Üçüncü Sektör Sosyal Ekonomi Dergisi
Third Sector Social Economic Review
55(4) 2020, 2157-2167
doi: 10.15659/3.sektor-sosyal-ekonomi.20.10.1423

Research Article

The Interaction Effect of Globalization and Human Capital on Economic Growth: The Case of Turkey[1]

Küreselleşme ve Beşeri Sermayenin Ekonomik Büyüme Üzerindeki Etkileşim Etkisi: Türkiye Örneği

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Makale Gönderme Tarihi	Revizyon Tarihi	Kabul Tarihi
14.07.2020	13.08.2020	09.10.2020

Abstract

This study investigates the interaction effect of globalization and human capital on economic growth in Turkey. The autoregressive distributed lag (ARDL) bounds testing approach is applied in the study, and the dataset covers the period 1984-2017. The results show that the impact of globalization on economic growth is conditional on the human capital level in Turkey. The positive effect of globalization on economic growth increases as the level of human capital increases. That is to say, there is a strong complementary relationship between globalization and human capital in terms of enhancing the economic growth in Turkey.

***Keywords**: Economic Growth, Globalization, Human Capital, Interaction Effect.*

Öz

Bu çalışma, Türkiye'de küreselleşme ve beşeri sermayenin ekonomik büyüme üzerindeki etkileşim etkisini incelemektedir. Çalışmada gecikmesi dağıtılmış otoregresif (ARDL) sınır testi yöntemi uygulanmaktadır ve veri seti 1984-2017 dönemini kapsamaktadır. Elde edilen sonuçlar, Türkiye'de küreselleşmenin ekonomik büyüme üzerindeki etkisinin beşeri sermaye düzeyine bağlı olduğunu göstermektedir. Beşeri sermaye düzeyi arttıkça küreselleşmenin ekonomik büyüme üzerindeki pozitif etkisi artmaktadır. Yani, küreselleşme ve beşeri sermaye arasında ekonomik büyümeyi artırma açısından güçlü bir tamamlayıcılık ilişkisi bulunmaktadır.

***Anahtar Kelimeler**: Ekonomik Büyüme, Küreselleşme, Beşeri Sermaye, Etkileşim Etkisi.*

1. Introduction

The relationship between globalization and economic growth has been frequently studied both theoretically and empirically in the literature. However, there is no consensus on the effects of globalization on economic growth.

[1] The draft version of this study presented at the "6th International Euroasia Congress, May, 18-20, 2020" and published in abstract book.

Önerilen Atıf /Suggested Citation
Ursavaş, U. 2020. The Interaction Effect of Globalization and Human Capital on Economic Growth: The Case of Turkey, *Üçüncü Sektör Sosyal Ekonomi Dergisi,* 55(4), 2157-2167

There are two views about how globalization (openness) affects economic growth. According to the dominant liberal view, globalization promotes economic growth by providing trade and investment opportunities which reduces income inequality and poverty. The other view argues that a higher level of globalization negatively affects the domestic economy. According to this approach, globalization increases economic insecurity and risk, which leads to economic and social inequalities (Rao and Vadlamannati, 2011, p. 795).

According to Rivera-Batiz (2018), openness enhances economic growth via technological change. There are various channels through which openness can influence technological changes. First of all, trade encourages domestic firms to increase R&D activities by increasing local competition. Secondly, trade may affect economic growth by reallocating resources between sectors. For instance, human capital may be reallocated to more productive sectors. The third channel is flowing of knowledge and ideas among countries. More information in each country supports technological change.

The empirical literature clearly shows that the effect of globalization on economic growth differs across countries. Therefore, recent research has mainly focused on the complementary factors of globalization, such as human capital, financial system, institutions, etc. Many researchers investigate the causes of heterogeneity in responses of countries to globalization.

One of the complementary factors emphasized in the literature is human capital. New growth theories (Lucas, 1988; Romer, 1990; Grossman and Helpman, 1991; Aghion and Howitt, 1992) emphasize the role of human capital in the growth process. Furthermore, many empirical studies (Romer, 1989; Barro, 1991; Mankiw, Romer and Weil, 1992; Nonneman and Vanhoudt, 1996; Vandenbussche, Aghion and Meghir, 2006) in the literature show that human capital is an essential factor for economic growth.

How does human capital enhance economic growth? The theoretical growth literature emphasizes at least three mechanisms through which education may affect economic growth. The standard approach is to treat human capital as an ordinary input in the production function. According to this approach, education may increase the human capital, which increases labor productivity, and increasing productivity leads to a higher level of output. The second approach (endogenous growth theories) is to model technological progress or the growth of total factor productivity as a function of the level of human capital. Education can increase the innovative capacity, and new technologies support economic growth. Third, education can facilitate the diffusion and transmission of knowledge which enables us to understand and process new information and to implement new technologies successfully (Benhabib and Spiegel, 1994, pp.143-144; Hanushek and Woessmann, 2020, p. 171). Rivera-Batiz (2018) emphasizes the importance of technological change and innovation in explaining how trade affects economic growth. According to the author, human capital is one of the key resources used in innovative activities, and the quantity of human capital allocated innovation is closely related to technological improvement.

In this study, I investigate the interaction effect of globalization and human capital on economic growth in Turkey. In other words, I analyze whether the impact of globalization on economic growth is conditional on the human capital level. The study uses the ARDL bounds testing approach, and the dataset covers the period 1984-2017.

The rest of the paper is organized as follows; Section two section presents a brief literature review. Section three defines data and methodology. Section four presents the empirical results. Finally, the last part concludes.

2. Literature Review

There are many studies in the literature (Özel, 2012; Doğan, 2013; Eren and Çütçü, 2018; Apaydın, 2019; Apaydın, 2020) analyzing the relationship between globalization and economic conditions in Turkey. However, recent research has mainly focused on the complementary factors of globalization, such as human capital, regulations, financial depth, infrastructure, etc. Most of the empirical studies investigate whether the effects of globalization on economic growth are conditional on the complementary factors.

Bolaky and Freund (2004) argue that openness does not promote economic growth in countries with excessive regulation. The authors investigate whether the effect of openness on growth is conditional on regulations using cross-country regressions for a sample of more than 100 countries. The results confirm that openness is positively related to economic growth in countries with lower regulations.

Chang, Kaltani and Loayza (2005) research the link among economic growth, trade openness, and complementary factors of openness for 82 countries over the period 1960-2000. It is concluded in the paper that the impact of openness on economic growth is conditional on complementary factors. One of the complementary factors examined in the study is human capital. According to the results, when the human capital level is higher, more openness increases economic growth.

Rivas (2007) investigate whether the impact of openness on growth is conditional on income level, infrastructure and human capital in Mexico. The results show that openness will benefit more those states with higher level of income and infrastructure.

Chen and Gupta (2006) investigate whether trade openness promotes economic growth, using data of the SADC region in Africa over the period 1990-2003. The authors find that interaction terms between openness and government expenditures and financial depth have a positive coefficient. This result indicates that trade openness positively affects economic growth with a higher expenditure on education, health and financial depth.

Kneller, Morgan and Kanchanahatakij (2008) investigate the link between growth and openness using liberalization indicators for 37 developing countries. The results state that liberalization positively affects economic growth with a higher level of human capital. Benarroch and Pandey (2008) analyze the relationship between government size and openness for 96 countries over the period 1970-2000. The author finds the insignificant relationship between government size and trade openness. The authors also investigate the interaction effect of trade openness and volatility. The results indicate that the coefficient on the interaction term is positive and statistically significant.

Using GMM (the generalized method of moments) estimation method, Law (2009) examines the effect of openness and capital flows on financial development in developing countries. The results indicate that openness and capital flows are significantly related to financial development. However, the paper analyzes the interaction effect of openness with competition and institutions. The results reveal that openness positively affects financial development via a more competitive environment. Furthermore, the interaction term between institutions and openness is positive and statistically significant. This result indicates that openness positively affects financial development with higher institutional quality.

Babatunde (2011) analyzes the relationship between infrastructure, openness, foreign direct investment in Sub Saharan African countries over the period 1980-2003. The results show that trade openness with higher infrastructure affects foreign direct investment in a positive way.

Hye (2012) investigates the link between openness and growth in Pakistan over the period 1971-2009 using dynamic OLS and ARDL methods. According to the results, trade openness positively affects growth when the human capital level is higher.

Souklazis and Antunes (2012) analyze the link between human capital, foreign trade, and growth in European Union countries applying GMM methodology for the period 1980-2004. It is concluded in the paper that an increase in openness increases growth with a higher level of human capital.

Shahbaz (2012) investigates whether trade openness contributes to economic growth in Pakistan over the period 1991-2011. According to the ARDL bounds test results, openness encourages economic growth. Furthermore, the findings show positive complementarity between openness and human capital in accelerating economic growth.

Samimi and Jenatabadi (2014) analyze the link between economic globalization and economic growth for the period 1980-2008 applying GMM. Besides, the authors investigate the complementary factors of globalization. According to the results, economic globalization positively affects economic growth in OIC countries. The results also show that the positive effect of globalization on economic growth is higher with deeper financial development, and higher human capital.

Vehapi, Sadiku and Petkovski (2015) analyze the relationship between openness and growth in South East European countries applying the GMM method. The findings show that the impact of openness on growth is conditional on complementary factors, and an increase in trade openness increases economic growth with higher foreign direct investment and capital formation.

Sakyi, Comodore and Opoku (2015) analyze the long-term relationship between economic growth, openness, and foreign direct investment in Ghana. The results show that the interaction of FDI with exports has a positive coefficient. This result implies that the impact of FDI on growth is conditional on the export-promotion environment.

Musila and Yiheyis (2015) investigate the interaction effect of physical capital stock and openness on economic growth in Kenya. The results show that the effect of physical capital on growth decreased with increased openness.

İbrahim and Sare (2018) analyze the impact of the interaction of openness with human capital on financial development in African countries over the period 1980-2015. The results show that the interaction of openness with human capital is significantly related to financial development.

Ramzan et al. (2019) analyze whether the impact of FDI on economic growth is conditional on human capital. The results show that the interaction term of FDI with human capital is positive and statistically significant. This result implies that FDI positively affects economic growth with a higher level of human capital in developing countries.

3. Data and Methodology

The annual data covers the period 1984-2017 for Turkey. The data used in the study are GDP per capita, globalization index, human capital index, and finally, the interaction term of globalization index with human capital index. The data are sourced from the Penn World Table (9.1) and the KOF Globalization Index. I use the KOF globalization index as a proxy for globalization because it has the advantage of taking all the possible dimensions (economic, social, and political) of globalization into account. The human capital index is based on average years of schooling and the return to education.

In order to analyze whether the effect of globalization on economic growth is conditional on human capital, the empirical model as follows:

$$Y_t = \beta_0 + \beta_1 KOF_t + \beta_2 HC_t + \beta_3 (KOF^* HC)_t + \varepsilon_t \qquad (1)$$

where Y represents the natural logarithm of GDP per capita, KOF and HC represent globalization and human capital, respectively. Finally, to test whether the effect of globalization on economic growth is conditional on the human capital level, I create an interaction term by multiplying globalization index and human capital index. $KOFHC$ represents the interaction term of globalization with the human capital level.

In this paper, I employ the ARDL bounds testing approach developed by Pesaran, Shin and Smith (2001) to investigate the interaction effect of globalization and human capital on economic growth and the long-run relationship among variables.

The ARDL model used in this study can be expressed as follows:

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{p} \omega_i \Delta Y_{t-i} + \sum_{i=0}^{p} \psi_i \Delta KOF_{t-i} + \sum_{i=0}^{p} \Phi \Delta HC_{t-i} + \sum_{i=0}^{p} \varphi_i \Delta (KOF^* HC)_{t-i} + \delta_1 Y_{t-1} + \delta_2 KOF_{t-1} + \delta_3 HC_{t-1} + \delta_4 (KOF^* HC)_{t-1} + \mu_t$$

(2)

where Δ represents the first difference operator, μ_t denotes the white noise error term.

4. Empirical Results

The first step in the ARDL bounds testing approach is to determine the order of the series. I conduct two different unit root tests to determine the order of the series . According to unit root test results (Table 1), all variables are integrated of order one.

Table 1: Unit Root Tests

Variables		Dickey-Fuller		Phillips-Perron	
		Level	1st Dif.	Level	1st Dif.
Y	Intercept	1.139	-4.858***	1.139	-4.850***
	Trend and intercept	-0.759	-5.182**	-0.759	-5.166**
KOF	Intercept	-1.857	-5.471***	-2.178	-5.471***
	Trend and intercept	-1.592	-5.822***	-1.514	-6.013***
HC	Intercept	4.327	-3.552**	1.762	-3.746***
	Trend and intercept	-0.905	-5.888***	-0.104	-5.561***
KOF*HC	Intercept	-0.364	-6.061***	-0.382	-7.377***
	Trend and intercept	-3.288	-5.953***	-3.311	-7.181***

Note: *** Statistically significant at the 1 percent level. **Statistically significant at the 5 percent level.

The ARDL approach can be applied regardless of whether the series are purely I (0) or I (1), or mutually cointegrated (Pesaran, Shin and Smith, 2001). After confirming that all variables are integrated of order one, I analyze whether there is a long-run relationship among variables. The ARDL bounds test results in Table 2 show that the null hypothesis of no cointegration relationship is rejected. This result implies that there is a long-run relationship among economic growth, globalization, human capital, and the interaction term of globalization with human capital.

Table 2: Bounds Test Results

F-Test	3.796**	
	I(0)	I(1)
1%	3.65	4.66
5%	2.79	3.67
10%	2.37	3.2

Note: **Statistically significant at the 5 percent level.

In the next step, I estimate the long-run coefficients of variables. Table 3 shows the long-run coefficients of the ARDL (1 0 4 0) model. According to the results, the coefficients on globalization and human capital are negative and statistically significant. This result implies that globalization and human capital are strong determinants of economic growth in Turkey.

The coefficient on the interaction term of globalization with human capital is statistically significant. This result reveals that the effect of globalization on economic growth is conditional on the human capital level. The positive impact of globalization on economic growth increases as the level of human capital increases. That is, in the absence of strong human capital, globalization alone may have a negative impact on economic growth. This result confirms that there is a strong complementary relationship between globalization and the human capital level in terms of

enhancing economic growth. This result coincides with the previous studies (Chang, Kaltani and Loayza, 2005; Kneller, Morgan and Kanchanahatakij, 2008; Hye, 2012; Shahbaz, 2012; Sauklazis and Antunes, 2012; Samimi and Jenatabadi, 2014).

It is clear that globalization helps less developed countries to access modern technology. However, access to modern technology may not lead to economic (productivity) growth in less developed countries. Although all countries have equal access to new technologies, the less developed countries do not exploit technology as much as developed countries do, which leads to productivity differences. Technology imported from developed countries may not be appropriate for less developed countries because workers in those countries are unskilled, and they are not able to use imported technology, which requires a skilled workforce (Acemoğlu and Zilibotti, 1999). The result in this study also supports the idea of knowledge and technology diffusion, which argues that technology transferred through trade can only be absorbed and developed through higher levels of education (Sauklazis and Antunes, 2012).

By using coefficients (Table 3), I estimate cut-off points. The impact of globalization on economic growth is only positive if the level of human capital is higher than 1.86. Furthermore, the effect of human capital on economic growth is positive as long as the KOF globalization index is higher than 54.

From Table 3, the coefficient of the error correction term (-0.599) is statistically significant at 1% significance level. The error correction term shows the pace of adjustment towards long-run equlibrium following a short-run shock. The results indicate that about 59% adjustment in a year from short-run disequilibrium to long-run equilibrium.

Table 3: Long-run Estimation Results

Dependent variable: Y		
Variable	**Coefficients**	**t-values**
KOF	-0.195***	-6.451
HC	-5.655***	-3.893
KOF*HC	0.105***	5.780
Diagnostic tests	**Test-statistics**	**p-values**
Serial correlation LM	0.484	0.623
Heteroskedasticity	0.761	0.639
Normality test	0.931	0.627
Functional form	0.130	0.878
CUSUM	Stable	
CUSUMSQ	Stable	
EC(-1)	-0.599***	

Note: ***Statistically significant at 1 percent level.

4. Conclusion

In this paper, I analyze the interaction effect of globalization and human capital on economic growth in Turkey over the period 1984-2017 using the ARDL bounds testing approach. In other words, I examine whether the impact of globalization on economic growth is conditional on the human capital level.

The results reveal that globalization and human capital are important determinants for economic growth in Turkey. According to the results, the coefficient on the interaction term of globalization with human capital is statistically significant. This result implies that the impact of globalization

on economic growth is conditional on the level of human capital in Turkey. The positive effect of globalization on economic growth increases as the level of human capital increases. However, in the absence of strong human capital, globalization alone would be harmful to economic growth in Turkey. In other words, there is a strong complementary relationship between globalization and the human capital level in terms of enhancing economic growth.

Thanks to globalization, less developed countries import modern technology from developed countries. However, access to modern technology may not generate economic growth in less developed countries. Less developed countries need the skilled workers required to absorb and use modern technology efficiently. Countries with a higher level of human capital or skilled workers may faster and better imitate and exploit imported technology (Mayer, 2001; Hye, 2012; Samimi and Jenatabadi, 2014).

It seems that globalization alone does not guarantee economic growth in Turkey. The results show that globalization may not be helpful in Turkey with a low level of human capital. In order to take advantage of the globalization process, Turkey should focus on complementary factors of globalization. Human capital is one of those factors enabling countries to benefit from globalization. Turkey should adopt education policies that aim to improve the quality of education. The education policies that improve human capital and labor skills will ensure that globalization leads to economic growth in Turkey.

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Araştırma Makalesi

The Interaction Effect of Globalization and Human Capital on Economic Growth: The Case of Turkey

Küreselleşme ve Beşeri Sermayenin Ekonomik Büyüme Üzerindeki Etkileşim Etkisi: Türkiye Örneği

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Genişletilmiş Özet

Son dönemlerde küreselleşme ve ekonomik büyüme ilişkisini inceleyen çalışmalar (Chang, Kaltani ve Loayza, 2005; Chen ve Gupta, 2006; Hye, 2012; Jenatabadi, 2014; Sakyi, Commodore ve Opoku, 2015; İbrahim ve Sare, 2018) küreselleşmenin tek başına ekonomik büyüme üzerindeki etkisinden ziyade, küreselleşmenin ekonomik büyüme üzerindeki etkisinin kurumsal kalite, finansal derinlik, beşeri sermaye, ihracat yapısı gibi başka tamamlayıcı faktörlere bağlı olup olmadığını incelemektedir.

Küreselleşmenin ekonomik büyüme üzerindeki etkisinin yönünü belirleyen tamamlayıcı faktörlerden biri de beşeri sermayedir. Kneller, Morgan ve Kanchanahatakij (2008), 37 gelişmekte olan ülke özelinde ticari açıklık ve ekonomik büyüme ilişkisini inceledikleri çalışmalarında daha yüksek beşeri sermaye düzeyi varlığında liberalizasyonun ekonomik büyümeyi pozitif etkilediği sonucuna ulaşmışlardır. Souklazis ve Antunes (2012), Avrupa Birliği ülkelerinde daha yüksek beşeri sermaye seviyesinde ticari açıklıktaki artışın ekonomik büyümeyi artırdığı sonucuna ulaşmışlardır. Hye (2012), Pakistan'da ticari açıklık ve ekonomik büyüme arasındaki ilişkiyi incelediği çalışmasında beşeri sermayenin yüksek olduğu durumda ticari açıklığın ekonomik büyümeyi pozitif etkilediği sonucuna ulaşmıştır.

Bu çalışmada, Türkiye'de 1984-2017 döneminde küreselleşme ve beşeri sermayenin ekonomik büyüme üzerindeki etkileşim etkisi incelenmektedir. Çalışmada ARDL sınır testi yöntemi kullanılmaktadır. Analizde kullanılan değişkenler; ekonomik büyümeyi temsilen kişi başı GSYİH değerinin doğal logaritması, küreselleşme endeksi, beşeri sermaye endeksi ve son olarak etkileşim etkisini test etmek amacıyla oluşturulan; beşeri sermaye ve küreselleşme endekslerinin çarpımından oluşan etkileşim değişkenidir.

Sınır testi bulguları değişkenler arasında uzun dönemli bir ilişkinin varlığını işaret etmektedir. Uzun dönem katsayıları incelendiğinde küreselleşme ve beşeri sermaye endekslerinin çarpımından oluşan etkileşim değişkeninin ekonomik büyüme üzerindeki etkisinin pozitif ve istatistiksel olarak anlamlı olduğu görülmektedir. Bu bulgu, küreselleşmenin ekonomik büyüme üzerindeki etkisinin beşeri sermaye düzeyine bağlı olduğunu göstermektedir. Diğer bir deyişle ekonomik büyümeyi artırma açısından küreselleşme ve beşeri sermaye arasında güçlü bir tamamlayıcılık ilişkisi bulunmaktadır. Küreselleşmenin ekonomik büyüme üzerindeki pozitif

etkisi, beşeri sermaye düzeyi arttıkça artmaktadır. Bu bulgu literatürde beşeri sermaye ve küreselleşme arasındaki etkileşim etkisini inceleyen benzer çalışmaların (Chang, Kaltani ve Loayza, 2005; Kneller, Morgan ve Kanchanahatakij, 2008; Hye, 2012; Shahbaz, 2012; Samimi ve Jenatabadi, 2014) bulguları ile paralellik göstermektedir.

Küreselleşme sürecinin az gelişmiş veya gelişmekte olan ülkelerin teknolojiye erişmesine yardımcı olduğu açıktır; ancak transfer edilen bu teknoloji ekonomik büyümeye yol açmayabilir. Acemoğlu ve Zilibotti (1999), her ülkenin küreselleşme sürecinden kaynaklı yeni teknolojilere ulaşma şansı olsa da az gelişmiş ülkelerin gelişmiş ülkelere kıyasla verimlilik farklılıklarına yol açacak oranda teknolojiden faydalanmadığını savunmaktadır. Çünkü az gelişmiş ülkeler vasıflı işgücü yetersizliğinden dolayı teknolojiyi özümsemek ve verimli kullanmak noktasında gelişmiş ülkelerin gerisindedir. Beşeri sermayesi daha yüksek olan ülkeler, teknolojiyi daha hızlı ve daha iyi taklit edebilir ve sonucunda teknolojiden daha fazla verimlilik elde ederek daha yüksek büyüme oranlarına erişebilir (Mayer, 2001; Hye, 2012; Samimi ve Jenatabadi, 2014).

Türkiye'nin küreselleşme sürecinden fayda sağlaması küreselleşmenin tamamlayıcı faktörlerine bağlıdır. Bu faktörlerden biri de beşeri sermayedir. Analiz bulguları Türkiye'de düşük beşeri sermaye varlığında küreselleşmenin ekonomik büyümeyi artırmayabileceğini, bununla birlikte yüksek beşeri sermaye varlığında ise küreselleşmenin ekonomik büyümeyi pozitif etkilediğini göstermektedir. Bu nedenle eğitimin kalitesini artırmayı amaçlayan, niceliğe değil niteliğe öncelik veren eğitim politikaları benimsenmelidir.