İstanbul İktisat Dergisi - Istanbul Journal of Economics
69, 2019/1, s. 43-65
ISSN: 2602-4152
E-ISSN: 2602-3954

İSTANBUL UNIVERSITY PRESS

RESEARCH ARTICLE / ARAŞTIRMA MAKALESİ

The Causal Relationship Between Economic Growth and Export: The Case of Russia*

Ekonomik Büyüme ve İhracat Arasındaki Nedensellik İlişkisi: Rusya Örneği

Özgür UYSAL[1], Sultan SAT[2]

ABSTRACT

The relationship between economic growth and export has been one of the most disputed issues in economics literature. The main objective of this paper is to find the direction of the causality relationship between economic growth and export in Russia. We performed our analysis using quarterly economic growth and export data from 2003:q1 to 2018:q4. Using the ADF unit root test for stationarity we first analyzed whether the variables contained a unit root. As a result, we determined that all the variables were stationary at their first differences. Subsequently, we conducted the Engle Granger Cointegration test to analyze the long term relationship between the variables and we determined that there was a long-term relationship between the variables. By using the Granger Causality Test to determine the direction of the relationship, we found that a unidirectional causality existed between economic growth and export in the Russian economy between 2003 and 2018. As seen in the causality relationship between economic growth and export being unidirectional (from export to growth), the effect of export on economic growth is dominant because of export's dependence on raw materials. Russia should reduce its economic dependence on oil prices and strong structural improvements are necessary to reduce this dependence.

Keywords: Export, Economic growth, Russian economy
JEL Classification: F14, C12, O47

ÖZ

Ekonomik büyüme ve ihracat arasındaki ilişki ekonomi literatüründe en sık tartışılan konulardan biridir. Bu çalışmanın ana amacı Rusya'da ekonomik büyüme ve ihracat arasındaki nedensellik ilişkisinin yönünü ortaya çıkarmaktır. Analizler 2003:q1 - 2018:q4 arası çeyreklik ekonomik büyüme ve ihracat

DOI: 10.26650/ISTJECON2019-0011

*This study presented at the International Conference on Eurasian Economies held in Kazan-Russia in 2015 as "Causality Relationship Between Exports and Economic Growth: The Case of Russia". The data and method used in this paper has been updated.

[1]Asisst. Prof., Alanya Alaaddin Keykubat University, Faculty of Management, Department of Economics and Finance, Antalya, Turkey
[2]Phd Student, Alanya Alaaddin Keykubat University, Institute of Social Sciences, Department of International Trade, Antalya, Turkey

ORCID: Ö. U. 0000-0003-0049-8550;
S. S. 0000-0001-8295-557X

Corresponding author/Sorumlu yazar:
Özgür UYSAL,
Alanya Alaaddin Keykubat University, Faculty of Management, Department of Economics and Finance, Kestel, Alanya, Antalya, Turkey
E-mail/E-posta: ozgur.uysal@alanya.edu.tr

Submitted/Başvuru: 18.04.2019
Revision Requested/Revizyon Talebi: 21.05.2019
Last Revision Received/Son Revizyon: 01.06.2019
Accepted/Kabul: 17.06.2019

Citation/Atıf: Uysal, O., Sat, S. (2019). The causal relationship between economic growth and export: the case of Russia. *İstanbul İktisat Dergisi - Istanbul Journal of Economics, 69(1), 43-65.* https://doi.org/10.26650/ISTJECON2019-0011

verileri kullanılarak gerçekleştirilmiştir. Durağanlık testi için Augmented Dickey Fuller (ADF) birim kök testi kullanılarak değişkenlerin birim kök içerip içermediği analiz edilmiştir. Sonuç olarak, tüm değişkenlerin birinci farkları alındığında değişkenlerin durağan oldukları belirlenmiştir. Bu çalışmada daha sonra değişkenler arasında uzun dönemli ilişkiyi analiz etmek için Engle Granger eşbütünleşme testi yapılmış olup, bununla birlikte değişkenler arasında uzun dönemli bir ilişki bulunmuştur. Değişkenler arasındaki ilişkinin yönünü belirlemek için Granger nedensellik testi uygulanmıştır. Yapılan Granger nedensellik testi sonucu 2003 – 2018 yılları arası Rusya'da ekonomik büyüme ve ihracat arasında tek yönlü nedensellik ilişkisi bulunmuştur. Ekonomik büyüme ile ihracat arasında tek yönlü nedensellik ilişkisinde, ekonomik büyüme üzerinde ihracatın etkisi Rusya'nın ihracatta ham maddeye olan bağlılığı nedeniyle baskındır. Çalışmanın ortaya koyduğu temel öneri ise Rusya'nın petrol fiyatlarına olan ekonomik bağımlılığını azaltması gerektiğidir. Rusya ekonomisinin petrol fiyatlarına olan bu bağımlılığını düşürmesi için Rusya ekonomisinde güçlü yapısal reformlar ve ilerlemeler gereklidir.

Anahtar kelimeler: İhracat, Ekonomik büyüme, Rusya ekonomisi
JEL Sınıflaması: F14, C12, O47

EXTENDED ABSTRACT

Russia is one of the largest exporter countries in the world and has its own economic structure and international economic relations. The share of raw material in Russia's production and exports is very high. Russia is the world's biggest exporter of raw petroleum and the second biggest producer of natural gas. Oil and gas incomes represent over 40% of government spending incomes. Given this high oil and natural gas production, Russia's economic growth stems from energy exports.

Russia's economic system depends on exports of natural resources, especially gas and oil. The earnings from those exports are affected by the volatility of global resource markets. The current economic system in Russia can be characterized as consumption-led growth fueled by oil and gas export revenues.

Beginning in the 2000s, the demand-based economic growth model based on large gains from oil and natural gas exports has now ended. Oil price changes have negatively affected Russia's economy. Russia has grown rapidly by exporting raw materials, but this has decreased in recent years. As exports decreased, the monetary and financial resources that entered the market declined. This affected the Russian economy negatively. The recent decline in oil prices started slowing down economic growth some time earlier.

In this paper, we attempted to close the gap in this area of literature by determining the direction of causality between growth and export. Although there are many papers on the growth – export relationship in the literature, we found no study that was directly related to the causal relationship between Russian economic growth and exports. Therefore, we wanted to reveal this causal relationship in Russia. Herewith, this article brings the causality relationship between Russian economic growth and exports to the literature. The difference between this study and existing ones is that it includes the causality relationship between economic growth and exports in Russia. In this way, this paper differentiates itself from those in existing literature.

In our study, we first draw a theoretical framework in regards to exports and economic growth and make a literature review. We then use quarterly data for the period 2003:*q*1 to 2018:*q*4 and attempt to decide the direction of the relationship between the factors using the Granger Causality Test, and finally we make an assessment. In order to measure the relationship between economic growth and exports, the required data was obtained from OECD databases. Eviews 7.0 software was used in the analyses.

In this study, we used a time series approach as the econometric method. Within this framework, the series were seasonally adjusted using the moving averages method in the Eviews software. After this step, we first tested the stationarity of the variables using an ADF unit root test. Second, using the Engle Granger Cointegration Test, we analyzed whether there was cointegration between the variables. In the last stage, using the Granger Causality Test, we determined the direction of the causal relationship between exports and growth.

In this study we first analyzed whether the variables contained a unit root. As a result of a stationary test, we determined that all the variables were stationary at their first difference. Having established stationarity in the series, we then conducted a cointegration test to analyze the long term relationship using the Granger Cointegration Test. As a result of the cointegration test, we determined that there was a long-term relationship between the factors.

To determine the causal relationship between economic growth and exports, the Granger Causality Test is employed. The results indicated a unidirectional causal relationship between economic growth and exports for the Russian economy. Looking at these results it is possible to claim that exports and economic growth affect one another in Russia. As seen in the causality relationship between economic growth and exports being unidirectional running from exports to growth, the effect of exports on economic growth is dominant because of both theoretical details and export dependence on raw materials.

The Russian economy is heavily based on the export of raw materials. Price decines in oil and other raw materials, particularly in economic crisis periods (1998 and 2008), caused a contraction in Russia's GDP. Growth, however, which is based on various other sources, can cause an increase in exports.

Our specific policy recommendation for the Russian economy is to move to a new supply-oriented growth model. Progress should be made on issues such as liberalization, mobilization, effectiveness in production. Furthermore, strong structural improvements are necessary to reduce the dependence on oil prices - the country needs to reduce its economic dependence on oil prices.

1. Introduction

Over thecourse of recent years, the globalization process has generated an interconnected world, making feasible a single market, where exports have a direct effect on both the real economy and the financial sphere. In fact, exports are very important in providing the foreign currency inflow required for financing energy, investment and intermediate goods. Exports also have an effect on a country's foreign currency reserves and growth processes (Aktaş, 2009). Although different definitions of economic growth are made in the literature, in the broadest sense it is an 'increase in production levels of countries and rise in per capita income' (Sandalcılar, 2012). One of the most comprehensive subject areas in economics literature is how to attain a stable economic growth process, and it is known that one of the sources of economic growth is exports. The relationship between economic growth and exports is dynamic, and this relationship is discussed in the literature around the question 'Are exports an engine of growth or a supplementary element of it?' (Yiğidim and Köse, 1997). By researching this relationship in the world economy, and particularly in Russia (which is one of the biggest energy exporters and producers in the world) we wanted to know if this situation was valid for analysing Russian's GDP growth rate.

According to the Observatory of Economic Complexity's data, Russia is the ninth biggest export economy in the world and in 2013, Russia exports were $507 billion and imports $324 billion, which means a positive trade balance of $182 billion. In the same year the GDP of Russia was $2.1 trillion and the GDP per capita of Russia was $25.200; and in 2014, GDP was $1.8 trillion. According to World Bank statistics, Russia's exports of goods and services were $558 billion, its GDP growth rate was 0,6 % and per capita GDP was $12,735.

The Russian Federation is among the few countries worldwide, which has both natural resources and human capital that are the bases of an extensive economic power. With this characteristic, the Russian Federation is one of the economies and countries that are accepted as 'emerging markets' or 'emerging countries', also known as BRICS countries (Brazil, Russia, India, China, South Africa), which are the fastest developing economies in the world.

Russia has its own economic structure and international economic relations. The share of raw materials in exports and production is very high. Russia is the world's biggest crude oil producer and the second biggest producer of dry natural gas. Russia also produces a significant amount of coal. Gas and oil earnings represent over 40% of government spending incomes. Given the high natural gas and oil production, Russia's economic growth stems from energy exports. In 2015, gas and oil earnings accounted for 43% of Russia's federal budget earnings (U.S Energy Information Agency [EIA], 2017). Russia's economic system depends on exports of natural resources, especially gas and oil. The earnings from those exports are affected by the volatility of global resource markets (Bradshaw and Connolly, 2016). The current economic system in Russia can be characterized as consumption-led growth provided by oil and gas export revenues (Tabata, 2006).

Starting in the 2000s, the demand-based economic growth model based on large gains from oil and natural gas exports has now ended. Oil price changes have affected Russia's economy negatively (Mau, 2016, p. 350). Russia has grown rapidly by exporting raw materials, but this has decreased in recent years. As exports decreased, the monetary and financial resources that entered the market declined. This affected the Russian economy negatively (Zamaraev et al., 2014). The recent decline in oil prices started slowing down economic growth some time earlier. The economic growth model that serves Russia is a model dependent on the redistribution of natural resource incomes to other parts of the economy. This model waited on Russia between 1999 and 2008. Since 2012, this growth model has clearly been exhausted (Bradshaw and Connolly, 2016).

The average annual economic growth was over 7% in Russia in 1999 and 2009. Then, growth decreased dramatically. While it was around 4% in 2012 and 1,3% in 2013, the annual real GDP growth in 2014 decreased to only 0,6%. The reasons for this slowdown were the contraction of many factors, such as a shrinking labor force, government growth and slowdown in consumer spending, and perhaps most importantly, the decreasing share of investment in economic activity (Bradshaw and Connolly, 2016).

Russia's current account surplus decreased to $25 billion in 2016 from $69 billion. The current account outcome of the merchandise trade balance decreased to $90 billion (from $148,5 billion in 2015) because of declining exports affected by falling oil prices and energy products (The Central Bank of Russian Federation [CBR]).

The Bank of Russia's estimate in the current account of the balance of payments of the Russia reached a $104,3 billion surplus, in the January-November 2018 period. The surplus balance on external merchandise trade is $175,6 billion, through appropriate prices for Russia's main export commodities and low growth rates of imports (CBR).

In the period 2014-2016, prices of Russia's main export goods fell and this was followed by a slowdown in economic growth. The economic situation in Russia in 2014-2016 was defined by two group factors. First of all, external shocks such as sanctions (especially in the financial field) and Russia's main exports were falling at the same time. Second, serious structural problems brought about a decline in the growth potential of the Russian economy in the middle of the last decade, followed by a slowdown in economic growth. The decrease in investment activities has been seen ongoing since 2012, while growth rates have slowed down. These negative processes started before the imposition of sanctions and the decrease in oil prices. The reason for this slowdown was the decline in economic growth potential recorded since the second half of the 2000s (Mau, 2017).

Economic growth in Russia depends on many economic factors. Of course, exports are not the sole cause of growth -there are other determinants. In Russia, oil exports, human capital stock, macroeconomic stability, etc. are assumed as being among the most important determinants of economic growth. Infrastructure investment projects and government capital investments contribute to the Russia's economic growth (Zamaraev et al., 2014). Macroeconomic stabilization, increase in inward FDI, structural and institutional reforms based on liberalization of economic activity, and guarantees of property rights can ensure stable economic growth (Mau, 2016).

In this paper, we tried to close the gap in this area of literature by determining the direction of causality between export and growth. Although there are many studies on the growth – export relationship in the literature, we have found no study that was directly related to the causal relationship between Russian economic growth and exports. Therefore, we wanted to reveal this causal relationship in Russia. Herewith, this article brings the causality relationship between Russian economic growth and exports to the literature. The difference between this study and existing ones is that it includes the causality relationship between economic growth and exports in Russia. In this way, this paper differentiates itself those in the existing literature. In our study, we first draw a theoretical framework in regards to exports and economic growth and make a literature review. We then use quarterly data for the period 2003:*q*1 to 2018:*q*4 and attempt to determine the direction of the relationship between the variables using the Granger Causality Test, and finally we make an assessment.

2. Theoretical Framework

The emergence of trade in human history dates back to the beginnings of civilization, and the relationship between exports and economic growth is one of the most important subjects to have been explored by researchers. According to Acar (2004) it was John Stuart Mill who first tackled the relationship between foreign trade and growth within a theoretical framework. Mill dealt with classical thoughts on technological development, growth and foreign trade. Mill did not construct a theory about this matter, however, but touched upon technological advancement and its effect on the trade of necessary and luxury goods. In particular' he elaborated on imports increasing the effect of technological advancements.

F. Y. Edgeworth dealt with growth and foreign trade relationships in a clearer way. Tackling growth and foreign trade relationships from a pessimistic perspective, he talked about 'harmful growth'. According to Edgeworth, since economic growth disrupts the terms of trade against a country, the country finds itself experiencing economic wealth loss (Krugman and Obsfeld, 1991).

A more explanatory study of the relationship between growth and trade was made by Sir John Hicks. The same subject was later dealt with by T. N. Rybczynski in 1955, by H. G. Johnson in 1957 and by Bhagwati in 1958. According to Seyidoğlu (2009), Sir John Hicks predicated real issues such as growth and terms of trade on other real issues such as efficiency. Hicks conducted a study on the reasons behind the unfavorable development of terms of trade against the UK as a result of trade between the UK and the USA. He determined that in a standard foreign trade model, if efficiency increases in the export sector of a country, terms of trade develop against that country. Therefore, while import-oriented growth affects terms of trade positively, export-oriented growth affects terms of trade negatively and the country ends up a loser as a result of foreign trade.

According to T. N. Rybczynski, when full employment conditions are valid in a two-good two-factor model, and when the supply of one of the production factors increases, the production of the goods that use this factor increases, while production of the goods that use other factors decreases. When there is an increase in the factor that is used by export goods only, a foreign trade-increasing growth is observed. In such a case an increase in the production of export goods leads to an increase in exports and foreign trade volume. However, as the increase in the production factor, which is intensively used in the production of import substitution goods, will cause a decrease in imports, it will create a foreign trade-decreasing (against foreign trade) growth. On the other hand, the production of export goods will decrease. In other words, due to a decrease in imports stemming from a decrease in the production of export goods and an increase in the production of import substitution goods, foreign trade volume will decrease (Badurlar, 2013).

H. G. Johnson (1957) showed that an increase in terms of trade had a negative effect on growth. He explained the effects of growth on income and demand for imported goods by looking at changes in terms of trade. He put forth these effects utilizing five different concepts such as 'unbiased growth', 'pro-trade-biased growth', 'ultra-pro-trade-biased growth', 'anti-trade-biased growth' and 'ultra-anti-trade-biased growth' (Acar, 2004).

Another economist who analyzed the relationship between trade and growth is Bhagwati. Dealing with the negative effect of growth on welfare, Bhagwati introduced the concept of "immiserizing growth". According to this hypothesis, disruptions that emerge in terms of trade as a result of economic growth eliminate the positive effects on the welfare of the country, have a negative effect on consumption, and decrease the general welfare level (Jayme, 2001).

Feder (1982) considered exports one of the principal sources of growth. Starting off with the fact that marginal factor efficiencies of export and non-export sectors of the economy are not equal, Feder described how the marginal factor efficiency of export sectors was significantly higher than that of non-export sectors. Feder claimed that growth was occurring not only because of an increase in total levels of labor and capital, but also the resources were being allocated from relatively less efficient non-export sectors to highly efficient export sectors, and showed that exports were a source of growth.

3. Literature Review

Since there is no previous study which only deals with the causality relationship between Russian economic growth and exports, studies on other countries are presented. For example, we refer to some studies that include Russian economy and the nexus between export and growth.

Bildirici and Bakirtas (2014) investigated the causality relationship between economic growth and coal, natural gas and oil consumption in BRICTS (Brazil, Russia, India, China, Turkey and South Africa) countries using the ARDL testing analysis for the 1980–2011 period. They found bilateral Granger causality between economic growth and oil energy consumption in all countries. They also found bilateral causality relationships between economic growth and natural gas energy consumption in Brazil, Russia and Turkey.

Ledyaeva and Linden (2008) investigated *per capita* growth determinants in 74 Russian regions during the period 1996-2005 by using an empirical framework of

Barro and Sala-i-Martin's growth model. They used both panel and cross-sectional data. According to their paper the initial level of the region's economic development, the 1998 financial crisis, domestic investments, and exports determined the regional growth during the period 1996-2005. According to their results export has a positive, but quite small influence, on economic growth in Russia (Ledyaeva and Linden, 2008). A 1% growth in export per capita increases economic growth by 0,05-0,07% (Ledyaeva and Linden, 2008). Thus, by enhancing export, Russian authorities boost the economic growth in the country. However, Russian exports mostly consist of oil and gas (Ledyaeva and Linden, 2008).

Khatun (2016) analyzed the relationship between trade in financial services and economic growth in BRICS Economies for the period 1990-2012. They used Pedroni's panel cointegration method and they found uni-directional causality running from trade in financial services to economic growth.

Kuzmenko, Smutka, Pankov and Efimova (2017) investigated Russia's dependence on crude oil and pressure of crude oil prices on economic growth and structure of the export basket for the period 2000:*q*1 – 2014:*q*4. According to their results crude oil prices still influence Russian economy and this influence is stronger than fiscal and monetary policies implemented in Russia.

Despite the fact that until today the relationship between exports and economic growth has been the subject of many studies, no consensus has been reached as varying results were obtained in each of these studies. In many studies, researchers observed export-oriented growth models which are predicated on the premise that exports lead to an increase in growth. However, in other studies, it has been observed that imports lead to an increase in growth. According to the model known as the 'Export-Oriented Growth Hypothesis', an increase in exports, competition and practice of quality goods, the transition to a scale economy, increase in employment and workforce efficiency, and technological innovation in foreign markets, will all affect economic growth (İspir, Ersoy and Yılmazer, 2009). A selected summary of research conducted on these subjects is presented below in chronological order.

In 1997 J. Thornton analyzed the relationship between economic growth and exports in Germany, Denmark, England, Sweden, Italy and Norway, in the period from the second half of the 19th century to World War I. In the study, in which the Granger Causality Test was applied, different results were obtained for each of these countries. Thornton found that there was a causal relationship from exports to growth in Italy, Sweden and Norway, a causal relationship from economic growth to exports in England, and a unidirectional causal relationship between exports and economic growth in Germany and Denmark, meaning that while exports affected economic growth, economic growth also affected exports (Hüseyni, 2012).

In 2000 Afxentiou and Serletis analyzed the relationship between GDP, exports, and imports, using data from 50 developing countries for these three variables in the period 1970-1993. In this study, in which the authors used a unit root test, the Engle-Granger Cointegration Test, and the Granger Causality Test, they concluded with the hypothesis that exports are the driving engine of growth was valid only for South East Asian countries, and that this hypothesis did not hold true for other countries (Hüseyni, 2012).

Özer and Erdoğan (2006) analyzed the relationship between real economic growth and exports in Turkey in the period 1987-2006 using the Granger Causality Test. The study reached the conclusion that there was a one-way causal relationship between the variables, from exports to economic growth and imports, and from imports to economic growth, and that an export-oriented growth hypothesis was valid in Turkey.

Konya (2006) analyzed the possibility of Granger causality between real GDP and real exports in 24 OECD countries in the period 1960-1997. He used two different models in this study, the two-variable model (GDP and exports) and three-variable model (GDP, exports and openness). Konya determined a unidirectional relationship between growth and exports in the Netherlands, Finland and Canada; a one-way relationship from exports to GDP in Sweden, Spain, New Zealand, Italy, Ireland, Iceland, Denmark and Belgium; and a one-way

relationship from GDP to exports in Portugal, Norway, Mexico, Japan, Greece, France and Austria. The study found no relationship between the variables in Australia, Korea, Luxembourg, Switzerland, the UK or the USA.

Çetintaş and Barışık (2009) analyzed the causal relationship between import, export and aconomic growth for the 13 transition economies. According to their results, the growth-led export hypothesis was dominant in these countries and there was a unidirectional causality from economic growth to export.

Aktaş (2009) analyzed the causal relationship between exports, imports and economic growth in the period 1996-2006 in Turkey, using the Johansen Cointegration Test. A bi-directional causal relationship between exports, imports and economic growth were determined in the short term. However, in the long term, the study found a one-way causal relationship from exports to imports, from imports to exports, from growth in exports and from growth to imports.

Using Granger Causality analysis, Alagöz (2009) analyzed the relationship between growth and foreign trade in the period 1980-2006 in Turkey, within the framework of domestic growth variables. It was observed that there was a one-way causal relationship from foreign trade to GDP.

Taştan (2010) analyzed the causal relationship between exports, industrial production and imports in the period 1985:01 to 2009:05 in Turkey using the frequency domain method. Tastan found that in the long term, the direction of causality was from industrial production growth rate to export growth rate. These findings support the 'import-oriented growth' hypothesis.

Takım (2010) tested the relationship between exports and growth using Granger Causality Analysis of the data for the period 1975-2008 in Turkey, and concluded that increases in exports did not support an increase in growth.

Using data for the period 1975-2010, Sandalcılar (2012) analyzed the relationship between exports and economic growth in BRIC countries. Sandalcılar

used panel unit root, panel cointegration and panel causality tests in the study. The study found that in the short and long terms there was a one-way causal relationship from exports to economic growth, but that the opposite case was not significant.

Göçer (2013) used the panel data analysis method on data for the period 1980-2012 for Asian countries, and analyzed the effect of exports on economic growth. This study determined that exports had a significant and positive effect on growth in these countries and that a 10% increase in exports caused a 1% increase in economic growth.

Using quarterly data for the period 1998:q1 to 2013:q3 in Turkey, Korkmaz (2014) analyzed whether there was a causal relationship between exports and economic growth variables. The study found a one-way causal relationship from exports to grow.

Koçyiğit et al. (2015) analyzed the causal relationship between international trade and economic growth for Brasil, India, Russia, Turkey, South Africa and China. They found out uni-directional causality running from export to GDP for Russia, Brasil, Turkey and China. Therefore, export led growth was valid for these countries.

Srinivasan (2016) investigated causal relation between export and aconomic growth for BRICS countries by using Johansen cointegration analysis and VECM Granger causality analysis. According to his results, there is significant long term relationship between export and economic growth and there is bidirectional causality between export and growth for BRICS countries except Brasil.

Rani and Kumar (2018) analyzed the causal relationship between import, export and economic growth in BRICS Countries for the period 1967-2014. They used Pedroni's cointegration analysis and they found that there exists a long-run relationship between variables. They also found bidirectional causality between export and economic growth for BRICS Countries.

4. Data Set, Econometric Methodology and Findings

4.1. Data Set

In order to measure the relationship between exports and economic growth in the period 2003:q1to 2018:q4 in Russia, the required quarterly data was obtained from OECD databases (OECD, 2015). Eviews 7.0 software was used in the analyses. Exports data is described as seasonally adjusted US Dollar values of exports of goods and services in Russia. We used GDP deflator to express this nominal data in real terms. A seasonally adjusted real US Dollar values of gross domestic product measured by expenditure approach is used as a proxy for economic growth.

4. 2. Econometric Methodology

In this study, we used a time series approach as the econometric method. Within this framework, the series were seasonally adjusted using the moving averages method in the Eviews software. After this step, we first tested the stationarity of the variables using the Augmented Dickey-Fuller (ADF) unit root test. Second, using the Engle Granger Cointegration Test, we analyzed whether there was cointegration between the variables. In the last stage, using the Granger Causality Test we determined the direction of the relationship between the variables.

When the regression between the time series is estimated, usually a high R^2 value is found even when there is no economically meaningful relationship between the variables. This situation is called spurious regression. The observed high R^2 value emerges as a result of the similarity in the trend, rather than a real relationship. In order to detect this problem one should first checek whether the series is stationary or not (Gujarati, 2009). In order to determine stationarity in the series, researchers use unit root tests. The most important tests that are used to determine whether a time series contains a unit root are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests (Özer and Erdoğan, 2006).

If the Dickey-Fuller results indicate the presence of a unit root in the series, non-stationarity problem can be eliminated by differencing these variables. According to Tarı (2011), a model such as

$$Y_t = PY_{t-1} + u_t \quad (1)$$

can be constructed to test the stationarity of the series, in where u_t is a stochastic error term. If P is found to be P=1 then a unit root problem arises and the relationship takes the form given in equation (2) as:

$$Y_t = Y_{t-1} + u_t \quad (2)$$

When Y_{t-1} is subtracted from both sides of the equation we obtain the following equation:

$$\Delta Y_t = (P-1)\, Y_{t-1} + u_t \quad (3)$$

The first difference of the variable Y_t is defined as

$$\Delta Y_t = (Y_t - Y_{t-1}) \quad (4)$$

If (P-1) is expressed as δ then the relationship can be expressed as

$$\Delta Y_t = \delta Y_{t-1} + u_t \quad (5)$$

When P is equal to 1, δ is equal to zero (P=1, δ=0). In such a case,

$$\Delta Y_t = (Y_t - Y_{t-1}) = u_t \quad (6)$$

and the first difference will be stationary.

To determine the cointegration between time series variables, one of the method used widely is called the Engle and Granger cointegration test. In a given

equation, although the series used in empircal study are not stationary, their linear combinations can be stationary. This situation can be explained by the concept of cointegration. With the help of a cointegration analysis, it can be understood whether the economic variables that are considered to be in a relationship with one another actually move together in the long term (Bayraktutan and Arslan, 2008).

Although the cointegration test provides an evidence on the presence of long-run relationship between variables, it does not indicate the direction of the relationship between variables. To determine the direction of causality, the commonly used test is the Granger causality test. According to Granger (1969), causality can be defined as follows: 'If the prediction of Y is more successful when historical values of X are used than when historical values of X are not used, then X is the Granger-cause of Y'. If this definition is affirmed, the relationship is denoted by X→Y. Prior to conducting this test, variables need to be made stationary. If series are not stationary, the results obtained from a regression analysis can be misleading in reflecting the real relationship (Granger and Newbold, 1974).

4. 3. Empirical Findings

In order for the relationship between exports and economic growth to produce statistically significant results we first employed the ADF (Augmented Dickey Fuller) unit root test. The results are presented in Table 1.

Table 1: The Augmented Dickey Fuller Test Results

Level Values of Series					
		EXPORTS		ECONOMIC GROWTH	
		t-statistics	Probability	t -statistics	Probability
ADF test statistics		-2,001	0,588	-2,712	0,235
Test Critical Value	1%	-4,115		-4,124	
	5%	-23,485		-3,489	
	10%	-3,170		-3,173	

First Differenced Values of Series					
		EXPORTS		ECONOMIC GROWTH	
		t -statistics	Probability	t-statistics	Probability
ADF test statistics		-7,190	0,000	-4,126	0,009
Test Critical Value	1%	-4,115		-4,115	
	5%	-3,485		-3,485	
	10%	-3,170		-3,170	

Source: Authors' calculations.

The Augmented Dickey-Fuller unit root test results pertaining to levels of unit root values in the series show that the null hypothesis (H_0: Series has a unit root, H_1: Series is stationary) cannot be rejected with 1%, 5% and 10% level of significance (p=0,588≥0.05, p= 0,235≥0,05). In addition, the absolute value of *t* statistics for exports is less than the absolute value of critical test values, i.e. |-2,001|< |-4,115|, |-3,485|, |-3,170|. Likewise, the absolute value of *t* statistics for growth series is less than the absolute value of critical test values, i.e. |-2,712|< |-4,124|, |-3,489|, |-3,173|.

In general, the fact that the absolute value of *t* statistics for exports and growth series is less than the absolute values of critical test values at all significance levels shows that exports and growth series are not stationary. Therefore, these series were differenced once and the ADF test was applied again to the differenced series.

The second part of Table 1 shows that in the period 2003:*q*1 to 2018:*q*4 the two variables used in the study are stationary at their first differences (p≤ 0,05). In addition, the absolute value of *t* statistics for the export series is greater than all the test critical values, i.e. |-7,190|> |-4,115|, |-3,485|, |-3,170|. Likewise, the absolute value of *t* statistics for the growth series is greater than all of the test critical values, i.e. |-4,126|> |-4,115|, |-3,485|, |-3,170|. The fact that the absolute value of *t* statistics is greater than the absolute value of critical test values at each of the two significance levels shows that export and growth series are stationary at their first differences. Such series are called the series integrated at level one, I(1). Since the first differences of all the data are stationary, that is the series are non-stationary, we moved on to the

cointegration test to avoid falling in the spurious regression problem. It is well known that regression with non-stationary variables may lead to superious regression.

In this study, the Engle-Granger Cointegration Test is employed to determine whether the economic growth and export variables move together in the long-run, that is whether they are cointegrated. The results related to the Engle-Granger Cointegration Tes are presented in Table 2.

Table 2: Granger Cointegration Test Results

		Level Values of RESIDUALS (u_t)	
		t-statistics	**Probability**
ADF test statistics		-3,742	0,0057
Test Critical Value	1%	-3,542	
	5%	-2,910	
	10%	-2,592	

Source: Authors' calculations.

The results in Table 2 show that the null H_0 hypothesis of no cointegration is rejected at 1% level of significance and hence the alternative, the H_1 , hypothesis of cointegration is accepted. We reach the conclusion that there is a cointegration between the series implying that exports and economic growth series move together in the long-run and that they have along run relationship.

Having established that exports and economic growth variables are cointegrated, the causal relationship between exports and economic growth is tested by using the Granger Causality Test. The lag length of the causality test is determined as three according to Akaike Information Criteria (AIC) and Schwarz Criteria (SC). The results pertaining to the Granger causality test are presented in Table 3.

Table 3: Causal Relationship between Exports and Economic Growth

Null Hypothesis	**Chi-sq.**	**Probability Value (p)**	**Decision at 5% Significance Level**
Growth is not Granger-cause of exports	0,375	0,9452	Accepted
Exports are not Granger-cause of growth	10,571	0,0143	Rejected

Source: Authors' calculations.

Examination of Table 3 shows that economic growth is not a Granger-cause of exports, but exports are a Granger-cause of growth. The null, H_0, hypotheses are rejected at a 5% significance level of significance ($p \leq 0,05$). It is found that there is only one way causal relationship between economic growth and exports which is running from exports to growth.

5. Conclusion

As a result of globalization, countries have been in close interaction with one another in the trade of goods and services, and in the financial services sector. In particular, those countries regarded as emerging economies take part more heavily in this trade network. Through the development of this trade network, the efficiency of a country increases, its technology continues to advance, and its economy can grow, thanks to foreign currency inflow in the country. Just as exports lead to growth, growth can also cause an increase in exports. This situation differs greatly depending on the source of growth. If the source of growth is an increase in production factors, economic growth increases exports.

In this study we analyzed the causal relationship between exports and economic growth in the period 2003:*q*1 to 2018:*q*4 in Russia. We first analyzed whether the variables contained a unit root. As a result of a stationary test, it was determined that all the variables were stationary at their first difference. Having established stationarity in the series, we conducted a cointegration test to analyze the long term relationship. As a result of the cointegration test, we determined that there was a long-term relationship between the variables.

Furthermore the Granger causality test results indicated that there is a unidirectional causality running from exports to economic growth in the Russian economy. Examining the findings of this study, it is possible to claim that exports affect economic growth in Russia. The results coincide with the structure of the Russian economy.

The Russian economy is heavily based on the export of raw material and petrolium. Price decreases in oil and other raw materials, particularly in economic

crisis periods (1998 and 2008), cause a contraction in Russia's GDP. Growth, however, which is based on various other sources, does not cause an increase in exports.

In the light of these findings, it can be aruged that a suitable policy for the Russian economy involves starting to implement supply-oriented growth policies. Progress should be made on issues such as liberalization, mobilization, and effectiveness in production. Furthermore, strong structural improvements are necessary to reduce the dependence on oil prices -the country needs to reduce this economic dependence.

Grant Support: The authors received no financial support for this work.

References

Acar, S. (2004). *Uluslararasi Reel Ticaret: Teori, Politika*. İzmir: Dokuz Eylül Üniversitesi Yayınları.

Aktaş, C. (2009). Causality Analysis between Turkey's Exports, Imports and Economic Growth. *Kocaeli University Journal of Social Sciences*, *18*(2), 35–47.

Alagöz, M. (2009). Within the Framework of Internals Growth Theory a Causality Analysis on Relationship between Turkey's Foreign Trade and Growth (1980-2006). *Finans Politik & Ekonomik Yorumlar*, *46*(529), 75–84. Retrieved from http://www.ekonomikyorumlar.com.tr/files/articles/152820004634_5.pdf

Badurlar, İ. Ö. (Eds.). (2013). *Uluslararasi Iktisat*. Eskişehir: Anadolu Üniversitesi Açık Öğretim Yayınları.

Bayraktutan, Y., & İbrahim, A. (2008). Effect of Fixed Capital Investments on Economic Growth in Turkey: Cointegration Analysis (1980-2006). *KMU Journal of Economic and Administrative Sciences*, *14*, 1–12.

Bildirici, M. E., & Bakırtaş, T. (2014). The Relationship Among Oil, Natural Gas and Coal Consumption and Economic Growth in BRICTS (Brazil, Russian, India, China, Turkey and South Africa) Countries. *Energy, 65*(C), 134–144.

Bradshaw, M., & Connolly, R. (2016). Russia's Natural Resources in the World Economy: history, review and Reassessment, *Eurasian Geography and Economics*, *57*(6), 700–726, DOI: 10.1080/15387216.2016.1254055.

Cetintaş, S., & Barışık, S. (2009). Export, Import and Economic Growth: The Case of Transition Economies. *Transition Studies Review*, *15*(4), 636–649.

Feder, G. (1982). On Exports and Economic Growth. *Journal of Development Economics, 12*, 59–73.

Göçer, İ. (2013). Ekonomik Büyümenin Belirleyicisi Olarak İhracat: Gelişmekte Olan Asya Ülkeleri İçin Yatay Kesit Bağımlılığı Altında Çoklu Yapısal Kırılmalı Panel Eşbütünleşme Analizi. *Bankacılar Dergisi, 86*, 27–42. Retrieved from https://www.tbb.org.tr/Content/Upload/dergiler/dosya/60/TBB_dergi86-web.pdf.

Granger, C. (1969). Investigating Causal Relations by Econometric Models and Cross-spectral Methods. *Econometrica*, *37*(3), 424–438. doi:10.2307/1912791.

Granger, J. W. C., & Newbold, P. (1974). Spurious Regressions in Econometrics. *Journal of Econometrics*, *2*, 111–120. Retrieved from https://wolfweb.unr.edu/homepage/zal/STAT758/Granger_Newbold_1974.pdf.

Gujarati, D. N. (2009). *Basic Econometrics*. Translated and edited by Senesen, U. and Senesen, G.G. Istanbul: Literatur Publications.

Hüseyni, İ. (2012). *Dış ticaret ve ekonomik büyüme analizi Türkiye örneği: 1980-2010*. (Master Disseration). Ataturk University, Erzurum.

İspir, S. M., Ersoy, B. A., & Yılmazer, M. (2009). Do Exports or Imports Have More Effect on Turkey's Growth Dynamics?. *Dokuz Eylul University, Journal of Economics and Administrative Sciences*, *24*(1), 59–72. Retrieved from http://iibf.deu.edu.tr/deuj/index.php/cilt1-sayi1/article/view/248/pdf_228.

Jayme, F. (2001). *Notes on Trade and Growth*. Texto Para Discussão. Retrieved from http://www.cedeplar.ufmg.br/pesquisas/td/TD%20166.pdf.

Khatun, R. (2016). Relation between Trade in Financial Services and Economic Growth in BRICS Economies: Cointegration and Causality Approach, *Global Business Review*, *17*(1), 214–225.

Koçyiğit, A., Bayat, T., Kayhan, S., & Şentürk, M. (2015). Short and Long Term Validity of Export-Led Growth Hypothesis in BRICS-T Countries: A Frequency Domain Causality Approach, *Journal of Asian Development Studies*, *4*(3), 117–129.

Konya, L. (2006). Exports and Growth: Granger Causality Analysis on OECD Countries with a Panel Data Approach. *Economic Modeling*, *23*(6), 978–992. Retrieved from https://www.sciencedirect.com/science/article/pii/S0264999306000496.

Korkmaz, S. (2014). Causal Relationship between Exports and Economic Growth in Turkish Economy. *Business and Economics Research Journal*, *5*(4), 119–128.

Krugman, P., & Obstfeld, M. (1991). *International Economics Theory and Policy*. New York: Harper Collins Publishers.

Kuzmenko, E., Smutka, L., Pankov, M., & Efimova, N. (2017). The Success of Economic Policies in Russia: Dependence on Crude Oil vs. Export Diversification. *Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis*, *65*, 299–310.

Ledyaeva, S., & Linden, M. (2008). Determinants of Economic Growth: Empirical Evidence from Russian Regions. *The European Journal of Comparative Economics, 5*(1), 87–105.

Mau, V. (2016). Between Crises and Sanctions: Economic Policy of the Russian Federation. *Post-Soviet Affairs, 32*(4), 350–377.

Mau, V. (2017). Russia's Economic Policy in 2015–2016: The Imperative of Structural Reform. *Post-Soviet Affairs, 33*(1), 63–83. Retrieved from http://www.tandfonline.com/doi/full/10.1080/1060586X.2016.1215679.

OECD (2015). Country statistics. Retrieved from: https://data.oecd.org

Özer, M., & Erdoğan, L. (2006). A Time Series Analysis of Export, Import and Economic Growth Relations in Turkey. *Gazi University Economic Approaches,17*(60-61), 93–110. doi:10.5455/ey.10619

Rani, R., & Kumar, N. (2018). Is There an Export- or Import-led Growth in BRICS Countries? An Empirical Investigation. *Jindal Journal of Business Research*, *7*(1), 13–23.

Sandalcılar, R. A. (2012). Relationship between Economic Growth and Exports in BRIC Countries: Panel Cointegration and Panel Causality. *Suleyman Demirel University Journal of Economics and Administrative Sciences*, *17*(1), 161–179. Retrieved from http://sablon. sdu.edu.tr/fakulteler/iibf/dergi/files/2012-1-8.pdf.

Seyidoğlu, H. (2009). *International Economics: Theory, Politics and Application*. İstanbul: Güzem Can Publications.

Srinivasan, P. (2016). Causal Nexus between Export and Growth: BRICS Nations. *SCMS Journal of Indian Management*, *8*(1), 67–80.

Tabata, S. (2006). Observations on the Influence of High Oil Prices on Russia's GDP Growth. *Eurasian Geography and Economics, 47*(1), 95–111.

Takım, A. (2010). Relationship Between GDP and Exports in Turkey: Granger Causality Test. *Ataturk University Journal of Social Sciences*, *14*(2), 1–16. Retrieved from http://dergipark. ulakbim.gov.tr/ataunisosbil/article/viewFile/1020005978/1020005764.

Tarı, R. (2011). *Econometrics*. Istanbul: Umuttepe Printing House.

Taştan, H. (2010). Spectral Analysis of Causal Relationships between Exports, Imports and Economic Growth in Turkey. *Journal of Economic Sciences*, *2*(1), 87–98. Retrieved from http:// www.sobiad.org/eJOURNALS/dergi_EBD/arsiv/2010_1/10huseyin_tastan.pdf.

The Central Bank of Russian Federation (CBR). Retrieved from: https://www.cbr.ru/Eng/statistics/?PrtId=svs.

The World Bank – World Development Indicators. Retrieved from: http://databank.worldbank.org/data/reports.aspx?source=2&country=RUS&series=&period=#.

U.S. Energy Information Agency, (EIA) (2017). Retrieved from https://www.eia.gov/beta/international/analysis_includes/ countries_long/Russia/russia.pdf. (Accessed 09 July 2017).

Uysal, Ö., & Sat, S. (2015). *Causality Relationship between Export and Economic Growth: The Case of Russia*. International Conference on Eurasian Economies. Kazan-Russia Federation. 416-422.

Yiğidim, A., & Köse, N. (1997). Relationship Between Exports and Economic Growth, and Role of Imports: The Case of Turkey (1980-1996). *Economic Approach*, *8*(26), 71–85. Retrieved from http://ekonomikyaklasim.org/pdfs2/EYD_V08_N26_A05.pdf.

Zamaraev, B., Kiiutsevskaia, A., Nazarova A., & Sukhanov E., (2014). The Slowdown of Russian Economic Growth. *Problems of Economic Transition, 57*(3), 13–56.