

Evaluation of openness effects on economic growth in Turkey

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Article Info	Abstract
<p>Research Article</p> <p>Received: 9 April 2021 Revised: 10 July 2021 Accepted: 11 July 2021</p> <p>Keywords: International trade, Labour productivity, Trade openness, Economic growth, Capital formation</p>	<p>Especially, after 1980, the effect of labour productivity and capital investments on income per capita observed in open economies in the globalizing trade system has attracted the attention of growth economics literature. In this study, the relationship between labour productivity, fixed capital investments and foreign trade openness in Turkey between 1980-2016 was examined by the ARDL method. The results match the findings of foreign trade and growth theories which argue that increase in openness of foreign trade, technology factor, labour productivity and fixed capital investments affect the economic growth process in a positive and significant way. In this sense, among the findings, the increasing level of integration into global trade causes technology and know-how transfer, the growth rate increases together with labour and capital efficiency in the next stage.</p>

1. Introduction

In Turkey, it has been implementing adaptive economic policies which were requirements of domestic and foreign conditions since the 1920s. The development implementations which began with governmental leadership evolved to the subvention of the private sector in the trials of planned industrialization and import substitute and evolving towards increasingly more liberal market structure in the continuation, under the effect of domestic and foreign market dynamics. Especially, the aftermath of the economic and political crises that were witnessed in the 1970s, with a revolutionary political declaration known as 24th January Economic Stability Measures, liberalization implementations transferred into a different level since 1980. In the 1980s, compared to previous periods, real and financial sectors testified a complete liberalization transformation. The excessive implementations of liberalization policies prepared the ground for economic crises of the subsequent 20 years (Yıldırım, 2001; Kazgan, 2002; 2012; Yeldan, 2006; 2013).

The period of 2002-2007 was a period of economic restructuring with reform packages. The yield of these reforms has been a five-year stable growth trend. The growth that slowed down after the effects of the 2008 World Financial Crisis was seen as of 2009, declined below the long-term average growth rate. Despite the negativities encountered at global and national levels, no restrictions were imposed on openness in the economy, only increases and decreases were experienced depending on the cyclical developments. As a result of these developments, which started in 1980 after the liberalization moves in Turkey has developed a substantial literature that examined the impact of trade openness on economic growth (Boratav, 2017; Pamuk, 2012).

The main goal of our study is to indicate the relationship between trade openness and growth in Turkey for 1980 - 2016 years. Economic growth is an increasing GDP of the country relative to the previous year, in a simple definition. By taking the population effect into account and evaluating economic growth as GDP per capita is important for an accurate calculation. It can be claimed that the most important source of economic growth is productivity as a more technical description. In this sense, productivity is one of the most significant determinants of an economy's long-term growth (Kepenek and Yentürk, 1994; Yalman, 2009; O'Sullivan et al., 2011).

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Improvement and development studies are generally analysed together in literature. Origins of growth approaches and researches go back to the classic economic theory. And all of these approaches acknowledge labour, natural resources, and added value are the components of growth. Growth is evaluated as an exogenous matter completely and explained that growth can occur through improved labour productivity of capital accumulation (Kurz and Salvadori, 2003).

The classical theory of international trade, which advocates free trade, developed by the two outstanding British economists; Adam Smith and David Ricardo. Adam Smith in his famous book *The Wealth of Nations* published in 1776 developed the concept of absolute advantage, the ability of a country to produce a good using fewer productive inputs than is possible anywhere else in the world, which is understood as a basis for international trade. David Ricardo published his ideas on international trade in his book *On the Principles of Political Economy* in 1819 where he developed the concept of comparative advantage which is the most significant concept of international trade that determines fundamental trade partners. Ricardo's contribution to international trade theory has been deemed so important, so that classical trade theory is also referred as Ricardian theory (Smith, 2006 (1776); Husted and Melvin, 2010).

The classical comparative advantage theory of free trade is a static model based on strictly on a one variable factor (labor cost), and complete specialization approach to creating the gains from trade. It is assumed that in the classical model, trade arises from fixed but different labor productivity for different goods in different countries. Compare to the classical model, the two Swedish economists, Eli Heckscher and Bertil Ohlin created the neoclassical Heckscher-Ohlin (HO) factor endowment model in the early twentieth century. The HO theory assumes to take into account differences in factor supplies (land, labor, capital) on international specialization. The basis for trade arises not because of inherent technological differences in labor productivity for different goods between different countries, but because countries are endowed with different factor supplies. For example, if a country owns rich land and labor resources, that country can produce wheat with lower cost and prices, then cheaper wheat can be exported to abroad; in return for imports of capital-intensive goods. The factor endowment theory implies that capital-abundant countries will tend to specialize such products as automobiles, aircraft, electronics, computers which use capital intensively. They export some of these capital-intensive products in exchange for the labor or land intensive products like food, raw materials, and minerals that can best be produced by countries that are relatively well endowed with labor or land (Todaro and Smith, 2015).

Since the Second World War many countries tried to adopt international trade policies in order to fasten their economic growth. As governments consider that foreign trade significantly affects their economic growth, then they tried to increase their export revenues or in some sense they tried to reduce their import bills. In the literature three approaches can be seen in order to regulate their international trade policies which are i) primary-export-led, ii) outward-looking, and iii) import substitution development policies. Primary-export-led development strategy involves government programs designed to exploit natural comparative advantage by increasing production of a few export goods most closely related to the country's resource base and exporting them in return for manufactured goods produced elsewhere. Examples of this strategy are coffee in Columbia, petroleum in Mexico and Nigeria, and rubber in Malesia. Secondly outward-looking development policies involve government support for manufacturing sectors in which a country has potential comparative advantage. Successful examples are Japan, Hong Kong, South Korea, Singapore, and Taiwan. Finally import substitution development policies tried to reduce import bills by encouraging domestic industrialization behind high barriers to foreign goods. It is argued that high production costs and inefficient government interventions created unsuccessful examples in the different parts of the world (Husted and Melvin, 2010).

The protectionist theories argued by Singer (1950) and Prebisch (1962) were advocated by many developing countries, especially Latin American countries, and applied as a foreign trade policy throughout the 1950s, 1960s, and 1970s. After the Second World War, as a result of the lacking growth performances of Latin American countries that implemented import substitution policies compared to East Asian countries, these countries started to adopt more outward-looking growth strategies. After 1980s, these countries began to reduce trade barriers and implement to market-based open economy policy¹ (Singer, 1950; Singer, 1975; Prebisch, 1962; Edwards, 1993). Second phase of literature review is related with growth theories itself. Since Second World War, it has been argued that rapid economic growth of national economies is highly depend on increases on physical capital investments. It means that if more physical capital investments are taking place, then the growth rates of national

¹ Aftermath the 24th of January 1980 declaration in Turkey, leaving import substitute policies and change to open growth strategy are important indicators of policy implementations in Turkey at global level.

economy would be higher. In this respect the models of Harrod-Domar and Solow draw particular attention. Lately Romer's new growth theory is also important with respect to productivity increases due to advances in education, research and technological level in the society.

Harrod – Domar's growth model suggests that investments that bring about an increment in existent capital stocks will achieve economic growth. Therefore, including domestic and foreign savings into the economy is necessary to realize growth. Solow added labour variable into the Harrod – Domar model which includes capital variable and commented technology as an exogenous factor that affects labour and capital together and determinative of long – term growth. The model, which is known as traditional neoclassical growth theory, explained growth as an improvement on at least one of labour quality, capital stock, and technological development components. Furthermore, Solow put labour productivity into his model and calculated the growth of labour productivity as 2 percent per year in developed countries (Harrod, 1939;1959; Domar,1946;1948; Solow, 1956; Sato, 1964; Asimakopulos:1986; Todaro and Smith, 2015; Krugman and Wells, 2013).

According to Romer and Lucas, the representatives of the new growth approach, productivity improvement is in the core of growth and emphasizes the technology factor which supports it. In this frame, international trade contributes to economic growth considerably through the spill-over of technology and externality. The technologically developed countries make underdeveloped countries learn these technologies gradually, contribute to information exchange owing to present extend market opportunities and improving competitiveness through international trade. According to Krugman who is accepted as representative of new trade theory, international trade contributes to economic growth by increasing the production capacity of the economy and providing effective resource distribution between the final goods producer sector and the knowledge producer sector (Romer, 1986; Lucas, 1988; Grossman and Helpmann, 1994; Chen, 2009).

2. Studies on the relationship of openness and growth

As a consequence of all these theories, evaluating the relationship between growth and trade openness has importance. Thus, foreign trade openness causes prosperity expansion through factor and production mobility besides market expansion brings by merchandise trade. Therefore, the relationship between international trade and growth has been theme of economic growth literature in all periods. Generally, the contribution of international trade to the economy, more specifically throughout spill over of technology and externalities, improves productivity through providing efficiency on resource distribution and acquiring raw materials (Klump et al., 2007; Chen, 2009; Weil, 2009). While foreign trade allows the importation of goods and services that are not owned due to lack of natural resources and factor accumulation, it increases competition by forcing companies operating in industry branches to compete through technology transfer. The size of foreign trade can be obtained by summing imports and exports in currency (Baldwin, 2004; Weil, 2009; Buchanan, 2014; Değirmen and Şengönül, 2014).

There are many studies conducted using different variables in the analysis of the relationship between trade openness and growth which are consistent with the findings of this study. Ben-David's study on openness and income convergence, Harrison's (1996) panel analysis on the relationship between trade and growth, Wacziarg's (1998) study in order to determine channels which effect of trade openness on economic growth in 57 countries, and the panel analysis study conducted by Riezman et al. (1995) covering 126 countries between 1950-1990 can be given as an example. Generally, the results of these studies show the existence of a significant relationship between openness and growth (Ben-David, 1993; Harrison 1996; Wacziarg, 1998; Riezman et al., 1995; Rodriguez and Rodrik, 2001).

The same results were found in the studies which have been carried out for Turkey. Ay and others (2004) indicated, in the analysis of 1980–2004 data, that there is a mutual relationship between international trade and economic growth. The study of Utkulu and Özdemir (2004), indicated this relationship as two-sided. Demirhan (2005) used quarterly data belong to the 1st quarter of 1987 – 3rd quarter of 2004 and demonstrated the existence of an effect directed from import to growth. Erdoğan (2006) reached a result that displays the existence of this relationship for long term such 1923 – 2004 years in his study. Korkmaz and Aydın (2015) found a bi-directional causality between import and economic growth, and one-way causality towards export for 1st quarter of 2002 and 2nd quarter 2014 import-led growth and growth-driven import hypotheses. Pata (2017) obtained that there is a positive one-way and statistically significant causality relationship from exports, imports and foreign trade to economic growth in the short run for 1971-2014 period. He also indicated that export-led growth and import-led growth hypotheses are valid for the Turkish economy. Şahin and Durmuş (2018) found a two-way causality relationship between imports and economic growth, and one-way causality towards export for 2002-01 and 2017-01.

Their findings support growth hypotheses (Ay et al., 2007; Utkulu and Özdemir 2004; Demirhan, 2005; Erdoğan, 2006; Koçak and Uçan, 2014; Korkmaz and Aydın, 2015; Pata, 2017; Şahin and Durmuş, 2018).

For instance, in some recent studies; for 1996-2006, Aktaş (2009) determined the existence of a two-sided relationship between export, import, and growth in the short-term; found the existence of one-sided relationship in the long-term. Korkmaz, Çevik, and Birkan (2010) found the result that the improvement of export impacts growth positively in their analysis for 1990 – 2008 years. Kıran and Güriş (2011) reached a mutual relationship between trade openness and growth in their study which had been carried out with data from 1992 – 2006 years; nevertheless, they found no meaningful correlation between financial openness and growth. Acaravcı and Akyol (2017) found the impact of foreign direct investments and imports on short-term growth in their study which was implemented for Turkey's international trade with the 1st quarter of 1998 and 1st quarter of 2015 data. They demonstrated that knowledge that spills-over by international trade, increases economic growth. Huchet et al. (2018) observed that trade openness may have a negative impact on the countries which have low-quality export goods portfolio based on 4 years of average data between 1988 and 2014 years for 169 countries. Uslu (2018) reached the evidence of trade openness decreases national income in the short-term but increases in the long-term using 1960 – 2017 yearly data as a consequence of multiple structural break analyses for Turkey. Short- and long-term correlation was determined among national income per capita and capital accumulation and labour force growth (Aktaş, 2009; Korkmaz et al., 2010; Kıran and Güriş, 2011; Acaravcı and Akyol, 2017; Huchet et al., 2018; Uslu, 2019).

The existence of a positive correlation between economic growth and trade openness can be claimed according to studies that are presented from the World and Turkey. In these studies, various variables were used to analyse the correlation between international trade and growth and carried out analysis through regression models that were created with them. While, in this study, model variables were determined as GDP per capita, trade openness, the share of fixed capital investments in GDP, and labour productivity.

3. Data and methodology

In empirical studies, the most accepted method to measure trade openness is the proportion of the international trade volume that is calculated as the sum of export and import to GDP. Besides this calculation, there are alternative methods in particular for countries such as average tariff proportion, protection of non-tariff barriers ratio, non-tariff limitations, average tariff proportions, black market premium, the existence of socialist regime for the economy and governmental monopolies. Here are some other indexes and calculations; Sachs-Warner openness index which was used by Edwards to describe the correlation among trade openness and growth, subjective classification of trade strategies of World Bank in 1987 World Development Report, openness index of Lerner, average black market premium, United Nations Conference on Trade and Development average import tariffs, average protections of non-tariff barriers, subjective distortion index of Heritage Foundation in international trade, the proportion of total revenues from trade taxes to total trade and regression-based index of import distortions of Wolf for 1985. Total factor productivity and the above-mentioned indexes included models indicate a significant and positive relationship between trade openness and economic growth (Robinson, 1945; Lewis, 1954; Laffer, 1968; World Bank, 1987; Lerner, 1988; Wolf, 1993; Johnson and Sheehy, 1996; 1998; Arıcanlı and Rodrik, 1990; Rodrik, 1991; Rodriguez and Rodrik, 2001; Sachs and Warner, 1995; Sachs et al., 1995).

$$GDPPC = \beta_0 + \beta_1 (X+M)/GDP + \beta_2 FCI + \beta_3 LP + \varepsilon$$

In our regression model, (X+M)/GDP calculated as the proportion of the sum of export and import to GDP, which represents trade openness. FCI independent variable is the share of fixed capital investments in GDP. LP as an independent variable represents labour productivity. Labour productivity indicates output per employee that is a proportion of GDP to total employment or GDP per employee in another meaning. The purpose of using fixed capital investments and labour productivity variables together with trade openness in our model is to separate total factor productivity and demonstrating the contribution to GDP growth more clearly. Thus, we purposed to make findings more interpretable in the frame of the assumptions of neoclassical and endogenous growth theories (Dornbusch et al., 2011; Todaro and Smith, 2015; Krugman and Wells, 2013).

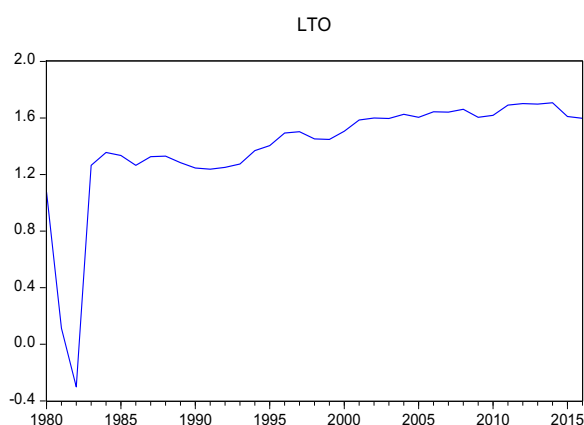
Based on this information, our H_0 hypothesis assumes that trade openness has no positive impact on economic growth while our H_1 hypothesis assumes that trade openness has a positive impact on economic growth. The positive externalities of trade openness penetrate economic growth via some channels such as the revenue accelerator impact of export and the boosting investment and technology transfer impacts of importing. We expect that fixed capital investment and labour productivity variables that we used together with trade openness demonstrate

the same impact on GDP per capita, too. On the other hand, in this time series model that we consider, we construct the first-order lag difference equation below.

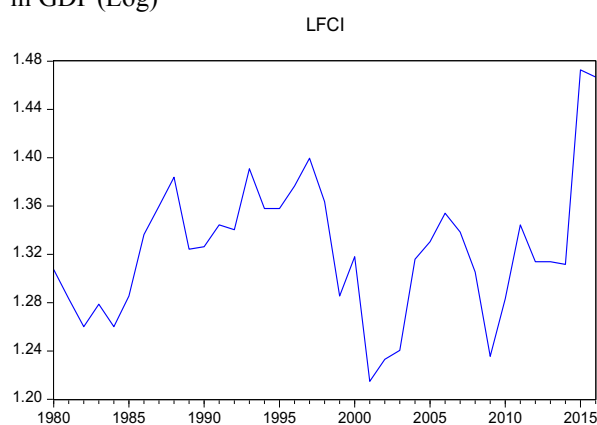
$$\Delta GDP_{PC} = \beta_0 + \beta_1 \Delta(X+M)/GDP + \beta_2 \Delta FCI + \beta_3 \Delta LP + \varepsilon$$

Variables were considered at the logarithmic level. Augmented Dickey-Fuller (ADF), Philips Perron, Kwiatkowski–Phillips–Schmidt–Shin (KPSS), and Breakpoint Unit Root test which was presented by EViews 9 were implemented to series to determine the level of cointegration. Furthermore, these tests provided an insight to decide the form and year of structural break such as innovative or adaptive-outlier (Yurdakul, 2000; Torun, 2015; Perron, 1989; Vogelsang and Perron, 1998; Zivot and Andrews, 1992; Banerjee et al., 1992).

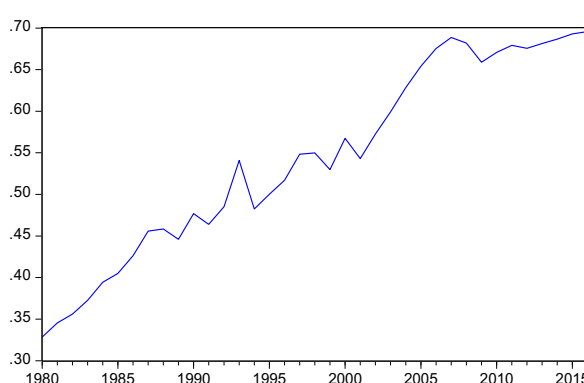
Graph 1. Trade Openness (Log)



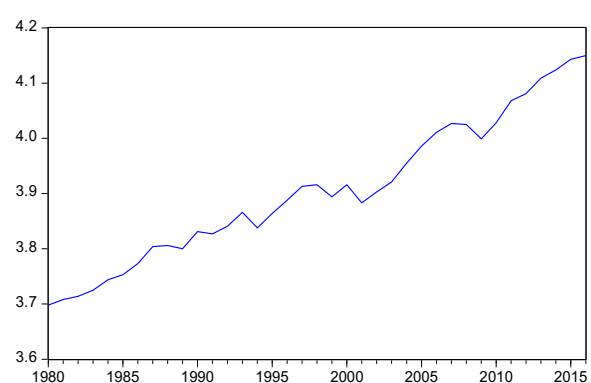
Graph 2. The Proportion of Fixed Capital Investments in GDP (Log)



Graph 3. Labour Productivity (Log)



Graph 4. GDP per Capita (Log)



The results of the unit root test which were estimated for labour productivity independent variable presented on table 7, 8, and 9. In ADF and Philips-Perron tests, stationarity was obtained at the first difference tests. Stationarity was observed at the level and the first difference in the KPSS test, but estimations of trend and average did not give stationary results.

ARDL bound test approach chose as an appropriate econometric method way to determine cointegration because of detecting stationarity at different levels. Breakpoint unit root test was implemented to trade openness variable. In order to eliminate autocorrelation between error terms, we determined for 12 lags. Considering the economic developments and unit root test results, 2008 was found suitable for the breaking year and dummy variable. In order to determine the breaking year at trend level, the years that up to breaking year valued as 0, breaking year and later years valued as 1.

If there is a correlation between error terms, it has to be eliminated for having efficient and biased parameters in the ARDL model. Therefore, among all lag combinations, according to Akaike Information Criteria “ARDL (3,1,3,0,3)” determined as the most appropriate model through utilized from “Q-Prob” value. These lags were assigned for variables GDP_{PC} (3), (X+M)/GDP (1), FCI (3), LP (0), and DUMMY (3), respectively.

Unit root test results are presented in Chart 1- 9.

Table 1. Augmented Dickey Fuller test results for trade openness variable

(Test for Unit Root In)	Include in Test Equation	t-%5	T-Stats	Prob
Level	Individual Intercept	-2,95	-2,57	0,1076
Level	Trend and Individual Intercept	-3,54	-3,75	0,0309
Level	Null Hypothesis	-1,95	-0,40	0,5319
First Difference	Individual Intercept	-2,95	-6,95	0
First Difference	Trend and Individual Intercept	-3,56	-3,76	0,0325
First Difference	None	-1,95	-6,94	0

Note: For the purpose of avoiding autocorrelation, Schwartz Info Creation proposed 12 lags.

Table 2. Philips-Perron Test Results for Trade Openness independent variable

Test for Unit Root In	Include in Test Equation	PP-%5	PP-Stats	Prob
Level	Individual Intercept	-2,94	-2,61	0,18
Level	Trend and Individual Intercept	-3,54	-3,20	0,03
Level	Null Hypothesis	-1,95	-0,01	0,67
First Difference	Individual Intercept	-2,94	-7,91	0
First Difference	Trend and Individual Intercept	-3,54	-9,54	0
First Difference	Null Hypothesis	-1,95	-7,45	0

Note: For the purpose of avoiding autocorrelation, Bartlett Kernel criterion proposed 3 lags.

Table 3. KPSS unit test results for trade openness variable

Test for Unit Root In	Include in Test Equation	LM- Stats	LM-%1	LM-%5
Level	Individual Intercept	0,66	0,73	0,46
Level	Trend and Individual Intercept	0,12	0,21	0,11
First Difference	Average	0,50	0,73	0,46
First Difference	Trend and Individual Intercept	0,48	0,21	0,14

Note: For the purpose of avoiding autocorrelation, Bartlett Kernel criterion proposed 3 lags.

ADF, Philips-Perron, and KPSS test results are presented on table 1, 2, and 3. First difference level of trade openness serial became stationary.

Table 4. Augmented Dickey Fuller unit root test results for Fixed Capital Investments variable

Test for Unit Root In	Include in Test Equation	t-%5	t-Stats	Prob
Level	Individual Intercept	-2,94	-2,05	0,26
Level	Trend and Individual Intercept	-3,54	-2,13	0,51
Level	Null Hypothesis	-1,95	0,48	0,81
First Difference	Individual Intercept	-2,94	-6,25	0
First Difference	Trend and Individual Intercept	-3,54	-6,23	0,0001
First Difference	Null Hypothesis	-1,95	-6,26	0

Note: For the purpose of avoiding autocorrelation, Schwartz Info Creation proposed 12 lags.

Table 5. Philips-Perron unit root test results for Fixed Capital Investments independent variable

Test for Unit Root In	Include in Test Equation	PP-%5	PP-Stats	Prob
Level	Individual Intercept	-2,94	-2,14	0,23
Level	Trend and Individual Intercept	-3,54	-2,31	0,41
Level	Null Hypothesis	-1,95	0,76	0,87
First Difference	Individual Intercept	-2,94	-6,54	0
First Difference	Trend and Individual Intercept	-3,54	-6,49	0
First Difference	Null Hypothesis	-1,95	-6,45	0

Note: For the purpose of avoiding autocorrelation, Bartlett Kernel criterion proposed 3 lags.

Table 6. KPSS unit root test results for Fixed Capital Investments independent variable

Test for Unit Root In	Include in Test Equation	LM- Stats	LM-%1	LM-%5
Level	Individual Intercept	0,12	0,73	0,46
Level	Trend and Individual Intercept	0,10	0,21	0,14
First Difference	Individual Intercept	0,22	0,73	0,46
First Difference	Trend and Individual Intercept	0,13	0,21	0,14

Note: For the purpose of avoiding autocorrelation, Bartlett Kernel criterion proposed 3 lags.

ADF, Philips-Perron, and KPSS test results are presented on table 4, 5, and 6. First difference level of trade openness serial became stationary.

Table 7. Augmented Dickey Fuller unit root test for Labour Productivity independent variable

Test for Unit Root In	Include in Test Equation	t-%5	t-Stats	Prob
Level	Individual Intercept	-2,94	-1,40	0,56
Level	Trend and Individual Intercept	-3,54	-2,81	0,20
Level	Null Hypothesis	-1,95	2,47	0,99
First Difference	Individual Intercept	-2,94	-7,69	0
First Difference	Trend and Individual Intercept	-3,54	-7,80	0
First Difference	Null Hypothesis	-1,95	-6,12	0

Note: For the purpose of blocking autocorrelation 12 lags were implemented and utilized from Schwartz Info Creation to

Table 8. Philips-Perron unit root test results for Labour Productivity independent variable

Test for Unit Root In	Include in Test Equation	PP-%5	PP-Stats	Prob
Level	Average	-2,94	-1,40	0,56
Level	Trend and Individual Intercept	-3,54	-2,80	0,20
Level	Null Hypothesis	-1,95	3,07	0,99
First Difference	Individual Intercept	-2,94	-7,69	0
First Difference	Trend and Individual Intercept	-3,54	-8,03	0
First Difference	Null Hypothesis	-1,95	-6,16	0

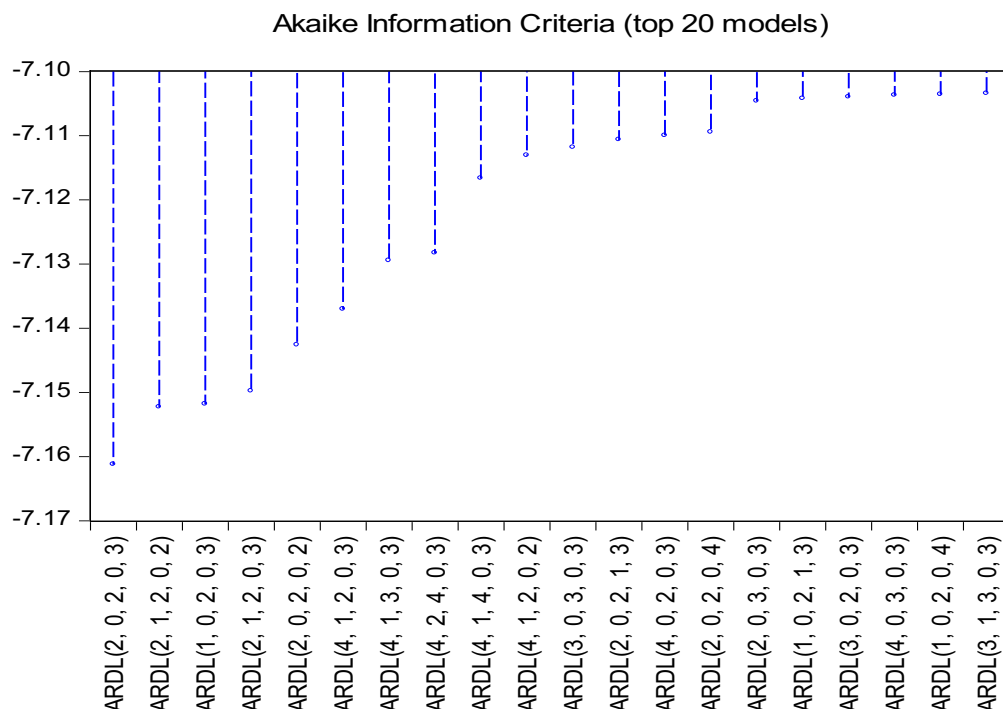
Note: For the purpose of blocking autocorrelation 3 lags implemented and utilized from Bartlett Kernel criteria to deter-

Table 9. KPSS unit root test results for Labour Productivity independent variable

Test for Unit Root In	Include in Test Equation	LM- Stats	LM-%1	LM-%5
Level	Individual Intercept	0,71	0,73	0,46
Level	Trend and Individual Intercept	0,09	0,21	0,14
First Difference	Individual Intercept	0,14	0,73	0,46
First Difference	Trend and Individual Intercept	0,04	0,21	0,14

Note: For the purpose of blocking autocorrelation utilized from Bartlett Kernel criteria to determine lag length.

Graph 5. ARDL bound test lag length



Note: According to Akaike information criterion, the model which has the highest value was chose.

Aftermath the determination of lag length, we can test through the hypothesis below:

H_0 : No correlation between error terms.

H_1 : Correlation between error terms.

Table 10. Breusch-Godfrey serial correlation LM test

F-Stats	Observed R ²	Prob- F (2, 20)	Prob-Chi Square (2)
0.666105	2.123320	0.5247	0.3459

Note: According to the results of Breusch-Godfrey Serial Correlation LM Test correlation between error terms were removed at 2 lags.

At this stage, the results of the F-test are presented to determine the accuracy of applying the ARDL limit test according to the boundary test approach that takes into account the existing delays.

Table 11. ARDL bound test critical values and estimated value

Test Stats	Value	k	Lower Bound	Upper Bound
F-Stats	3,535818	4	2,45	3,52

Before the recent literature on unit root and cointegration, empirical analysis of level relationships had a complementary status to time series econometrics. However, in the first studies in the literature, it developed on the calculation of the level relationship rather than testing their existence. In our study, since the calculated F statistic is significantly higher than the critical table values, it is possible to talk about the existence of cointegration between our variables of openness, GDP, labour productivity, and investments in the long run (Pesaran et al., 2001).

Table 12. ARDL cointegrated form and long-term parameters

Variable	Parameter	t-Stats	Prob
D (L-GDPPC REAL (-1))	0,1758	1,2609	0,2205
D (L-FCI)	0,1032	3,6568	0,0014
D (L-LP)	0,6065	10,2005	0,0000
D (L-LP (-1))	-0,2490	-2,2080	0,0380
D (L-TO)	0,0382	1,9554	0,0633
D (DUMMY2008)	-0,0009	-0,1440	0,8868
D (DUMMY2008	-0,0255	-2,9211	0,0079
D (DUMMY2008 (-2))	-0,0123	-1,3467	0,1918
CointEq (-1)	-0,3826	-5,6147	0,0000

According to the ARDL bound test which considers the result of regression test between long-term parameters and error term intended to test of whether there is the existence of cointegration error term parameter was found between 0 and -1. Hence, we testified a long-term cointegration among the variables in our model.

Table 13. Long-term parameters

Variables	Parameters	t-Stats	Prob
Trade Openness	0,0998	1,8669	0,0753
Fixed Capital Investments	0,2699	0,0705	0,0009
Labour Productivity	0,8114	9,5013	0,0000
Dummy Variable (2008)	0,0832	7,0194	0,0000
C	2,9590	24,3079	0,0000

Long-term, experienced a 1percent increase in the openness variable in Turkey, it is observed that GDP per capita increased by 0.0998 percent. This shows that the openness factor contributes positively to economic growth, as in the theories we explained in previous chapters. While 1 percent increment at fixed capital investments causes a 0.2699 percent increments at GDP per capita; 1 percent increment at labour productivity causes 0.8114 percent increments in GDP per capita. Using dummy variables increased the meaning level of other variables in terms of theoretical and statistical ways, made parameters compatible with the theory and reality of Turkey's economy. Table 12, 13, 14, 15 present the findings regarding the cointegration relations of the variables with each other.

While a significant relationship is observed between the GDP per capita and the share of fixed capital investments in GDP per capita and openness, no causality relationship has been found with labour productivity.

Table 14. Causality results (dependent variable is labour productivity)

Excluded	Chi-Square	Prob
GDP per Capita	3,8397	0,1466
Fixed Capital Investments	9,2772	0,0097
Trade Openness	0,3342	0,8461
Dummy Variable (2008)	6,8012	0,0334
All	14,3387	0,0734

Note: Degrees of freedom is 2 for all variables.

Table 15 presents data of results for causality between trade openness and other variables. According to data there are meaningful correlations between trade openness and other variables.

Table 15. Causality results (dependent variable is trade openness)

Excluded	Ki-Square	Prob
GDP per Capita	0,0820	0,9598
Fixed Capital Investments	0,1718	0,9177
Labour Productivity	1,1682	0,5576
Dummy Variable (2008)	0,7615	0,6833
All	9,4872	0,3029

Note: Degree of freedom is 2 for all variables.

All these results indicate that the increase in foreign trade openness leads to an increase in GDP per capita and that the increase in trade openness also increases the share of fixed capital investments in GDP and labour productivity. An increment in the share of fixed capital investments in GDP affects the increment of GDP per capita, labour productivity, and trade openness positively. This case demonstrates the consequence of a two-sided correlation between fixed capital investments and trade openness.

While the increase in labour productivity positively affects the increase in GDP per capita, it is possible to talk about a one-way correlation since labour productivity is not affected by this variable. Moreover, it has been observed that the increase in labour productivity does not have an effect on the share of fixed capital investment in GDP, so there is no cointegration from labour productivity to the share of fixed capital investment in GDP. However, there is a two-way relationship between trade openness and increases in labour productivity.

As a result of tests H_0 : There is not a correlation between the error terms hypothesis is rejected. We found that trade openness affects economic growth positively. In this frame, it can be said that the increment impact of trade openness on economic growth occurs in several ways (Koçak ve Uçan, 2014; Korkmaz ve Aydın, 2015; Pata, 2017; Şahin ve Durmuş, 2018). The contribution of labour productivity increment which is supported by technology spill-over through international trade to economic growth explains the growth process of Turkey between 1980 and 2016 as a claim of new growth theory. The positive impact of trade openness on the share of fixed capital investments in GDP and labour productivity proves this consequence. Besides, explaining of increment in labour productivity and fixed capital investments in the growth process in Turkey between 1980 and 2016, supports the assumptions of Solow on growth. On the other hand, due to the lack of explanatory power of our variables Krugman's theory, it is not possible to make an inference for the contribution of foreign trade to economic growth. In his theory, he indicated an increase in the production scale of the economy through market expansion and the requirements of efficient resource distribution between finished goods and information producing sectors.

As a result, an increase in import and export share in GDP causes an increase in the speed of economic growth in Turkey. It is reached the evidence on the increment of these two factors jointly also contribute to fixed capital investments and labour productivity and finally increment of fixed capital investments and labour productivity jointly contribute to economic growth.

4. Conclusion

In Turkey, since the 1920s, economic policies implemented have been shaped under the influence of many external and internal factors. Again, under the influence of the same factors, the policy choices that continue today have been shaped more under the influence of human resources and capital accumulation when considered in terms of internal factors. Therefore, human resources and capital accumulation have been taken as independent variables in our econometric calculations explained in the previous section.

In the light of the data obtained in Turkey's human resources has been demonstrated that increased productivity for the years 1980-2016. These results show that the increase in productivity in human resources has a positive effect on economic growth within the framework of a balanced and sustainable growth path in line with growth theories. Increasing productivity in human resources depends primarily on the developments in education, knowledge, and skills. However, knowledge and skill development alone will not be enough. In order to use the human resources, which will be developed, efficiently and in correct areas, there are some other factors which should be taken into consideration such as improving working conditions and establishing and operating effective management and organizational structures.

The findings of the study to reach Turkey's long-term policy objectives of economic growth depends on the adequate and stable inflow of external resources with the continuous development of human resources. Here, the foreign sources should be evaluated as technology and capital goods that enter to the country through imports together with foreign direct investments. The priority issue that will contribute to the inflow of foreign funds will be increasing the foreign direct capital inflows. It is important to encourage foreign direct investments and, in this sense, to benefit from the positive externalities of the product market such as technological diffusion. Incentives provide some kind of cost-cutting opportunities for foreign capital and increase the attractiveness of the country. However, the incentives applied must be supported by complementary elements such as minimizing infrastructure problems, creating an active and smoothly functioning domestic market, and easy access to foreign markets. The development of new business models for establishing partnerships between domestic and foreign capital will also support these studies. Another issue that is required to achieve the desired results in foreign resource entry is the necessity of using different tools in terms of money, fiscal, and income policies.

The aim here will be to raise average saving rates in order to use domestic savings in funding capital accumulation. It is argued that one of the major causes of current account deficit in Turkey is the open economy regime of the country. This situation leads to an increase in exchange rates and similarly to an increase in interest rates in financial markets with the increase in external fund demand. Increasing borrowing demand causes an increase in borrowing costs and difficulties in borrowing opportunities in the long term. This is a particularly leftward shift of the supply curve with the increase of production costs in countries such as Turkey, which is the energy dependence, leads to a fall and subsequently negatively affected by the growth of employment demand.

In addition to the measures for closing the current account deficit in the balance of payments table; in terms of ensuring foreign trade surplus, it is important to create a wide export network with a wide range of products and destinations with high added value and a high growth model with high consumption and import tendency, where domestic demand is predominant. In this way, partial foreign exchange savings will be achieved by reducing imports relatively, and improvements in interest rates will be seen. In addition, while the share of consumption goods in imports decreases, the weight of investment goods will increase and it may reflect as a net export increase to GDP in the long-run.

4.1. Policy implication

The results support the idea that Turkey initially should keep increasing foreign trade volume with the rest of the world in terms of international trade for sustainable economic growth. In addition, Turkey should be striving to diversify the export and import destinations, in order to reduce dependence indices and reduce counterparty risk in international trade. The second issue is that Turkey should obtain a positive net international trade balance in intra-industry trade to build a vigorous balance of payments in the monopolistic competition structure. In this context, the existing international trade incentives should be rearranged to support export-oriented, and high value-added industries. However, these types of implementations should not restrict imports or disrupt the perfect competition structure in the domestic market. As a matter of fact, imports have a significant contribution to economic growth in Turkey. Future studies, beyond magnitude of trade openness, will be able to address the issues, such as the decomposition of international trade's contribution to growth in terms of the component of exports and imports, as well as their destination and origin.

Author contribution statements

It should be noted that theoretical studies are the works of Kerem Özbey and Dr. İbrahim Boz, and the empirical studies are carried out by Dr. Ömür Saltık. All remaining works are the done by Kerem Özbey.

Disclosure statement

No potential conflict of interest was reported by the authors.

Ethics committee approval

All responsibility belongs to the researchers. All parties were involved in the research of their own free will.

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