DO IMPACTS OF FACTORS AFFECTING GOODS TRADE DIFFERENTIATE FOR SERVICE TRADE? THE CASE OF TURKEY[1]

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ABSTRACT| As known, international trade, which can be thought as the way that individuals, organizations, and countries fulfill their needs, is a very important concept. Although, for a long time, international trade has been associated with only international trade of physical products, especially after 2000s, researchers have begun to think that there can be international trade of services which is different from international trade of goods. In this sense, both of differences among these two concepts, and factors, that possibly affect and are affected by these two concepts, became an area that requires to be understood clearly in the literature. Therefore, this research aims to analyze the relationship between the variables (globalization, foreign direct investment, informal economy, and internet technology), that are not widely studied in Turkish literature in terms of service trade, and Turkish service export. To understand the relationship among mentioned variables, cointegration analyzes was conducted for the period of 1970-2018 by using ARDL model. As a result of the analysis, it was understood that the answer to the question of whether the effects of the factors affecting the trade of goods differ for the export of services is yes based on the example of Turkey. In this direction, it has been observed that globalization has the opposite effect of what is expected. Lastly, this research provides some recommendations for policymakers.

Keywords: *Service export, ınformal economy, globalization, foreign direct ınvestment, ınternet technology*
Jel codes: *E26, F21, F14, F62*

Scope: *International Trade*
Type: *Research*

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[1] Compliance with the ethical rules of the relevant study has been declared.

MAL TİCARETİNİ ETKİLEYEN FAKTÖRLERİN ETKİLERİ HİZMET İHRACATI İÇİN FARKLILAŞIYOR MU? TÜRKİYE ÖRNEĞİ

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ÖZ | Bilindiği gibi bireylerin, örgütlerin ve ülkelerin ihtiyaçlarını karşılama şekli olarak düşünülebilecek olan uluslararası ticaret oldukça önemli bir kavramdır. Uzun bir süredir uluslararası ticaret sadece fiziksel ürünlerin uluslararası ticareti ile ilişkilendirilmesine rağmen özellikle 2000'lerden sonra araştırmacılar uluslararası hizmet ticaretinin uluslararası mal ticaretinden farklı olacağını düşünmeye başlamışlardır. Bu bağlamda hem bu iki kavram arasındaki farklılıklar hem de bu kavramları etkileyen ve bu kavramlardan etkilenen unsurlar literatürde anlaşılması gereken bir alan haline gelmiştir. Buradan hareketle bu çalışmada hizmet ihracatı kapsamında Türkçe literatürde çokça çalışılmayan değişkenler (küreselleşme, doğrudan yabancı yatırım, kayıt dışı ekonomi ve internet teknolojisi) ile Türk hizmet ihracatı arasındaki ilişkiyi analiz etmek amaçlanmıştır. Bahsi geçen ilişkileri anlamak için ARDL modeli kullanılarak 1970-2018 dönemi için eşbütünleşme analizleri gerçekleştirilmiştir. Yapılan analizler sonucunda Türkiye örneğinden hareketle mal ticaretini etkileyen faktörlerin etkileri hizmet ihracatı için farklılaşıyor mu sorusunun cevabının evet olduğu anlaşılmıştır. Bu doğrultuda küreselleşmenin beklenenin aksi yönde etki doğurduğu gözlemlenmiştir. Ayrıca bu çalışma politika yapıcılar için tavsiyelerde de bulunmaktadır.

Anahtar Kelimeler: *Hizmet ihracatı, kayıt dışı ekonomi, küreselleşme, doğrudan yabancı yatırımı, internet teknolojisi*
JEL Kodu*: E26, F21, F14, F62*

Alan: *Uluslararası Ticaret*
Türü: *Araştırma*

1. INTRODUCTION

As known, trade is a very ancient term in which its history dates to prehistoric times. Trade, which can be simply defined as an exchange of goods and/or services among people, is one of essential daily life activities in human life. Individuals, organizations, and governments must engage in trade activities to sustain their activities because the way, that they can fulfill their needs, is trade. Therefore, they always pursue trade activities in their routines. From prehistoric times to the present, volume and scope of trade have enlarged incredibly especially with the fastened globalization process. Since this situation has made trade more significant for all elements of the society, trade (particularly international trade) has become one of widely examined research areas throughout the last two centuries.

For a long time, international trade has been associated with only international trade of physical products. However, especially after 2000s, researchers have begun to think that there can be international trade of services which is different from international trade of goods in terms of the process that trade activities realized, the volume of them, buyer-seller relationships etc. So that, they have started to conduct research which mainly focus on differences between international trade of goods and international trade of services (Lennon, 2008; Ariu, 2016). In this sense, they have found out differences between international trade in goods and international trade in services such as differences in impact of language and physical geography on them and the amount of export and import of goods and services (Lennon, 2008; Ariu, 2016).

Since international trade in goods and international trade in services are thought as separate concepts from each other, researchers have thought that factors that was considered as influential on international trade may affect international trade in service in a different way or even may not be influential on international trade in services. Due to this reason, scholars begun to conduct research focusing on the factors, that may specifically affect international trade in services, in recent years (Zong-biao, 2010; Eichengreen & Gupta, 2013; Yousefi, 2018, Abasimi, Vorlak, Salim & Li, 2019).

As known, each country has its own country-specific conditions that affects all actors in their economic and social life. Hence, it is important to understand the factors affecting the service trade in a country-specific manner because understanding how country-specific factors shape the service trade, which constitutes the substantial part of each economy, is important especially for developing countries. Although this is the case, there are not enough effort to comprehend service trade in Turkish literature. So that, to enhance the understanding about Turkish service trade, which is not widely studied, this

research aims to discover some of variables (informal economy, FDI, globalization, internet technology) that possibly affects Turkish service trade and not widely studied from the perspective of Turkish service trade. Therefore, this research purposes to answer the question do impacts of factors affecting goods trade differentiate for service trade. This research includes significant contributions for the literature. Since this research takes only Turkish service export into account and covers relatively less studied variables, it would provide inclusive and country-specific perspective for Turkey.

To achieve research objective, this research is designed as quantitative research using secondary data produced for Turkey and obtained from various reputable sources. In addition, this research used ARDL model to test research hypotheses. The following parts of the research will be about literature review that describes conceptual framework of the study, research method, and results and conclusion.

2. LITERATURE REVIEW

2.1. Understanding the Differences Between International Trade in Goods and International Trade in Services

International trade is generally thought as an international trade of only physical products. However, at the beginnings of 2000s, it was begun to be thought that it is possible to exist special form of international trade for services which have different characteristics compared to goods. Therefore, researchers have begun to carry out studies that aim to understand international trade of services and its differences.

To show the differences between them, international trade of goods and international trade of services have been defined separately. The most widely accepted definition is provided by Organization for Economic Cooperation and Development (OECD). While OECD defines international trade in services as "*the recording the value of services exchanged between residents and non-residents of an economy, including services provided through foreign affiliates established abroad"*, it defines international trade in goods as "*all goods which add to, or subtract from, the stock of material resources of a country by entering its economic territory (imports) or leaving it (exports)".*

In addition to definitional differences, Lennon (2008) and Ariu (2016) have touched on the differences between these two concepts from the point of different perspectives. While Lennon (2008) takes the attention on differences in terms of impact of language and physical geography on international trade of goods and services, Ariu (2016) underlines the existence of differences in the amount of export and import of firms making international trade of goods and services, or in entry and exit ratios of these companies. Lennon (2008) has found

out that while the effect of physical geography on trade in services is lower, the impact of language on trade in services is higher compared to trade in goods. In addition to Lennon's (2008) findings, Ariu (2016) has concluded that the export and import amount of service trader is less than goods traders. Also, he has stated that service traders experience higher entry and exit rates and a lower survival probability.

Since international trade in goods and international trade in services have different characteristics, the elements, which affect them and are affected by them, have also been begun to be researched separately. The reason is the thought that same elements can affect both in a different way or there might be factors that affect one of them and does not affect the other. By keeping this thought in mind, this research aims to find answers to questions that do the variables accepted as influential on international trade (generally thought as international trade in goods) affect the international trade in service and if it is, how do they influence international trade in services.

2.2. International Trade and Informal Economy

Informal economy is a phenomenon that affects all actors of an economy. Businessdictionary.com simply defines informal economy as "*system of trade or economic exchange used outside state controlled or money-based transactions."* Informal economy is an influential concept on various areas ranging from employment to trade. In the literature, there are research stating that informal economy impacts international trade in different ways (Sarıkaya, 2007; Doğanlar, Bal and Özmen, 2004; Sinha 2011). From theoretical perspective, Sinha (2011) explains the relationship between informal economy and trade according to three different views: dualistic view, legalistic view, and structuralist view. While dualistic view states that actors only in the formal economy may carry out international trade activities and existence of large informal economy disadvantages international trade, legalistic view emphasizes that informalization is detrimental for trade because of the failure of the government to address trade and economic development (Sinha, 2011). In addition to these views, structuralist view says that informal economy occurs as a response to the obstacles encountered in economic development and limits the economy to absorb gains from trade (Sinha, 2011). In short, all views on the relationship between international trade and informal economy presented by Sinha (2011) state that informal economy is a factor which is detrimental for trade. Sarıkaya (2007), who approaches to the topic from different perspective, has touched upon inaccurate calculation of balance of trade resulted from informal economy and problems occurred due to this reason. In addition to these, by referring Özsoylu (1997), Doğanlar, Bal and Özmen (2004) have stated that informal economy made

production for domestic demand more attractive and caused export to lose its importance compared to past. Also, Bilgiç (2019a) has proposed that decrease in informal economy may enhance service export in Turkey by examining fluctuations in variables between 1991 and 2015. Furthermore, Elgin and Öztunalı (2014) have exhibited in most regressions that trade openness is positively related with informal economy size. In another study, Elgin and Birinci (2016) have found that there is an inverted-U relationship between informal sector size and growth of GDP per capita which is associated with higher degree of trade openness. Finally, Mawusi (2021) has shown that there is a long run relationship between informality, growth, and openness to trade in Ghana, and as Ghana become more open to trade, the size of the informal economy rises. In the light of three views of Sinha (2011) and studies shared above, the first research hypothesis is constructed as:

H1: There is a negative and significant relationship between Turkish service export and informal economy.

2.3. International Trade and Foreign Direct Investment

Foreign Direct Investment (FDI) is one of the most important components of development for any country. OECD defines it as "*the category of international investment that reflects the objective of a resident entity in one economy to obtain a lasting interest in an enterprise resident in another economy"*. Since it is a very crucial concept for countries, conditions, which attract FDI, and factors, which are affected by FDI, can be shown among the topics widely researched in the field of FDI. In this respect, New Trade Theory has brought into the open that FDI may have both a substitution effect and complementarity effect on trade circumstantially (Albulescu and Goyeau, 2016). In this sense, Fontagné (1999) explains the impacts of inward and outward FDI on export and import under four different situations. According to Fontagné (1999), these situations are: 1) Exports are affected by inward FDI in where a foreign firm located in the host country has intention to export back home, or supply products to a regional market, 2) Outward FDI affects exports due to increased competitiveness in foreign markets, 3) Imports are impacted by inward FDI due to increased competitiveness of foreign firms operating in domestic market, however, it is possible to increase the exports if the host country obtains competitiveness, and 4) Imports are influenced by outward FDI if backward vertical integration and/or relocation of labor-intensive activities abroad happens (Fontagné, 1999). In addition to propositions of New Trade Theory, there are studies examining FDI and trade relationship empirically. For example, Zhang (2005) has concluded that FDI plays important role in Chinese export boom, but this does not mean that FDI enhance export automatically because Chinese

country-specific advantages also have crucial role in export boom. Sun (2009) has stated that FDI affects exports of firms positively, but the impact depends on some variables such as geographical location, ownership structure, etc. Harding and Javorcik (2012) have found out a positive effect of FDI on unit values of exports in developing countries, however, they could not find any indication that FDI increases the similarity of export structure of developing and developed economies. Xiong and Sun (2021) have shown that while FDI flowing from developed countries to developing countries enhances exports, FDI flows among developed countries are less significant in enhancing exports. There is also other research taken the relationship between FDI and international trade in services specifically into account (Zong-biao, 2010; Bilgiç, 2019a; Abasimi, Vorlak, Salim & Li, 2019). Zong-biao (2010) has studied out that there exists a long-term stable equilibrium relationship among FDI, goods trade exports and service trade exports. Dong and Zhang (2016) have found out that as FDI increases, exports of China's service trade will increase. Ahmad and others (2017) have concluded that FDI is an important determinants of service trade which stimulates service export. Bilgiç (2019a) has proposed that FDI and Turkish service export can be positively related after he examined related literature and fluctuations in both FDI and Turkish service export for the period of 1990-2017. Abasimi and others (2019) have also concluded existence of significant relationship between FDI and service export. By taking into New Trade Theory and studies mentioned above account, the second research hypothesis is as follows:

H2: There is a positive and significant relationship between Turkish service export and FDI inflow.

2.4. International Trade and Globalization

Globalization is a phenomenon in which its history dates to the end of 1800s and has worldwide impacts. Although there is no universally accepted definition of globalization, KOF (Swiss Economic Institute), which is a very reputable Swiss institute, defines it as "*the process of creating networks of connections among actors at intra- or multi-continental distances, mediated through a variety of flows including people, information and ideas, capital, and goods and as the process that erodes national boundaries, integrates national economies, cultures, technologies and governance, and produces complex relations of mutual interdependence"* (Gygli, Haelg, Potrafke & Sturm, 2018). On the other hand, economic globalization, which is a specific type of globalization, can be defined as *the rapid proliferation of cross-border production, trade, and investment activities spearheaded by global corporations and international financial institutions that facilitate the emergence of an increasingly integrated and interdependent global economy* (Dicken, 1998 cited

in Yeung, 2002: 287). From this conceptual framework, it is possible to say that globalization has affected international trade. In this context, the relationship between globalization and international trade has been examined by different scholars (Kim & Shin, 2002; İncekara & Savrul, 2011; Adıgüzel, 2013). Kim and Shin (2002) have concluded that increase in globalization between 1959 and 1996 has led the world trade network to become denser. İncekara and Savrul (2011) have proposed that globalization process and participating international institutions enhance trade activities especially in developing countries. Adıgüzel (2013) has stated that after 1980, Turkish foreign trade volume increased rapidly due to the acceleration of globalization. Savrul and İncekara (2015) have shown that there is a positive and significant relationship between international trade and globalization. Akpan and Atan (2015) have also concluded that globalization has positive impact on trade. Furthermore, Matore and Sagar (2015) have explained the relationship between globalization and international trade from historical perspective. Bilgiç (2019b) has put forward that globalization may affect service export through moderating effect of informal economy. In consideration of economic globalization conceptualization and studies above, the third research hypothesis is:

H3: There is a positive and significant relationship between Turkish service export and globalization.

2.5. International Trade and Internet Technology

Internet is an invention that has changed the fundamentals of almost all fields. The benefits, that the internet has brought such as rapid and worldwide communication, easing in keeping records, easing conducting research etc., have affected the way of living, the way of doing business and the way of carrying trade activities. In this sense, authors have conducted research examining how the developments in internet affected international trade (Freund & Weinhold, 2004; Clarke & Wallsten, 2006; Meijers, 2014; Lin, 2015; Şeker, 2017). Freund and Weinhold (2004) have found out that internet stimulates trade, and it is likely due to internet-related reduction in fixed costs. Clarke and Wallsten (2006) have concluded that access to the internet does improve export performance in developing countries, although not in developed countries. Meijers (2014) has exhibited positive impact of the internet use on international trade. Lin (2015) has also reached empirical results showing strong effect of the internet on trade improvement. Şeker (2017) has either obtained similar results and concluded that internet usage has meaningful impact on trade volume between Turkey and European Union countries. There are also some other research specifically focusing on the impact of the internet on international trade in services (Choi, 2010; Yousefi, 2018; Bilgiç, 2019b; Luong & Ngyuen, 2020). These studies have

also found out positive relationship between variables. By taking account of studies above, the fourth research hypothesis is:
H4: There is a positive and significant relationship between Turkish service export and internet technology.

Table 1. The Summary of Literature

Variables	Source	Analysis	Analyzed Country
International Trade and Informal Economy	Sarıkaya (2007: 39)	Theoretical Discussion	-
	Özsoylu (1997) cited in Doğanlar, Bal and Özmen, (2004: 93)	Theoretical Discussion	-
	Sinha (2011: 136)	Theoretical Discussion	-
	Bilgiç (2019a: 160)	Numerical Analysis	Turkey
	Elgin and Birinci (2016: 289)	Econometric Analysis	161 Countries
	Elgin & Öztunalı (2014: 152)	Econometric Analysis	141 Countries
	Mawusi (2021: 5)	Econometric Analysis	Ghana
International Trade and FDI	Zhang (2005: 10)	Econometric Analysis	China
	Sun (2009: 1221)	Econometric Analysis	China
	Harding and Javorcik (2012: 979)	Econometric Analysis	105 Countries
	Xiong and Sun (2021: 542)	Econometric Analysis	140 Countries
	Zong-biao (2010: 1)	Econometric Analysis	China
	Dong and Zhang (2016: 42)	Econometric Analysis	China
	Ahmad and others (2017: 129)	Econometric Analysis	13 Countries
	Bilgiç (2019a: 162)	Numerical Analysis	Turkey
	Abasimi and others (2019: 39)	Econometric Analysis	10 Countries
International Trade and Globalization	Kim and Shin (2002: 445)	Econometric Analysis	105 Countries
	İncekara and Savrul (2011: 19)	Numerical Analysis	Turkey
	Adıgüzel (2013: 18)	Numerical Analysis	Turkey
	Bilgiç (2019a: 158)	Numerical Analysis	Turkey
	Savrul and İncekara (2015: 93)	Econometric Analysis	12 Countries
	Akpan and Atan (2015: 154)	Econometric Analysis	Nigeria
	Matore and Sagar (2015: 94)	Numerical Analysis	India
International Trade and	Freund, and Weinhold (2004: 171)	Econometric Analysis	56 Countries
	Clarke and Wallsten (2006)	Econometric Analysis	98 Countries

Internet Technology	Lin (2015: 424)	Econometric Analysis	Nearly 200 Countries
	Şeker (2017: 86)	Econometric Analysis	26 Countries
	Yousefi (2018: 65)	Econometric Analysis	63 Countries
	Choi (2010: 104)	Econometric Analysis	151 Countries
	Meijers (2014: 161)	Econometric Analysis	162 Countries
	Luong and Ngyuen (2020: 1073)	Econometric Analysis	228 Countries

In Table 1, the literature review above is summarized based on analysis and analyzed country. As seen, research focusing on Turkey have used numerical analysis and research focusing on group of countries (possibly including Turkey) have used econometric analysis. Therefore, it is important for the literature to focus only on Turkey by using econometric analysis from the perspective of service export.

3. RESEARCH METHOD

3.1. Data

Data used in this research are secondary data collected from highly reputable sources for the period of 1970 - 2018. The sources of data are represented in Table 2.

Table 2. Sources of Data Used in the Research

Variables	Period of Data	Used Sources
Turkish Service Export	1984 - 2018	OECD Database
Net FDI Inflow	1974 - 2018	World Bank Database
Internet	1993-2017	International Telecommunication Union, World Telecommunication/ICT Development Report and Database
Informal Economy	1971 - 2016	IMF (International Monetary Fund) Working Papers; Medina, L., & Schneider, F. (2018). Shadow Economies Around the World: What Did We Learn Over the Last 20 Years?. & Çetintaş, H., & Vergil, H. (2003). Türkiye'de Kayıtdışı Ekonominin Tahmini. Dogus Universitesi Dergisi, 4(1), 15-30.
Globalization	1970-2016	Swiss Economic Institute, KOF Index

As known, Organization of Economic Cooperation and Development (OECD), World Bank (WB) and International Monetary Fund (IMF) are highly reputable institutions, and their data are accepted as highly valid. Turkish service export is calculated in millions of American dollars, net foreign direct investment inflow is calculated as percentage in GDP, internet technology is calculated as percentage of people using internet and informal economy is calculated as size of the informal economy in percentage of GDP.

Data about globalization are taken by database of Swiss Economic Institute (KOF). Swiss Economic Institute is a highly reputable international institute which delivers profound insight into the field of economic research. One of the indexes produced by Swiss Economic Institute is KOF Globalization Index. The KOF Globalization Index is an index that measures the economic, social, and political dimensions of globalization. The increase in the value of the index means increase in the level of globalization of the country. In this research, KOF Globalization Index of Turkey is used to measure globalization.

3.2. ARDL model of the research

Testing the long-term relationship between variables is usually done by using cointegration analyzes. Although there are different cointegration methods in the literature, ARDL cointegration method has been utilized in this study due to its advantages. These advantages are; applicability without checking whether variables are I(0) or I(1), ability to use unrestricted error correction model, applicability for small samples (Pesaran, Shin, & Smith, 2001; Narayan & Narayan; 2005; Narayan & Smyth, 2005; Pamuk & Bektaş, 2014).

3.2.1. Specification tests

Before conducting ARDL analysis, it is required to do unit root tests and CUSUM, CUSUMSQ test, and to check for autocorrelation, normal distribution, and heteroscedasticity. In this sense, firstly, Augmented Dickey Fuller (ADF) test was done, and as seen in Table 3, there is a stability at the first difference for all variables at %5 critical values. Then, to check autocorrelation and heteroscedasticity, Breusch-Godfrey Serial Correlation LM Test and Breusch-Pagan-Godfrey Heteroskedasticity Test was done. The results of these tests are provided in Table 4 and it is seen that there is no problem of autocorrelation and heteroscedasticity. Furthermore, data was controlled for normal distribution by using skewness and kurtosis values. In Table 5, descriptive statistics are shared. By using reference points of -2 and +2 for skewness (George, 2011) and reference points of -7 and + 7 for kurtosis (Byrne, 2011) as an indicator of normal distribution, it was decided that data are normally distributed. Lastly, CUSUM and CUSUMSQ (Figure 1 and 2) tests was conducted, and it was seen that there

is a stability. At the end of these analyses, it was shown that ARDL analysis is applicable in the scope of this research.

Table 3. ADF Unit Root Test

Variables		ADF Unit Root Test			
	T-Statistic "Intercept and trend"	Test Critical Values		P Values	Decision
Informal Economy (I.E)	-5.635084	%1	-4.180911	0.0002	Stationary at all critical values
		%5	-3.515523		
		%10	-3.188259		
Internet (INT)	-3.801419	%1	-4,416345	0.0352	Stationary at %5 and %10
		%5	-3.622033		
		%10	-3.248592		
Globalization (GLOB)	-6.698259	%1	-4.175640	0.0000	Stationary at all critical values
		%5	-3.513075		
		%10	-3.186854		
FDI	-5.989186	%1	-4.186481	0.0001	Stationary at all critical values
		%5	-3.518090		
		%10	-3.189732		
Service Export (S.EXPORT)	-6.572855	%1	-4.262735	0.0000	Stationary at all critical values
		%5	-3.552973		
		%10	-3.209642		

Table 4. Autocorrelation and Heteroskedasticity Tests

Breusch-Godfrey Serial Correlation LM Test			
F-Statistic	2.073305	Prob. F (2,3)	0.2720
Breusch-Pagan-Godfrey Heteroskedasticity Test			
F-Statistic	0.313773	Prob. F (16,5)	0.9652

Table 5. Descriptive Statistics

Mean	-5.65e-16
Median	0.001856
Maximum	0.026508
Minimum	-0.043175
Standard Deviation	0.014015
Skewness	-1.089529
Kurtosis	5.456062

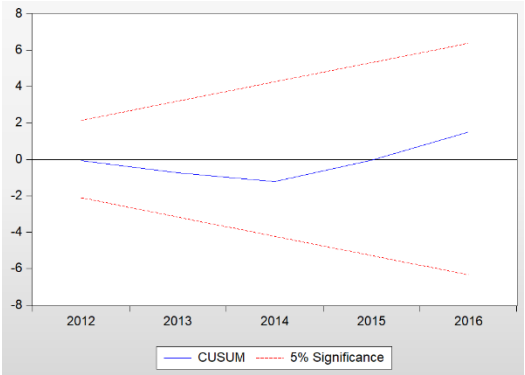

Figure 1: CUSUM Test

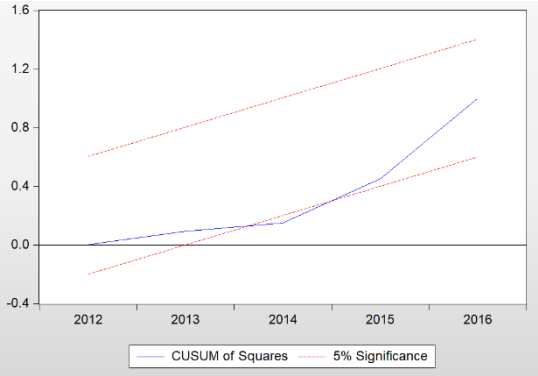

Figure 2: CUSUMSQ Test

3.2.2. ARDL model

Autoregressive Distributed Lag Bound Models (ARDL) are standard least squares regression which is making estimation over the lagged values of both dependent and independent variables. The basic ARDL (p, q) regression model can be defined as follows:

$$Y_t = \beta_0 + \beta_1 Y_{t-1} + \cdots + \beta_k Y_{t-p} + \alpha_0 X_t + \alpha_1 X_{t-1} + \cdots + \alpha_q X_{t-q} + \varepsilon_t \quad (1)$$

Here, ε_t is the error term.

The cointegration relationship of the variables is primarily determined according to the ARDL boundary test approach, which was developed by

Pesaran, Shin and Smith (2001). For this purpose, unrestricted error correction model in Formula 2 is defined. In this research, (3, 3, 1, 2, 3) model was selected.

$$\Delta S.EXPORT_t = \alpha_0 + \sum_{i=1}^{q} a_{1i}\Delta S.EXPORT_{t-i} + \sum_{i=1}^{p} a_{2i}\Delta GLOB._{t-1} + \sum_{i=1}^{p} a_{3i}\Delta INT._{t-1} + \sum_{i=1}^{p} a_{4i}\Delta FDI_{t-1} + \sum_{i=1}^{p} a_{5i}\Delta I.E._{t-1} \beta_1 S.EXPORT_{t-1} + \beta_2 GLOB_{t-1} + \beta_3 INT_{t-1} + \beta_4 FDI_{t-1} + \beta_5 I.E_{t-1} + u_t \quad (2)$$

Here, the equation given in (2) consists of model established according to the hypotheses formed above. The meanings of abbreviations are as follows:

- S.EXPORT => Turkish Service Export
- GLOB => Globalization
- INT => Internet Technology
- FDI => Foreign Direct Investment Net Inflow
- I.E => Informal Economy

This system of equation, which is defined as an unrestricted error correction model, is used to test the cointegration relationship.

The null hypothesis formed as "no cointegration in long-term" is defined as:

$$H_0: \beta_1 = \beta_2 = 0 \quad (3)$$

When deciding between null and alternative hypotheses, Wald test is applied to model coefficients. The obtained F statistic values are compared with the lower and upper critical values given in Pesaran's *et al.* (2001) study. If the F statistic value is above the upper value, it means that there is a cointegration relationship between the variables. If the F statistic value is less than the lower value, it is stated that there is no cointegration relationship and if it is among the critical values, no interpretation can be made. In the scope of this research, F statistic was calculated as 29.54935 and I0 and I1 bound values are represented in Table 6 below. Since F statistic value of 29.54935 is higher than critical bounds value in Table 6, it can be stated that that there is a cointegration relationship between the variables.

Table 6. Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

After determination of the long-term cointegration relationship, the long and short-term coefficients are estimated from the ARDL model given in equation (1). The long-term model is defined as:

$$S.EXPORT_t = \alpha_0^* + \sum_{i=1}^{q} \alpha_{1i}^* S.EXPORT_{t-i} + \sum_{i=1}^{p} \alpha_{2i}^* GLOB_{t-i} + \sum_{i=1}^{p} \alpha_{3i}^* INT_{t-i} + \sum_{i=1}^{p} \alpha_{4i}^* FDI_{t-i} + \sum_{i=1}^{p} \alpha_{5i}^* I.E_{t-i} + u_t^* \quad (4)$$

The equation given here in (4) consists of model established according to the hypotheses formed above. The * sign above the coefficients represents the long-term coefficients calculated from the ARDL model.

The existence of cointegration relationship between the variables indicates the existence of short-term error correction mechanism. The short-term error correction model is defined as:

$$\Delta S.EXPORT_t = a_0 + \sum_{i=1}^{q} a_{1i} \Delta S.EXPORT_{t-1} + \sum_{i=1}^{p} a_{2i} \Delta GLOB_{t-1} + \sum_{i=1}^{p} a_{3i} \Delta INT_{t-1} + \sum_{i=1}^{p} a_{4i} \Delta FDI_{t-1} + \sum_{i=1}^{p} a_{5i} \Delta I.E_{t-1} + a_6 ECM_{t-1} + u_t \quad (5)$$

The equation given here in (5) consists of models established according to the hypotheses formed above. In the model, α_6 is called as error correction coefficient. The term of error correction refers to long-term equilibrium rate that occurs in short-term after a shock. The term of negative and statistically significant error correction indicates the existence of a convergence towards the long-term equilibrium point.

4. RESULTS

To analyze the relationships mentioned in the research hypotheses, cointegration analysis was conducted by using ARDL Model described above. The results obtained from ARDL model for long-term period and short-term period are represented in Table 9 and Table 10 respectively, and ARDL results and regression statistics of the model are shown in Table 7 and Table 8 respectively. While the coefficients given in second column of the tables shows the direction of relationship between stated variable in the first column and the dependent variable, which is Turkish service export, the p-value given in the last column of the tables shows whether the relationship between the variable in the

first column of the tables and Turkish service export is significant or non-significant. If the p-value is below the 0,05, it can be stated that the relationship between the variable in the first column and Turkish service export is significant. Otherwise, it cannot be stated that the relationships between the variables are significant. By considering Table 7 and 8, when Table 9 and 10 are examined, it is seen that hypotheses except third hypothesis are approved both in short-term and long-term period.

Table 7. ARDL Results

Variables	Coefficient	Std. Error	t-statistic	p-value
LOG (S.EXPORT (-1))	-0.192048	0.119047	-1.613206	0.1676
LOG (S.EXPORT (-2))	-0.398877	0.114606	-3.480404	0.0177
LOG (S.EXPORT (-3))	0.755245	0.103013	7.331576	0.0007
LOG (I.E)	-0.251558	0.049253	-5.107441	0.0037
LOG (I.E(-1))	-0.508791	0.087463	-5.817244	0.0021
LOG (I.E(-2))	0.079904	0.068698	1.163126	0.2973
LOG (I.E(-3))	-0.238862	0.089233	-2.676847	0.0440
LOG (GLOB)	-1.636890	0.869353	-1.882883	0.1184
LOG (GLOB(-1))	0.731917	0.962498	0.760435	0.4813
LOG (INT)	0.655683	0.074337	8.820441	0.0003
LOG (INT (-1))	-0.318891	0.080781	-3.947622	0.0109
LOG (INT (-2))	-0.108412	0.053529	-2.025292	0.0987
LOG (FDI)	0.174192	0.042179	4.129833	0.0091
LOG (FDI (-1))	0.099225	0.040080	2.475648	0.0561
LOG (FDI (-2))	-0.125671	0.024838	-5.059667	0.0039
LOG (FDI (-3))	0.117753	0.026686	4.412576	0.0069
Constant	8.990355	6.203023	1.449351	0.2069

Table 8. Regression Statistics of the Model

R-Squared	0.999163	**Mean Dependent Var.**	3.152510
Adjusted R-Squared	0.996487	**S. D. Dependent Var.**	0.484553
S.E. of Regression	0.028722	**Akaike Info. Criterion**	-4.198491
Sum Squared Resid	0.004125	**Schwarz Criterion**	-3.355412
Log Likelihood	63.18340	**Hanna-Quin Criterion**	-3.999887
F-Statistic	373.2536	**Durbin-Watson Statistic.**	2.993697
Prob. (F-Statistic)	0.000001		

Table 9. Long-Term Results

Variables	Coefficient	Std. Error	t-statistic	p-value
LOG (I.E)	-1.100072	0.186946	-5,884447	0.0020
LOG (GLOB.)	-1.082918	1.709938	-0.633308	0.5544
LOG (INT)	0.273286	0.024926	10.964003	0.0001
LOG (FDI)	0.317705	0.094152	3.374400	0.0198
Constant	10.758140	7.633648	1.409305	0.2178

Table 10. Short-Term Results

Variables	Coefficient	Std. Error	t-statistic	p-value
DLOG (S.EXPORT (-1))	-0.356368	0.099738	-3.573028	0.0160
DLOG (S.EXPORT (-2))	-0.755245	0.103013	-7.331576	0.0007
DLOG (I.E)	-0.251558	0.049253	-5.107441	0.0037
DLOG (I.E (-1))	-0.079904	0.068698	-1.163126	0.2973
DLOG (I.E (-2))	0.238862	0.089233	2.676847	0.0440
DLOG (GLOB)	-1.636890	0.869353	-1.882883	0.1184
DLOG (INT)	0.655683	0.074337	8.820441	0.0003
DLOG (INT (-1))	0.108412	0.053529	2.025292	0.0987
DLOG (FDI)	0.174192	0.042179	4.129833	0.0091
DLOG (FDI (-1))	0.125671	0.024838	5.059667	0.0039
DLOG (FDI (-2))	-0.117753	0.026686	-4.412576	0.0069
CointEq	-0.835679	0.131701	-6.345288	0.0014
Cointeq = LOG(S.EXPORT) - (-1.1001*LOG(I.E) -1.0829*LOG(GLOB) + 0.2733*LOG(INT) + 0.3177*LOG(FDI) + 10.7581)				

According to the results in the tables, acceptance/rejection situation of the research hypotheses is provided in Table 11.

Table 11. Acceptance / Rejection Situation of Hypotheses

Hypotheses	Test Result
H1: There is a negative and significant relationship between Turkish service export and informal economy.	Accepted
H2: There is a positive and significant relationship between Turkish service export and internet technology.	Accepted
H3: There is a positive and significant relationship between Turkish service export and globalization.	Rejected
H4: There is a positive and significant relationship between Turkish service export and FDI inflow.	Accepted

First, second and fourth hypotheses of this research are accepted because the p-values of each variable related with the hypotheses are below the 0,05 and the direction of the relationships between stated variables are coherent with the

relationship direction mentioned in the first, second and fourth research hypotheses. However, since the p-value of the variable related with third hypothesis is above the value of 0,05 and the found direction of the relationship is not coherent with the direction of the relationship mentioned in third hypothesis, the third hypothesis is rejected.

5. DISCUSSION AND CONCLUSION

According to results, it can be stated that as informal economy in Turkey decreases, number of services that Turkey export increases in both short-term and long-term period. This result might be explained by movement of firms from informal economy to formal economy, recovery in economy and competition, increase in ability to conduct international trade activities.

Since decrease in informal economy is expected to increase Turkish service export, policy makers in Turkey should create policies that can decrease informal economy to enhance service export. In this sense, it can be advised governments to decrease tax rates, to provide incentives to participate in formal economy such as providing credits at desirable interest rates, and to increase awareness of both firms and people about disadvantages of informal economy.

Furthermore, the results have shown that as foreign investors make their investments in Turkey, Turkish service export raises. This result can be clarified by increase in the numbers of firms producing service in domestic market and improvement in international networks of domestic firms.

It is obvious from this result that Turkish government should create policies that attract FDI to enhance Turkish service export. In this sense, Turkish government may provide incentives such as providing land for firms, reduction in tax rates, less bureaucracy, upgrading infrastructure of internet, electricity, transportation, etc., solving the terrorism problem or at least, minimizing the effect of terrorist attacks.

In contrast to hypothesis 3, the results have concluded that globalization is not influential on Turkish service export significantly. On the top of that, the results have also found out negative relationship between the variables.

Although this result must be researched deeply, the possible reasons of the existence of negative relationship might be as follows:

- The competition power of Turkish service exporter in global market might be inadequate. If this is the case, it is logical that as Turkey become more globalized, Turkish service exporting firms will leave from the market. So that, Turkish service export will decrease (see, Bashimov, 2017).
- The global reputation of Turkey might be getting poorer each day. Turkey may be engaging in activities that harm its global reputation. As

Turkey and the World globalize more, people living in different country may not be willing to consume Turkish services because of increasing poor global reputation of Turkey (see, Dimitrova, Korschun & Yotov, 2017).

The possible reasons of existence of non-significant relationship might be as follows:

- Although globalization does not affect Turkish service export, there might be mediating and moderating variables. The globalization might be exhibiting its impact on Turkish service export through mediating and moderating variables (see, Bilgiç, 2019b).
- As is known, while some types of services are not appropriate for international trade because of its nature, some of them are appropriate for international trade. For example, some administrative services provided by governments cannot be traded. So that, if a major part of services is untradeable, the globalization cannot be expected to impact Turkish service export significantly (see, Filipović, Nikolić, & Katić, 2015).
- Another reason might be that globalization might be impactful on service trade when it reaches certain threshold. From this point of view, the last globalization score of Turkey (%64,03) might be below the threshold value that we assume that it exists. So that, globalization's impact may not had appeared on Turkish service export yet.

These reasons ordered above to explain why globalization is not impactful on Turkish service export are only assumptions. These assumptions and other possible reasons that is not mentioned should be researched.

Lastly, it was found out that as internet technology spreads around Turkey, Turkish service export will improve. It is possible to explain this result with the advantages of internet for service trade such as eased communication and increase in ability to reach international customers, and creation of new service fields.

According to data of World Bank for 2018, approximately %70 of people is using internet in Turkey. Compared to countries exporting service in amounts above the world average such as United Kingdom (%94), France (%82), Japan (%85) and United States (%87), the rate of individuals using internet in Tukey is low. In this sense, Turkey must upgrade internet infrastructure around the country (not only in west regions of the country but also in east regions of the country). Also, Turkish government should encourage activities towards development of new software and applications that enhance service export via internet. For example, enterprises, which are like amazon.com, aliexpress.com or are completely innovative and service based, should be supported. In addition, companies producing services and university students should be trained about online services. Through these ways, Turkish service export might be improved.

In sum, this research has investigated the impact of informal economy, internet technology, globalization and FDI on Turkish service export by using ARDL model. Depending on results, possible reasons which might have led to these results have been explained and recommendations for policy makers have provided. This research may also open the doors of new studies. In this sense, it might be advised for future studies to examine countries from different development levels in the scope of service trade. It may also be beneficial to use projection techniques specially to investigate threshold level of globalization if exist. Since there is no perfect study, this research has some limitations including lack of comparison among countries, using only one method, having limited amount of data for some data between 1970 – 2018, and non-inclusion of other critical variables such as exchange rate, GDP, etc.

6. CONFLICT OF INTEREST STATEMENT

There is no conflict of interest between the authors. (Single Author)

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8. AUTHORS CONTRIBUTION

EB: Idea;
EB: Design;
EB: Control;
EB: Resources collection and/or processing;
EB: Analysis and/or interpretations;
EB: Literature review;
EB: Writing;
EB: Critical examination

9. ETHICS COMMITTEE STATEMENT AND INTELLECTUAL PROPERTY COPYRIGHTS

Since this research uses secondary data, there were no need for ethics committee permission. Intellectual property and copyright principles have been taken care at most level in the article.

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