 11 bölgenin negatif ıraksadığı; 5 bölgenin ise göreli konumunda kayda değer değişim olmadığı saptanmıştır.

Anahtar Kelimeler: Yakınsama, AB, Ekonomik Kriz, Kalkınma.

JEL Sınıflandırma Kodları: O47, G01.

* The paper is prepared from the Ph. D. Dissertation titled "Küresel Finansal Krizin (2008) Ulusal ve Bölgesel Ölçekte Türkiye-AB Yakınsama Sonuçları" prepared by "Ömer DİLER" under the supervision of "Yusuf BAYRAKTUTAN" and defended on 11.02.2021.

[1] Kocaeli University, Faculty of Political Sciences, Department of Economics, omerdiler@hotmail.com

[2] Kocaeli University, Faculty of Political Sciences, Department of Economics, ybayrak@kocaeli.edu.tr

Makale Geliş Tarihi / Received : 22.03.2024
Makale Kabul Tarihi / Accepted : 27.12.2024

https://doi.org/10.21076/vizyoner.1457502

Süleyman Demirel Üniversitesi Vizyoner Dergisi, Yıl: 2025, Cilt: 16, Sayı: 45, 227-246.
Süleyman Demirel University Visionary Journal, Year: 2025, Volume: 16, No: 45, 227-246.
ISSN: 1308-9552

GENİŞLETİLMİŞ ÖZET

Amaç ve Kapsam:

Avrupa Birliği'ne (AB) adaylık statüsü kazanan Türkiye'de, AB istatistiksel sınıflandırma birimlerinin şartları esas alınarak 12 Düzey-1 bölgesi ve 26 Düzey-2 bölgesi oluşturulmuştur. Yeni bölgesel yaklaşımın koordinasyonunu sağlamak ve uygulamak amacıyla Düzey-2 bölgelerinde Kalkınma Ajansları kurulmuştur. Farklı bölgeler arasında ekonomik, sosyo-kültürel ve demografik özelliklerin farklılaşması, gelişmişlik düzeyindeki farklılaşma olarak yorumlanmaktadır. Uzun vadeli büyüme dinamiklerini belirlemede önemli bir yaklaşım olan ve farklı ülke ve bölgeler arasındaki gelişmişlik düzeyi farkının zamanla azalacağı beklentisini içeren yakınsama hipotezinin bulguları, politika seçimini ve tasarımını da etkileyecektir. Türkiye ve AB özelinde yapılan yakınsama analizinde, 2008 öncesi dönemleri kapsayan çalışmaların çoğunlukla ulusal ölçekte yürütüldüğü; bölge veya il bazında karşılaştırmalı uluslararası yakınsama çalışmaları çok yaygın değildir. Bu çalışmada, 2008 küresel krizinin etkileriyle birlikte, Türkiye ile AB ülkeleri, özellikle de beşinci genişlemeyle AB'ye katılan ülkeler arasındaki yakınlaşma düzeyinin araştırılması amaçlanmaktadır. Böylece aday ülke olarak Türkiye'nin kriz sonrasında AB'deki gelişmiş ülkelere yakınlaşıp yakınlaşmadığının ortaya konulması ve AB'nin yeni üyeleriyle karşılaştırma yapılarak Türkiye'nin performansının görülmesi amaçlanıyor.

Yöntem:

2004-2017 dönemine ait bölgesel kişi başına GSYİH (EUR) verileri EUROSTAT'tan alınmıştır. 25 ülke ve 81 NUTS-II düzeyindeki bölgeden oluşan örneklem, AB'nin kişi başına düşen ortalama GSYİH'si ile karşılaştırıldı. Söz konusu döneme ilişkin yakınlaşma-uzaklaşmayı analiz etmek ve küresel finansal krizin etkisini değerlendirmek amacıyla iki farklı dönem için hesaplanan kişi başına ortalama GSYİH. Hepsi değil, 2004 yılında GSYH'si en yüksek olan seçilmiş ülkelerin ilk dört bölgesi ve Türkiye'den ilk beş bölge örnekleme dahil edildi. Yakınsama literatüründe beta ve sigma yakınsamasını değerlendirme yöntemleri olarak panel regresyon, panel birim kök, yatay kesit ve zaman serisi analizlerinin sıklıkla kullanıldığı görülmektedir. Bu çalışmada beta ve sigma geleneksel yakınsama analiz yöntemlerinin yanı sıra, yakınsaklık için yeni bir analiz yöntemi olarak Diler tarafından 2021 yılında kurulan aritmetik ortalama kullanılmıştır. Aritmetik ortalama yöntemiyle yapılan analizin bulguları 5 kategori ortaya çıkarıyor: Kişi başına düşen GSYH'da AB ortalamasının üstünde, altında ve paralel değişim kaydeden bölgeler. Birinci ve ikinci gruptaki bölgeler kriz öncesi dönemde AB-28 kişi başına düşen GSYH ortalamasının altında kalırken, birinci grup bölgeler kriz sonrasında pozitif yönde yakınlaşırken, ikinci grup bölgeler kriz sonrasında negatif yönde ayrıştı. Üçüncü ve dördüncü grup bölgelerde kişi başına düşen gelir, kriz öncesi dönemde AB-28'in kişi başına düşen GSYİH ortalamasının üzerindeydi. Kriz sonrası dönemde üçüncü grup bölgeler AB ortalamasından olumlu yönde ayrışırken, dördüncü grup bölgeler olumsuz yönde yakınlaştı. Beşinci grup AB ortalamasıyla paralel bir değişim gösterdi; yani ne yakınsar ne de uzaklaşır.

Bulgular:

Solow büyüme modelinin geçerliliği beta yakınsaması ile test edilmiştir; sigma yakınsamasının varlığı varyans analizi ile incelenmiş ve AB-28 ortalama kişi başına GSYH'nin kriz öncesi ve sonrası bölgeler arasındaki yakınsaması/farklılığı benzersiz olan aritmetik ortalama yöntemi ile analiz edilmiş ve bulgular şu şekildedir: yorumlandı. Koşullu beta yakınsama analizi sonuçlarına göre, 2004 yılında kişi başına düşen geliri görece düşük olan bölgelerin çoğunun, görece yüksek gelirli bölgelere göre daha yüksek büyüme oranlarına ulaştığı görülmüştür. Ayrıca regresyon analizinde t ve p değerlerinin anlamlı, beta katsayısının ise negatif olması dolayısıyla yakınsama olduğu sonucuna varılmıştır. İkinci analiz olan sigma yakınsaması kapsamında ise her yıl için belirlenen değişim katsayıları kullanılarak birimlerin AB ortalamasına yakınsayıp yakınsamadığı bulguları ile seçilen bölgeler için yakınsamanın varlığı incelenmiştir. Özellikle krizin en yoğun hissedildiği yıllarda değişim katsayısı 0'a en yakın seviyeye ulaşmış; dolayısıyla seçilen bölgelerin kriz döneminde birbirine yakınlaştığı sonucuna varılmıştır. Üçüncü yöntem kullanılarak elde edilen bulgulara göre; 81 bölgenin 26'sı grup-1 olarak sınıflandırılarak pozitif yönde yakınlaşırken, 11 bölge ise 2. grupta yer alarak negatif yönde ayrıştı. Grup-3'te 21 bölgede pozitif ayrışma yaşandı. Grup-4 bölgeleri toplamda 18 olup AB ortalamasına negatif yakınsamış olup, son 5 bölge ise ne yakınsayan ne de uzaklaşan grup-5 olarak sınıflandırılarak AB ortalamasındaki yerini korumuştur.

Sonuç ve Tartışma:

Kişi başına düşen gelirle ölçülen bölgesel büyüme performansı, bölgenin parçası olduğu ülkenin genel performansından, siyasi ve ekonomik istikrarından bağımsız düşünülemez. Maastricht kriterlerine rağmen yüksek kamu borç stoku, zayıf bütçe performansı ve mali disiplin sorunlarıyla küresel mali krizle karşı karşıya kalan ülkeler olumsuz ayrışma veya olumsuz yakınsama yaşarken, örneklemdeki Türkiye ve bölgeleri, olumlu mali koşullar ve mali disiplin nedeniyle 2001 krizi sonrası Güçlü Ekonomiye Geçiş Programı'na dayanan Türkiye'nin krizden daha az etkilenmesi yakınsama fırsatına dönüştü. Bankacılık Denetleme ve Düzenleme Kurulu, Sermaye Piyasası Kurulu ile kurumsal yapının ve kontrol mekanizmalarının güçlendirilmesi, yapısal reformlar ve mali piyasalara ilişkin düzenlemelerin şüphesiz katkısı olmuştur. Kriz yönetimi açısından bir diğer önemli sonuç ise para politikası açısından esnekliktir. Özellikle borç stoku yüksek olan ülkeler, likidite ihtiyaçlarını karşılamak ve başta faizler olmak üzere birçok araçla krize cevap vermede esneklik kazanmak için para politikası araçlarını kullanıyor. Bu bağlamda ulusal para birimine ve kendi merkez bankasına sahip olan ülkeler, ortak para birimi kullanan ülkelere göre daha avantajlı konumdadır. Özellikle Türkiye, İngiltere, Finlandiya gibi ülkeler merkez bankası ve ulusal para birimlerini kullanarak para politikalarını etkin bir şekilde kullanabilmişlerdir. Öte yandan, krizden en çok etkilenen Yunanistan, İspanya, İtalya, Portekiz ve İrlanda gibi Avro Bölgesi ülkelerinin müdahale kapasitesi nispeten daha düşüktü.

Süleyman Demirel Üniversitesi Vizyoner Dergisi, Yıl: 2025, Cilt: 16, Sayı: 45, 227-246.
Süleyman Demirel University Visionary Journal, Year: 2025, Volume: 16, No: 45, 227-246.
ISSN: 1308-9552

1. INTRODUCTION

Obtaining candidate status to the European Union (EU), a new regional structuring has been made in Türkiye at the context of harmonization of regional development policies. 12 Level-1 regions and 26 Level-2 regions have been formed based on the conditions of EU statistical classification units. Development Agencies have been established in Level-2 regions to ensure coordination and implement the new regional approach.

The divergence of economic, socio-cultural and demographic characteristics between different regions is interpreted as differentiation in development levels. Findings of the convergence hypothesis, which is an important approach in determining long-term growth dynamics and includes the expectation that the difference in development levels between different countries and regions will decrease over time, will also affect policy choice and design.

In the convergence analysis specific to Türkiye and the EU, it is seen that the studies covering pre-2008 periods are mostly carried out on a national scale; comparative international convergence studies based on regions or provinces are not very common. Some examples of the studies in the literature can be; Barro and Sala-i Martin (1991), analysing the data of 73 regions of 7 European countries for the 1950-1985 period, concluded that convergence rate in terms of real GDP per capita is 2% per year. Another study was conducted by Folfas (2017), the existence of convergence between 2000 and 2011 for selected 211 regions at the NUTS-3 level from Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. For the 2000-2008 period, absolute beta convergence was observed among the 10 regions of new member countries, whereas in the 2008-2011 crisis period, the convergence was very low. Similar to most of the studies in the literature, traditional convergence analyses methodologies are used, where as in this study new approach among convergence study has been created and a contribution in terms of calculation method and terminology (such as positive and/negative - convergence/divergence) has been contributed to literature. From this scope, this study opens a new window to the convergence analyses.

This study intends to find an answer to the question whether the global financial crises has resulted as convergence for Türkiye to EU in terms of GDP. Also the purpose of this study is to investigate the level of convergence between Türkiye and EU countries, especially for those that joined the EU with the fifth enlargement, together with the effects of the 2008 global crisis. It is also aimed to reveal whether Türkiye, as a candidate country, converged to the developed countries in the EU after the crisis and to see Türkiye's performance by making a comparison with the new members of the EU.

The results to be achieved may also be a reflection of the effectiveness of the national and regional development policies being implemented. Since comparative convergence analysis has been carried out between the EU and candidate countries, the results of economic policies in terms of convergence are analyzed in comparison with other countries. Another prominent feature of this study is that a comparison will be made on a regional basis. A comparative analysis will be made with the TR42 Eastern Marmara region of Türkiye and selected regions of the EU countries, and the effects of regional developments after the 2008 crisis in the context of convergence-divergence debate have been determined.

After summarizing the convergence hypothesis and the theoretical-conceptual framework of crisis, the 2008 global financial crisis, and the relevant literature are discussed. The methodology, model and variables of this study are introduced, and the validity of the Solow growth model is tested in beta convergence; the existence of sigma convergence is examined by an analysis of variance, and finally, the convergence/divergence of the EU-28 average GDP per capita between the regions before and after the crisis are analysed with the arithmetic mean method, which is unique, and the findings are interpreted.

2. CONVERGENCE AND CRISIS: CONCEPTUAL FRAMEWORK

Convergence is expressed as the act/state of "moving toward a single point", "becoming more and more similar" or "identifying in the process" (Quah, 1996, p. 1). The concept is interpreted in terms of economic growth and national/regional development indicators. It is based on GDP (Gross Domestic Product) defined as the value calculated with the market prices of the final goods and services used for this purpose and produced within the borders of a country in a given period (Yıldırım et. al., 2012, p. 46). When GDP is divided by the country's population, the GDP per capita is obtained. The course of regional, national or international differences in certain economic variables (usually GDP or GDP Per capita) over time is one of the main research topics of the

convergence hypothesis. Convergence evaluates the relative positions of different units (individual, firm, city, region and country) over time in the context of measurable variables.

The convergence hypothesis, which was frequently discussed in the second half of the 20th century, states that emerging economies will converge to developed ones over time (Coulombe, 2000, p. 713); because "under certain conditions, being behind will create the ability and productivity to grow faster than the initial leader" (Rassekh, 1998: 86). Whether income differences between economies will decrease over time is one of the old debates in economics, but convergence has taken its place in the literature as an outcome of the neoclassical growth theory of Solow (1956) and Swan (1956).

Among the different types, the two most studied are Beta and Sigma convergences. Beta (β) convergence, which means that relatively low-income countries grow faster than high-income countries (Sala-i Martin, 1994. P. 2), aims to determine the relationship between countries' initial income levels and growth rates, and is called Beta convergence because of the name of its coefficient. β convergence is divided into three types, as conditional, unconditional (absolute), and club convergence. According to Galor (1996, p. 1056), if per capita incomes converge between countries regardless of their initial income in the long run, this is unconditional convergence. If production functions, technologies, preferences, and other economic characteristics are similar, convergence independent of initial income is conditional convergence in the long run. Club convergence, on the other hand, is the situation in which per capita incomes converge in the long run as a result of initially being the same in production functions, technologies, preferences, and other economic factors.

In order to test the sigma convergence, which includes the convergence analysis of the decrease in the dispersion in the income distribution over time, the distribution of the countries' real national income or productivity levels per capita within the examined period should be looked at. The standard deviation of the logarithm of national incomes or productivity is often used as a criterion to examine the distribution. The coefficient of variation found by dividing the standard deviation by the mean is also taken as a criterion. The decrease in the standard deviation or coefficient of variation is presented as evidence of the existence of sigma convergence (Rassekh, et. al., 2001, p. 149).

The word crisis, which is etymologically based on the Greek word krisis, corresponds to terms such as recession or depression in the economic literature. (Turgut, 2007, p. 35) According to Bayraktutan (2000, p. 15), a crisis is a spontaneous fluctuation for the repair of an unsustainable structuring that occurs in the basic balances of an economy, while Kibritçioğlu (2001, p. 174) defines the term as severe fluctuations in prices or quantities in the foreign exchange market that occur outside of an acceptable ratio. Based on the definitions of Bayraktutan (2000, p. 15), Claessens and Köse (2013, p. 3), and Mishkin (1996, p. 710) main characteristics and elements of the crisis are as follows:

- Crisis is the emergence of serious effects/results at macro and micro level by some previously unknown or unpredictable developments.
- While the crisis is a danger and a threat, it also creates new opportunities. It is not entirely "negative" in this respect.
- The duration of the crisis depends on the timely taking and implementation of the measures.
- Crises also have contagious features.

A crisis that starts in a country or sector can spread to others. Economic crises occur in different ways according to the factors in the formation phase; basically, it is divided into two groups as real sector crises and financial crises (Kibritçioğlu, 2001, p. 175). Real sector crises are crises that involve goods-services markets and labor markets, and are based on inflation-recession and unemployment. Financial crises, on the other hand, are divided into types such as banking, money-currency, foreign debt-balance of payments, stock market, etc. (Bayraktutan, 2006, p. 25).

3. CRISES IN THE WORLD AND THE 2008 GLOBAL FINANCIAL CRISIS

In the 20th century, there were many crises in the world economy. Although the economic expansion between 1923 and 1928 centred on North America and Europe, from 1929 onwards, there was a great depression that spread to the rest of the world (especially in industrialized countries) and resulted in devastating effects. After the Great

Depression, the world economy did not experience a global crisis until the 1970s. Stagflation in the 1970s was accompanied by two oil crises, the first in 1973-1974, and the second in 1979 (Bayraktutan, 2000, p. 15). Crises began in various parts of the world in the 1990s. In 1992-1993, there was a crisis in the European Monetary System. The tequila crisis in Mexico (1994) has affected Latin American countries, especially Argentina and Brazil (Devarajan, et. **A**l., 2001, p. 6-11). Within the scope of the Asian crisis, Asian dragons (Hong Kong, Singapore, South Korea and Taiwan) and tigers (Indonesia, Malaysia, Philippines and Thailand), which entered the crisis period in 1997, have entered the recovery process as of the 2000s (Allen, and Gale, 2007, p. 15). The Asian crisis led to the Russian crisis, which had a negative impact on the world financial markets in 1998, while the Russian financial institutions, and the markets collapsed and its deep social repercussions were observed (Pinto, et. **A**l. 2009, p. 408).

In 2007-2008, there was another crisis on a global scale, which was compared with the 1929 economic depression in terms of its effects. The underlying reason 231or the mortgage crisis that started in the USA in August 2007 is the recession of 2001-2002. In order to stimulate the economy, the US Federal Reserve (Fed) reduced the short-term interest rates from 6.5% in 2001 to 1% by 2003. During this period, funds shifted to housing investments, whose prices were rising. The housing purchase index, which was 146.6 in the first quarter of 2001, rose to 224.26 in the first quarter of 2007, increasing by 53%. The abundance in global liquidity has increased the risky loans (subprime mortgage, etc.) provided by financial institutions.

Loans created for people with low income and weak credit history to become homeowners in the USA have been one of the main factors of the crisis (Hevner, 2009, p. 135). While the amount of subprime mortgage loans used in 2000 had a share of 7% in the total mortgage loans, this rate reached 20% in 2006. Its monetary size increased from 180 billion dollars in 2000 to 600 billion dollars in 2006 (Jaffee, 2008, p. 10-11).

While credit utilization increased, household debt burden reached a critical level above its disposable income. The ratio of household debt to GDP, which was 74% in 2001, was 99.63% in 2007. Interest rates, which were at the level of 1% in 2004, increased to 5.25% in 2006 and this development triggered the crisis. As a result of the decrease in favourable credit conditions, a decrease was observed in housing demand, while housing prices entered a decreasing trend in 2007. The housing purchasing index, which peaked at 224.26 in the first quarter of 2007, dropped to 178.59 by 2011. With these developments, the household debt remained above the value of the house, and as a result of the decrease in debt repayments, the number of confiscated houses increased by 79% in 2007 compared to 2006 (Sapir, 2008, p. 90). While the loss in the financial sector was about 50 billion dollars in mid-2007, the first period of the crisis, it was 400 billion dollars in February 2008, 945 billion dollars in April 2008 and 1,405 billion dollars in October 2008 (Sitikantha. 2009, p. 23).

The global financial crisis has deeply affected the EU as well as the US economy, and deteriorations were observed in economic variables. Beginning in 2008 Q2, growth, employment, public debt, etc. in many EU countries, especially Spain, Ireland, Greece, and Portugal worsened. While the EU countries diverged from the Maastricht convergence criteria in 2009, as the crisis deepened, during this period Türkiye performed better than the average of the EU members.

According to Table-1, which reflects the GDP data of EU countries and Türkiye at constant prices, there was a growth between 2.1% and 3.3% in the EU before 2008. It is seen that Ireland, Greece, Spain and Croatia, among the countries most affected by the crisis, have a growth rate above the EU average. In 2008, when the crisis was heavily reflected in macroeconomic data, stagnation began in many economies; the following year, growth rates turned negative. During the crisis, recovery took a shorter time in the relatively developed countries of the EU. In developing countries, on the other hand, the recovery has spread over the long term.

Table 1. Annual GDP Change (%, 2004 – 2017)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EU (28 countries)	2.5	2.1	3.3	3.1	0.5	-4.3	2.1	1.8	-0.4	0.3	1.8	2.3	2.0	2.4
EU (19 countries)	2.3	1.7	3.2	3.1	0.5	-4.5	2.1	1.6	-0.9	-0.2	1.4	2.1	1.9	2.4
Germany	1.2	0.7	3.7	3.3	1.1	-5.6	4.1	3.7	0.5	0.5	2.2	1.7	2.2	2.2
Ireland	6.7	5.8	5.0	5.3	-4.4	-5.0	1.9	3.7	0.2	1.3	8.8	25.1	5.0	7.2
Greece	5.1	0.6	5.7	3.3	-0.3	-4.3	-5.5	-9.1	-7.3	-3.2	0.7	-0.4	-0.2	1.5
Spain	3.2	3.7	4.2	3.8	1.1	-3.6	0.0	-1.0	-2.9	-1.7	1.4	3.6	3.2	3.0
France	2.8	1.6	2.4	2.4	0.3	-2.9	1.9	2.2	0.3	0.6	1.0	1.1	1.2	2.2
Croatia	4.1	4.2	4.9	5.3	2.0	-7.3	-1.5	-0.3	-2.3	-0.5	-0.1	2.4	3.5	2.9
Italy	1.6	0.9	2.0	1.5	-1.1	-5.5	1.7	0.6	-2.8	-1.7	0.1	0.9	1.1	1.6
Netherlands	2.0	2.2	3.5	3.8	2.2	-3.7	1.3	1.6	-1.0	-0.1	1.4	2.0	2.2	2.9
Austria	2.7	2.1	3.5	3.7	1.5	-3.8	1.8	2.9	0.7	0.0	0.7	1.1	2.0	2.6
Poland	5.1	3.5	6.2	7.0	4.2	2.8	3.6	5.0	1.6	1.4	3.3	3.8	3.1	4.8
Portugal	1.8	0.8	1.6	2.5	0.2	-3.0	1.9	-1.8	-4.0	-1.1	0.9	1.8	1.9	2.8
United Kingdom	2.5	3.0	2.5	2.5	-0.3	-4.2	1.7	1.6	1.4	2.0	2.9	2.3	1.8	1.7
Turkey	9.4	8.4	7.1	5.0	0.8	-4.7	8.5	11.1	4.8	8.5	5.2	6.1	3.2	7.4

Source: (EUROSTAT, 2018; TUIK, 2018).

Before the crisis (2004-2008 period), Türkiye had higher growth rates compared to the EU countries. Because the financial sector has been strengthened with the structural reforms implemented after the 2001 crisis in Türkiye; it has gained a resilient and stable structure in the face of crises. Türkiye, which displayed a growth performance of 4.7-9.4% in the 2004-2008 period, experienced a slowdown in 2008, and negative growth in 2009, similar to the EU, due to the impact of the global crisis. The Turkish economy, which recorded high growth rates again in 2010 and 2011, reached positive growth figures above the EU average in the following years.

The ratio of gross public debt stock to GDP should not be over 60% as the Maastricht criterion. When Table-2 is examined, with the exception of Italy and Greece, selected countries meet the Maastricht criterion or show a performance close to 60%. While an increase was observed in the public debt stock in the EU member countries after 2008, the public debt stock in Türkiye decreased over the years and fell below the level of 2008. When evaluated by the Q2 of 2018, Türkiye is the country with the lowest public debt stock among the selected countries.

Table 2. Annual GDP Change (%, 2004 – 2017)

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
EU 28	60.9	61.5	60.1	57.5	60.7	73.3	78.8	81.4	83.8	85.7	86.4	84.4	83.3	81.6
EU 19	68.5	69.3	67.4	65.0	68.7	79.2	84.6	86.6	89.7	91.6	91.8	89.9	89.1	86.8
Germany	64.8	67.0	66.5	63.7	65.2	72.6	81.0	78.6	79.9	77.4	74.5	70.8	67.9	63.9
Ireland	28.2	26.1	23.6	23.9	42.4	61.5	86.0	110.9	119.9	119.7	104.1	76.8	73.4	68.4
Greece	102.9	107.4	103.6	103.1	109.4	126.7	146.2	172.1	159.6	177.4	178.9	176.8	180.8	178.6
Spain	45.3	42.3	38.9	35.6	39.5	52.8	60.1	69.5	85.7	95.5	100.4	99.3	99.0	98.1
France	65.9	67.4	64.6	64.5	68.8	83.0	85.3	87.8	90.6	93.4	94.9	95.6	98.2	98.5
Croatia	40.3	41.2	38.6	37.2	39.0	48.3	57.3	63.8	69.4	80.4	84.0	83.7	80.2	77.5
Italy	100.1	101.9	102.6	99.8	102.4	112.5	115.4	116.5	123.4	129.0	131.8	131.6	131.4	131.2
Netherlands	50.3	49.8	45.2	43.0	54.7	56.8	59.3	61.7	66.2	67.7	67.9	64.6	61.9	57.0
Austria	65.2	68.6	67.3	65.0	68.7	79.9	82.7	82.4	81.9	81.3	84.0	84.8	83.0	78.3
Poland	45.0	46.4	46.9	44.2	46.3	49.4	53.1	54.1	53.7	55.7	50.4	51.3	54.3	50.7
Portugal	62.0	67.4	69.2	68.4	71.7	83.6	96.2	111.4	126.2	129.0	130.6	128.8	129.2	124.8
UK	38.6	39.8	40.7	41.7	49.7	63.7	75.2	80.8	84.1	85.2	87.0	87.9	87.9	87.4
Türkiye	57.7	50.8	44.7	38.2	38.1	43.9	40.1	36.5	32.7	31.4	28.8	27.6	28.3	28.3

Source: (EUROSTAT, 2018; Turkish Ministry of Treasury and Finance, 2018).

As a significant observation in terms of the convergence results of the global crisis, when the growth rates in Table-1 and the debt stock in Table-2 are compared, it is concluded that the growth rates are lower in countries with high debt stock.

4. LITERATURE REVIEW

The concepts of convergence and crisis are explored in the context of the 2008 global financial crisis. In this context, firstly, similar studies in the literature will be examined.

As one of the first studies on convergence, Baumol (1986, p. 1079), using Maddison's data set, obtained a negative and significant β convergence in his analysis for the 1870-1979 period with a sample of 16 industrialized countries; The estimate of β is almost equal to -1. Baumol, who included the highest-income countries in 1979 in the sample and later expanded the number of countries to 72, pointed out the existence of more than one convergence club in his analysis, and concluded that the countries in the high-income group showed income convergence among themselves.

Barro and Sala-i Martin (1990), determined convergences in each of three analysis using the data of 48 US states for 1963-1986 period, those of the selected 98 countries for 1960-1985 period, and the data of the OECD countries for the period of 1960-1985. In another study, Barro and Sala-i Martin (1991), analysing the data of 73 regions of 7 European countries for the 1950-1985 period, concluded that convergence rate in terms of real GDP per capita is 2% per year.

Bernard, and Durlauf (1996) tested the convergence hypothesis with a sample of 15 OECD members, and could not reach significant results. On the other hand, Nahar and Inder (2002) performed a new analysis based on the same study, and showed that the convergence hypothesis can yield meaningful results even if the series are not stationary. Nahar and Inder, who applied their tests with the data of 22 OECD countries, found significant convergence between the selected countries.

Folfas (2017) investigated the existence of convergence between 2000 and 2011 for selected 211 regions at the NUTS-3 level from Bulgaria, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, and Slovenia. For the 2000-2008 period, absolute beta convergence was observed among the 10 regions of new member countries, whereas in the 2008-2011 crisis period, the convergence was very low.

Nevima, and Melecky (2011) used the data of 35 regions of the Czech Republic, Hungary, Poland and Slovakia at the NUTS-II level, the so-called the Visegrad Group for the period of 1995-2008, and concluded that there was absolute beta convergence in the pre-crisis period.

In the analysis based on the conditional model of Gündem (2017), the convergence relationship between NUTS-II regions in Türkiye for the 2004-2011 period was statistically insignificant. Accordingly, there was no income convergence between regions within the framework of the conditional convergence model in the period under consideration.

In terms of sigma convergence, a recent study using the data of 2004-2014 period of the NUTS-II level regions in Türkiye by Gömleksiz et al. (2017) reached findings supporting the argument of sigma convergence. The rate of convergence increased more after the crisis compared to the pre-crisis period.

Monfort (2008), investigating sigma convergence for the EU, tested convergence by calculating the coefficient of variation, in terms of the NUTS-II level regions of EU-27 and EU-15 countries, using the data of 1979-2005 period. As a result, it was determined that there was a strong convergence for EU-15 until the mid-1990s, but the rate of convergence decreased relatively, and reached a stable level in the following years. The existence of sigma convergence was determined for EU-27 until 2005. It has been concluded that the countries that were included after the enlargements rather than EU-15 were effective in increasing the speed of convergence.

Sigma convergence was investigated by Głodowska (2015) for a total of 276 regions of EU-28 countries at NUTS-II level. The data of 2000-2013 on the country basis, and 2000-2011 for the regions were used. According to the region-level results in terms of sigma convergence, convergence increased rapidly for 276 regions in the pre-crisis period, and convergence stopped during 2008-2011. In other words, it was concluded that the global crisis affected convergence negatively.

5. METHODOLOGY

In the convergence literature, it is seen that panel regression, panel unit root, cross section and time series analysis are frequently used as methods to evaluate beta and sigma convergence. In this study, besides beta and sigma

convergence, arithmetic mean was used as a different analysis method; that is, three different analyses were carried out in this study.

In order to test the validity of the Solow growth model for 81 regions under the first method, the rate of increase between the GDP per capita in 2004, and the one in 2017 was calculated for the regions.

$$ln(Y_{it} - Y_{i0}) = \alpha + \beta y_{i0} + u_i \quad (1)$$

In Equation-1, which is used for the analysis of absolute beta convergence, Y_it represents GDP per capita in period t, while Y_i0 represents GDP per capita at the initial time. As a result of the calculation, the negative beta coefficient indicates the presence of convergence.

In the second analysis, the presence of sigma convergence was analysed over the years with the coefficient of variation for the same 81 regions. In order to reach the coefficient of variation, first of all, the standard deviation of the GDP per capita of 81 regions was calculated. The standard deviation was divided by the arithmetic mean calculated for the 81 regions in the relevant year, and the coefficient of variation was obtained. According to the Sigma convergence, if the coefficients of variation calculated over the years approach zero, convergence occurs. The closer the coefficient is to zero, the stronger the convergence.

$$Coefficient\ of\ Variation = Sh_Y/\overline{Y} \quad (2)$$

Here, Sh_Y denotes the standard error of 81 regions for the year, and $\overline{Y}$ the annual average of 81 regions.

In the third analysis, the period 2004-2017 is divided into two sub-periods, pre-crisis and post-crisis, in order to determine the impact of the 2008 crisis. In the compared periods, first of all, the GDP per capita of each year, and each region is compared with the EU-28 average. Based on year and region calculations, the average of 5 years for the pre-crisis period, and the average of 8 years after the crisis were obtained. The averages obtained on the basis of the region, and two separate periods were compared to the EU-28 average per capita income in the same period, and two different coefficients were obtained on the basis of the region for the pre-crisis and post-crisis periods. If the coefficient for the first period is between 0 and 1, an increase in the coefficient in the second period indicates positive convergence; A decrease in the coefficient indicates negative divergence. If the coefficient for the first period is greater than 1, if the coefficient for the second period decreases compared to the first period, it indicates negative convergence, and if it increases, it indicates positive divergence.

$$AO = AO_2/AO_1 \quad (3)$$

$$AO_1 = \frac{\sum_{i=1}^{k} X_i}{k} / \frac{\sum_{i=1}^{m} Y_i}{m} \quad (4)$$

$$AO_2 = \frac{\sum_{i=1}^{m} X_i}{m} / \frac{\sum_{i=1}^{k} Y_i}{k} \quad (5)$$

where AO1 is the Arithmetic Mean of GDP Per Capita of a region for pre crises period, AO2 is the Arithmetic Mean of GDP Per Capita of a region for post crises period, X The Total GDP Per Capita for Brands (region) for the selected years, k is the quantity of the Selected years, Y is the total GDP Per Capita for EU-28 for the selected years EU-28 and m is the quantity of Selected years.

AO1 = (The Total GDP Per Capita for Brands (region) for the selected years /(quantity of Selected years)) / (The Total GDP Per Capita for EU-28 for the selected years /(quantity of Selected years)) ,

AO2 = (The Total GDP Per Capita for Brands (region) for the selected years /(quantity of Selected years)) / (The Total GDP Per Capita for EU-28 for the selected years /(quantity of Selected years))

Result (change) Coefficient = AO2/AO1

If the calculated coefficient is greater than 1, it indicates positive convergence or divergence; If it is less than 1, it indicates negative convergence or divergence. What is decisive here is the initial value of the region, and four possible cases are as follows:

- If the initial value is below the EU-28 average, and the value in the second period is higher than the first period, the coefficient will be above 1, and indicates a positive convergence.
- If the initial value is below the EU-28 average, and the result is less than 1, it will mean that there is a negative divergence.

- If the initial value is above the EU-28 average, and the value in the second period is higher than the first period, the result will be above 1, and will be interpreted as a positive divergence.
- If the initial value is above the EU-28 average, and the result is less than 1, it will mean that there is a negative convergence.

In summary, this study contributes the literature by introducing new concepts: positive/negative convergence and divergence.

6. DATA SET

Regional GDP per capita (EUR) data for the period of 2004-2017 were obtained from EUROSTAT. The sample of 25 countries and 81 NUTS-II level regions were compared with the EU average GDP per capita. The average GDP per capita calculated for two different periods to analyse convergence-divergence for the period under consideration, and evaluate the effect of global financial crisis. Not all, but the first four regions of selected countries with the highest GDP in 2004 and the first five regions from Türkiye were included in the sample. In the convergence literature, it is seen that panel regression, panel unit root, cross section and time series analysis are frequently.

7. ANALYSIS

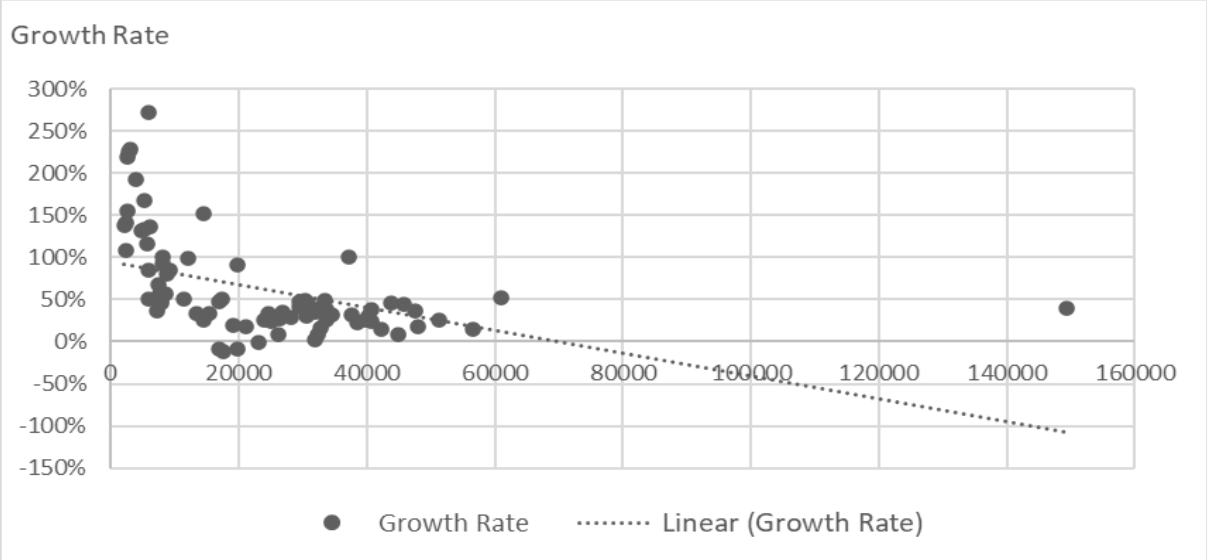
In addition to the analyses based on beta and sigma convergence, which have many examples in the literature, the third analysis which is specific to/developed for this study is used, and the average growth rates on a regional basis for two different periods were compared with the EU-28. Unlike other methods, detailed convergence / divergence results were obtained on a regional basis.

7.1. Beta Convergence Analysis

According to the neo-classical growth theory, regions with relatively lower incomes at the beginning will grow faster and converge with developed regions in the long run, since capital productivity is higher than developed regions. In the first analysis, in which absolute (unconditional) beta convergence was used to test the validity of the Solow growth model for 81 regions, the rate of increase in GDP per capita in 2004 and 2017 was calculated for selected regions, and Graph-1 was obtained.

When the linear growth trend in Graph-1, which includes the GDP per capita change rate according to the beginning and ending years (2004 and 2017) on the vertical axis, and the GDP per capita value (EUR) of the countries in the starting year on the horizontal axis, is analysed, it is seen that countries with low GDP per capita in the beginning have higher growth rates compared to the relatively high income states. Based on this result, the existence of absolute beta convergence can be seen

Figure 1. Distribution of Growth Rates by Region and Beta Convergence



Although the scatter in Figure 1 shows beta convergence, regression analysis was performed to confirm this result. Based on the t and p values presented in Table-3, the findings were significant. At the context of convergence, the existence of absolute beta convergence is confirmed as the beta coefficient is negative.

Table 3. Findings of Conditional Beta Convergence Regression Analysis

Regression Statistics								
Multiple R	0,472338383							
R Square	0,223103548							
Adjusted R Square	0,213269416							
Standard Error	0,525583339							
Observations	81							
Anova								
	df	**SS**	**MS**	**F**	**Significance F**			
Regression	1	6,266912207	6,266912207	22,68665313	8,5077E-06			
Residual	79	21,82278988	0,276237847					
Total	80	28,08970208						
	Coefficients	**Standard Error**	**t Stat**	**P-value**	**Lower 95%**	**Upper 95%**	**Lower 95,0%**	**Upper 95,0%**
Intercept	0,952586673	0,090190664	10,56192111	9,11674E-17	0,773066648	1,132106698	0,773066648	1,132106698
X Variable 1	-1,35381E-05	2,84232E-06	-4,763050822	8,5077E-06	-1,91956E-05	-7,88061E-06	-1,91956E-05	-7,88061E-06

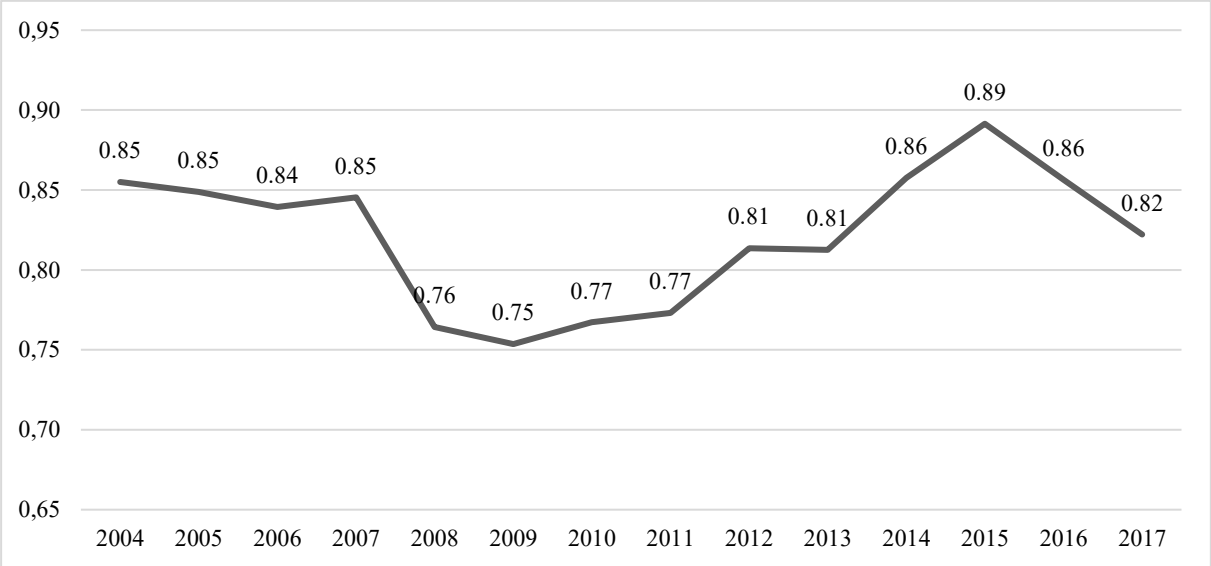
The first analysis may be seen as incomplete as it does not contain details for the convergence relationship between selected regions on a region/year basis. The neglect of measurement problems that may arise from price-currency changes can also be criticized. In addition, since the convergence relationship is evaluated percentage wise, small income increases in regions with low GDP per capita produce proportionally large results mathematically. This affects the interpretation of the findings. For example, Romania - Bucharesti Ilfov region, which had a per capita income of 5.900 Euros in 2004, increased its per capita income to 22.000 Euros until 2017, and became the region with the highest proportional increase with an increase of 273% among the 81 selected regions. Whereas, the net increase in per capita income in nominal terms is 16,100 Euros. In contrast, the United Kingdom - Inner London West region increased its per capita income by 40% from 2004 to 2017, nominally from EUR 149.400 to EUR 209.900, or EUR 60.500. Based on these observations, additional analyses were made.

7.2. Sigma Convergence Analysis with Coefficient of Variation and Findings

In the second analysis, the existence of sigma convergence was tested over the years with the coefficient of variation using the same sample and data set. In this method, first the standard deviation was calculated for each year and for 81 regions, and divided by the average GDP per capita of 81 regions to obtain the coefficient of variation, which shows the convergence on a yearly basis. According to Sigma convergence, the coefficient of variation is between 0 and 1. The closer the coefficient is to 0, the greater the convergence, and the closer it is to 1, the weaker the convergence.

As seen in Figure 2, while the coefficient of variation was 0.85 for 81 regions in the initial year (2004), it decreased to 0.75 during the global financial crisis, and convergence was higher among the selected regions in this period. While the rate of convergence slowed down with the decrease of the effects of the crisis, after 2015 the coefficient of variation entered a downward trend again, and the rate of convergence increased. The average coefficient of variation during the period (14 years) was determined as 0.82.

Figure 2. Coefficient of Variation by Years and Sigma Convergence



Although it is concluded that 81 regions converge in crisis period, with the two analyses presented above, detailed results cannot be obtained for each region. In order to determine the convergence results on the basis of region and year, a method specific to this study was developed.

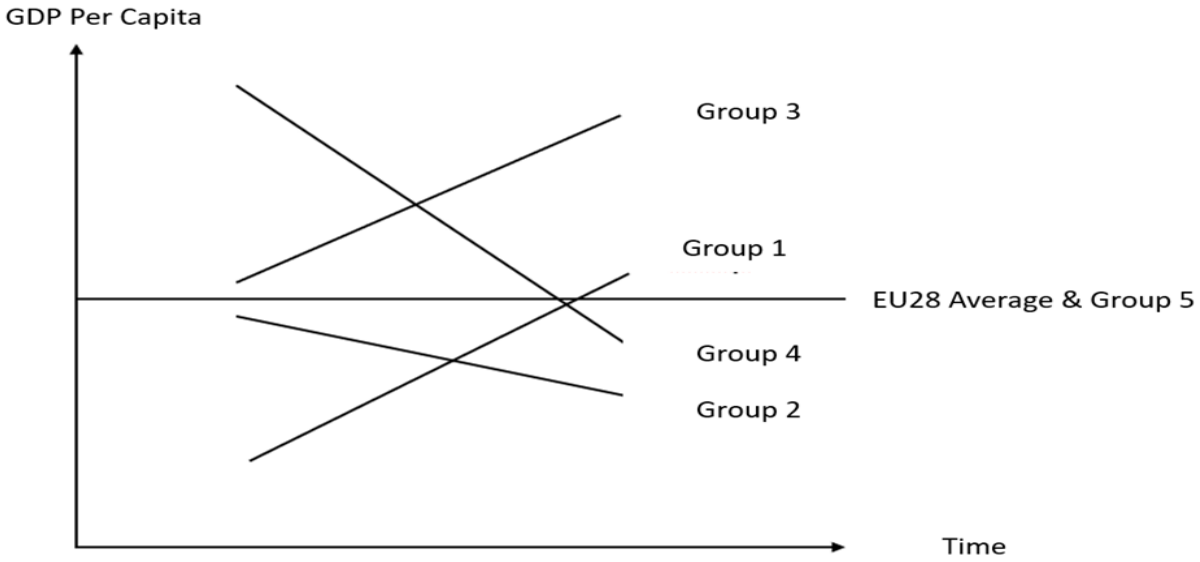
7.3. Sigma Convergence Analysis with Arithmetic Mean and Findings

In the analysis based on the original method, which is defined as the arithmetic mean, 2009 was taken as the threshold year, when the effects of the crisis were felt the most in terms of GDP per capita, and a comparison was made between the previous (2004-2008) and the following (2010-2017) periods. During the comparison periods, the average GDP per capita of the period was calculated for each region, and the value obtained was proportioned to the period average of the EU-28 GDP per capita value. While the average of the selected regions was used in the first two analyses, the main reason for dividing the values of the regions by the EU-28 average GDP per capita in the third analysis is to determine whether the regions converge to the average of the EU member countries. One of the advantages of this method is that choosing a single year as the start or end year eliminates the risk of possible misleading evaluations due to exceptional circumstances regarding the selected year, and allows the determination of regional performances over a relatively long period of time with periodic data.

The findings of the analysis with the arithmetic average method produce 5 categories: Regions that recorded changes in GDP per capita above, below and parallel to the EU average. Regions in the first and second groups were below the EU-28 average GDP per capita in the pre-crisis period, while the first group regions converged positively after the crisis, while the second group regions diverged negatively after the crisis. The third and fourth group regions had a per capita income above the EU-28 average GDP per capita in the pre-crisis period. In the post-crisis period, while the third group regions diverged positively from the EU average, the fourth group regions converged negatively. The fifth group showed a parallel change with the EU average; that is, it neither converges nor diverges.

In the first group, 26 out of 81 regions took place. All of these 26 regions with incomes below the EU-28 average GDP per capita for the period of 2004-2008 have converged to the average by increasing their GDP per capita more than the EU-28 average in the post-crisis period (2010-2017). This group included 4 regions from Bulgaria, Romania and Slovakia, 3 regions from Czechia, and 1 region from North Macedonia, Latvia, Hungary, Slovenia and Malta.

Figure 3. Convergence/Divergence Groups According to Arithmetic Mean Analysis



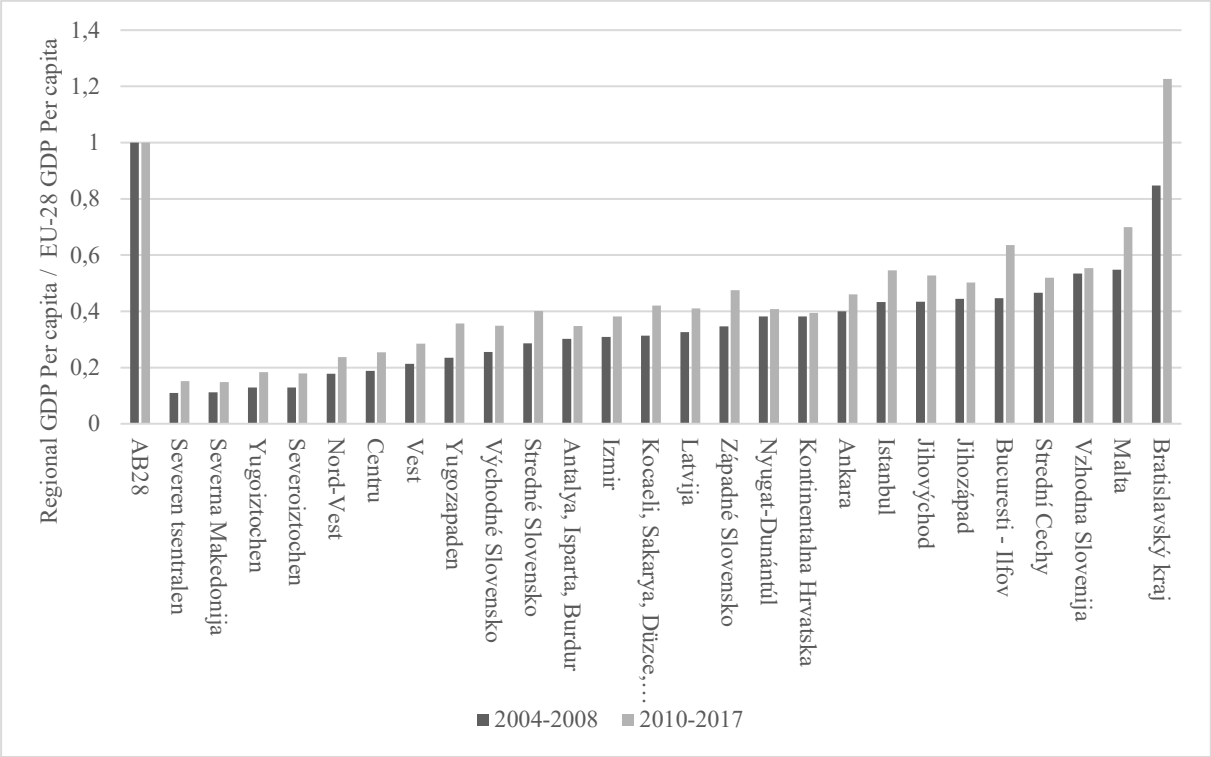
5 regions participating in the sample from Türkiye were also included in the first group. The Eastern Marmara Region, consisting of Kocaeli, Sakarya, Düzce, Bolu, and Yalova provinces, had an income of 0.31 times the average per capita income of the EU-28 in the pre-crisis period, while it increased to 0.42 times in the post-crisis period. In this period, the GDP per capita of the Eastern Marmara Region of Türkiye increased by approx. 50% from 7,740 Euros to 11,638 Euros. In the EU-28, per capita income increased by 12.6% from EUR 24,560 to EUR 27,650. When the other four regions of Türkiye are examined, the per capita income of the Istanbul region increased by 41%; compared to the pre-crisis period it increased from 0.43 times to 0.55 times in relation to the EU-28 average. Per capita income of the Ankara region increased by 29% and reached 0,46 times from 0.40 times. The per capita income increase in the İzmir region was 38.5%; the income of the region increased from 0.31 times the average income of the EU-28 to 0.38 times. Finally, the per capita income increase in the Western Mediterranean Region, which consists of Antalya, Isparta and Burdur provinces was 29%, and increased from 0.30 times to 0.35 times compared to the EU-28 average.

Among regions in the first group, the region with the highest increase in income and the most positive convergence to the EU average was the Bulgaria – Yugozapaden region. The ratio of per capita income, which increased by 69% compared to the pre-crisis period, to the EU-28 average increased from 0.24 to 0.36. The least positively convergence in this group is of the Croatia - Kontinentalna Hrvatska region, whose income increased by 15.6% and its ratio to the EU-28 average increased from 0.38 to 0.39. Another remarkable region is Slovakia - Bratislavský district. While the income increase of this region was 61,3%, the per capita income, which was 0.85 times the EU-28 average before the crisis, reached 1.23 times the EU average after the crisis.

It has been concluded that the 2008 global financial crisis was an opportunity for convergence for the regions in the first group, that is, showing positive convergence. The average growth rate between the pre-crisis period (2004-2008) and the post-crisis period (2010-2017) in the 26 regions in this group was 42.9%.

Süleyman Demirel Üniversitesi Vizyoner Dergisi, Yıl: 2025, Cilt: 16, Sayı: 45, 227-246.
Süleyman Demirel University Visionary Journal, Year: 2025, Volume: 16, No: 45, 227-246.
ISSN: 1308-9552

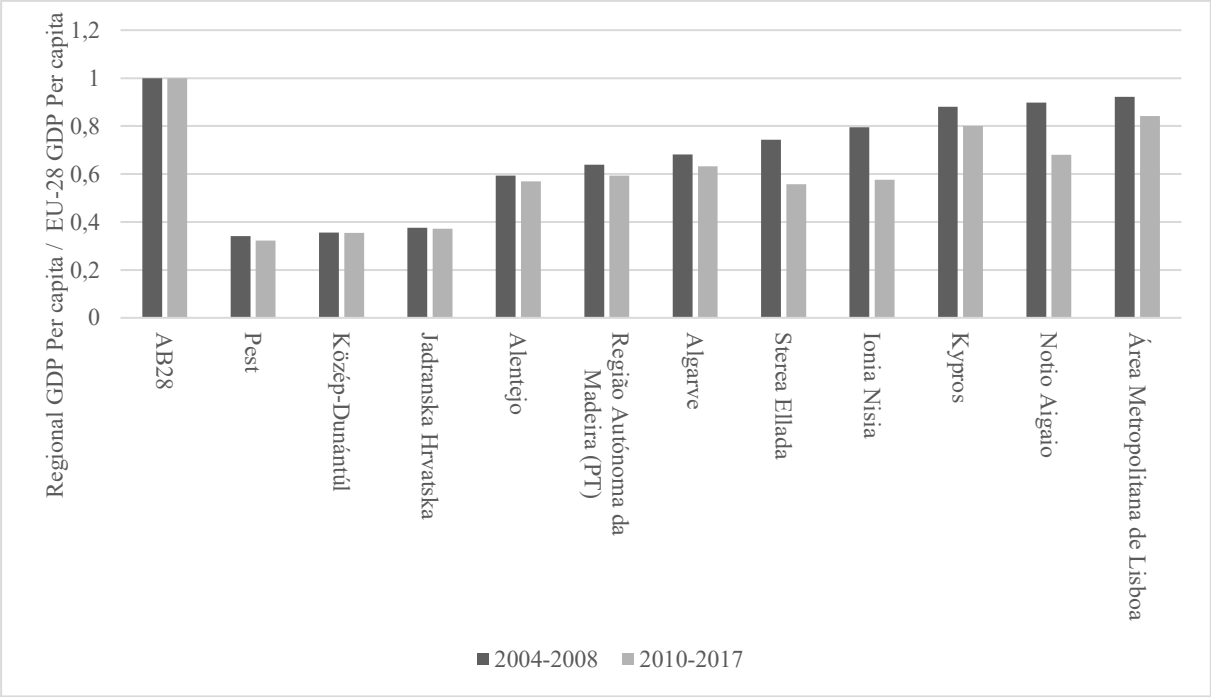
Figure 4. Group 1 Regions, GDP Per Capita/The EU-28 Average in Pre- and Post-Crisis



Regions in the second group, like those in the first group, have a GDP below the EU-28 average; however, unlike the first group, they did not converge to the EU average in the post-crisis period and showed negative divergence. 11 regions; 2 from Hungary, 3 from Portugal and Greece, 1 each from Croatia and Southern Cyprus, are in this group. The main reason for the negative divergence is that in these 11 regions, GDP Per capita increased less in the post-crisis period than before the crisis compared to the EU-28 average GDP per capita. Thus, these regions, which already have incomes below the EU average, diverged in a negative sense and moved further away from the average. Among these regions that were negatively affected by the crisis, the income of the Ionia Nisia region of Greece, which diverged the most, decreased by 19% compared to the pre-crisis period, while its ratio to the EU-28 average income decreased from 0.80 to 0.58. When the common characteristics of the countries where the regions are located are examined, it is known that the debt stock/national income ratio of selected countries increased above 75% in the post-crisis period, and even rose to 180% in Greece. In addition, these countries are in the category of developing countries and post-crisis recovery processes have been relatively slow. The average growth rate of 11 regions in the 2nd group between the pre-crisis period and the post-crisis period is 0%. This rate is the lowest group growth rate among the 5 groups formed by the arithmetic mean analysis.

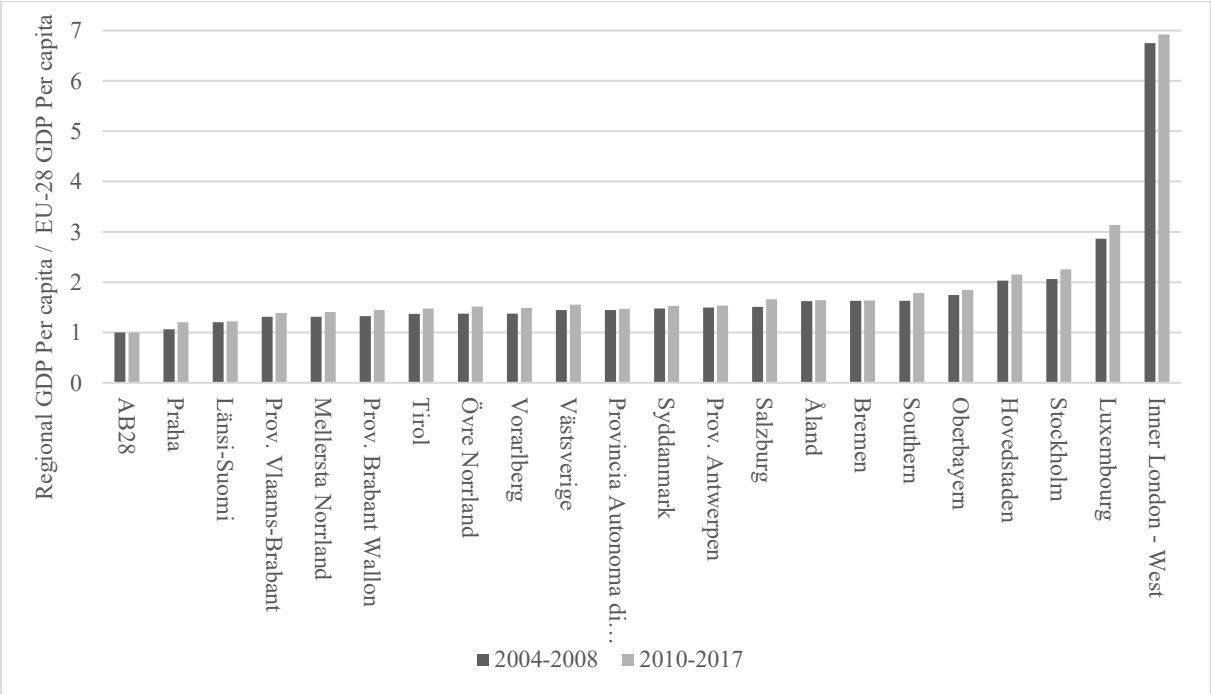
The positive divergence is defined as the fact that the regions with a GDP per capita above the EU-28 average in the pre-crisis period showed an income increase above the EU average in the post-crisis period. 21 regions from the sample were included in this status, and formed the 3rd group in which there are 4 regions from Sweden, 3 from Austria and Belgium, 2 from Germany, Denmark and Finland, 1 each from the United Kingdom, Czechia, Ireland, Italy and Luxembourg. In this group, the income of the Irish – Southern region, whose per capita income increased the most, by 25% compared to the pre-crisis period, from 39,960 Euros to 50,075 Euros, and increased from 1.63 times to 1.78 times compared to the EU-28 average. In the 3rd group, the region with the least increase in income is the Bremen region of Germany: 13.3%. While the per capita income of this region was 1.63 times the EU average before the crisis, it increased only 1.64 times after the crisis.

Figure 5. Group 2 Regions, GDP Per Capita/The EU-28 Average in Pre- and Post-Crisis



Since the regions in the 3rd group recorded an increase in income per capita above the EU average, they experienced advantageous as the first group from the global financial crisis. These regions, which had a per capita income above the EU-28 average in the pre-crisis period, increased their income relatively, more and diverged positively from the EU average. The average growth rate of these 21 regions that make up this group between the pre-crisis period and the post-crisis period was 19.8%.

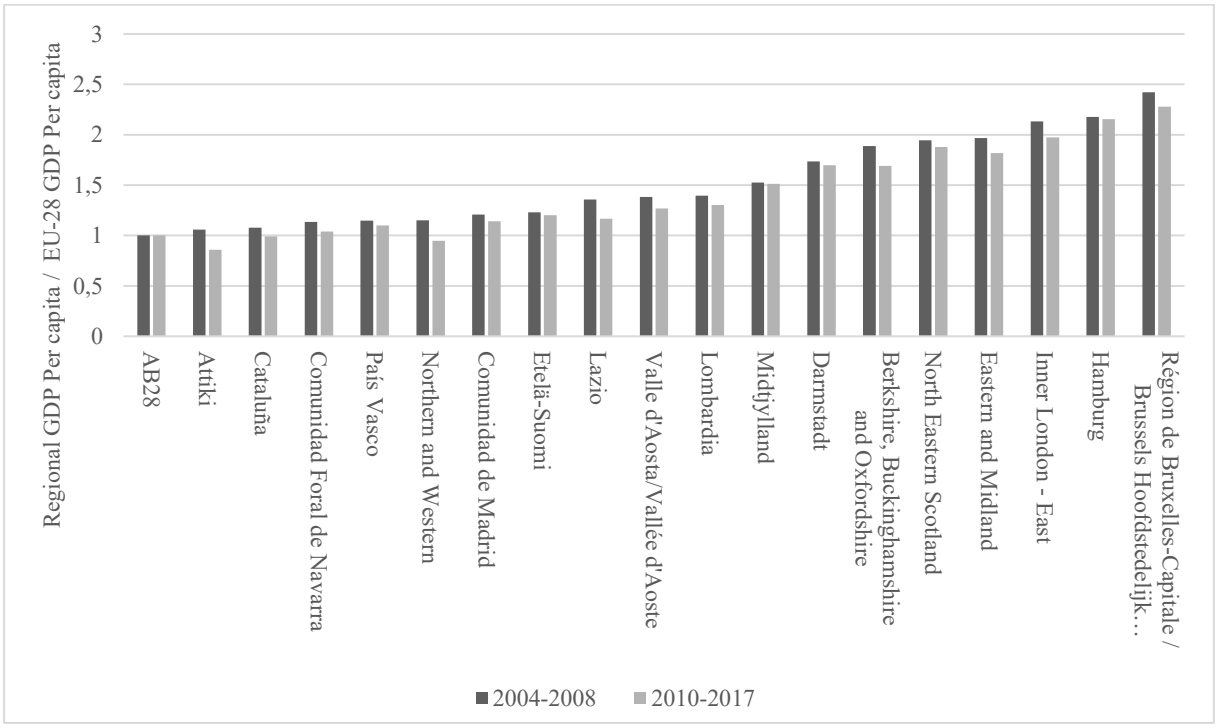
Figure 6. Group 3 Regions, GDP Per Capita/The EU-28 Average in Pre- and Post-Crisis



Süleyman Demirel Üniversitesi Vizyoner Dergisi, Yıl: 2025, Cilt: 16, Sayı: 45, 227-246.
Süleyman Demirel University Visionary Journal, Year: 2025, Volume: 16, No: 45, 227-246.
ISSN: 1308-9552

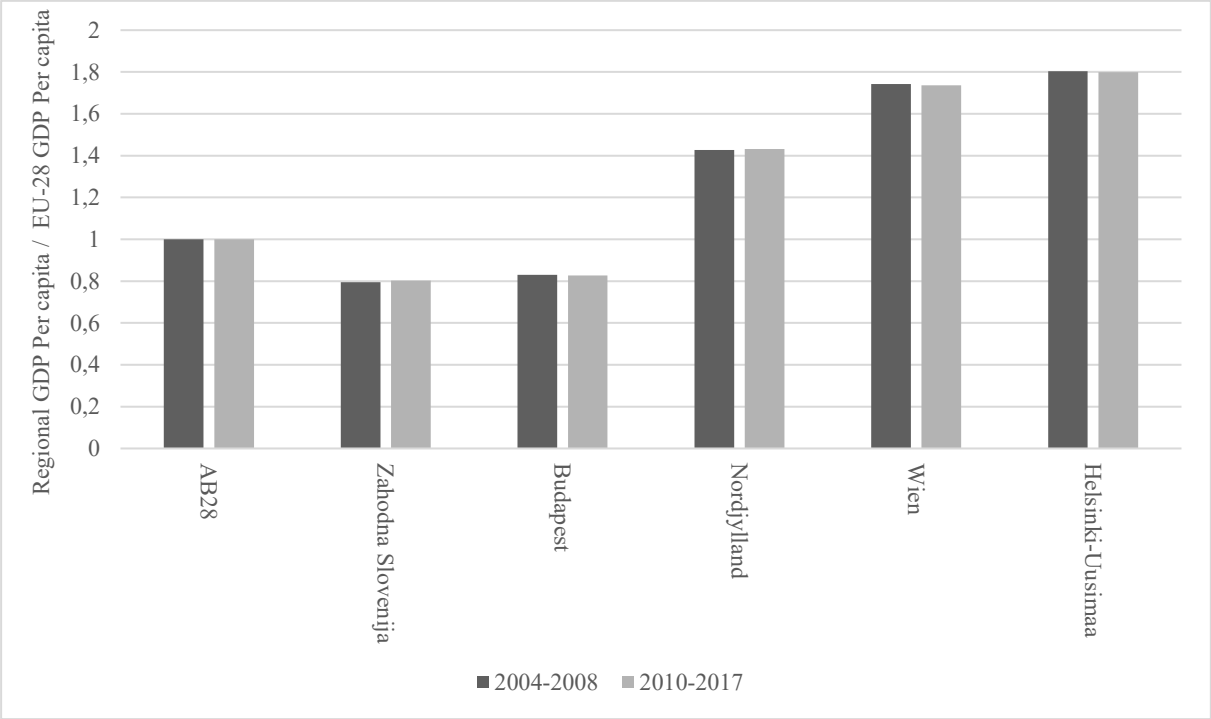
Similar to the third group, the situation of regions that had per capita incomes above the EU-28 average before the crisis, but, unlike the third group, converged to the average with an income increase below the EU average in the post-crisis period, is called negative convergence. 18 regions in Group 4 with negative convergence were determined: 4 regions from Spain, 3 from Italy and the United Kingdom, 2 from Ireland and Germany, 1 from Greece, Finland, Denmark and Belgium. Although 15 of these regions showed a slower growth performance than the EU-28 average after the crisis, they still continued to have incomes above the EU-28 average GDP per capita. While the remaining 3 regions had incomes above the EU-28 average before the crisis, they fell below the EU-28 average after the crisis. These regions are Greece - Attiki, Spain – Cataluña, and Ireland - Northern and Western regions. Greece – Attiki region's GDP per capita decreased by 9.5% compared to the pre-crisis period, while its ratio to the EU-28 average decreased from 1.06 times to 0.86 times. Similarly, while the per capita income of the Spain – Cataluña region was 1,08 times the average per capita income of the EU-28 before the crisis, it decreased to 0.99 times after the crisis. Ireland – Northern and Western region, on the other hand, had an income of 1.15 times the EU-28 average before the crisis, but decreased to 0.95 times after the crisis. The average growth rate of the 18 regions that make up the group between the pre-crisis period and the post-crisis period is 4.2%. Among all groups, Group 4 was the second with the lowest growth rate after the crisis, with an average group growth rate of 4.2%.

Figure 7. Group 4 Regions, GDP Per Capita/The EU-28 Average in Pre- and Post-Crisis



Solvenya - Zahodna Slovenija, Hungary - Budapest, Denmark - Nordjylland, Austria – Wien, and Finland - Helsinki-Uusimaa regions, which performed in parallel with the EU-28 average in the pre-crisis and post-crisis period, formed the 5th Group; per capita income growth in these regions is the same as the EU-28 average, have neither converged nor diverged. The average growth rate of the 5 regions in the fifth group between the pre-crisis period and the post-crisis period is 12.4%. While the regions of Slovenia and Hungary had incomes, respectively, 0.8 and 0.83 times below the EU-28 average GDP Per capita before the crisis, they remained at the same rate after the crisis. The regions of Denmark, Austria and Finland remained above the EU-28 with 1.43, 1.74 and 1.80 times the income, respectively.

Figure 8. Group 5 Regions, GDP Per Capita/The EU-28 Average in Pre- and Post-Crisis



Per capita income performances on a regional scale are generally in line with the country's macroeconomic outlook. For example, the findings on the regions of Greece, one of the countries most affected by the crisis, are weak, as are the national economic indicators. While 3 of the 4 regions of Greece in the sample diverged negatively from the EU-28, 1 region converged negatively. Similarly, all 4 regions in the sample from Portugal are among those with negative divergences. The common features of these countries are their high debt stock and relatively weak fiscal discipline. On the other hand, all 5 regions in the sample from Türkiye converged positively to the EU-28. As a matter of fact, the public debt stock/national income ratio in Türkiye is better than the EU members in the period under consideration. In terms of being resistant to adverse liquidity conditions such as the global financial crisis, a policy stance keeping fiscal discipline and a reformist approach compatible with it, contribute to the recovery in a short time and to be less affected by the crisis.

8. CONCLUSION

In the context of economic development indicators, the decrease in the difference between countries over time, and the convergence of low-income countries to high-income economies have been the main purpose of the economic/structural transformation, which is called development. It is aimed that different regions of the same country and different countries that participate to an integration initiative should reach a similar level of development. Success in the process of economic integration requires that the differences between the parties to be low, and decrease over time. It is expected from the candidate countries to approach the criteria determined by the union, and the members to converge to each other.

In order to evaluate the developments experienced during the global financial crisis in the context of convergence, it has been observed that the existing publications generally cover the national level, and studies are rarely carried out at the NUTS-II regional level. Especially in the relationship between crisis and convergence, a research gap has been identified at the NUTS-II level. In this study, it was aimed to determine the convergence results of the 2007-2008 global financial crisis at the level of NUTS-II regions. The GDP per capita series of the 81 selected regions for the years 2004-2017 covering the pre-crisis and post-crisis period were used. The arithmetic mean method, which was used for the first time in this study, was used together with the traditional methods of convergence analysis, namely beta and sigma analysis.

According to the results of the conditional beta convergence analysis, it was observed that most of the regions with relatively low per capita income in 2004 achieved higher growth rates compared to the regions with relatively high income. In addition, in the regression analysis, t and p values are significant, and the beta coefficient is negative, so it is concluded that there is convergence.

In the context of the second analysis, sigma convergence, the existence of convergence for selected regions were examined with the findings of whether the units converge to the EU average or not, using the coefficients of variation which were determined for each year. Especially in the years when the crisis was felt most intensely, the coefficient of variation reached the level closest to 0; therefore, it was concluded that the selected regions converged during the crisis period.

In order to reach detailed convergence results for each region and year, arithmetic mean analysis, which was used for the first time in this study, was performed. 2009 was taken as the threshold. The data of 2004-2008 and 2010-2017 periods were compared. By calculating the average GDP per capita of both periods separately on a regional basis, the values found for the two periods are proportioned to the EU-28 average for the same periods. Using a large sample, the data of suitable period, and the average regional performances for a relatively long time contributes eliminating the certain risks specific to the years, and reaching at healthier findings.

Using the third method, this study introduces five new concepts/terminology to the literature. Positive convergence, negative convergence, positive divergence, negative divergence and stationarity. Based on the findings of the final analysis, the selected regions were divided into 5 different groups. Regions in the 1st and 2nd groups had a per capita income below the EU-28 average in the pre-crisis period. The 1st group regions converged positively after the crisis, while the 2nd group regions diverged negatively after the crisis. The 3rd and 4th group regions had a per capita income above the EU-28 average in the pre-crisis period. 3rd group regions diverged positively from the EU average in the post-crisis period, while the 4th group regions converged negatively. The 5th group showed a parallel change with the EU average; instead of convergence and divergence, they remained in the same position.

26 out of 81 regions in the sample were included in Group 1, while they had incomes below the EU-28 average for the period of 2004-2008, they converged to the average by increasing their GDP Per capita more than the EU-28 average in the post-crisis period (2010-2017). The 5 regions included in the sample from Türkiye were also in the 1st group, and converged positively to the EU-28 average. 11 regions in the 2nd group, as in the 1st group, have GDP per capita below the EU-28 average, but they did not converge to the EU-28 in the post-crisis period and diverged negatively.

Realization of the regions with per capita income above the EU-28 average in pre-crisis period an increase in their income level above the EU-28 average in post-crisis period was called as positive divergence. Group 3 has this characteristics and includes 21 regions of the sample.

Unlike the 3rd group, 18 regions with an income above the EU-28 average GDP per capita before the crisis achieved an income increase below the EU-28 average and converged to the EU average in the post-crisis period, but this is a relative decline, that is, a negative convergence of these regions.

5 regions, whose relative position did not change before and after the crisis and showed the same development as the EU-28 average, were classified as Group 5.

The regional growth performance, measured by per capita income, cannot be considered independent of the general performance, as well as political and economic stability of the country of which the region is a part. Despite the Maastricht criteria, the countries that faced the global financial crisis with high public debt stock, weak budget performance and fiscal discipline problems experienced negative divergence or negative convergence, while Türkiye and its regions in the sample, due to favourable financial conditions and fiscal discipline based on the Transition to a Strong Economy Program after the 2001 crisis, were less affected by the crisis, which turned to be an opportunity for convergence. The strengthening of the institutional structure and control mechanisms with the Banking Supervision and Regulation Board, the Capital Markets Board, structural reforms and regulations on financial markets undoubtedly contributed. Another important implication in terms of crisis management is flexibility in terms of monetary policy. Especially countries with high debt stock use monetary policy tools to meet their liquidity needs and gain flexibility in responding to the crisis with many tools, especially interest rates. In this context, countries that have a national currency and their own central bank are in a more advantageous position than countries that use a common currency. Especially, countries like Türkiye, England, Finland have been able

to effectively use their monetary policy, making use of central bank and national currency. On the other hand, Eurozone countries most affected by the crisis, such as Greece, Spain, Italy, Portugal and Ireland, had relatively less response capacity. Regional policies that actively improve the economic potential of regions, and the effectiveness of institutional structures such as development agencies, specialization based on dynamic comparative advantages, and improvement of international competitiveness will be beneficial for moving from regional disparities to positive convergence, and later to positive divergence.

DECLARATION OF THE AUTHORS

Declaration of Contribution Rate: The authors have equal contributions.

Declaration of Support and Thanksgiving: No support is taken from any institution or organization.

Declaration of Conflict: There is no potential conflict of interest in the study.

REFERENCES

Allen, F., & Gale, D. M. (2007). An introduction to financial crises. *SSRN Electronic Journal*. 10-15

Barro, R. J., & Sala-i-Martin, X. (1990). *Economic growth and convergence across the United States*, NBER Working Paper, 3419.

Barro, R. J., & Sala-i-Martin, X. (1991). Convergence across states and regions, *Brooking Papers on Economic Activities*, *1*, 107-182.

Baumol, W. J. (1986). Productivity growth, convergence and welfare: What the long-run data show?. *The American Economic Review*, *76*(5), 1072–1085.

Bayraktutan, Y. (2000). Küreselleşme kriz ve IMF. *Liberal Düşünce Dergisi*, *5*, 14-18.

Bernard, A. B., & Durlauf, S. N. (1996). Interpreting tests of the convergence hypothesis. *Journal of Econometrics*, *71*(1-2), 161-173.

Claessens, S., & Ayhan Köse (2013). *Financial crises: Explanations, types, and ımplications*, IMF Working Paper, WP(13): 28.

Coulombe, S. (2000). New evidence of convergence across Canadian provinces: The role of urbanization, *Regional Studies*, *34*, 713–725.

Devarajan, S., Rogers, F. H. & Squire, L. (2001). *World Bank Economists Forum*, Volume 1, The World Bank, (p. 6-11.)

Diler, Ö. (2021). *Küresel Finansal Krizin (2008) Ulusal ve bölgesel ölçekte Türkiye-AB yakınsama sonuçları* [Ph.D. Dissertation]. Kocaeli.

EURSTAT. (2018). Retrieved September 14, 2018 from http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&plugin=1& language=en&pcode=tec00115/

Folfas, P. (2017). Income absolute beta-convergence of NUTS 3 level regions in new EU member states before and during a crisis. *Folia Oeconomica Stetinensia*, *31*, 151-162.

Galor, O. (1996). Convergence? Inference from theoretical models, *The Economic Journal*, *106*, 1056–1069.

Głodowska, A. (2015). Beta and sigma convergence within the European Union countries and regions. *Proceedings of the 6th Global Conference on Management in Recovering Markets*, (p. 233-246), University of Maribor.

Gündem, F. (2017). Is there ıncome convergence between NUTS 2 territories in Türkiye? A spatial statistical and spatial econometrics contribution, *Sosyoekonomi*, *25*(34), 145-160.

Hevner, L. B. (2009). *Adding a real estate component to your portfolio – considering a truly unique asset, in the perfect portfolio, a revolutionary approach to personal ınvesting* (p. 35-157). John Wiley & Sons,

Jaffee, D. (2008). *The U.S. subprime mortgage crisis: ıssues raised and lessons learned*, The World Bank Commission on Growth and Development Working Paper, 28.

Kibritçioğlu, A. (2001). Türkiye'de ekonomik krizler ve hükümetler, 1969-2001. *Yeni Türkiye Dergisi*, *2*(41), 174-183.

Mishkin, F. S. (1996). Understanding financial crises: a developing country perspective, *Annual World Bank Conference on Development Economics*, The World Bank, (p. 29-62).

Monfort, P. (2008). *Convergence of EU regions measures and evolution*, European Union Regional Policy Working Papaers, 01/2008.

Gömleksiz, M., Şahbaz, A., & Mercan, B. (2017). Regional economic convergence in Turkey: Does the government really matter for?. *Economies*, *5*(3), 1-16.

Nahar, S., & Inder, B. (2002). Testing convergence in economic growth for OECD countries. *Applied Economics*, *34*(16), 2011-2022.

Nevima, J, & Melecky, L. (2011). Regional competitiveness evaluation of visegrad four countries through econometric panel data model, *Liberec Economic Forum Conference*, (p. 348-361).

Pinto, B., Gurvich, E., & Ulatov, S. (2005). Lessons from the Russian crisis of 1998 and recovery. In *Managing economic volatility and crises: A practitioner's guide* (p. 406-438). Cambridge University Press.

Quah Danny, T. (1996). Twin peaks: Growth and convergence in models of distribution dynamics. *The Economic Journal*, *106*, 1045-1055.

Rassekh, F., Panik, M. J., & Kolluri, B. R. (2001). A test of the convergence hypothesis: The OECD experience, 1950–1990. *International Review of Economics & Finance*, *10*(2), 147-157.

Rassekh, Farhad (1998). The convergence hypothesis: history, theory, and evidence, *Open Economies Review*, *9*, 85–105.

Sala-I Martin, X. (1994). *Regional cohesion: evidence and theories of regional growth and convergence*, Center Discussion Paper, 716.

Sapir, Jacques (2008). Global finance in crisis. *Real-World Economics Review*, *46*, 82-101.

Sitikantha, P. (2009). The global financial stability architecture fails again: Subprime crisis lessons for policymakers. *Asian-Pacific Economic Literature*, *23*(1), 21-47.

Solow, R. M. (1956). A Contribution to the theory of economic growth. *Quarterly Journal of Economics*, *70*(1), 65-94.

Turgut, A. (2007). Türleri, nedenleri ve göstergeleriyle finansal krizler. *TÜHİS İş Hukuku ve İktisat Dergisi*, *20*(4-5), 35-56.

Turkish Ministry of Treasury. (2018). Retrieved September 15, 2018 from https://www.hazine.gov.tr/tr-TR/Istatistik-Sunum-Sayfasi?mid=59&cid=12 /

Turkish Statistical Institution. (2018). Retrieved September 18, 2018 from http://www.tuik.gov.tr/UstMenu.do?metod =temelist /

Yıldırım, K., Karaman, D., & Taşdemir, M. (2012). *Makro ekonomi*. Seçkin Yayınevi.