Export – Economic Growth Nexus in the World Regions: Directions of Public Policy

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Anotacija. This paper has examined a long-run causal nexus between export and economic growth in six regions of the world. For this purpose, the authors have applied the Granger causality test. Using annual data for the period of 1971 – 2018, the authors have tested the direction of the causality between the variables. The research has found unidirectional causality running from export to economic growth in Asia, Europe, North America and Oceania. Moreover, the research has noticed the absence of the Granger causality in Africa and Latin America & the Caribbean. The findings could be useful in implementing regional policy. In Asia, Europe, North America and Oceania policy makers should aware of the importance of trade and focus on implementing export-oriented policies to stimulate economic development.

Keywords: *export, economic growth, world regions, public policy*
Raktažodžiai: *eksportas, ekonomikos augimas, pasaulio regionai, viešoji politika*

Introduction

The interrelationship between export and economic growth has been a subject of debate among the scientists for a long time (Smith, 1776; Feder, 1982; Fryges, 2009; Mishra, 2011; Wagner, 2012; Tekin, 2012; Abbas, 2012; Dritsaki, 2013; Saaed et al., 2015; Shafiullah et al., 2017; Guntukula, 2018; Sultanuzzaman et al., 2019; Mensah & Okyere, 2020; Adebayo, 2020). Scientific studies on the export-economic growth nexus provide controversial results. The evidence of some studies supports export-led growth hypothesis while the other group advocates for growth-driven export hypothesis. Even more, the other studies provide the evidence that exports lead to economic growth and economic growth promotes export, i.e., the bi-directional causality between export and economic growth. According to the neutrality hypothesis, there is no relationship between export and economic growth. It is notable, that causality between export and economic growth differs in various regions of the country or even different periods of the same country. Thus, understanding the relationship between export and economic growth might be significant in developing, implementing or improving the public policy of economic growth in a country or region.

Statement of the problem: the authors have noted that in the context of the export – growth nexus, majority of the previous studies were with findings at the national level. Hence, the current paper has extended the causal link analysis at the regional level and provided some insights into differences in the growth process across the world regional economies.

The object of the research: export – economic growth nexus in the world regions.

The aim of the research: this research attempts to provide estimates of the export – growth nexus that are more reliable in the world regions during the period of 1971 – 2018.

The limitation of the research: two indicators such as export as a percentage of GDP and GDP per capita growth have bounded this research. The authors have not considered other variables and relationships in this paper. It is the main limitation of the research. Despite the limitation, the research highlights key relationships that contribute to the implementation of economic policies in the regions of the world.

The paper consists of three parts. The first part covers critical scientific literature review on the links between economic growth and international trade. The second part of the article explains the methodology of the research. The third part provides the results of the research and the direction of economic policy-making in the regions of the world.

Economic growth theories and the concept of international trade

Economic growth has been the object since Adam Smith's times (1776). Smith (1776) defines that in the competitive free-traded economy the main drivers of economic growth are population, capital growth and division of labour, and institutional framework of the economy. Especially, he emphasises the labour division or in the other words technological progress. Ucak (2015) states that the valuable part of Smithian growth model is the increasing returns to scale by running labour productivity resulted from the division of labour. Warr & Ayres (2012) have revealed that a two-parameter production function with two traditional factors – labour and capital – and one non-traditional factor named as "useful work" stimulate the growth.

Lange et al. (2018) especially have emphasized the importance of the Solow model in developing neoclassical growth theories. Solow (1956) has provided beneficial insights by supporting point of view that in the long - run economic growth must come from technological process instead of capital accumulation. However, John Maynard Keynes (1936) has claimed that economic growth is driven by consumption, but at the same time, it promotes poverty and inequality. The data provided by the United Nations shows that links among consumption, poverty, inequality, and environment are constantly increasing. Meanwhile, according to the Standard Keynesian growth model, human behaviour and the investment reaction to the profit determine the economic growth rate (Lange et al., 2018). Hence, the Conventional economic growth theory presumes that the technological process is exogenous which means that consumption is not a cause of economic growth (Ayres, 2001). Domar (1947) highly criticises Keynes while analysing under-consumption and links between employment and capital accumulation. At the same time, Harrod (1948) extends Keynes' economics by explaining overheating unemployment and dynamics of cyclical fluctuations. Harrod-Domar model unveils both the conditions that economy grows stable or unstable and that market mechanism might not provide stable growth rate in the long - run (Ucak, 2015).

Since 1960s, researchers have developed four different approaches on relation between international trade and economic growth. They are as follows: export-led growth, growth-driven export, two-way causality between export and growth and neutrality approach. Vanek (1971) is one of the economists who made significant input into the analysis and concept of economic growth and international trade. He states that growth of a trade does not guarantee improved living standards for a country in the long - run. Vanek (1971) claims that in a case of small open economy, uniqueness of a country, or in the other words, specialization is a driving force of the economic growth. Even more, in the line with the Solow model, Vanek (1971) notes that technological process must be always increasing in the long - run, as a result the economy would reach a state of complete specialization in the capital-intensive product.

According to the export-led growth approach, the export growth causes economy – wide productivity in the form of enhanced levels of GDP (Morgan & Katsikeas, 1997). As GDP measures the strength of economic, thus the growth of GDP stimulates economic well-being and social prosperity. Markusen (2013) has noted that international trade is the main driving force behind the development of internal assets, especially when a country pursues specialization in the areas of

economic activities, in which it has advantages. Even more, the export might have a different impact in various parts of a country. For example, the study of Shafiullah et al. (2017) shows that export-led growth is unique to each region in Australia. Besides, this study verifies that export of mining and fuels products stimulates economic growth in Australia, especially in the boom regions. Meanwhile, the other exporting sectors such as agriculture or manufacturing have insignificant effect on regional economic growth. The export-led growth has suggested that the exporters tend to be more productive than the non-exporters, because export encourages the domestic producers to use better production resources and to be more competitive in the world market. Also, export permits firms to take advantage of economies of scale by promoting increases in production, increases awareness of technical progress and creates incentives for making innovations. Moreover, export induces management to be more efficient as the firms face the pressures of foreign competition (Feder, 1982; Nabeshima et al., 2018). Zahonogo (2016) while analysing trade and economic growth in sub-Saharan African economies finds that the trade openness has positive impact on economic in the long - run, but the effect is not linear. According to Dritsaki (2013), Trošt & Bojnec (2015), stimulation of the industrialization process of the countries by opening markets and establishing favourable conditions for foreign trade might have positive effect on economic growth.

The second approach of growth-driven export has indicated that export follows economic growth. According to Konya (2006), the situation in the economy when the growth drives export, might create comparative advantages in certain areas, which would lead to specialisation and facilitating exports. However, the study of Konya (2006) provides controversial results. He examines the data of OECD countries for the last three and a half decades. The growth causes export only in Canada, Japan and Korea. Hye et al. (2013) explore trade-growth nexus in Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka. The results of their study show that the export-led growth model is relevant to all countries except Pakistan. In Pakistan, the economic growth affects exports and imports in the long - run. Meanwhile, the case of Bhutan and India shows bidirectional causality between economic growth and exports; economic growth and imports in the long - run. Shan and Sun (1998) pose a question of the application of the export-led growth model to a large emerging economy such as China. Their findings prove that export plays important role in the Chinese economy. However, instead of driving the growth, in the case of China the growth is a driving force of export. Tingvall & Ljungwall (2012) has revealed the significance of export in China's development. They have performed a meta-analysis of 68 country-specific studies that explores links between export and economic growth. The results of this study show that export has been more significant for China than for other countries. The researchers of this study have concluded that it is a result of export-driven growth strategy, which China has been implementing for a few decades. He & Zhang (2010) analyse links between China's economic growth and exports. The results of this study show that China's export dependency is significantly lower than implied by the headline exports-to-GDP ratio. Even more, the researchers have found that the contribution of export to economic growth in China came mainly from its impact on total factor productivity. In accordance to the studies on China, it might be stated that links between export and the economic growth evolves within the time depending on the government focus on growth factors and effective allocation of resources.

The third approach based on bidirectional causality implies two-way relationship between export and economic growth. Mah (2007) explores the causality among economic growth, export expansion and export composition in China since the economic reform in 1978. The study covers data from 1980 until 2001. The author has found bidirectional causality between export and economic growth. Thus, in this case, the higher export growth rate would increase real economic growth rate and vice versa. Dritsaki and Stiakakis (2014) investigate causal relationship among foreign direct investment, exports, and economic growth in Croatia for the period of 1994-2012. These researchers confirm that a bidirectional causal relationship exists between exports and economic growth in the long - run. They analysis indicate that in the long - run an increase of economic growth at 1% would result in an increase in exports at 0.367%. Meanwhile, in the long - run an increase of exports at 1%

would increase economic growth by 1.538%. Sunde (2017) finds bidirectional causality between economic growth and exports while analysing economic growth as a function of foreign direct investment and exports in South Africa for the period of 1970 – 2014.

Finally, the neutrality approach states that there is no causality between export and economic growth. Marwan et al. (2013) study relationship among exports, overseas development aid and economic growth in Sudan for the period of 1970 – 2010. The research shows that there is no causal relationship between exports and economic growth.

Table 1. **Causes and unique classifications of human errors in the construction industry**

AUTHORS (YEAR)	COUNTRIES EXPLORED	PERIOD	DIRECTION OF CAUSALITY
Shan and Sun (1998)	China	1987–1996	Growth → Export
Konya (2006)	OECD countries	1960 to 1997	Export → Growth Export ↔ Growth Growth → Export
Mah (2007)	China	1980–2001	Export ↔ Growth
He & Zhang (2010)	China	1993–2005	Export → Growth
Tingvall & Ljungwall (2012)	China	1990–2011	Export → Growth
Hye et al. (2013)	Six Asian countries	1971 to 2009 for Pakistan and Bangladesh; 1960–2009 for India and Sri Lanka; 1965–2009 for Nepal and 1981–2009 for Bhutan.	Export → Growth Export ↔ Growth Growth → Export
Marwan et al. (2013)	Sudan	1970–2010	Growth ≠Export
Gokmenoglu et al. (2015)	Costa Rica	1980–2013	Growth → Export
Zahonogo (2016)	Sub-Saharan African	1980–2012.	Export → Growth
Shafiullah et al. (2017)	Australia	1991–2012.	Export → Growth
Sunde (2017)	South Africa	1970–2014	Export ↔ Growth
Guntukula (2018)	India	2005–2017	Export ↔ Growth
Sultanuzzaman et al. (2019)	Emerging Asian economies	2000–2016	Export → Growth
Mensah & Okyere (2020)	Ghana	2010–2019	Export ↔ Growth
Adebayo (2020)	Nigeria	1981–2018	Export ↔ Growth

Source: Authors

Concluding, although links between export and economic growth have been distinctly explored; however, the causality varies across the countries have been observed. Different results prove that the direction of causality between export and economic growth depends on the economic development, size of a country, its specialization, and even government policy.

Even more, controversial results of various studies on case of China leads to conclusion that relationship between export and economic growth evolves in the long- run.

Methodology

In recent studies, the researchers have applied various methods for the investigation of interrelationship between export and economic growth. According to Ee (2016), Giles and Williams (2000) have overviewed more than 150 exports – growth studies and noticed that the authors have used Granger (1969, 1980) causality test in fifty percent of the investigations. The authors have used research method that requires a sufficiently long period. In this case, the study covers a period of 48 years, which is appropriate for the Granger causality test to be applied and reliable results obtained.

In the context of the objective of this research, the authors have examined time series data on export as a percentage of GDP and GDP per capita growth rate for the period of 1971–2018. United Nations Statistics Division has provided information about the variables. Various international organizations have presented the division of the world into the regions differently. Many of the factors determining regional exclusion have varied and have not clearly determined. This investigation is based on the working paper of Memedovic & Iapadre (2010), where six regions of the world, such as

Africa, Asia, Europe, Latin America & the Caribbean; North America and Oceania have been identified. The authors have organized the research as follows:

Stage 1. Checking the stationarity of the variables. Before estimating the causality between the variables under consideration, the authors have checked whether time series data is stationary or non-stationary. For this purpose, the Augmented Dickey Fuller (ADF) unit root test has been applied (Fuller, 1976; Heij et al., 2004; Nielsen, 2005). ADF checks the stationarity of the particular variables at significance level of 1%, 5% and 10 %. If the variables appear non-stationary, the researchers have used differencing. In the ADF test, the authors have checked three different equations to any variable. The equations are the following:

$$\Delta y_t = a + \delta y_{t-1} + u_t \text{, (with intercept, no trend)} \quad (1)$$

$$\Delta y_t = a + \delta y_{t-1} + \beta t + u_t \text{, (with intercept, with trend)} \quad (2)$$

$$\Delta y_t = \delta y_{t-1} + u_t \text{, (no intercept, no trend)} \quad (3)$$

Where: a is an intercept and δ, β are coefficients, ut is white noise, t is a time variable. Maximum lags have been determined applying Schwarz Info Criterion.

Stage 2. Applying the Granger (1969) causality test. The test has been used for the stationary variables in order to determine the direction of the causality. Granger causality test has estimated two regression equations as follows (Granger, 1980; Stern, 2011):

$$y_t = \beta_{1,0} + \sum_{i=1}^{p} \beta_{1,i} y_{t-i} + \sum_{j=1}^{p} \beta_{1,p+j} x_{t-j} + \varepsilon_{1t} \quad (4)$$

$$x_t = \beta_{2,0} + \sum_{i=1}^{p} \beta_{2,i} y_{t-i} + \sum_{j=1}^{p} \beta_{2,p+j} x_{t-j} + \varepsilon_{1t} \quad (5)$$

Where: p is the number of lags, β - parameter, ε - error. If the p parameters $\beta_{1,p+j}$ are jointly significant then the null hypothesis that x does not Granger cause y can be rejected. Also, if the p parameters $\beta_{2,i}$ are jointly significant then the null hypothesis that y does not Granger cause x can be rejected. Three hypotheses have been tested as follows:

Hypothesis 1: Does export cause economic growth in regional economies?
Hypothesis 2: Does economic growth cause export?
Hypothesis 3: Is there a mutual inter-conditioning (a feedback) relationship between export and economic growth?

All calculations have been made applying econometric software Eviews v. 8.0. Next section has examined the interrelations between the variables.

Estimation of the export – growth causality and discussion

The stationarity of the variables have been tested before the applying the Granger causality test. For this purpose, Unit root test has been performed.

Unit root test. Economic variables are often found to be non-stationary, containing a unit root. Augmented Dickey Fuller (ADF) test has been used for checking stationarity. ADF checks the hypothesis about the stationarity of the particular variables at significance level of 1%, 5% and 10 %. Also, three different models have been considered: with intercept, with intercept and trend and without intercept or trend. Based on Schwarz Info Criterion, maximum lags make 9. The results reported in Table 2 show that all variables have not been stationary in their levels. Therefore, the authors have performed differencing.

Table 2. **Augmented Dickey Fuller stationarity test**

REGIONS	VARIABLES	IN LEVEL			IN FIRST DIFFERENCE		
		Intercept	intercept & Trend	None	Intercept	Intercept & Trend	None
Africa	GDP per capita growth, %	-2.56	-2.64	-2.44**	-14.11***	-13.97***	-14.26***
	Export, % of GDP	-0.87	-1.82	-1.00	-10.18***	-10.17***	-10.16***
Asia	GDP per capita growth, %	-4.80***	-5.21***	-1.13	-8.92***	-8.90***	-9.02***
	Export, % of GDP	-0.53	-1.44	1.77	-6.52***	-6.45***	-6.13***
Europe	GDP per capita growth, %	-5.53***	-5.65***	-3.49***	-9.38***	-9.23***	-9.43***
	Export, % of GDP	1.36	-1.91	5.81	-6.47***	-6.84***	-4.26***
Latin America & Caribbean	GDP per capita growth, %	-4.36***	-4.39**	-3.80**	-8.79***	-8.70***	-8.88***
	Export, % of GDP	-0.27	-1.75	2.31	-5.01***	-4.96***	-4.01***
North America	GDP per capita growth, %	-5.08***	-5.21***	-3.29***	-8.51***	-8.43***	-8.60***
	Export, % of GDP	-0.36	-1.93	3.52	-5.79***	-5.72***	-4.63***
Oceania	GDP per capita growth, %	-5.90***	-5.83***	-3.47***	-6.22***	-6.14***	-6.30***
	Export, % of GDP	-0.26	-2.19	2.10	-5.17***	-5.13***	-4.46***

Note: ***$p<0.01$, **$p<0.05$; *$p<0.1$.
Source: authors' calculations based on Eviews v. 8.0

After the first differencing both series become stationary. This implies that series are integrated in order one, i.e. 1(1).

Granger causality test. The Granger causality test has been used in order to study the forerunner-lag relationships between export and economic growth. A variable –export is said to Granger cause another variable – economic growth – if past values of export help predicting the current level of economic growth. Moreover, if economic growth in fact causes the export, then given the past history of economic development, the values of export can be predicted. The results of the Granger causality tests for the world regions have been summarized in Table 3.

Table 3. **Augmented Dickey Fuller stationarity test**

NULL HYPOTHESIS	OBSERVATIONS /LAGS	F-STATISTIC	PROBABILITY	TEST RESULTS
Africa				
GDP does not Granger cause export	Obs.: 38	0.80648	0.6160	Accepted
Export does not Granger cause of GDP	Lags: 9	0.90876	0.5376	Accepted
Asia				
GDP does not Granger cause export	Obs.:46	2.40699	0.1281	Accepted
Export does not Granger cause of GDP	Lags: 1	17.3719	0.0001	Rejected
Europe				
GDP does not Granger cause export	Obs.: 46	1.77320	0.1900	Accepted
Export does not Granger cause of GDP	Lags: 1	9.48480	0.0036	Rejected
Latin America & the Caribbean				
GDP does not Granger cause export	Obs.: 38	0.89760	0.5459	Accepted
Export does not Granger cause of GDP	Lags: 9	0.48299	0.8682	Accepted
North America				
GDP does not Granger cause export	Obs.:46	0.30739	0.5822	Accepted
Export does not Granger cause of GDP	Lags: 1	9.28003	0.0039	Rejected
Oceania				
GDP does not Granger cause export	Obs.: 45	2.49188	0.0955	Accepted
Export does not Granger cause of GDP	Lags: 2	4.50611	0.0172	Rejected

Source: Authors

The null hypothesis has been rejected if probability associated to F-statistic is ≤0.05. Conversely, the null hypothesis has been accepted if the associated probability of F statistic is >0.05. With reference to the results of the Granger causality test, it should be stated that for Asia, Europe, North America and Oceania the causality has been in favour of a unidirectional running from export to economic growth. However, it should be noted that Africa and Latin America & the Caribbean have not demonstrated causality between the variables under consideration. This implies that neither export nor economic growth affects each other. The results tell that causality has been detected considering maximum lag 9, which has been determined by Schwarz Info Criterion.

On the one hand, the results of this research are in line with other previous studies, where unidirectional causalities running from export to economic growth have been detected (He & Zhang, 2010; Tingvall & Ljungwall, 2012; Zahonogo, 2016; Shafiullah et al., 2017; Sultanuzzaman et al., 2019) and the approach of neutrality has been supported (Marwan et al., 2013). On the other hand, the investigation has extended the causal link analysis at the regional level and provided some insights into differences in the growth process. This would contribute to the formulation of common regional economic policies. For Asia, Europe, North America and Oceania, where a unidirectional causality runs from export to economic growth, public policy should be addressed to promoting exports, removing trade barriers, searching for new markets, and increasing the competitiveness of exporting products in international markets. Policy makers should aware of the importance of trade and focus on implementing export-oriented policies to stimulate economic growth and achieve sustainable development.

However, the authors of this investigation have doubts that the attempt is maybe incomplete and disputable, because the countries of the same region are different by their history, socio-economic indicators and their development. Supplementary studies are necessary in order to outline a largely accepted methodology of quantitative estimation and apply this in the context of export – growth nexus. However, this idea is for the next research.

Conclusions

1. The main objective of this research is to examine the causal interrelationship between export and economic growth in the world regions. The export - growth nexus is still a topic of discussion by researchers. Some investigations have confirmed that export leads to economic development, while others see economic growth promotes export.

2. In the context of the export – growth nexus, majority of the previous scientific studies have been with data and findings at the national level. Hence, the current paper has extended the causal link analysis at the regional context and provided some insights into differences in the growth process. The insights of the research could be useful in implementing regional development strategy.

3. The Granger test has shown unidirectional causality running from export to economic growth in Asia, Europe, North America and Oceania. This has supported export-led growth and suggested that public policy should focus on promoting the industrialization process of the countries by opening markets and establishing favourable conditions for international trade and investigating new markets. In the case of Africa and Latin America & the Caribbean, the authors have not detected causality between the variables.

4. The authors of this investigation have doubts that the attempt is maybe incomplete and disputable, because the countries of the same region are different by their history, socio-economic indicators and their development. In the future, supplementary studies are necessary in order to outline a largely accepted methodology of quantitative estimation and apply this in the context of export – growth nexus. However, the authors suggest using the findings to expand the range of research in other countries and regions, also applying insights in university studies by teaching subjects related to regional economics, public policy and administration, sustainable development, and others.

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Eksporto – ekonomikos augimo ryšys pasaulio regionuose: viešosios politikos kryptys

Anotacija

Straipsnyje nagrinėjamas priežastinis ryšys tarp eksporto ir ekonomikos augimo šešiuose pasaulio regionuose 1971 – 2018 metų laikotarpiu. Priežastiniam ryšiui nustatyti naudojamas Grangerio testas. Tyrimas parodė, kad Azijos, Europos, Šiaurės Amerikos ir Okeanijos regionuose eksportas skatina ekonomikos augimą. Tuo tarpu Afrikos, Lotynų Amerikos ir Karibų regionuose tyrimo metu priežastinio ryšio tarp nagrinėjamų kintamųjų nenustatyta. Tyrimo rezultatai gali būti naudingi, įgyvendinant bendrą regioninę politiką. Azijos, Europos, Šiaurės Amerikos ir Okeanijos regionuose politikos formavimas turėtų būti nukreiptas į eksporto skatinimą, mažinant tarptautinės prekybos barjerus, atveriant naujas rinkas, didinant eksportuojančių prekių konkurencingumą tarptautinėse rinkose.

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