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Article

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Academic Journal of Economic Studies
Vol. 3, No. 2, June 2017, pp. 36–40
ISSN 2393-4913, ISSN On-line 2457-5836

Public Expenditures and Economic Growth: Was Wagner Right? Evidence from Turkey

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Abstract *Going by Adolph Wagner's theory, increased in public expenditure would have a significant influence growth. However, the endogenous growth theories posit that public sector either has direct or indirect impacts on economic growth. It is on this premise, we seek to examine and validate Wagner's theory on the impact of current, investment and transfer expenditures on economic growth over the periods 1975-2014 for Turkey, using Johansen co-integration test and Granger causality test. Findings confirm Wagner's law through the existence of a long term relationship between the variables, while public expenditures display a significant positive impact on economic growth.*

Key words Public expenditure, economic growth, cointegration, Granger causality, Turkey

JEL Codes: C51, H50, O40

1. Introduction

Today, many economists agree that, government plays more important role in developed and developing economies especially before and after the 2nd World War. Since the government is an important part of economy, its decisions and policies affect the national income remarkably. It is widely accepted that, one of the macroeconomic goals of the government is sustained economic growth and development. However, in economics literature there is a discussion about the impact of government spending on economic growth. In addition, in economic theory, there is no certain information about the impact of government spending increase on economic growth. As a result, one can easily see that there are many studies in the literature implying the positive or negative impacts of government spending on economic growth due to the differentiation of data, different economy characteristics and econometric techniques. It is agreed that, there are some classifications among government spending and each category of spending could have either positive or negative impact on economic growth. Therefore, both the impact of economically and functionally classified government spending on economic growth is widely analyzed in economic literature.

2. Literature review

In literature, there are two different approaches for the relationship between government spending and economic growth. First, the government spending is assumed as an endogenous variable and determined by economic growth. The government spending is very responsive to the economic growth and if real GDP expands then it also increases. In other words, as the national income increases the government spending will also increase and its share in the economy rises. In addition with regards to growth, the qualitative and quantitative increase in the government spending and the other factors influences the share of public sector. Since the economy enlarges, the demand for managerial and defensive services will also increase. However, the demand for social and cultural activities will rise and in order to have a strong market structure, the government spending should be also increased. This approach was the theory of German Economist Adolf Wagner popularly called "the law of increasing government spending". The second approach follows the opposite. According to this theory, as the government spending increases then the economy will expand. The government spending is assumed to be the determining factor of economic growth. This approach is based on Keynesian theory (see Oktayer and Susam, 2008). The economic growth and government spending relationship shows conflict conclusions not only for theory but also in empirical studies. The reasons for this difference could be listed as theoretical framework, econometric method, type of the government spending and time period.

There have been extensive literatures on this study. Tuna (2013) analyzes the linkages between economic growth and public expenditures by using Granger causality test for a period from 1961 to 2012. The result of this study shows that there is no Granger causal relationship between economic growth and public expenditures. The implication is that the study failed to validate Wagner's law in Turkey. Also, Demirbas (1999) Bağdigen and Cetintas (2004) Cavusoglu (2005) Oktayer and Susam (2008) Bagdigen and Beser (2009) Basar, Aksu, Temurlenk and Polat (2009) could not find any evidence to support Wagner's law in their studies for different periods for Turkey. However, Oktayer (2011) investigated the validity of Wagner's law for Turkey by using Johansen cointegration test and Granger causality test based on the Vector Error Correction Model (VECM). Empirical outcomes show that the Oktayer findings is in support of Wagner's law over the coverage periods 1950-

2009. In addition, Yamak and Kucukkale (1997) Terzi (1998) Günaydın (2000) Sari (2003) Arisoy (2005) Isık and Alagoz (2005) Mohammadi ve diğerleri (2008) Yay and Tastan (2009) empirical findings also confirm Wagner's hypothesis for Turkey.

Furthermore, Gul and Yavuz (2011) examines the relationship between public expenditure and economic growth by using cointegration test and Granger causality test for Turkey between the periods 1963 to 2008. Their empirical findings support the hypothesis that, public expenditure cause economic growth as proposed by the Keynesian theory. Similarly, Uluturk (2001) Uzay (2002) Artan and Berber (2004) Uysal Mucuk (2009) Kanca (2011) from their findings also lend support to Keynesian theory. The works of (2003) Bakirtas and Halicioglu (2003) Tasseven (2011), are also among the many works that have lend their support to both Wagner's law and Keynesian theory. However, Bagdigen and Beser (2003) and Basar *et al.* (2009) and have argued differently. Their position on these theories has placed them among scholars who have failed to provide evidence.

In this study we investigate the impact of government spending on economic growth of Turkey using updated data from periods of 1975 to 2015. It is paramount to note that for this study, we economically classify government spending as a function of current, investment and transfer spending. We intend to substantiate whether Wagner's hypothesis, using updated data and economic classification of government spending for Turkey.

3. Methodology of research

We intend investigate the nexus between public expenditure and economic growth for Turkey, to this end, annual data was retrieved from Republic of Turkey Ministry of Development for the period of 1975-2014. The choice of time lag was as a result of data availability. Gross Domestic Product (GDP) was proxy for economic growth, while government spending is measured through current, investment and transfer spending. The variables are in their natural logarithmic form. The study specified economic growth as a function of government expenditure. The model specification is given below as:

$$GDP = \alpha + \beta_1 CURRENTEXP + \beta_2\, INVESTEXP + \beta_3\, TRANSEXP + u_t \quad (1)$$

Where:
GDP: Gross Domestic Product; CURRENTEXP: Current Expenditures
INVESTEXP: Investment Expenditures; TRANSEXP: Transfer Expenditures; u_t : Error term.

4. Econometrics procedures

4.1.1 Unit root Test

Generally, it is widely known that, working with time series data pose constrains of stationarity which prompt the need for conducting both formal and informal test. The general practice is to plot the series (graphically) to have a glimpse of how the series fare. Empirical works done in the area of time series econometrics agrees that observed data are stationary. That is, the series in question have a mean, variance and auto-covariance that are not changing over time what is known in the literature as time invariant. However, most economic and financial data are seen to display trend and high volatility over time. Thus, the challenging of handling such series is the problem of spurious regression (Granger and Newbold, 1974; Nelson and Plosser, 1982). The implication of a spurious regression is a data set with no explanatory power and policy strength. The remedy to this issue informed the widely known formal unit root tests of Augmented Dickey Fuller (ADF) by Dickey and fuller (1981) test and Phillips Perron (PP) test proposed by Phillips and Perron (1988) and Kwiatkowski Phillips Schmidt and Shin‟s (KPSS) as a confirmatory test to affirm the outcomes the earlier test. The general form of the equation is given as:

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum \alpha_i \Delta Y_{t-i} + \in_t \quad (2)$$

Where, $\in_t$ represents Gaussians white noise that is a serially uncorrelated with zero mean value.

4.1.2. Cointegration Test

To capture for long-run equilibrium relationship, the variables under review need to be integrated of same order, for instance all variables should be I(1). Cointegration test is necessary to measure the long-run equilibrium bond among series. Granger (1981) and Engle and Granger (1993) offered a cointegration test to examine the long-run equilibrium relationship among variables. The current study apply Johansen (1988) cointegration test given below (1.3) to trace any long run relationship among variables under review.

$$\Delta Y_t = \Gamma_1 \Delta X_{t-1} + ... + \Gamma_{K-1} \Delta X_{t-K+1} + \Pi X_{t-K} + \mu + e_t \quad (3)$$

4.1.3. Granger Causality

The conventional regression does not depict causation. Thus, there is need for causality test, to do this, this current study apply the granger causality approach to test for predictability power of series as well as direction of causality. For instance, variable X is said to granger cause Y, if variable X and its past realization are better predictor of Y rather than just X alone and its past realization.

5. Results and discussions

5.1 Unit Root Test Results

Stationarity of the series is determined by the unit root test. Augmented Dickey Fuller [ADF] (Dickey and Fuller, 1981) and Phillips Perron [PP] (Philips and Perron, 1988) tests are used to test for the unit root. The results of unit root tests are presented below Table 1.

Table 1. Unit Root Test Results

	Level				First Differences			
	H0: I(0)				H0:		I(0)	
Series	ADFa	ADFb	PPa	PPb	ADFa	ADFb	PPa	PPb
lncurrentexp	-0.38	-1.94	-0.26	-2.67	-5.53*	-5.5*	-7.91*	-7.79*
lninvestexp	-0.86	-1.76	-0.75	-1.64	-5.41*	-5.96*	-7.16*	-13.53*
lntransfexp	-1.44	-1.81	-1.49	-1.66	-9.49*	-9.81*	-9.07*	-9.35*
lngdp	-0.21	-3.08	-0.13	-3.16	-6.7*	-6.64*	-6.74*	-6.69*

Note: *,**,*** indicate significance at the 1,5 and 10 percent levels, respectively, aTest allows for a constant and linear trend; bTest allows for a constant: one-sided test of the null hypothesis that the variable has a unit root.

Table 1 depicts that LNCURRENTEXP, LNINVESTEXP, LNTRANSFEREXP, and LNGDP are not stationary at level from the both models of unit root employed as well as failure to reject the null hypothesis of unit root. However, after taking the first difference of all variables, they became stationary. That is, all the variables of interest are integrated order one, I ~ (1). Therefore, the next step is to investigate the co- integration relationship among the all variables.

Table 2. Johansen Cointegration Test Results

Hypotheses	Eigenvalue	Trace Statistic	Critical Value (%5)	Prob.
H_0: r=0 H_1: r≥1	0.49	43.85	40.17	0.00*
H_0: r≤1 H_1: r≥2	0.26	18.08	24.27	0.24
H_0: r≤2 H_1: r≥3	0.09	6.67	12.32	0.36
H_0: r≤3 H_1: r≥4	0.08	3.20	4.13	0.09
Hypotheses	**Eigenvalue**	**Max-Eigen Statistic**	**Critical Value (%5)**	**Prob.**
H_0: r=0 H_1:r=1	0.49	33.43	40.17	0.02*
H_0: r≤1 H_1:r=2	0.26	11.40	17.79	0.34
H_0: r≤2	0.09	3.47	12.32	0.71
H_0: r≤3	0.08	3.21	4.13	0.09

Note: Table show result of the Johansen trace and maximal eigenvalue test of cointegration. P is the order of the VAR model, 1, which is identified by the Schwarz Information Criterion (SIC). *, ** and *** denote 1,5 and 10 percent levels of significance, respectively.

According to Table 2; we are able to reject the null hypothesis by using Trace and Max-Eigen statistics and there is only one co-integration rank at 5% level. This implies, current expenditures, investment expenditures, transfer expenditures and gross domestic product have long run relationship. We can conclude that one common stochastic trend among these variables. Since, variables are co-integrated; we can employ Granger causality test based on Vector Error Correction Model (VECM) to determine the direction of causality between variables. Because, VECM take into account long run behavior of endogenous variables as they converge to their long run equilibrium path while allowing a wide range dynamics of the short run. The causality test result given in Table 3.

Table 3. Granger Causality Test

H0 Hypothese	Statistics (χ^2)	Degrees of freedom	Prob.
∆lncurrentexp ≠> ∆lngdp	17.36	1	0.00
∆lntransexp ≠> ∆lngdp	4.29	1	0.04
∆lninvestexp ≠> ∆lngdp	3.63	1	0.06
∆lngdp ≠> ∆lncurrentexp	0.71	1	0.40
∆lntransexp ≠> ∆lncurrentexp	0.07	1	0.79
∆lninvestexp ≠> ∆lncurrentexp	0.74	1	0.03
∆lngdp ≠> ∆lntransexp	0.02	1	0.88
∆lncurrentexp ≠> ∆lntransexp	3.37	1	0.07
∆lninvestexp ≠> ∆lntransexp	0.89	1	0.06
∆lngdp≠> ∆lninvestexp	0.63	1	0.43
∆lncurrent ≠> ∆lninvestexp	2.92	1	0.09
∆lntransexp ≠> ∆lninvestexp	4.69	1	0.03

Note: The symbol „" ≠>"" indicates does not linearly Granger Cause.

The Granger block exogeneity result is reported in table 3. Where, the null hypotheses are rejected for current expenditures, investment expenditures and transfer expenditures at 10% significance level. The findings from the Granger causality were revealing with a bi-directional Granger causality between current and investment expenditure as well as transfer expenditure and investment expenditures. On the other hand, a unidirectional Granger causality between public expenditures and GDP was recorded. This means that any percentage changes in the current expenditures, investment expenditures and transfer expenditures have a statistically significant impact on GDP.

6. Conclusions

This study explores the impact of government spending on Turkey's economic growth in an attempt to verify the Wagner's hypothesis for the case of Turkey for the period 1975 – 2014. To this end, government spending was classified as current spending, investment spending and transfer payments. The long-run relationship between variables was estimated by Johansen Co-integration method whereas short-run was estimated by Granger causality test based on the VECM. The empirical findings revealed that there is a long term relationship between the variables. That means there is a stochastic trend between gross domestic product (GDP) and government spending and the categories (current spending, investment spending and transfer payments) have a positive impact on economic growth. Finding reveals that government spending increases the economic output; thereby validate the Wagner hypothesis for the study area.

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