THE RELATIONSHIP BETWEEN PUBLIC EXPENDITURES AND ECONOMIC GROWTH: A PANEL VAR APPROACH

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ABSTRACT

The relationship between public expenditures and economic growth has gain importance, especially after the First World War. In this study, the relationship between public expenditures and economic growth was investigated using data from 1989-2017 for BRICS countries and Turkey with cointegration and causality tests. As a result the cointegration test; there is a cointegration between variables for long run. Causality results show that there is no causality from public expenditures to economic growth in the short term but there is causality relationship from economic growth to public spending. In the long run, it is seen that there is bidirectional causality both from public expenditures to economic growth and from economic growth to public expenditures.

Key Words: Economic Growth, Public Expenditures, Wagner Law, Panel Causality Tests

Kamu Harcamaları ve Ekonomik Büyüme İlişkisi: Panel VAR Yaklaşımı

Özet

Kamu harcamaları ve ekonomik büyüme arasındaki ilişki 1. Dünya Savaşı sonrası önem kazanmıştır. Bu çalışmada BRICS'e üye ülkeler ve Türkiye'ye ait veriler ile 1989-2017 yılları arasında kamu harcamaları ve ekonomik büyüme arasındaki ilişki eşbütünleşme ve nedensellik testi ile incelenmiştir. Elde edilen sonuçlara göre değişenler arasında uzun dönemde eşbütleşme ilişkisinin olduğu sonucuna ulaşılmıştır. Nedensellik testi sonuçlarına göre kısa dönemde kamu harcamalarından ekonomik büyümeye doğru nedensellik ilişkisi bulunamazken ekonomik büyümeden kamu harcamalarına doğru nedensellik ilişkisi olduğu sonucuna varılmıştır. Uzun dönemde ise hem kamu harcamalarından büyümeye hem de ekonomik büyümeden kamu harcamalarına doğru bir nedensellik ilişkşisinin olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Ekonomik Büyüme, Kamu Harcamaları, Wagner Yasası, Panel Nedensellik Testi

INTRODUCTION

When we look at the historical process to examine the impact of public expenditure on economic growth, it is seen that the Russian revolution in 1917, and Great Depretion which started in 1929 and which affects the whole world public expenditures have been seriously increased. "Laissez faire" which is the prevailing economic thought, the fact that classical ideas can not produce,it seems to be the main reason for this situation. (Kolcak and Others, 2017:468).

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The relationship between public expenditures (education, health, defence, investment, research and development, etc.) and economic growth has been among the topics that have been discussed and examined in the economic literature since the 19th century. It has been studied in many studies related to this subject as much as the day-to-day. The relationship between public expenditure and economic growth is two concepts developed in theory by Wagner and Keynes. Wagner argues that economic growth is the cause of public spending; Keynes defended the argument that public spending is the cause of economic growth.

Today, Public expenditures account for nearly half of total income in industrialized countries. The fact that public expenditure ratios in developed countries are higher than in developing countries has begun to raise the question ‘’The increase in the share of public expenditures can be a sign of development?’’. It is expected that basic public expenditures will have an impact on economic growth in the positive direction but ıt is also known that an increase beyond basic public expenditures leads to a decrease in the positive effect on growth. Public expenditures affects economic growth positively; by providing infrastructure services, encouraging private investments, setting standards, providing qualified staff, creating demand, providing technological progress. Besides, these positive effects on the economic growth of the public sector, there are also negative effects. The increase in public expenditures seems to create to adversely affecting economic growth due to distortions and reduce private sector investments, leading to corruption, causing diminishing returns, not adapting to market conditions immediately, and low productivity. (Uzay 2002:169).

In this study, firstly, the relationship between public expenditures and growth is examined theoretically and the relationship between variables is examined econometrically for BRICS-T (Brazil, Russia, India, China, South Africa and Turkey) countries.

THEROTICAL BACK GROUND

In the economic literature, the relationship between public expenditures and economic growth has been studied and explained by various economic approaches. Wagner's Law and Keynes Hypothesis as the most important of these approaches.

German economist Wagner (1883) found that public spending tended to increase continuously as a result of his researches in various countries in the 19th century. Wagner has linked the increase in public spending to the change in the role of the state in the economic and social sphere. He argued that public and private sector changed the weight of the economy as a result of the pressures caused by social progress in society (Musgrave and Peacock, 1958).

Adolph Wagner, together with economic development, announced that it would cause an increase in public economic activities and thus public expenditures. This increase is due to the necessity of the state to perform administrative and security duties more effectively and to make the legal system more important than before (Aksoy, 1991:114).

According to Keynes; public spending is an external factor that can be used as a policy tool designed to affect economic growth and improve short-term fluctuations. According to Keynesian economists, the budget deficits resulting from the increase in public expenditures have increased the domestic production, thus expanding the economy and consequently encouraging private sector investments. Unlike Wagner, John Maynard Keynes argues that public spending is not the result of economic growth, but rather economic growth as a result of increased public spending.

LITERATURE

Gul and Yavuz (2011) examined the impact of public spending on economic growth in Turkey by considering the 1996-2008 period on their studies. It is concluded that there is a cointegration

relationship between economic growth and public expenditures, current expenditures, investment expenditures and transfer expenditures by using the unit root, cointegration and Granger Causality Tests. On the other hand, according to the results obtained from the Granger causality test, there is no causality from economic growth to investment expenditures, current expenditures and transfer expenditures. But there is a one-way causality relationship from current, investment and transfer expenditures to economic growth when public spending as a whole. (Gul and Yavuz, 2011:164-175).

Esen and Bayrak (2015) examined the effects of 1990-2000 public spending on economic growth for the 5 Turkish Republic (Azerbaijan, Kazakhstan, Kyrgyzstan, Uzbekistan and Turkmenistan) by using panel data analysis. According to the results, there is a positive and statistically significant relationship between long term public spending and economic growth. It is observed that the increase in public expenditures which is examined in the transition countries, affects economic growth positively in the period between 1990 and 2012. (Esen and Bayrak, 2015:231). Kabaklarlı and Er (2014), were examined in the framework of Wagnerian and Keynesian approaches by analyzing the relationship between economic growth, for the 1930-2012 period with public expenditure in Turkey. According to the results of the analysis, the increase of economic growth in the short term seems to cause a decrease in public expenditures, whereas in the long run the income elasticity of public expenditures is greater than zero and it is seen that Wagner Law has significant results compared to Musgrave model. (Kabaklarlı and Er, 2014: 268). Altunc (2011), analyzed the relationship of public expenditure components and economic growth in the context of Turkey's economy at 1960-2009 period. Empirical findings provide evidence supporting the Wagner's Law between public expenditure and economic growth while finding that public spending is broken down by economic category. (Altunc, 2011:57). Yarasir, Tulumce and Zeren, examine the relationship between Turkey's economic growth and public expenditures, and it reveals the existence of a bi-directional causality between total public spending and transfers spending to economic growth. Finally, for total expenses and transfer expenses, Keynes and Wagner's approaches are valid at the 1975-2014 year range. (Yarasir Tulumce and Zeren, 2017: 299). Oktayer and Susam, have examined the relationship between Turkey's economic growth and public expenditures for the 1970-2005 period. In Keynesian view, there are two different approaches to the issue. The first one is that there is a positive relationship between public expenditure and economic growth, and the second is that the public expenditure is affecting economic growth negatively. According to the analysis results, the effect of total public expenditures on economic growth was not significant, but that public investment expenditures had a positive effect on economic growth.(Oktayer and Susam, 2008:145). Arisoy examines the relationship between economic growth and total public expenditure for the period 1950-2003 by taking the Wagner and Keynes hypotheses and shows that long-term economic growth supports the Wagner's Law, which suggests that economic growth will increase public expenditures (Arisoy, 2005: 65). Agayev examines the economic growth relationship of public expenditures for the member of 10 former Soviet Union countries by using the panel data methods of the 1995-2009 period to taking into account the validity of the Wagner law. In this study which used Panel cointegration analysis shows that the public expenditure and income level are cointegrated. It shows that causality is from economic growth to public expenditures. According to the results obtained, it seems that the former Soviet Union countries are supported by the Wagner law. (Agayev, 2012:7). Aytaç and Guran (2010), investigated the relationship between public expenditures and economic growth with vector autoregression (VAR) and causality tests for the period of 1987-2005 in Turkey. As a result of this study, it has been concluded that the increase in public expenditure will bring the increase of growth in the period examined for Turkey. Kolcak and others has been investigated on the between growth and public spending for the years 1984-2014 in Turkey. As a result of the tests conducted, it is seen that when this period is taken, public spending ~~is~~ has not used as a policy tool on economic growth. (Kolcak ve Others, 2017:46). Destebasi examined developing the D-8 countries (Turkey, Iran, Pakistan, Indonesia, Nigeria, Bangladesh, Egypt and

Malaysia), relationship between defence, health and education spending with vector autoregression model (VAR). According to the results of analysis, defence and health expenditures have statistically significant effects on economic growth. In this respect, the increase of defence and health expenditures in the D-8 countries will lead to an increase in economic growth. (Destebasi,2017: 28-42). Basar and others in the study, have analyzed the relationship between economic growth and public spendings with bound testing approach, 1975-2005 period. According to information obtained from the analysis, there is no relationship between the growth and public expenditure for this period. (Basar & Others, 2009).

Koçyiğit and others (2015) suggest that the source of economic growth in BRICS-T countries is the export based growth hypothesis and that the welfare increase created by economic growth is distributed to the various segments of society through the public. The increase in the share of the Gross Domestic Product (GDP) negatively affects economic growth. However, total factor productivity with fixed investment of the public increases and contributes positively to economic growth. (Koçyiğit and others, 2017). According to Kayhan and the others. (2013), individuals are exposed to external shocks with the increase in the foreign trade volume of national economies. Governments also choose to increase public expenditures to protect individuals from external shocks. For positive impact of increased public spending on economic growth governments should be in the form of the liberalization of the foreign exchange rate and foreign exchange regime, the liberalization of the foreign trade regime, the removal of obstacles in front of capital movements, and the reduction of state intervention in the balance of economy (Kayhan and Others, 2017).

EMPIRICAL RESULTS

In this study, for public expenditures ''public expenditures to gross domestic product ratio'' and for economic growth GDP per capita (constant 2011) variables are used. Data belongs to Brazil, Russia, India, China and South Africa which are called BRICS and Turkey for period the 1989-2017 The data was taken from the World Bank Data Bank. In contrast to the variance problem in the scope of the analysis, the variables are analyzed by taking the natural logarithms. The model is shown below.

$$GDP_{it} = \alpha_i + \beta_{1i} GOV_{it} + \varepsilon_{it}$$

GDP and GOV represent respectively GDP per capita and public expenditures to gross domestic product ratio. In the panel data analysis, after unit root tests we are looking the for cross-sectional dependence test for determine that each i is related the others. If there is no cross-sectional dependence the 1st Generation unit root tests are used, if there is cross-sectional dependence, 2nd Generation unit root tests are used. In panel data analysis, Peseran (2004) CD_{LM}, Breusch-Pagan CD_{LM1}, Peseran (2004) CD_{LM2} tests are used to test the cross-sectional dependency. The $CD_{LM1}$and CD_{LM2} tests are used when T> N, the time dimension is greater than the horizontal dimension, and the CD_{LM} test is used when N> T, the horizontal dimension is greater than the time dimension. In the cross-sectional dependency tests, the zero hypothesis has no cross-sectional dependency and the alternative hypothesis is cross-sectional dependency.

Table 1. Cross-Sectional Dependency Tests

Constant Model	GOV		GDP	
	Statistic	p-value	Statistic	p-value
CD_{lm} (BP,1980)	36.141	0.00***	29.124	0.016**

CD_{lm} (Pesaran, 2004)	3.860	0.00***	2.579	0.00***
CD (Pesaran, 2004)	-2.182	0.015**	-2.787	0.00***
LM_{adj} (PUY, 2008)	26.467	0.00***	17.592	0.00***

Notes: $\Delta y_{i,t} = d_i + \delta_i y_{i,t-1} + \sum_{j=1}^{p_i} \lambda_{i,j} \Delta y_{i,t-j} + u_{i,t}$ model, the number of delays (pi) is taken as 1. The figures which is ***, **, * show 1 %, 5 % and 10 % levels, respectively

Taking the probability values into account, the alternative hypothesis is accepted as there is a cross-sectional dependency. For that we are using the 2nd generation unit root test which is called Cross-Sectional Augmented Dickey-Fuller (CADF) test, CADF tests are used for to see if the variables are stationary when the time dimension is larger than the horizontal dimension (T> N). In the CADF test, the null hypothesis is the series has got unit root, and the alternative hypothesis is the series has not got unit root. If the CADF test statistic value is smaller than the critical value, it indicates that the country series is stable. If the CADF test value is greater than the critical value, the null hypothesis is accepted and has a nonstable process characteristic of that country group's series.

Table 2. CADF Unit Root Test

	Constant		Constantand Trend	
	ags	CADF-stat	ags	CADF-stat
GOV				
Brazil		-1.901		-1.830
Russia		-4.368***		-4.245**
India		-2.005		-3.184
China		-0.567		-1.357
South Africa		-1.614		-1.876
Turkey		-1.772		-3.193
Panel		-2.038		-2.614
GDP				
Brazil		-0.565		-1.456
Russia		-2.209		-1.696
India		-0.461		-3.784
China		-1.711		-2.059
South Africa		-3.360**		-4.751***
Turkey		-2.163		-3.883**
Panel		-1.745		-2.938**

Notes: The maximum lag length is taken 4 and the optimal lag lengths are determined according to the Schwarz information criteria. The statistical critical values of CADF are -4.11 (1%), -3.36 (5%) and -2.97 (10%) in the fixed model (Pesaran 2007, table I (b), p: 275); (1%), -3.87 (5%) and -3.49 (10%) in the fixed and trending model (Pesaran 2007, table I

(c), p: 276). Panel statistical critical values were -2.57 (1%), -2.33 (5%) and -2.21 (10%) in the fixed model (Pesaran 2007, table II (b), p: 280); in the fixed and trending model, -3.10 (1%), -2.86 (5%) and -2.73 (10%) (Pesaran 2007, table II (c), p: 281). The panel statistic is the average of the CADF statistics.

When the test statistics are compared with the critical values obtained by Peseran (2007), it can be seen that in public expenditure variable, Russia has got unit root in the constant and constant-trend model. In GDP, South Africa has got unit root in the fixed model. It has been reached that Turkey and South Africa has unit root in the constant- trend model.

Table 3. Cross-Sectional Dependency and Homogeneity Tests

Regression Model: $GDP_{it} = \alpha_i + \beta_{1i} GOV_{it} + \varepsilon_{it}$	Statistic	p-value
Cross-section dependency tests:		
LM (BP,1980)	189.71	0.00***
CD_{lm} (Pesaran, 2004)	31.89	0.00***
CD (Pesaran, 2004)	13.43	0.00***
LM_{adj} (PUY, 2008)	5.40	0.00***
Homogeneity tests:		
$\tilde{\Delta}$	5.61	0.00***
$\tilde{\Delta}_{adj}$	5.91	0.00***

Notes: The figures which is ***, **, * show 1 %, 5 % and 10 % levels, respectively

The alternative hypothesis has accepted that considering cross-sectional dependency and heterogeneity when taking into account the probability values. Therefore, it has been decided to use the Panel Cointegration Tests from the cointegration tests based on the heterogeneous estimation taking into account the Cross-Sectional Dependency Tests.

Table 4. Structural Unbreakable Panel Cointegration Tests

	Constant			Constantand Trend		
	Statistic	Asymptotic p-value	Bootstrap p-value	Statistic	Asymptotic p-value	Bootstrap p-value
Group_tau	-5.515	0.00***	0.00***	-4.984	0.00***	0.00***
Group_alpha	-3.936	0.00***	0.00***	-1.542	0.062*	0.247
Panel_tau	-6.753	0.00***	0.00***	-6.566	0.00***	0.00***
Panel_alfa	-7.451	0.00***	0.00***	-4.970	0.00***	0.04**

Notes: The null hypothesis of the test is that there is no cointegration. In the Error Correction test, the lag and the premise are taken as one. Bootstrap probability values were obtained from 1,000 replicate distributions. The asymptotic probability values are obtained from the standard normal distribution. The figures which is ***, **, * show 1 %, 5 % and 10 % levels, respectively.

The alternative hypothesis is taken to show that there is a long-run relationship between public spending and economic growth variables, especially when the asymptotic and bootstrap critical values are taken into account in the constant and trend model. It may be a causal relationship between variables for the existence of long term cointegration relationship. The Panel VECM method, which is suitable for heterogeneity and cross-sectional dependency. It was used for the determination of the causality of the series in which long-term relationships were found between them.

Table 5. Panel VAR and VECM Causality

		Short Run Causality	Long-run causality
	Δ (GDP)	Δ (GOV)	ECT(-1)
Δ (GDP)	-	9.465 (0.023)**	-0.0378 (0.048)**
Δ (GOV)	0.579 (0.901)	-	0.5601 (0.045)**

Notes: The figures which is ***, **, * show 1 %, 5 % and 10 % levels, respectively

When the panel VECM Causality results are examined, it is seen that there is not causality in economic growth from public expenditures in short term, but there is causality relation from public expenditures to economic growth which is compatible with Keynes Law.

In the long run, it is seen that there is bidirectional causality between public expenditures and economic growth at 5% significance level. On the other hand, Panel VAR results also provide information on the direction of the causality between variables. In this context, in short-term there is a positive relation between economic growth and public expenditure variables. Findings show that public expenditures will increase if long-term economic growth is achieved, and the finding is consistent with the theoretical framework (Wagner Laws).

CONCLUSION

In this study for investigated to relatonship between public expenditures and economic growth firstly, CADF unit root tests used which is considering cross sectional dependency and after the panel cointegration test was applied to investigate the existence of a long-run relationship between the series. When it appears that long-run relationship between series, the Vector Auto Regressions (VAR) and Vector Error Correction Method (VECM) has been used to investigate the short and long-term causality between variables.

The results of the causality test show that there is no causality from public expenditures to economic growth in the short term but there is causality relationship from economic growth to public spending. In the long run, it is seen that there is bidirectional causality both from public expenditures to economic growth and from economic growth to public expenditures.

This shows that, Wagner law is valid for selected countries in the short term like result of Altunc (2011)'s study. In long-run term Keynes and Wagner law are valid like Tulumce and Zeren (2017), Arısoy (2005), Agayev (2012), Esen and Bayrak (2015). According to the results of the study, it would appear to be beneficial to use public expenditure as a tool, especially in long-term growth and development targets in selected emerging market economies (BRICS-T). On the other hand, in the short run, expansionary fiscal policies will not benefit economic growth, in brief, the Keynesian perspective is seen to be invalid in some countries and periods examined.

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