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Impact of Public Expenditures and Economic Classification on Growth: Turkey Analysis

Ersin YAVUZ
Pamukkale Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Maliye Bölümü, ersiny@pau.edu.tr

Eren ERGEN
Pamukkale Üniversitesi, İktisadi ve İdari Bilimler Fakültesi, Maliye Bölümü, eergen@pau.edu.tr

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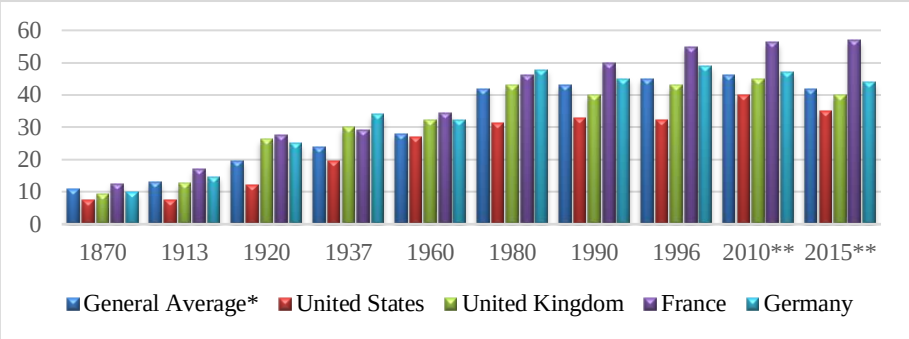
ABSTRACT

The aim of the study is to examine empirically the effects of public expenditure and economic classification which are current, investment and transfer spending on economic growth. The VAR method and the regression method are tested with data covering the years 1975-2014. According to the findings, a shock occuring in total public expenditures affects negatively economic growth up to a turn. When economic classification of public expenditures is analyzed, it is established that a shock occuring in transfer expenditures affects negatively economic growth up to two turns. Current expenditures affect the first and third period negatively and the effect of investment expenditures can not be interpreted statistically. According to regression analysis, a 1% increase in total public expenditure affects negatively economic growth by 0.85%. Moreover, a 1% increase in transfer expenditures within the economic classification has a negative effect of 1.28% on economic growth. The findings show that public spending in Turkey is not effective in the corresponding period.

INTRODUCTION

Over the past 200 years, very important changes have taken place in relation to the role of the government. From the end of the 19th century until the 1980s, public spending has increased significantly, especially in industrialized countries, due to war, crisis, population growth, technological and other reasons. It has been determined that after the 1980s, it has entered a period of slowdown partly. Graph 1 shows the national income ratios of public expenditures in various dates from 1870 onwards. When looked at the average of 13 industrialized countries, related ratio was 10.8% in 1870 and it increased to 46% by 2010. Particularly, public spending seems to have increased drastically in the First and Second World Wars, in times of economic crises such as the Great Depression and the Global Financial Crisis. However, except for these extraordinary periods, expenditures generally have increased. It has been viewed that only a small decrease is observed in 2015 between the years examined. This decline can be explained by the fact that after the 2008 Global Financial Crisis countries first increased their public expenditure to minimize the effects of the crisis and then reduced. In the other four countries, France and Germany are generally found to have spending rates well above average (Tanzi and Schuknecht, 2000: 3).

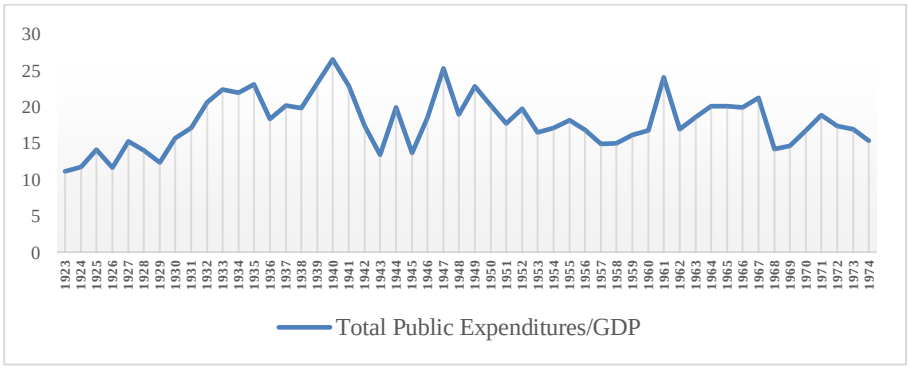
Graph 1: National Income Rate of Public Expenditures (1870-2015)



Source: (Tanzi ve Schuknecht, 2000: 8). *The overall average is represented by the average of Australia, Austria, Canada, France, Germany, Italy, Ireland, Japan, New Zealand, Norway, Sweden, Switzerland, United Kingdom and United States. **The years 2010 and 2015 were derived from the IMF database.[1]

The general course of expenditures in Turkey is lower than developed countries. Between 1923 and 1974, the national income rate of expenditures was about 18% (Graph 2). Graph 3 shows the development of public expenditures in Turkey between 1975 and 2014. The related rate is about 12% in 1975, but it rises to roughly 25% by 2014. The year of the highest level was 34% in 2001. The national income rate of public spending in Turkey is very low compared to the developed countries in Graph 1. When the economic classification of public expenditures is examined, it has been determined that transfer expenditures which are generally emphasized as negative effects on growth have a significant increase and the most important share since 1993. Current expenditures tend to increase in general despite the ups and downs, while the investment expenditures which are emphasized as the positive effects of the economy are generally at a very low level.

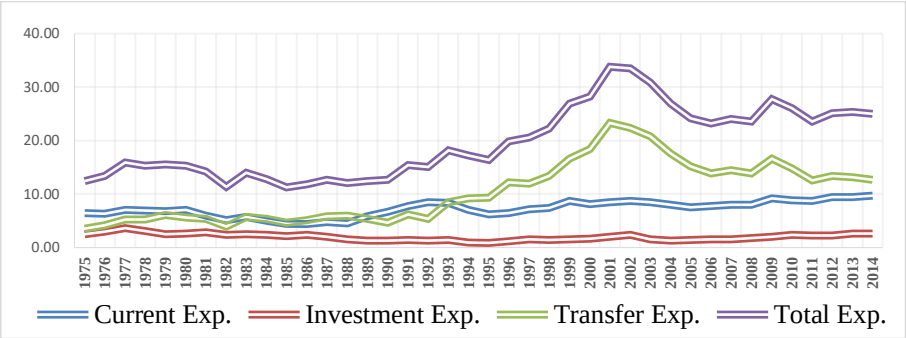
Graph 2: National Income Rate of Public Expenditures in Turkey (1923-1974)



Source: (Susam, 2009).

[1] World Economic Outlook Database, October 2016.

Graph 3: National Income Rates of Total Public Expenditures and Current/Investment/Transfer Expenditures in Turkey (1975-2014)



Source: Ministry of Development

The increase in public spending can be attributed in general to population growth and the development of technology. The rise in health spending due to prolonging life expectancy, the need for education, subsidies and incentives, public employment, interest payments due to budget deficits and the expansion of coverage of social security systems including pensions can be regarded as important reasons for the increase in public expenditures. Well, what is the impact of rising public spending on economic growth? The answer to this question varies from country to country and from period to period. The aim of the study is to analyze, Turkey's current, investment, transfer (economic classification) expenditures and total public expenditures effects of the growth for the period 1975-2014.

1.Theoretical Framework

The classical approach which advocates the minimum role of the public sector in the economy lost its influence with the Great Depression of 1929, after this date the Keynesian approach advocating the intervention in the economy has become important. With the adoption of Keynesian policies, generally increase in public expenditures has come to the fore. Under the influence of this increase, many researchers examine the relationship between public expenditures and economic growth (Gül and Yavuz, 2011: 73-74).

Two basic approaches are generally adopted in the literature to address public spending and economic growth. These are the approaches of Adolph Wagner and J. M. Keynes. In Wagner's approach, public spending is regarded as an endogenous variable determined by economic growth. In other words, public spending which is very sensitive to increases in economic growth tend to increase. That's to say, the public sector is expanding simultaneously with economic growth. The most important factor in the expansion of the public sector is the increase in public expenditures in terms of quality and quantity. This approach is defined as Wagner's *"law of the increase of public expenditure"*. Keynes's approach, in contrast to Wagner, centralizes public spending. The main argument of this approach is that public expenditures should be increased for economic development to occur. Because increasing public expenditures with multiplier effect will contribute to economic growth (Oktayer and Susam, 2008: 148).

2.Literature Review

From past to present, relationship between public expenditure and economic growth has been and continues to be a matter of research for many countries and periods. Some studies also examine the economic and functional classification of public expenditures in detail. The related literature is shown in Table 2.

Table 1: Empirical Studies on Public Expenditures and Economic Growth

Author / Year of Work	Country / Countries	Year	Econometric Method	Results
Barro (1989)	98 Countries	1960 1985	Cross Section / Time Series / Regression Analysis	Public consumption expenditures affect negatively economic growth. Although investment expenditures are related to economic growth, this relationship is weak.
Devarajan et al. (1996)	43 Countries	1970 1990	Regression Analysis	The increase in the share of expenditures has a significant and positive impact on growth. The relationship between per capita income and capital spending are negative.
Uzay (2002)	Turkey	1971 1999	Two Sector Production Function	As the share of public expenditures in national income increases, economic growth is affected adversely.
Kar and Taban (2003)	Turkey	1971 2000	Least Squares Method, Engle-Granger Causality Test	Education and social security expenditures have a positive effect on economic growth, have a negative impact on health expenditures, and no contribution on infrastructure investments.
Ramey (2007)	United States	1939 2008	VAR Method	The impact of public spending on economic growth is positive (Keynes).
Ağayev (2007)	The Soviet Union (10 Countries)	1995 2009	Panel Data Analysis, Granger Causality Test	There is a relationship between public expenditures and income level. There is also one-way causality to public spending from economic growth (Wagner).
Rose et al. (2007)	30 Countries	1970 1990	Panel Data Analysis	The relation of capital expenditures and economic growth is positive and significiant. The effect of current expenditures is insignificiant.
Oktayer and Susam (2008)	Turkey	1970 2005	Least Squares Method	There is a strong relationship between public investment expenditures and economic growth in public expenditures.
Arpaia and Turrini (2008)	AB-15 Countries	1970 2003	Panel Data Analysis	There is a relationship between public spending and potential output.
Alexiou (2009)	7 Countries (European)	1995 2005	Panel Data Analysis	Capital formation in the public sector, supporting development, supporting private sector investments and spending on trade-openings, are positive and significiant for growth.
Bağdigen and Beşer (2009)	Turkey	1950 2005	Granger, Todo-Yamamoto, and Hsiao Causality Tests	Apart from a test, the results support the Wagner Law in the relevant period.
Başar et al. (2009)	Turkey	1975 2005	Boundary Test Approach	Total public expenditures are affected negatively by the national output. There is no relationship between growth and sub-items of public spending.
Nurudeen and Usman (2010)	Nigeria	1979 2007	Co-integration Test and Error Correction Model, Regression Analysis	The effect of capital, current and education expenditures on the economy is negative. The impact of health, transportation and

				communication spending on economic growth is positive.
Altunç (2011)	Turkey	1960 2009	ARDL Boundary Test Approach, VAR Granger Causality Test / Block Externality Wald Test	There is a positive relationship between total public spending - investment expenditures and economic growth, and there is a negative relationship between public consumption expenditures and economic growth. Causality from total public expenditure to economic growth (Wagner) is determined. There is also mutual causality between investment expenditures and economic growth (Wagner-Keynes).
Kanca (2011)	Turkey	1980 2008	Co-integration Test, Causality Test, Error Correction Model	In the short run, there is causality in economic growth (Keynes) from public spending (current / investment / transfer), and in the long run there is the opposite causality (Wagner).
Gül and Yavuz (2011)	Turkey	1963 2008	Unit Root Test, Co-integration Test, Granger Causality Test	There is a co-integration relationship between economic growth and public spending, investment, current and transfer expenditures. There is also one-way causality from public spending, investment, current and transfer spending to economic growth (Keynes)
Yüksel and Songur (2011)	Turkey	1980 2010	Engle-Granger Co-integration Test, Granger Causality Test	There is a long-run relationship between economic growth and all variables except debt interest payments. In addition, one-way causality from current spending and total public expenditure towards economic growth is determined.
Yıldız and Sarısoy (2012)	OECD Countries	1990 2010	Panel Data Analysis	Both the Wagner and Keynes Laws goes for.
Tuna (2013)	Turkey	1961 2012	Granger Causality Test	The results are not available supporting Wagner in the period concerned. Findings support the Keynesian approach.
Gangal and Gupta (2013)	India	1998 2012	Unit Root Test, Co-integration Test, Granger Causality Test	In the long term, there is a positive relationship between economic growth and public expenditures. In addition, mutual causality between two variables is found.

3.Data Set and Econometric Methodology

In this paper, the effect of total public expenditures and economic classification of expenditures which are current, investment and transfer expenditures on economic growth is tested by VAR and regression analysis. Two models are created by the annual data obtained from the Ministry of Development. The data cover the period 1975-2014. In the first model, total expenditures and economic growth, in the second model current, transfer, investment expenditures and economic growth relation are taken into consideration. The variables used are:

EGR: Economic growth rate,

TPE: National income ratio of total public expenditures,

CE: National income ratio of current expenditures,

TE: National income rate of transfer spending,

IE: National income ratio of investment expenditures.

The VAR model used for empirical analysis is generally formulated as follows:

Model 1: Total Public Expenditure Model

$$EGR_t = \alpha_0 + \sum_{p=1}^{k} \beta_{1p} \Delta TPE_{t-p} + \sum_{P=1}^{k} \gamma_{1P} EGR_{t-P} + \varepsilon_{1t} \quad (1)$$

$$\Delta TPE_t = \alpha_0 + \sum_{p=1}^{k} \gamma_{1p} EGR_{t-p} + \sum_{P=1}^{k} \beta_{1P} \Delta TPE_{t-P} + \varepsilon_{2t} \quad (2)$$

Model 2: Economic Classification Model

$$EGR_t = \alpha_0 + \sum_{p=1}^{k} \lambda_{1P} \Delta CE_{t-P} + \sum_{P=1}^{k} \theta_{1P} \Delta TE_{t-P} + \sum_{p=1}^{k} \delta_{1P} \Delta IE_{t-P} + \sum_{P=1}^{k} \gamma_{1P} EGR_{t-P} + \varepsilon_{1t} \quad (3)$$

$$\Delta CE_t = \alpha_0 + \sum_{P=1}^{k} \gamma_{2P} EGR_{t-P} + \sum_{p=1}^{k} . \delta_{2P} \Delta IE_{t-P} + \sum_{P=1}^{k} \theta_{2P} \Delta TE_{t-P} + \sum_{p=1}^{k} \lambda_{2P} \Delta CE_{t-P} + \varepsilon_{2t} \quad (4)$$

$$\Delta TE_t = \alpha_0 + \sum_{P=1}^{k} \gamma_{3P} EGR_{t-P} + \sum_{P=1}^{k} \lambda_{3p} \Delta CE_{t-P} + \sum_{p=1}^{k} \delta_{3P} \Delta YH_{t-P} + \sum_{P=1}^{k} \theta_{3P} \Delta TE_{t-P} + \varepsilon_{3t} \quad (5)$$

$$\Delta IE_t = \alpha_0 + \sum_{P=1}^{k} \gamma_{4P} EGR_{t-P} + + \sum_{p=1}^{k} \lambda_{4P} \Delta CE_{t-P} + \sum_{P=1}^{k} \theta_{4P} \Delta TE_{t-P} + \sum_{p=1}^{k} \delta_{4P} \Delta IE_{t-P} + \varepsilon_{4t} \quad (6)$$

k: Lag length — ε : Error term

t: Time — P: Number of delays

Δ : Difference parameter — δ : YE stationary coefficient

γ : EGR stationary coefficient — θ : TE stationary coefficient

β : TPE stationary coefficient — λ : CE stationary coefficient

4.Implementation and Results

Table 3 shows the stationarity of the variables used in both models compared to Augmented Dickey-Fuller and Philips Perron unit root tests. Indeed, the series must be stationary used for the VAR analysis. According to the tests, only the growth rate is stationary at the level, while the other variables are stationary when the first differences are taken.

Table 2: Unit Root Test Results

Augmented Dickey-Fuller (ADF) Test				
Variables	Intercept		Trend and Intercept	
	t-statistic value	Prob. value	t-statistic value	Prob. value
EGR (Level)	-6,4007(0)	0,0000*	-6.313(0)	0.0000*
TPE (Level)	-1.1373(0)	0.6912	-1.5649(0)	0.7886
TPE (1. Difference)	-5,2914(0)	0,0001*	-5.2216(0)	0.0007*
CE (Level)	-0.8869(0)	0.7819	-2.6112(1)	0.2778
CE (1. Difference)	-5,1628(0)	0,0001*	-5.1411(0)	0.0009*
IE (Level)	-1.5407(0)	0.5027	-1.2394(0)	0.8879
IE (1. Difference)	-5,7122(0)	0,0000*	-5.9295(0)	0.0001*
TE (Level)	-1.2970(0)	0.6214	-1.0981(0)	0.9165

TE (1. Difference)	-5,0889(0)	0,0002*	-5.0852(0)	0.0010*
Philips-Peron (PP) Test				
Variables	**Intercept**		**Trend and Intercept**	
	t-statistic value	**Prob. value**	**t-statistic value**	**Prob. value**
EGR (Level)	-6,8058[5]	0,0000*	-6.698[5]	0.0000*
TPE (Level)	-1.2940[3]	0.6228	-1.9135[3]	0.6285
TPE (1. Difference)	-5,3049[2]	0,0001*	-5.2374[2]	0.0007*
CE (Level)	-1.1297[2]	0.6943	-2.4151[2]	0.3665
CE (1. Difference)	-5,1677[1]	0,0001*	-5.1450[1]	0.0009*
IE (Level)	-1.5076[3]	0.5193	-1.1278[4]	0.9111
IE (1. Difference)	-5,7511[4]	0,0000*	-9.1559[15]	0.0000*
TE (Level)	-1.4308[3]	0.5574	-1.5395[3]	0.7982
TE (1. Difference)	-5,1288[2]	0,0001*	-5.1280[2]	0.0009*

* It represents a level of significance at 1%. **The optimal lags for ADF test were selected by Schwarz information criterion. The bandwidth for PP test was selected with Newey-West using Bartlett Kernel. ( ) shows the values of Lag Length in the ADF test. [ ] shows the values of Bandwidth in the PP test.

Tables 4 and 5 contain information criteria for determining the lag length for both models. In total public expenditure and economic classification models, number of delays are set at 2 to solve the problem of autocorrelation and varying variance.

Table 3: Determination of Lag Length - Total Public Expenditures

Delay	LR	FPE	AIC	SC	HQ
0	NA	76.94347	10.01880	10.10677	10.04950
1	1.385374	92.20907	10.19904	10.46296	10.29115
2	2.308813	107.1942	10.34678	10.78665	10.50031
3	3.34412	120.057	10.45369	11.0695	10.66863

Table 4: Determination of Lag Length - Economic Classification

Delay	LR	FPE	AIC	SC	HQ
0	NA	1.397365	11.68604	11.86199	11.74745
1	12.68488	2.273815	12.16574	13.04547	12.47279
2	22.08422	2.53068	12.23669	13.82021	12.78938
3	15.13867	3.498334	12.46738	14.75468	13.26571

In Figures 1 and 2, it has been seen that the variables are located in the unit circle of the opposite roots in both the total public expenditure (TPE) model and the economic classification model (EC) at the specified stationary state and the appropriate delay level.

Figure 1: Reverse Roots Unit Circle (TPE)

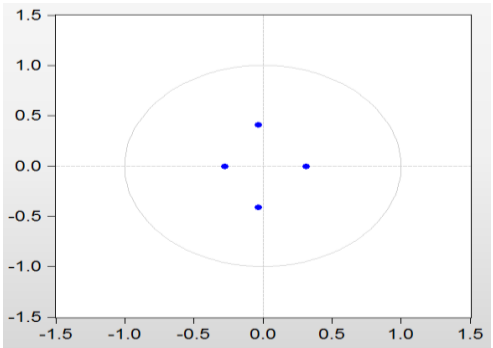
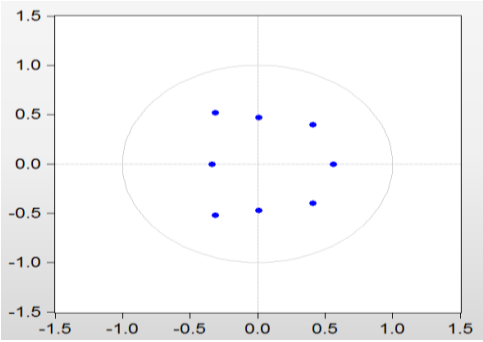


Figure 2: Reverse Roots Unit Circle (EC)



Tables 6 and 7 show no autocorrelation and homosc(k)edasticity variance problems in both models. In both models the probability values are greater than 5%.

Table 5: LM Autocorrelation Test

Delay	LM Statistic (TPE)	Prob. (TPE)	LM Statistic (EC)	Prob. (EC)
1	3.351844	0.5008	15.0831	0.5186
2	1.015052	0.9075	9.795863	0.8771
3	3.026814	0.5533	8.816647	0.9208
4	5.603895	0.2307	21.75308	0.1513
5	1.828009	0.7674	9.247134	0.9029
6	1.525984	0.822	18.45458	0.298

Table 6: Varying Variance Test

White Heteroskedasticity (No Cross Terms) (TPE)		
Chi-square	df	Probability
30,42	24	0,1710
White Heteroskedasticity (No Cross Terms) (EC)		
Chi-square	df	Probability
158,23	160	0,5246

Impulse-response analysis is applied after unit root tests and other problems are resolved. Impact-response analyzes generally reveal how an other variables respond to a shock of standart error in a variable (Barışık and Kesikoğlu, 2006: 69). According to Figure 3, a shock occuring in the total public expenditure affects negatively economic growth as much as a turn. Figure 4 shows the effects of economic classification on growth. According to this, the response of the economic growth is not interpreted statistically a shock occuring in investment expenditure. A shock in transfer spending affects negatively economic growth as much as two turns. A shock in current expenditures affects negatively economic growth in the first and third period. First of all, in theory and in the empirical studies carried out, it is generally accepted that effect of transfer expenditures have negative effect on economic growth and effect of investment expenditures are positive. In the period under review, transfer expenditures generally increased until the beginning of the year 2000, and then decreased. Nevertheless, transfer expenditures have had the largest share in total expenditures since 1993. Proportion of interest expenditure which is a negative effect on growth, in total transfer expenditures rose from about 10% in 1975 to 73% in 2001. After this date, interest payments falling in a decreasing tendency are 22% as of 2014. These data explain that transfer expenditures have an adverse effect on growth. The ratio of investment expenditures is very low. In the relevant period, failure to make investments in the required level, failure of public investment projects to be completed within the planned periods[2], and failure to obtain the expected gainings from

[2] In 1980-1996, public investment projects, which are considered as important projects, have a 2 to 3 times difference between the planned ending time and the actual ending time. The planned and actual ending period for

the investments can be given as an answer to why investing expenditures do not positively contribute to growth. The negative impact of current expenditures on the economy can be explained in the context of populist policies. These are generally, during the election period, politicians are more inclined to make public employment on the optimal level and to make more rise than it should be in wages for the broad electorate base who are civil servants and retirees.

Figure 3: EGR's Response to Shock in TPE

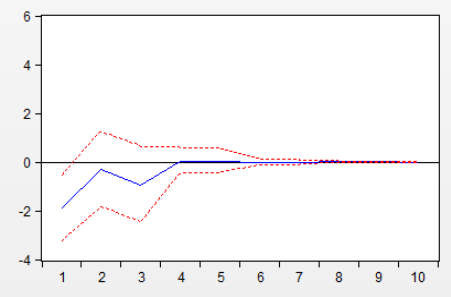
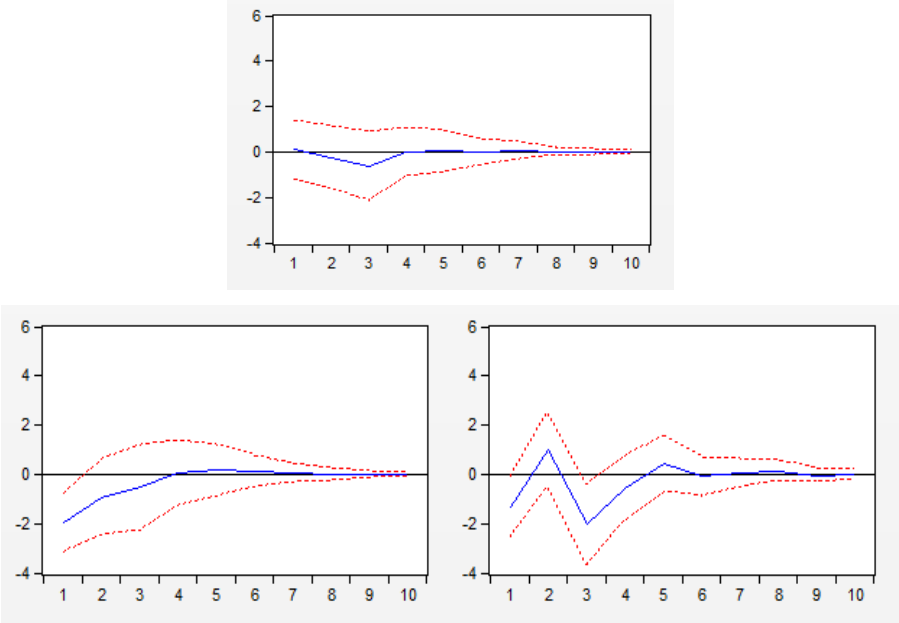


Figure 4: EGR's Response to Shock in IE / TE and CE



One of the analyzes carried out within the VAR method is variance decomposition. The variance decomposition *"gives the proportion of the fluctuations that occur in dependent variants in response to shocks in other variables"* (Kara et al., 2012: 91). In other words, it explains that how many percent of the percentage a shock occuring in the variables are caused by themselves and by other variables. In the study, the *"Generalized Impulses"* method is used which is not affected by the ordering of variables and is used in impact-response analyzes. According to the total public expenditure model in Table 8, economic growth is affected completely by itself in the first period and by 0.6% from total public expenditure in the tenth period. According to the economic classification model, economic growth is fully explained in the first period by itself. However, especially since the second period, the effect of current expenditures is increasing. Economic growth in the tenth period caused by 87% by itself, 11.5%

the relevant period in the sectoral order is as follows: Agriculture 5.4-13.6; Mining 4.7-9.7; Production 4.5-15; Energy 5.2-14.7; Transportation 3.4-9.3; Tourism 5-13.4; Training 3.5-13 and Other Services 6.1-11.1 (Ilgın, 2003: 368).

from current expenditures, 0.56% from transfer expenditures and 0.05% from investment expenditures.

Table 7: Variance Decomposition (Generalized Impulses)

TPE (Total Public Expenditure)				
Period	EGR	TPE		
1	100	0		
2	99,98227583	0,017724175		
3	99,75153336	0,248466645		
4	99,6266395	0,373360502		
5	99,54773656	0,452263443		
6	99,49370398	0,506296017		
7	99,4543867	0,545613305		
8	99,42452468	0,575475324		
9	99,40107443	0,598925569		
10	99,38217134	0,617828656		
EC (Economic Classification)				
Period	EGR	IE	TE	CE
1	100	0	0	0
2	98,9467195	0,000752013	0,245971671	0,806556812
3	95,65066129	0,018605247	0,340588249	3,990145217
4	93,36697207	0,029277778	0,410473899	6,193276255
5	91,74260672	0,036476704	0,456478026	7,764438549
6	90,54271933	0,041702835	0,490169464	8,925408373
7	89,62544729	0,045831425	0,516675397	9,812045885
8	88,89262947	0,04908287	0,537554309	10,52073335
9	88,29910719	0,051717921	0,554446981	11,09472791
10	87,80922465	0,053892692	0,568389653	11,56849301

In this paper, the regression analysis is performed to measure the amount of the effect of the variables on each other after VAR analysis. While the EGR are used in the models, the other variables are used by taking the first differences. Table 9 contains the diagnostic test results for both models. The results show that both models do not have any problems in terms of regression analysis.

Table 8: Diagnostic Test Results

	Model 1		Model 2	
	F-stat.	Prob.	F-stat.	Prob.
Model	8.144 (df: 39)	0.007	5.245 (df: 39)	0.004
Breusch-Godfrey Serial Correlation LM Test	0.758 (df: 35)	0.4757	0.485 (df: 33)	0.6198
Heteroskedasticity Test: White	0.127 (df: 37)	0.723	0.284 (df: 35)	0.8363
Ramsey Reset Test	1.362 (df: 36)	0.2507	0.7570 (df: 34)	0.3904

According to the 1% significance level of the variables included in the regression models, the variables of total public expenditures and transfer expenditures are significant.

Model 1: EGR = 4.400 - 0.8587*ΔTPE

(-2.85)

Model 2: EGR = 4.4974 - 1.288*ΔTE - 0.9538*ΔCE + 4.0622*ΔIE

(-3.284) (-0.926) (2.046)

When the results of Model 1 are examined, a 1% increase in total public expenditure affects negatively economic growth by 0.85%. According to the results of Model 2, a 1% increase in transfer expenditures affects negatively economic growth by 1.28%. Current and investment expenditures are not statistically significant. Findings from regression analysis support the results of the VAR model.

CONCLUSION

Two methods are used to measure the effect of public expenditure and economic classification on growth in VAR and VAR regression. For the VAR method, unit root tests are performed first. While all variables are stable when first differences are taken, it is seen that only economic growth ration is stationary at the level. Impulse-response analysis and variance decomposition are applied to the variables within the scope of VAR analysis. According to impulse-response analyzes, a unit shock in total public spending affects negatively economic growth up to a turn. It is observed that one unit shock in transfer expenditures affects negatively economic growth up to two turns, and one unit shock in current expenditures affects negatively economic growth in the first and third period. Investment expenditures can not be interpreted statistically. The most striking result of the analysis of variance, which is the other analysis within the scope of the VAR analysis, is that 11.5% of the economic growth in the 10th period stems from by current expenditures. According to the second analysis, which is regression method, 1% increases in total public expenditures and transfer expenditures affect negatively economic growth by 0.85% and 1.28% respectively. The results of the two analyzes generally overlap.

When the findings obtained from the paper are evaluated, it can be said that public spending is generally used inefficiently and away from activity. First of all, it is important to note that in this period, the general election is made every 3 years on average and the government changes every 13 months on average. It is also known that the 1980 Military Coup, outsourced crisis such as the 1994 Gulf Crisis, the 1997 Asian Crisis, and the 2008 Global Financial Crisis and domestic crisis such as 1994, 2000, and 2001 were carried out in this period. When all these are assessed, the deterioration of political and economic stability in the period and the weak public control over spending are the main reasons why total public, current and transfer expenditures have negative impact on the economy.

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