Eurasian Academy of Sciences Social Science Journal (International Refereed & Indexed)
Eurasian Academy of Sciences Social Sciences Journal
2023 Volume: 46 S: 54 - 60
Published Online January 2023 (http://socialsciences.eurasianacademy.org)
http://doi.org/10.17740/eas.soc.2023.V46.04

THE RELATIONSHIP BETWEEN ECONOMIC GROWTH AND EXPORTS IN TURKEY 1960-2020

Abdullah Burhan BAHÇE * Taleh MAMMADOV**

* Doç. Dr. Kütahya Dumlupınar Üniversitesi, abdullah.bahce@dpu.edu.tr, ORCID: 0000-0002-4730-1332
** Doktora Öğrencisi, Kütahya Dumlupınar Üniversitesi, talehsekili55@gmail.com, ORCID: 0000-0002-8142-9962

Received Date: 28.10.2022 Revised Date: 02.01.2023 Accepted Date:05.01.2023

ABSTRACT

In our study, the causality relationship between exports and economic growth in Turkey between the years 1960-2020 was examined. First of all, by taking the natural logarithmic values of the series, it was verified whether the series contains a unit root and it was determined that the series were not stationary in their level values, and that the series were stationary in their first difference. In the continuation of the analysis, the most appropriate delay length was checked by establishing a VAR model, and it was determined that the 4th delay was the most appropriate delay based on the AIC criterion. In the next step, it was checked whether there was an autocorrelation problem, it was observed that it provided a normal distribution, and that there was no autocorrelation in the series and that it was normally distributed. At the last stage, VAR Granger Causality /Block Exogeneity WALD test was applied and as a consequence of the analysis, a one-way causality relationship from economic growth to exports was found.
Keywords: Economic growth, exports, Granger causality, VAR

1960-2020 YILLARI ARASI TÜRKİYE'DE İHRACAT VE EKONOMİK BÜYÜME ARASI NEDENSELLİK İLİŞKİSİ

ÖZET

Çalışmamızda 1960-2020 yılları arasında Türkiye'de ihracat ve ekonomik büyüme arasındaki nedensellik ilişkisi incelenmiştir. Öncelikle serilerin doğal logaritmik değerleri alınarak serinin birim kök içerip içermediği doğrulanmış ve serilerin düzey değerlerinde durağan olmadığı, birinci farklarında serilerin durağan olduğu tespit edilmiştir. Analizin devamında VAR modeli kurularak en uygun gecikme uzunluğu kontrol edilmiş ve AIC kriteri baz alınarak 4'ncü gecikmenin en uygun gecikme olduğu tespit edilmiştir. Sonraki aşamada otokorolasyon sorunu olup olmadığına bakılmış, normal dağılım sağladığı ve serilerde otokorolasyon olmadığı, normal dağıldığı görülmüştür. Son aşamada VAR Granger Nedensellik / Block Dışsallık WALD testi uygulanmıştır ve analiz sonucunda ekonomik büyümeden ihracata doğru tek yönlü bir nedensellik ilişkisi bulunmuştur.
Anahtar Kelimeler: Ekonomik büyüme, ihracat, Granger nedensellik, VAR

1. INTRODUCTION

One of the most comprehensive issues in the economic literature is the question of "how to realize a faster and more stable economic development (growth) process". Developing countries have limited foreign exchange reserves and have difficulties in finding financing from international financial markets. Export is very significant in the growth process of a country in providing the scarce foreign exchange resources necessary for financing important imports such as energy, investment goods and intermediate goods (Aktaş, 2009).

Many studies have been carried out to get the relationship between growth and export in Turkey and in the world countries. It is possible to divide these studies into two, generally based on cross-section analysis and time series analysis. In addition to the studies carried out to specify the relationship between growth and exports in time series analysis; Studies to establish the causal relationship between these two variables have an important place in applied economic studies. With the determination of the direction of causality between growth and exports, it is possible to determine whether export-based growth strategies are valid for the country studied (Demirhan, 2005:76).

In the second part of our study, a literature review on exports and economic growth is included. In the third part, data and economic methods will be given, and in the fourth part, analysis will be given.

2. REVIEW OF LITERATURE

(Jregorio, 1992), in his study, economic growth between 1950-1985 for 12 Latin American countries conducted a study on the determinants and concluded that foreign trade does not have a notable effect on the growth of Latin American countries.

(Saatcioğlu and Karaca, 2004), using the data between 1950 and 2000 in their studies, the causality relationship from export to growth in Turkey was investigated with the Engle-Granger cointegration test and they determined a causality relationship from economic growth to exports.

(Arvas and Torusdağ, 2016) investigated the influence of exports and imports on economic growth in Turkey between 1987 and 2015. In the study, the Least Squares Method (OLS) was used as the method. Empirical results found that growth and imports were in a positive relationship. Apart from this, it is seen that the 1-unit change in DM contributes 20.3101 units to economic growth. The main conclusion of the study shows that the source of growth is imports.

(Sandalcılar, 2012) examined the relationship between Economic Growth and Exports in BRIC (Brazil, Russia, India, China) member countries. In his study, the period between 1993-2010 was selected and panel unit root with panel cointegration and then panel causality tests were applied as methods. Empirical results showed causality from exports to economic growth in both the short and long term. This situation supports the export-based growth hypothesis.

(Genç, Değer, and Berber, 2010), handled a study on the relationship between Exports, Growth and Human Capital in Turkey between 1980-2007 by using the Toda Yamamoto Causality Test. As a consequence of the study, it was seen that there was a one-way causality from exports to human capital. The findings show that the need for human capital has increased as a result of the change in Turkey's export structure

(Yapraklı, 2007) analysed the relationship between economic growth and exports in Turkey. In the study, the years 1970-2005 were discussed and cointegration and error

correction models were developed as methods and examined econometrically by using Granger causality test. As an outcome of the study, it was concluded that there is a one-way causality between total and industrial exports to GNP in the Turkish economy and bidirectional causality between agricultural and mining exports and GNP.

(Jung and Marshall, 1985) studied the effect of exports on economic growth in 37 developing countries using the Granger causality analysis method. As a conclusion of the analysis, it was designated that only four countries' exports had a positive effect on economic growth.

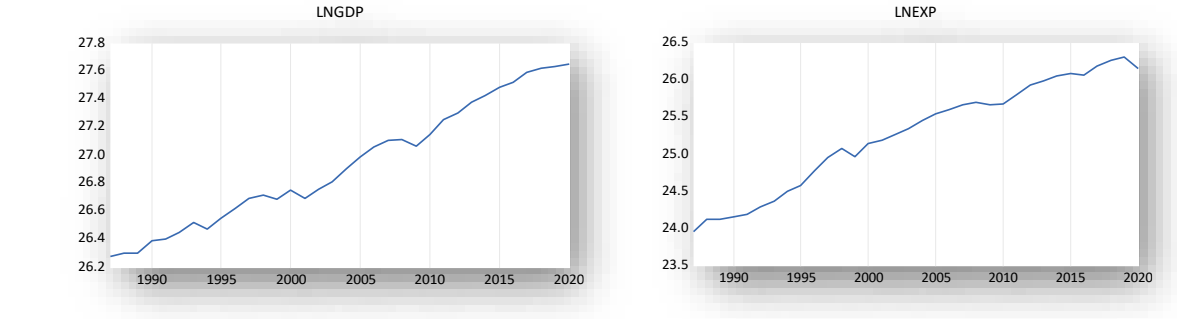
(Helpman and Krugman,1985) conducted similar studies and found that there is a one-way relationship from exports to economic growth. As a consequence of the study, it was stated that the spillover effect of exports affected the domestic industry positively, except for the exported sectors. For example, with the foreign currency obtained from exports, companies have the opportunity to buy modern technologies by importing machinery. This situation increases labor productivity and accelerates economic growth.

Yiğidim and Köse (1997), examining the relationship between imports, exports, and GDP (Gross Domestic Product) in Turkey for the 1980-1996 periods with the Granger Causality test; they found that the first variable affecting growth was imports.

3. DATA AND METHODOLOGY

In our study, annual reel goods and services exports and GDP data of 2015 between the years 1960-2020 are discussed. Logarithmic values of the received data were used. Export (LNEXP), GDP (LNGDP) definitions are used for the variables. Study data were taken from the (World Bank data).

Graph 1: Logarithm GDP and export graph



It is important whether the data discussed in the studies with time series are stationary or not. In order to find a significant relationship between the series, the series must be homogeneous of the same order. If it is stationary at the level of the series, then the series are cointegrated and the relationship between them is real. On the other side, if the series becomes stationary not at the level of the series, but by taking the first difference or the second difference, then the I(d) difference of the series is taken.

Augmented Dickey-Fuller (ADF) unit root test enhanced by (Dickey D.A & Fuller W.A, 1979) and developed and brought to the literature by (Phillips & Perron, 1988) to check whether the GDP and Export data we will use in our study contain unit root. Phillips-Perron test will be used. The Phillips-Perron test is a unit root test that can give more powerful and effective results than the ADF test, and non-parametric corrections are recommended. The

critical values of the Phillips-Perron test and the critical values of the ADF test are the same, and Mac Kinnon critical values are used in both. Fixed, trending and trendless sequences are followed in the series. If the series has become stationary in the trending process, then the other order is not followed and this value is taken as the basis.

Table 1: Augmented Dickey–Fuller unit root test results

Series		Level			I(1) First difference		
	Critical value	İntercept	Trend and intercept	None	İntercept	Trend and intercept	None
LNGDP		0.149505 **(0.9648)**	-2.613052 **(0.2773)**	5.518247 **(1.0000)**	-5.927315 **(0.0000)**	-5.848709 **(0.0002)**	-1.906548 **(0.0551)**
	%1	-3.646342	-4.262735	-2.636901	-3.653730	-4.273277	-2.641672
	%5	-2.954021	-3.552973	-1.951332	-2.957110	-3.557759	-1.952066
	%10	-2.615817	-3.209642	-1.610747	-2.617434	-3.212361	-1.610400
LNEXP		-1.904005 **(0.3265)**	-0.783198 **(0.9571)**	4.892255 **(1.0000)**	-4.733771 **(0.0006)**	-4.998281 **(0.0017)**	-3.285936 **(0.0018)**
	%1	-3.646342	-4.262735	-2.636901	-3.653730	-4.273277	-2.639210
	%5	-2.954021	-3.552973	-1.951332	-2.957110	-3.557759	-1.951687
	%10	-2.615817	-3.209642	-1.610747	-2.617434	-3.21361	-1.610579

Table 2: Phillips-Perron unit root test results

Series		Level			I(1) First difference		
	Critical value	İntercept	Trend and İntercept	None	İntercept	Trend and intercept	None
		0.317950 **(0.9758)**	-2.648569 **(0.2630)**	6.862455 **(1.0000)**	-6.052594 **(0.0000)**	-6.182525 **(0.0001)**	-3.573111 **(0.0008)**
	%1	-3.646342	-4.262735	-2.636901	-3.653730	-4.273277	-2.639210
LNGDP	%5	-2.954021	-3.552973	-1.951332	-2.957110	-3.557759	-1.951687
	%10	-2.615817	-3.209642	-1.610747	-2.617434	-3.212361	-1.610579
		-2.762248 **(0.0747)**	-0.158044 **(0.9914)**	5.027234 **(1.0000)**	-4.734250 **(0.0006)**	-4.806812 **(0.0027)**	-3.285936 **(0.0018)**
LNEXP	%1	-3.646342	-4.262735	-2.636901	-3.653730	-4.273277	-2.639210
	%5	-2.954021	-3.552973	-1.951332	-2.957110	-3.557759	-1.951687
	%10	-2.615817	-3.209642	-1.610747	-2.617434	-3.212361	-1.610579

When we look at the results of the Augment Dickey-Fuller (ADF) unit root test, the H0 hypothesis is accepted, that is, the series are not stationary at their normal levels. In other words, our series are stationary when our t-statistical value at 1%, 5% and 10% significance levels is less than our ADF test statistical value in absolute value.

In the Phillips-Perron unit root test results, it was concluded that the series were not stationary at levels, and became stationary when the first difference was taken. In other words, since our t-statistics values are smaller than our level values in absolute value, we reject the H0 hypothesis and accept the H1 hypothesis. However, when the first difference of the series was taken, it was finalized that our series did not contain a unit root, since the probe values were less than 0.05.

Table 3: Lag length criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	75.62981	NA*	9.48e-06*	-5.890385	-5.792875*	-5.863340*
1	79.09765	6.103402	9.92e-06	-5.847812	-5.555282	-5.766677
2	80.31070	1.940871	1.25e-05	-5.624856	-5.137305	-5.489630
3	85.84722	7.972589	1.13e-05	-5.747777	-5.065207	-5.558461
4	92.36846	8.347191	9.56e-06	-5.949477*	-5.071886	-5.706070
5	94.35096	2.220398	1.19e-05	-5.788077	-4.715466	-5.490580
6	97.84176	3.351174	1.37e-05	-5.747341	-4.479710	-5.395754
7	101.5275	2.948583	1.63e-05	-5.722199	-4.259548	-5.316522
8	105.9496	2.830117	1.97e-05	-5.755964	-4.098293	-5.296197

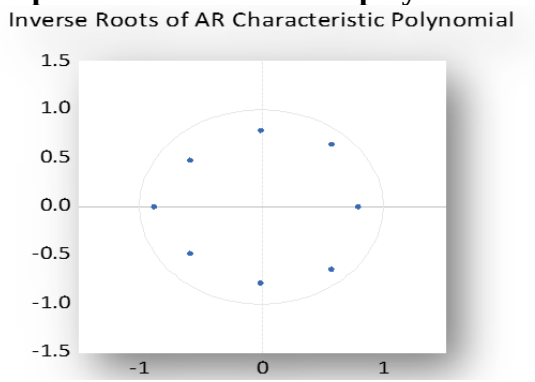
The optimal delay length appears to be 0 and 4 in Table 3. However, since 0 cannot be used in our model, it was chosen as 4 according to the AIC criteria. If there is an autocorrelation trouble in the model, then the lag length will be estimated again.

Table 4: Autocorrelation LM test

Lag	Lre stat	Prob
1	2.171890	0.7042
2	0.857403	0.9306
3	2.504910	0.6438
4	0.874055	0.9283
5	4.340976	0.3618

As can be visible in Table 4, the probability values in the fourth delay are above 0.05, so there was no autocorrelation in the series and we can continue our analysis.

Graph 3: AR characteristic polynomial



As seen in Graph 3, it can be said that the model is stable since the inverse unit roots are inside the unit circle. The statuses of the inverse roots of the AR characteristic polynomial within the unit circle show that the model is stationary.

Table 5: Normality test

Component	Jarque-Bera	df	Prob
1	1.633021	2	0.4420
2	1.733692	2	0.4203
Joint	3.366713	4	0.4984

As the probability value is larger than 0.05, it can be said that our model provides the assumption of normality.

Table 6: VAR Granger causality test

Direction of causality	Chi-sq	df	Prob
GDP → EXP	8.361352	4	0.0792
EXP → GDP	5.780321	4	0.2162

As a result of the Granger causality test, 0.10% Granger causality was found from economic growth to exports and H0 was rejected.

4. CONCLUSION

In our study, the relationship between Turkey's growth and exports between the years of 1960-2020 is examined. First, the logarithmic values of the series were taken and it was checked whether they were stationary. As a consequence of the ADF and PP test, it was determined that the series were not stationary at I(0) level values, but were stationary when the first difference of I(1) was taken.

Then, by estimating the most appropriate delay, it was checked whether the model included autocorrelation, and as a result, no autocorrelation problem was encountered. In the last stage, VAR Granger causality block wald test was applied and as an outcome of the test, a unidirectional Granger causality from GDP → EXP growth to exports was determined.

When we look at the literature, there are many domestic and foreign studies analysing the relationship between growth and exports, and the results differ from each other. In our study, a causality from growth to export was found by looking at the data between 1960 and 2020, but there are many studies in this literature that detect export-led growth.

REFERENCES

- Aktaş, C. (2009). Türkiye'nin İhracat, İthalat ve Ekonomik Büyüme Arasındaki Nedensellik Analizi. Kocaeli Üniversitesi Sosyal Bilimler Enstitüsü Dergisi (18), 35-47.
- Arvas, M. A., & Torusdağ, M. (2016, Aralık). İthalat ve İhracatın Ekonomik Büyüme Üzerine Etkisi. Iğdır Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi, 1(2), 1-18.
- Demirhan, E. (2005). Büyüme ve İhracat Arasındaki Nedensellik İlişkisi: Türkiye Örneği. Ankara *Üniversitesi SBF Dergisi, 60*(4), 75-88.
- Dıckey, D.A., Fuller, W.A. (1979). Distributions of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association 74. 427-431.
- Genç, M. C., Değer, M. K., & Berber, M. (2010). Beşerî Sermaye, İhracat ve Ekonomik Büyüme: Türkiye Ekonomisi Üzerine Nedensellik Analizi. The Journal of Knowledge Economy & Knowledge Management (5), 29-41.
- Granger, Clive, W. 1969." Investigating Causal Relations by Econometric Models and Cross-spectral Methods." Econometrica Vol:37(3):424–438, https://doi.org/10.2307/1912791
- Jregorio, J. (1992). Economic growth in Latin America. *Journal of Development Economics, 39*(1), 59-84. http://www.sciencedirect.com/science/article/pii/0304-3878(92)90057-G.

- Phillips, P., Perron, P. (1988). Testing for a unit root in time series regression. Biometrica, 75. 335-346.
- Saatcioğlu, C., & Karaca, O. (2004). Türkiyedeki ihracat ile ekonomik büyüme arasındaki nedensellik ilişkisi: 1980 dönüşümünün etkisi. *İstanbul Ünv. İşletme Fak. İşletme İktisadı Enstitüsü Dergisi*(49), 30-40.
- Sandalcılar, A. R. (2012). BRIC Ülkelerinde Ekonomik Büyüme ve İhracat Arasındaki İlişki: Panel Eşbütünleşme ve Panel Nedensellik. Süleyman Demirel Üniversitesi, İktisadi ve İdari Bilimler Fakültesi Dergisi, 17(1), 161-179.
- Yapraklı, S. (2007, Haziran). İhracat ile ekonomik büyüme arasındaki nedensellik: Türkiye üzerine ekonometrik bir analiz. ODTÜ Gelişme Dergisi, 34, 97-112.
- Jung, W., & Marshall, P. (1985). Exports, Growth and Causality in Developing Countries. Journal of Development Economics, 18, 1-12. http://dx.doi.org/10.1016/0304-3878(85)90002-1.
- Helpman, E., & Krugman, P. R. (1985). Market structure and foreign trade. MIT press, Cambridge, MA.
- Yiğidim, A. & Köse, N. (1997). İhracat ve Ekonomik Büyüme Arasındaki İlişki, İthalatın Rolü: Türkiye Örneği (1980-1996). Ekonomik Yaklaşım, 8, 71-85.