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The Future of Export-Based Growth Policies in the Turkish Economy: An Econometric Simulation Approach

Ekonomisinde İhracata Dayalı Büyüme Politikalarının Geleceği: Bir Ekonometrik Simülasyon Yaklaşımı

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Öz

Türkiye ekonomisinde 1960-1980 yılları arasında uygulanan ithal ikameci sanayileşme politikalarının başarısız olması, ekonomik büyüme için ihracata dayalı politikaların benimsenmesine neden olmuştur. 1980 yılında ekonomi politikalarında köklü dönüşümler yaşanmıştır. 1980 yılından günümüze sürdürülebilir ekonomik büyüme için ihracata önemli anlamlar yüklenmiştir. Bu nedenle çalışmada, 1987-2021 dönemi yıllık veri setleriyle ARDL sınır testi yaklaşımı kullanılarak Türkiye ekonomisinde ihracat ve ekonomik büyüme arasındaki uzun ve kısa dönem ilişki incelenmiş ve Türkiye 2022-2032 dönemi kişi başı GSYH rakamları ekonometrik simülasyon yöntemiyle öngörülmüştür. ARDL modeli tahmin sonuçlarında ihracatın kısa ve uzun dönemde ekonomik büyüme üzerinde istatistiki olarak anlamlı ve pozitif etkili olduğu görülmüştür. Yapılan öngörü analizinde, kişi başı GSYH'nın 2032 yılında baz ihracat senaryosunda 20990$, düşük ihracat senaryosunda 17327$ ve yüksek ihracat senaryosunda ise yaklaşık iki katına çıkarak 25157$ olabileceği tespit edilmiştir. Elde edilen bu sonuçlar Türkiye ekonomisinde gelecek on yılda kişi başı GSYH'nın yaklaşık iki katına çıkmasının mümkün olabileceğini ancak bu rakamlara ulaşılabilmesi için ihracatın yıllık ortalama %13.86 kadar arttıracak politika bileşenlerine ihtiyaç duyulduğunu göstermektedir.

Anahtar Kelimeler: İhracat, Ekonomik Büyüme, Tahmin ve Simülasyon Tekniği

Abstract

The failure of the import substitution industrialization policies implemented in the Turkish economy between 1960 and 1980 led to the adopting of export-oriented policies for economic growth. In 1980, radical transformations were experienced in economic policies. Since 1980, exports have been attributed important meanings for sustainable economic growth. Therefore, this study analyzes the long-run and short-run relationship between exports and economic growth in the Turkish economy by using the ARDL bounds test approach with annual data sets for the period 1987-2021 and forecasts Turkey's GDP per capita for the period 2022-2032 by econometric simulation method. The ARDL model estimation results show that exports have a statistically significant and positive effect on economic growth in the short and long run. According to the forecast analysis, it has been determined that the per capita GDP in 2032 will be $20990 in the base export scenario, $17327 in the low-export scenario, and nearly double to $25157 in the high-export scenario. These results show that it is possible for the GDP per capita to nearly double in the next ten years in the Turkish economy. Still, policy components are needed to increase exports by an average of 13.86% annually to reach these figures.

Keywords: Export, Economic Growth, Forecasting and Simulation Technique

Introduction

One of the main objectives of economic policies is realizing sustainable economic growth. This primary purpose ascribes important meanings to economic growth and concepts related to economic growth. Economic growth is defined in its simplest form as production increases or increase in production possibilities, and there are different indicators that represent economic growth. Economic growth is usually represented by increases in Real Gross Domestic Product (RGDP) or Real Gross National Product (RGNP) or real GDP per capita. Examining economic growth in terms of real GDP per capita, which also considers the changes in a country's total population, expresses the increases in per capita income in a country's economic activities. These increases must be continuous for real income increases per capita to be considered as growth. (Kibritcioğlu and Dibooğlu, 2001: 1; Kaynak, 2011: 1; Aktaş, Erdinç, Günsoy, Günsoy and Taban, 2013: 17). The main problem of economies that want to ensure this continuity is how they can achieve sustainable economic growth. The export-led growth hypothesis is accepted as one of the answers to this fundamental question (Jordaan and Eita, 2009: 2). An export-based growth strategy emphasizes the role of exports in stimulating economic growth (Balassa, 1985: 32; Jordaan and Eita, 2009: 2). The export-led growth hypothesis argues that the growth of national economies is not only due to labour and capital but also that increased exports increase economic growth (Sulaiman and Saad, 2009:218). Because the increase in exports leads to economic growth by directing resources from inefficient sectors to the export sector and contributing to the effective and efficient use of resources (Taştan, 2010: 88). Economies encouraging exports by paying attention to these effects have achieved significant success. Several countries in Asia (South Korea, Taiwan, Hong Kong, Singapore, Malaysia, Thailand, and recently China and India) have followed this path to achieve impressive economic growth since the 1960s (Tang, Lai, & Öztürk, 2015: 229). The successful results of export-oriented growth policies in these countries have brought the relationship between exports and economic growth to the agenda in the Turkish economy as well. The first serious step towards export-led economic growth in the Turkish economy coincides with January 24, 1980, known as the "January 24 Decision". It is possible to say that some economic events were influential in the adoption of export-oriented growth policies in Turkey. These are the unsuccessful import-substitution industrialization policies implemented between 1960 and 1980, the successes achieved by the countries that followed the export-based growth policy, and the unsustainable increase in the current account deficit due to the oil crisis in 1974. In addition, the General Agreement on Tariffs and Trade (GATT), to which Turkey is a party, and the International Monetary Fund (IMF)'s guidance on the liberalization of foreign trade led to the adoption of export-led growth policies in the Turkish economy. This transformation in the Turkish economy emphasizes the importance of exports for economic growth. For this reason, in this study, an export-based per capita economic growth forecast was made from 2022 to 2032 in the Turkish economy.

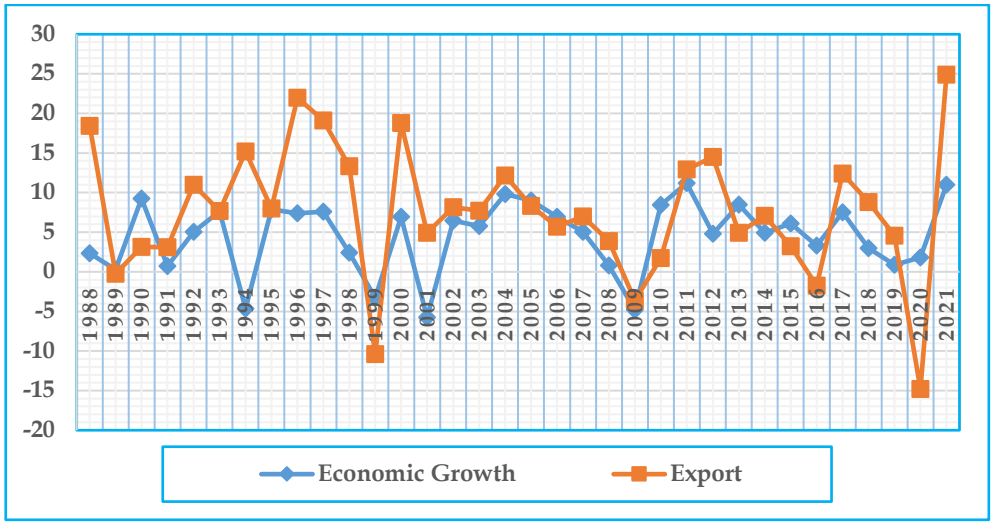
In the second part of the study, the export-oriented growth policies in the Turkish economy are examined historically. The second part includes the theoretical infrastructure of the export-oriented growth policies and the empirical literature research specific to the Turkish economy. The third part introduces the data set and the model created for the research problem, and the methods used in the analysis are explained. In the fourth part, the findings regarding the relationship between exports and growth covering the period of 1987-2021 and the per capita growth forecast results based on exports for the period of 2022-2032, and in the last part, the findings are interpreted, and suggestions for sustainable economic growth are given.

Export-Led Growth in the Turkish Economy: A Historical Perspective

With the decisions of January 24, 1980, in Turkey; foreign competitiveness has been tried to be achieved with a series of reforms that provide a free exchange rate regime, import liberalization, export incentives and facilitating foreign capital inflows (Özbey, 2000: 81; Taban and Aktar, 2008: 1536; Yeldan, 2008: 25). These reforms contributed to gaining the trust of international creditor institutions such as the IMF and the World Bank and facilitated access to the financial resources needed to get out of the economic bottleneck (Taban and Aktar, 2008: 1536). In addition, in this period, the Turkish economy was opened to foreign markets and the period 1980-1983 was the beginning

years of this transformation (Yeldan, 2008: 25). Initially, with the promotion of exports and liberalization of imports, the volume of foreign trade increased, and economic growth was also positively affected (Çatalbaş, 2022: 18). With the liberalization of capital movements in 1989, the economy gained a completely open structure in 1990 (Kurt and Terzi, 2007: 25; Yeldan, 2008: 25). However, this situation increased the foreign trade deficit by nearly 100% in the following years (Çatalbaş, 2022: 18). The recession in the world economy at the beginning of 1990 and the reasons such as the "Gulf Crisis" affected the economy negatively. As a result, a significant economic crisis occurred in 1994 (Gül and Ekinci, 2006: 166; Aygün, 2020: 648). After this crisis, an economic stabilization program called the "April 5 Decisions" was prepared. The high-rate devaluation implemented with this stabilization program has increased competitiveness and ensured the increase of exports. However, the slowdown in world trade in 1996, the 1998 Asian Crisis, the earthquake in the Marmara Region in 1999 and the February 2001 crisis caused a decrease in Turkey's exports (Aygün, 2020: 647-653). These economic events adversely affected the stable economic growth of the Turkish economy until 2002. For this reason, in 2001, the "Transition to a Strong Economy Programme", which includes structural economic reforms, was implemented to ensure sustainable economic growth and eliminate economic instability. Positive developments were experienced in the economy in the 2002-2006 period with this program (Şahin, 2014: 125). The export volume, which was 2 billion dollars in 1980, increased to 100 billion dollars in 2007 (Taban and Aktar, 2008: 1536). This positive picture continued until the Global Economic Crisis in the world economy in 2008. The global crisis experienced in 2008 caused contractions in the Turkish economy and a decrease in exports. The fluctuations in the exchange rate from 2009 to 2020, especially the global Covid-19 pandemic that occurred in 2020, negatively affected exports and economic growth. The adverse effects of the pandemic on the economy decreased in 2021, and despite the shrinking strong economies, the Turkish economy reached high growth and export figures. The Turkish economy's export-economic growth adventure can be better understood from Figure 1, which shows the economic growth and export growth rate.

Figure 1. Economic Growth and Export Growth Rates in the Turkish Economy (1988-2021)



Source: It was created by the authors using the World Bank data

Today, where the effects of the Covid-19 pandemic continue, many countries experience negative growth and seek answers to economic problems such as inflation and unemployment. With the effect of the pandemic, problems such as disruptions in the supply chain and food supply security increase the importance of the concept of the export day by day. As can be seen from Figure 1, it is understood that the changes in exports and economic growth followed a similar course in the Turkish economy, except for exceptional years (1994-2012-2013). This situation emphasizes the importance of the export concept and the export-led growth hypothesis for sustainable economic growth in the Turkish economy.

Motivation of Research and Literature Review

The effectiveness of foreign trade in economic growth goes back to the classical economic theories of A. Smith and D. Ricardo (Sulaiman and Saad, 2009: 217). The importance attributed to foreign trade, starting from the classical school, has inspired many studies in the recent past, and different aspects of exports on economic growth have been emphasized in the studies. Some of these studies emphasise that countries that export most of their output grow faster than other countries (Krueger, 1978; Bhagwati, 1988; Giles and Williams, 2000). Some authors argue that exports increase productivity through increased competition (Balassa, 1978), and productivity increases allow economies of scale and facilitate cost advantage (Helpman and Krugman, 1985), and the diffusion of technical knowledge through learning by doing (Grossman and Helpman, 1991; Rivera-Batiz and Romer, 1991; Young, 1991) claims to make it easier. In addition, an increase in exports may loosen the foreign exchange constraint, increasing output growth by facilitating input imports to meet domestic demand (McKinnon, 1964; Balassa, 1978; Giles and Williams, 2000). The idea that increases in exports can reduce the balance of payments deficits and improve employment opportunities by increasing foreign exchange reserves (Jordaan and Eita, 2009) highlights exports as a policy tool. The economic effects of exports are not limited to these. Export increases competition. Idle resources that are not in demand or low in demand in the domestic market are mobilized by exporting (Panas and Vamvoukas, 2002; Narayan and Smyth, 2004). Companies that open up to foreign markets thanks to exports can benefit from the opportunities of international trade by division of labor and cooperation with international companies (Rivera-Batiz and Romer, 1991; Barro and Sala-i-Martin, 1995). The multifaceted effects of exports on economic growth have also attracted the attention of researchers. This relationship has guided the studies on the Turkish economy. Studies conducted to test this relationship in the Turkish economy are summarized in Table 1.

Author(s)/ Year	**Period**	**The relationship between X-Y, and the direction of causality**
Çakmak and Temurlenk (1995)	1968-1993	X↮Y
Özmen, Özer andTürkyılmaz (1999)	1983-1997	X⟶Y
Ay, Erdoğan and Mucuk (2003)	1969-2002	X⟷Y
Saatcioğlu and Karaca (2004)	1950-2000, 1950-1980, 1981-2000	Long-run relationship, Y⟶X (1950-2020 period) X⟶Y (1981-2000 period)
Demirhan (2005)	1990:Q1-2004:Q3	X⟶Y
Erdoğan (2006)	1923-2004	Y⟶X (5% significance level) X⟷Y (10% significance level)
Özer and Erdoğan (2006)	1986-2006	X⟶Y
Yapraklı (2007)	1970-2005	Total and industrial exports X⟶Y
Kurt and Berber (2008)	1989:Q1-2003:Q3	X⟶Y
Bilgin and Şahbaz (2009)	1987-2007	X⟶Y
Takım (2010)	1975-2008	X↮Y

Temiz and Gökmen (2010)	1965-2009	Long-run relationship, Y⟶X
Çeviker and Taş (2011)	1962-2008	Y⟶X
Sandalcılar (2012)	1987-2007	X⟶Y
Özcan and Özçelebi (2013)	2005:M1-2011:M11	In the long run, X affects Y positively.
Korkmaz (2014)	1998:Q1-2013:Q3	X⟶Y
Küçükaksoy, Çifçi and Özbek (2015)	2003:1Q-2015:Q1	Long-run relationship, X⟷Y
Hüseyni and Çakmak (2016)	1980-2010	Long-run relationship, X⟶Y
Pata (2017)	1971-2014	X⟶Y
Aytaç (2017)	2001-2016	Y⟶X
Dura Beşer and Acaroğlu (2017)	1992:Q1-2014:Q4	There is a non-linear causality relationship from X to Y.
İzgi and Yılmaz (2018)	1992-2016	Long-run relationship, X⟶Y
Akcan and Metin (2018)	2000:Q1-2017:Q2	X⟶Y (before and after the 2008 global economic crisis)
Yenisu (2019)	1980-2016	A significant relationship was found between X and Y both in the short term and in the long.
Konak (2020)	1991-2018	Y⟶X (in the short-term) X⟷Y (in the long-term)
Adıgüzel (2020)	1971-2019	X⟷Y
Aygün (2020)	1988:Q1-2019:Q4	It has been found that export growth always has a positive but relatively less effect on economic growth.
Yılgör, Karahan and Öndes (2021)	2002:Q1-2018:Q4	Long-run relationship, X⟶Y

Güven (2021)	1980-2020	Long-run relationship, X⟶Y
Karakaş and Doğan (2021)	1996-2019	Long-run relationship, X⟶Y
Baktemur (2021)	2003:Q1-2020:Q3	X⟶Y
Karakuş and Özen Atabey (2021)	1988-2019	Y⟶X
Çatalbaş (2022)	1980-2020	It has been found that X has a significant effect on Y in the long run, and X⟶Y.
Çelik (2022)	1989-2020	Long-run relationship

Note: Created by the authors. (X: Export, Y: Economic Growth,)

In Table 1, it is understood that most studies conducted specifically for the Turkish economy to determine the relationship between exports and economic growth are cointegration and causality studies. It has been determined that there is a one-way causality relationship from exports to economic growth in most of the studies in which causality tests are preferred as the analysis method. In the cointegration tests, on the other hand, it was determined that there is a long-term relationship between exports and economic growth. In other words, the results supporting the conclusion that the export-led growth hypothesis is valid for the Turkish economy, in general, have been reached. There are also studies that provide evidence for a bidirectional causal relationship or the absence of any causality or relationship, albeit a small number. These results in the literature arouse curiosity about the future of the export-led growth hypothesis for the Turkish economy. Since the studies in the literature were made to test the relationship in the current period, the efficiency of the export-led growth hypothesis for the Turkish economy in future periods was not emphasized. This gap in the literature reveals the primary purpose and originality of the study

Data Set, Model and Method

In the study, the long and short-term relationships between exports and economic growth for the Turkish economy were examined using the 1987-2021 annual data. The data set starts from 1987 due to the availability of data and the adoption of export-oriented growth policies in the Turkish economy in the post-1980 period. In addition, in line with the study's primary purpose, an export-based economic growth forecast for the 2022-2032 period was made using the econometric simulation approach. The variables with natural logarithms used in the model created for this purpose and the explanations for these variables are given in Table 2.

Table 2. Variables Used in the Study and Their Explanations

Variables	Abbreviations	Explanations	Source
Economic Growth	lnY	GDP per capita (constant 2015 USD)	World Bank
Export	lnX	Total exports of goods and services (fixed 2015 USD)	
Imports	lnM	Total imports of goods and services (constant 2015 USD)	
Capital	lnK	Gross capital formation (% of GDP)	
Labor	lnL	Persons employed (thousand)	The Conference Board Website

Following the pioneering studies in the literature on the subject, the effect of exports on economic growth was analyzed within the framework of a simple production function model that treats exports as a production input. The Cobb-Douglas type production function, in which exports are treated as a production input, is simply shown as Y = f(L,K,X) (Balassa, 1978; Tyler, 1981; Feder, 1983; Ram, 1985). Here Y represents the level of output, L represents labor, K represents capital, and X represents exports. The import variable was added to the research model inspired by the Cobb-Douglas type production function, taking into account the dependence of exports on imports in the Turkish economy. The established full logarithmic model is shown in Equation 1.

$$lnY = \beta_0 + \beta_1 lnX + \beta_2 lnM + \beta_3 lnK + \beta_4 lnL + \varepsilon \quad \textbf{(1)}$$

In the established model, lnY is the dependent variable, lnX is the independent variable, and lnM, lnK and lnL are the control variables. In time series analysis, the variables must be stationary. Therefore, whether the variables are stationary or not was examined with Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root tests.

These two tests are widely used unit root tests that do not consider structural breaks. If stationarity is obtained in unit root tests that do not take into account structural breaks in the determination of stationarity, unit root tests with structural breaks may not be used (Mert and Çağlar, 2019: 97; Coşkun and Eygü, 2020: 237).

In the study, the Autoregressive Distributed Lag (ARDL) Bounds Test approach was used to test the cointegration relationship between the variables. Narayan and Narayan (2006) revealed in their study that the ARDL bounds test can be used in the analysis of series at different stationarity levels and gives more robust results in small samples than other cointegration tests. In this study, ARDL bounds test approach is used since the time series consists of 35 years and the dependent variable is I(1). The ARDL(m,n,p,q) model to which the variables used are adapted is shown in Equation 2:

$$\Delta lnY_t = \beta_0 + \sum_{i=1}^{m} \gamma_{1i} \Delta lnY_{t-i} + \sum_{i=1}^{n} \gamma_{2i} \Delta lnX_{t-i} + \sum_{i=1}^{n} \gamma_{3i} \Delta lnM_{t-i} + \sum_{i=1}^{p} \gamma_{4i} \Delta lnK_{t-i} + \sum_{i=1}^{q} \gamma_{5i} \Delta lnL_{t-i} + \theta_1 lnY_{t-1} + \theta_2 lnX_{t-1} + \theta_3 lnM_{t-1} + \theta_4 lnK_{t-1} + \theta_5 lbL_{t-1} + \varepsilon_t \quad \textbf{(2)}$$

Findings

To avoid the spurious regression problem in time series analysis, it is necessary to determine the stationarity levels of the variables and to perform analyzes with stationary variables. If the variables are not stationary at the level (I(0)) or the first difference (I(1)), the stationarity decision cannot be made because the table values cannot be calculated. Therefore, firstly, the stationarity levels of the variables were tested with ADF and PP Unit Root tests, and the test results are shown in Table 3.

Table 3. Unit Root Test Results

ADF Unit Root Test Results				
	At The Level		**At First Difference**	
	Constant	**Constant and Trending**	**Constant**	**Constant and Trending**
lnY	1.7224 (0.9995)	-2.5860 (0.2885)	-6.2747 (0.0000)*	-7.7764 (0.0000)*
lnX	-3.5391 (0.0128)**	-1.7208 (0.7199)	-6.4992 (0.0000)*	-6.8087 (0.0000)*
lnM	-1.5947 (0.4743)	-1.5936 (0.7745)	-7.4669 (0.0000)*	-13.7923 (0.0000)*
lnK	-2.5696 (0.1090)	-3.9963 (0.0184)**	-9.4249 (0.0000)*	-9.9016 (0.0000)*
lnL	0.0704 (0.9586)	-1.6302 (0.7596)	-5.2207 (0.0001)*	-5.1482 (0.0011)*
PP Test Results				
	At The Level		**At First Difference**	
	Constant	**Constant and Trending**	**Constant**	**Constant and Trending**
lnY	0.5242 (0.9851)	-2.5606 (0.2993)	-5.9869 (0.0000)*	-6.0335 (0.0001)*
lnX	-1.3205 (0.6087)	-1.8314 (0.6672)	-6.4696 (0.0000)*	-6.4980 (0.0000)*
lnM	-1.4879 (0.5276)	-1.8890 (0.6382)	-7.4139 (0.0000)*	-5.0459 (0.0018)*
lnK	-2.5999 (0.1028)	-4.0210 (0.0174)**	-8.8115 (0.0000)*	-8.7936 (0.0000)*
lnL	0.0704 (0.9586)	-1.5914 (0.7754)	-5.2207 (0.0001)*	-5.1482 (0.0011)*

Note: *,** Significant at 1 and 5 percent levels, respectively

When the unit root test results in Table 3 are examined, it is seen that all variables are stationary at the first difference at the 1% significance level. The maximum stationarity degree of the variables being "1" means that the ARDL model can be used. The ARDL bounds test should be started by determining the most appropriate lag length. Considering that the data set used in the study is 35 years old, a suitable model was sought up to a maximum of 2 lags. In line with the Akaike selection criteria, the appropriate model was determined as

ARDL(2,2,1,0,0). It was tested whether the estimated ARDL model provided autocorrelation, heteroscedasticity, and normality assumptions and whether the mathematical structure was chosen correctly, and the results are given in Table 4.

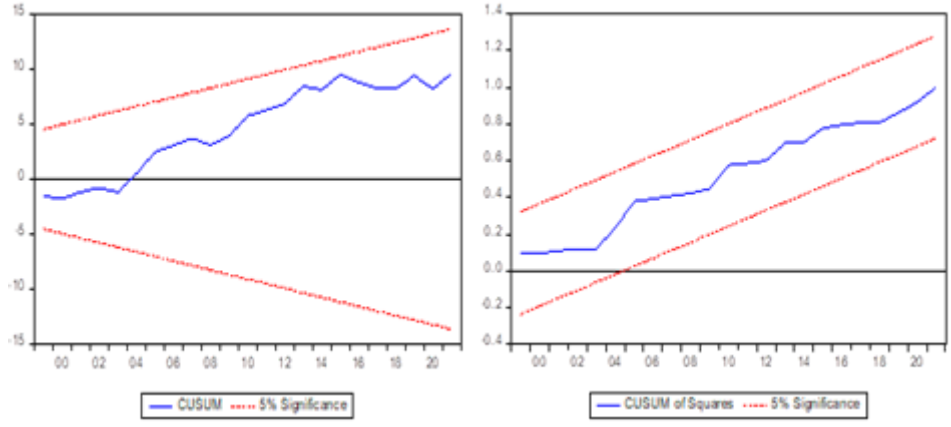
Table 4. Assumption Results for the Selected Model

Model: ARDL(2,2,1,0,0)	
Adjusted R^2	0.998120
F-Statistic	1888.704 (0.0000)
Durbin-Watson statistics	2.082318
Assumption Test Results	
Breusch-Godfrey LM Test	0.183895 (0.8333)
White Test	0.232529 (0.9859)
Jarque-Bera Test	1.854750 (0.395591)
Ramsey Reset Test	2.213834 (0.1510)

Note: Values in parentheses are probabilities calculated for test statistics.

As can be seen from Table 4, the fact that the F-Statistical value is "1888.704" and the probability value is less than the significance level of 1% means that the model as a whole is significant. In addition, as a result of the Breusch-Godfrey LM test, it is seen that there is no autocorrelation problem in the model, as a result of the White test, the model does not contain a changing variance problem, and as a result of the Jarque-Bera test, the errors are distributed normally. In the testing of the mathematical pattern of the model, the Ramsey Reset test was used and it was determined that the research model was selected correctly as a result of the test. Cusum and CusumSQ tests were performed to determine whether the model coefficients behaved stably in the long term, and the test results are shown in Figure 2.

Figure 2. Cusum and CusumSQ Graphics



When Figure 2 is examined, it is seen that the curves remain within limits, and therefore, the model coefficients are stable in the long term. It has been determined as a result of the tests that the selected ARDL(2,2,1,0,0) model does not contain hypothetical problems. In this case, the ARDL(2,2,1,0,0) model was used to determine the

cointegration relationship, and the ARDL bounds test results are given in Table 5.

Table 5. ARDL Bounds Test Result

F Bounds Test				
k	**F-Statistic**	**Significance level**	**I(0)**	**I(1)**
4	9,538280	10%	2.696	3.898
		5%	3.276	4.63
		1%	4.59	6.368

As can be seen from Table 5, the F statistical value is greater than the upper limit value, and it is understood that the variables are cointegrated. If there is a cointegration relationship between the variables, long-term and short-term coefficients can be calculated. The calculated long-term coefficients are shown in Table 6.

Table 6. Long-Term Test Results

Variable	**Coefficient**	**Standard Error**	**t statistic**	**Probability**
lnX	0.392542	0.161663	2.428151	0.0234**
lnM	-0.189299	0.144933	-1.306111	0.2044
lnK	0.709396	0.167486	4.235550	0.0003*
lnL	0.648916	0.168746	3.845518	0.0008*

Note: *,** Significant at 1 and 5 percent levels, respectively

When the long-run coefficients in Table 6 are analyzed, the export variable's coefficient is statistically significant at the 5% significance level, and the coefficients of the capital and labor variables are statistically significant at the 1% significance level. When the coefficients are examined, it is understood that a 1% increase in exports in the long term will increase economic growth by about 0.39%, a 1% increase in capital will increase economic growth by about 0.71%, and a 1% increase in the labor force will increase economic growth by about 0.65%. It has been determined that imports do not have a significant effect on economic growth in the long run.

In the case of a long-term relationship, it is necessary to test whether the deviations from the short-term equilibrium that have occurred have come to equilibrium in the long term by establishing an error correction model. For this purpose, the ARDL error correction model was estimated, and the estimation results are given in Table 7.

Table 7. Short-Term Test Results

Variable	Coefficient	Standard Error	t statistic	Probability
C	-1.298776	0.174800	-7.430071	0.0000*
D(lnY(-1))	0.135961	0.061338	2.216598	0.0368**
D(lnX)	0.155415	0.030022	5.176635	0.0000*
D(lnX(-1))	-0.101717	0.032086	-3.170147	0.0043*
D(lnM)	0.138765	0.023364	5.939395	0.0000*
ECT(-1)	-0.264730	0.035381	-7.482350	0.0000*

Note: *,** Significant at 1 and 5 percent levels, respectively

Table 7 shows that the error correction coefficient obtained from the error correction model is -0.264730, and the probability value is less than the 1% significance level. The fact that the error correction coefficient is negative and significant means that the deviations occurring in the long-term equilibrium will come back to equilibrium. The error correction coefficient calculated as ECT(-1)=-0.264730 from the unconstrained error correction model shows that approximately 26% of these deviations will stabilize in the next period, that is, one year later. In other words, it can be said that an imbalance that may occur will return to balance after about 4 years.

The error correction model also includes the short-run coefficients. When the coefficients are examined, it is seen that exports, imports, and the previous period of economic growth are positive and statistically significant on economic growth in the short term. In the short run, a 1% increase in exports increases economic growth by 0.16%, and a 1% increase in imports increases economic growth by 0.14%. It is observed that the previous period of exports negatively affected economic growth, but the deviation from this equilibrium in the short term turned into a positive effect by coming to equilibrium in the long term, considering that the established error correction coefficient is also negative and significant.

In the econometric simulation phase, it is first necessary to determine the model's forecasting performance. At this stage, the Theil inequality coefficient or MAPE (mean absolute percent error) criterion is often considered. A Theil inequality coefficient close to 0 indicates the model has good predictive power. According to Lewis (1982), a MAPE coefficient less than 10 is interpreted as "highly accurate forecasting", between 10-20 as "good forecasting", between 20-50 as "reasonable forecasting", and greater than 50 as "inaccurate forecasting" (Soğukpınar et al., 2023). To demonstrate the forecasting power of the ARDL model for the future, forecasts were made for the period 1980-2021, and the actual and forecasted economic growth values are in Figure 3, and Theil and MAPE values are shown in Table 8.

Figure 3. Real and Estimated Values of Economic Growth

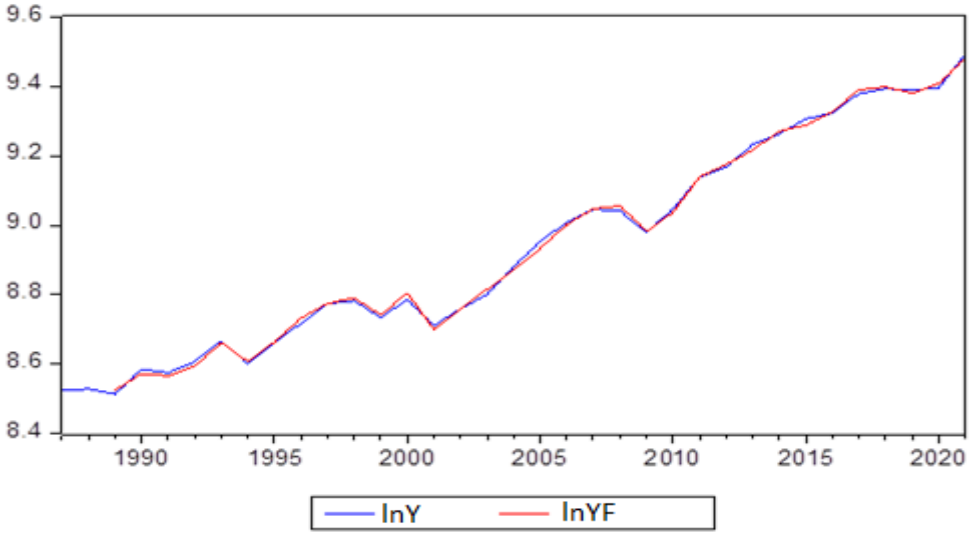


Table 8. Theil and MAPE values

Theil Inequality Coefficient	0.000785
MAPE(Mean Absolute Percent Error)	1.131896

In Figure 3, lnY represents the actual economic growth values, and lnYF represents the economic growth values obtained due to dynamic forecasting. As shown in Figure 3, the forecast values do not deviate too much from the actual values, meaning that the forecast model can be used for forecasting. Moreover, Theil and MAPE values indicate the model has good predictive power.

While estimating how economic growth will follow in the future for the Turkish economy, three different export scenarios were created, namely low, base, and high, and future GDP per capita figures were estimated for each export scenario. When creating scenarios, if there is an officially set target or announced rates of increase, scenarios can be determined according to these rates (Soğukpınar et al., 2023). However, if there is no such data, scenarios can be created within the framework of economic theory by calculating periodic rates of increase. While creating the 2022-2032 scenarios, annual increase rates were calculated for different scenarios first. For the base export scenario, the average annual growth rate between 1987 and 2021 is calculated as (approximately 7.7%), accepted as the annual growth rate for 2022 and beyond. While determining the annual increase rate for low and high export scenarios, the median of the increase rates was taken as a basis. The average of the annual increase rates less than the median value (about 1.5%) is accepted as the low scenario increase rate, and the average of the annual increase rates greater than the median value (approximately 13.86%) is the high scenario increase rate. Different scenarios were not created for the import, capital, and labor variables included in the model as control variables. For the period 1987-2021, the average annual growth rates of imports, capital, and labor force are calculated as 7.67% for imports, 1.34% for capital, and 1.87% for labor force, and these rates are accepted as the growth rates after 2022.

In line with these three different export scenarios (base, low and high), Turkey's future GDP per capita figures are forecasted. The forecast results for the 2022-2032 period are shown in Table 9.

Table 9. Forecast Estimation Results

Year	Base Scenario	Low Scenario	High Scenario
2022	13860.35804	13734.04358	13980.71012
2023	14584.07761	14334.50196	14823.75367
2024	15300.06624	14859.76543	15727.83747
2025	15996.85208	15298.74846	16685.33103
2026	16682.75325	15671,14143	17697.95582
2027	17367.44252	15996.8775	18769.3812
2028	18058.76819	16291.2024	19903,70029
2029	18762.68269	16564.96898	21105.15765
2030	19483.67712	16825.71487	22378.1342
2031	20225.19808	17078.62427	23727.17922
2032	20989.96639	17327.24829	25157.04595

The forecast results given in Table 9 show the per capita GDP projections for future periods with different export scenarios. GDP per capita in Turkey in 2021 is 13250$. According to the base export scenario, GDP per capita in 2022 is expected to be $ 13860, $ 13734 according to the low export scenario, and $ 13980 according to the high export scenario. In 2032, GDP per capita will increase by about 58% to $ 20990 according to the base export scenario and by about 31% to $ 17327 according to the low export scenario. When the per capita GDP figures are analyzed by the high export scenario, the GDP per capita in 2032 will increase by 89% to $25157. These results indicate that it is not an imaginary goal for GDP per capita to rise much higher than its current value.

Conclusion and Policy Implications

In the Turkish economy, the real GDP per capita was about $2,500 in the 1960s and about $4,000 in 1980. Although there were improvements in GDP per capita during the period of 1960-1980, when import-substitution growth policies were implemented, the desired levels could not be reached. To find solutions to chronic economic problems and to direct sustainable economic growth, export-based growth policies were adopted with the decisions of January 24, 1980, and exports played an essential role in the economic growth process. For this reason, in the study, the long and short-term relationship between exports and per capita economic growth in the Turkish economy was examined with the annual data for the 1987-2021 period, and GDP per capita for 2022-2032 was forecasted by simulation method.

In the study, firstly, the stationarity of all variables was examined, and it was determined that the variables were stationary at the first difference. Due to the fact that the study period was not very long, the ARDL bounds test was used to determine the cointegration relationship in order to obtain more robust results. As a result of the cointegration test, it was concluded that the variables are cointegrated, that is, they act together in the long run. In the next step, the long-term and short-term coefficients are examined. In the long run, a 1% increase in exports increases economic growth by approximately 0.39%, a 1% increase in capital increases growth by approximately 0.71%, and a 1% increase in the labor force increases growth by approximately 0.65%. It has been determined that

imports do not significantly affect economic growth in the long run. In the short run, a 1% increase in exports increases economic growth by 0.16%, and a 1% increase in imports increases economic growth by 0.14%. It has been observed that the previous period of exports had a negative impact on economic growth per capita, but the deviation from this balance in the short term turned into a positive effect by reaching the balance in the long term, considering that the error correction coefficient.

To determine the predictive power of the forecasting model before forecasting the next decade of economic growth, the actual and forecast results for the period 1987-2021 were compared using the graphical method. It was observed that the estimated values did not show significant deviations from the actual values. To forecast the future course of economic growth, three different export scenarios were created, and GDP per capita figures were forecast by these scenarios. According to the forecast results, it is understood that GDP per capita in 2022 maybe $ 13.660 according to the base export scenario, $13.734 according to the low export scenario, and $ 13.980 according to the high export scenario. In 2032, according to the low export scenario, GDP per capita may increase to about $ 17.327, according to the base export scenario to about $ 20.990, and according to the high export scenario, to about $ 25.157.

These findings suggest that it may be possible for per capita income in the Turkish economy to nearly double shortly. Achieving the forecasted annual growth rates of exports in the base and high scenario would raise per capita income to $20,000-25,000. This projection in per capita income emphasizes the importance of exports and export-related sectors. It shows that export-led economic growth is an important policy component for the Turkish economy and can contribute to sustainable economic growth. These results have some policy implications. Exports and export-related sectors should be developed, and the production and export of products that can gain a competitive advantage in international markets should be encouraged. This is because strong and sustainable economic growth is only possible by increasing the export potential of products with high added value, produced with advanced technologies, and providing a competitive advantage. Finally, to reduce the import dependency on exports, which is one of the chronic problems of the Turkish economy, encouraging industries with domestic raw materials and allocating more share to R&D and innovation investments are expected to reduce this dependency.

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