

Asymmetric Causality Test for Budget Deficit and Economic Growth: The Case of Turkey

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Abstract

Since the 1980s, neoliberal economic policies have accelerated around the world. The active participation of governments in economic activities began to change. Accordingly, significant shifts have occurred in the composition of public expenditures. In many countries, while investment expenditures decreased proportionally; current expenditures and transfer expenditures increased. However, despite the structural transformation in economic policies, budget deficits remained substantial. Therefore, budget deficits and the effects of these deficits have been constantly discussed in the economic literature. As a result of the EU debt crisis, debates on budget deficits have become one of the main agenda items of many countries, international institutions, and central banks. The negative effects of the deficits which were mainly caused by the financing of consumption expenditures were observed during the crisis. While developed countries can use the budget to support the economic growth process, budget deficits in underdeveloped countries can threaten economic stability. The aim of this study is to test the relationship between budget deficit and economic growth using asymmetric causality approach based on data of the period 1980-2011 for Turkey. According to the findings, contractionary fiscal policies adversely affect economic growth.

Keywords: budget deficit; economic growth; debt crisis; asymmetric causality; Turkish economy

1. Introduction

Governments spend money to meet social needs and regulate economic activities. The usual source of financing for public expenditures is tax revenues. However, if tax revenues are less than public expenditures, budget deficits arise.

Classical economics assumes that full employment will be achieved in the economy in the absence of state intervention. Therefore, according to the classical economists, the state should have both a balanced and small budget. Because budget deficits disrupt fiscal discipline and monetary

discipline and cause problems such as inflation and unemployment. As a matter of fact, financing budget deficits with debt creates a crowding-out effect on private sector investments. Monetization, on the other hand, increases the inflation rate by increasing the money supply. All these problems disrupt the growth performance of an economy. Classical economists also oppose the budget surplus. Because budget surplus means that resources remain idle (Şen et al., 2007: 37-39).

Until the Great Depression in 1929, the basic assumptions of classical economists were considered as true. Classical economists regarded the Great Depression as a temporary shock and claimed that the market mechanism would solve this problem on its own in a short period of time. They attributed the cause of the crisis to high real wages. And they proposed lowering real wages to overcome the crisis. However, Keynes stated that total demand would decrease if real wages were reduced. And the decrease in total demand deepens the crisis (Altıok, 2009: 79).

The Keynesian approach suggests that, unlike classical economics, economies can come to equilibrium at levels of underemployment. If markets are not intervened in such an environment, the economy could be plunged into crisis. The main reason for this problem is the lack of demand. Lack of demand refers to the under-use of resources (Eker et al., 1997: 63-64). The economic recession is the result of insufficient demand. It is necessary to use expansionary fiscal policy to end demand shortages. According to the Keynesian economics, fiscal policy is more effective than monetary policy (Erim, 2007: 198). Keynes acknowledged that money was not neutral and proposed a fiscal policy. Because there is a possibility that monetary policy will be caught in the liquidity trap. In the liquidity trap, however, expansionary fiscal policies do not crowd-out private sector investments. Thus, budget deficits bring about economic growth until full employment is achieved (Küçükkalay, 2010: 315).

Keynesian policies were implemented until the 1970s. However, the stagflation crisis increased the need for different economic models. Thus, the views that adopted a balanced and small budget approach emerged again (Yay, 2001: 130). Indeed, neoliberal approaches have gained momentum throughout the world since the 1980s. However, economic crises, in particular, have kept budget deficits on the agenda. Finally, after the 2008 Crisis and the EU Debt Crisis, many countries have used expansionary monetary and expansionary fiscal policies for growth (Dziemianowicz et al., 2018: 12).

The way to increase social welfare is through economic growth. And economic growth depends on the number of production factors, human capital investments and technological developments (Parasız, 2003: 11). Budget deficits created to support these elements may have positive effects on growth. In some underdeveloped countries, budget deficits are not a choice but a necessity. Because the private sector does not have the resources to achieve its growth targets. However, the important issue here is the effectiveness and efficiency of public interventions (Gönel, 2010: 221). As a matter of fact, public realization of economic activities that the private sector can do more efficiently or improper financing of public expenditures disrupts the relationship between growth and budget deficits (Bulut, 2002: 66).

Ricardian Equivalence Hypothesis, on the other hand, assumes that budget deficits do not have an impact on economic growth. This is because of the positive impact of expansionary fiscal policy on growth eliminates the increased savings of the private sector (Briotti, 2005: 9-10). The aim of this study is to investigate the relationship between budget deficit and economic growth in the Turkish economy during the period of 1980 to 2011. For this purpose, the asymmetric causality test is used. The remaining of this study has been organized as follows: Section 2 reviews the literature that examines the relationship between budget deficit and economic growth. Section 3 explains the data, methodology, and empirical findings. Finally section 4 concludes the paper with policy suggestions.

2. Literature Review

There are different theoretical approaches regarding the effect of budget deficit on economic growth. The classical approach accepts that the budget deficit will have negative effects on economic growth. However, the Keynesian approach assumes that while the economy is at the level of underemployment, the budget deficit will support economic growth. On the other hand, according to the Ricardian Equivalence Hypothesis, there is no relationship between budget deficit and economic growth. Several studies have been conducted to test which of these theories are valid. The results of the previous researches are mixed. Table 1 shows a literature review of the relationship between budget deficit and economic growth.

Table 1: Literature Review

Author(s)	Countries	Period	Methodology	Results
Buscemi and Yallwe (2012)	Emerging Countries (China, India and South Africa)	1990-2009	Dynamic GMM Method, Fixed Effect, Random Effect Estimation	Fiscal deficit are significant and positively correlated to economic growth.
Maji et al. (2012)	Nigeria	1970-2009	Granger Causality	No Causality
Samırkaş (2014)	Turkey	1980-2013	Granger Causality	No Causality
Shihab (2014)	Jordan	2000-2012	Granger Causality	There is a unidirectional causality from economic growth to budget deficit.
Nayab (2015)	Pakistan	1976-2007	Granger Causality	No Causality
Arjomand et al. (2016)	10 MENA* Countries	2000-2013	Fixed Effect, Random Effect Estimation	Budget deficit are significant and negatively correlated to economic growth.
Rana and Wahid (2017)	Bangladesh	1981-2011	Granger Causality	There is a unidirectional causality from budget deficit to economic growth.
Molocwa et al. (2018)	BRICS**	1997-2016	Panel Granger Causality	There is a bidirectional casuality between budget deficit and economic growth.

Öztürk and Sezen (2018)	Turkey	1975-2016	Variance Decomposition, Impulse-Response Analysis	Budget deficits have a positive effect on economic growth in the short term. On the other hand it has a negative effect in the long term.
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* Middle East and North Africa ** Brazil, Russia, India, China, Spain

3. Data, Methodology and Findings

This study examines the relationship between budget deficits and economic growth for Turkey. Table 2 summarizes the variables to be used in this paper.

Table 2. Data and Sources

Variable	Abbreviation	Sample	Source
Budget Deficit ^a	Bd	1980-2011	Poula et al. (2013)
Growth Rate	Gr	1980-2011	Poulo et al. (2013)

Note: ^a Calculated by the authors using tax revenue and government expenditures.

In order to determine the causal relationship between the budget deficit and economic growth, the stationarity test was performed first. Stationarity states that the mean, variance, and autocovariance of a variable are constant over time. In this respect, the effects of shocks in stationary series disappear in the short term, but shocks in non-stationary series create lasting effects (Gujarati and Porter, 1999: 713). Thus, series containing unit roots need to be fixed by making them free of the trend (Kennedy, 2006: 355-356). In this study, Fourier-type unit root tests were performed to determine whether the series were stationary or not.

3.1. Fourier Unit Root Tests

If the time series show a linear or nonlinear tendency, Fourier-type unit root tests can be used for stationarity testing (Becker et al., 2006: 381-382; Yalçınkaya, 2019: 40). The first of these tests is the Fourier KPSS (FKPSS) test developed by Becker et al. (2006). The FKPSS test is designed to provide the best estimate in cases where structural breaks occur gradually. The most important advantage of the FKPSS test is that it does not require pre-determination of the location, number, and form of breaks in the series (Beşer, 2019: 165). The hypotheses of the test are as follows:

H₀: There is no unit root.

H₁: There is a unit root.

The null hypothesis is rejected if the calculated test statistic is greater than the table's critical value.

The second of the Fourier-type unit root tests is the Fourier ADF (FADF) test developed by Enders and Lee (2012). Enders and Lee (2012) suggest the Dickey-Fuller version of the Fourier unit root tests. This version can be useful in the presence of unknown multiple breaks in a nonlinear form. The hypotheses of the test are as follows:

H₀: There is a unit root.

H₁: There is no unit root.

If the calculated test statistic is greater than the table critical value as an absolute value, the null hypothesis is rejected.

The third of the Fourier unit root tests were developed by Rodrigues and Taylor (2012).

They apply the flexible Fourier form to the local GLS unit root testing procedure of Elliott, Rothenberg, and Stock (1996) and to compare this with the corresponding DF and LM based unit root tests of Enders and Lee (2009). The hypotheses of the test are as follows:

H₀: There is a unit root.

H₁: There is no unit root.

If the calculated test statistic is greater than the table critical value as an absolute value, the null hypothesis is rejected.

Table 3. The Results of Fourier Unit Root Tests

Series	Constant														
	FADF (Enders and Lee, 2012)					FGLS (Rodrigues and Taylor, 2012)					FKPSS (Becker et al., 2006)				
Level	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10
Gr	-3.66 ^a	0	4	-2.97	-2.64	-6.06 ^a	0	3	-2.35	-2.00	0.03 ^a	0	5	0.46	0.35
Bd	-3.33	2	1	-3.81	-3.49	-3.46 ^a	2	1	-3.29	-2.32	0.19	0	1	0.17	0.13
	Constant and trend														
	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10
Gr	-3.62 ^b	0	4	-3.65	-3.29	-4.16 ^b	0	1	-4.17	-3.87	0.03	0	3	0.14	0.11
Bd	-3.90	2	1	-4.35	-4.05	-3.76	2	1	-4.17	-3.87	0.09 ^a	0	1	0.05	0.04
First Dif.	Constant														
	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10
ΔGr	-3.72 ^a	3	4	-2.97	-2.64	-3.74 ^a	1	4	-2.25	-1.91	0.02 ^a	0	4	0.45	0.34
ΔBd	-6.11 ^a	0	4	-2.97	-2.64	-3.93 ^a	0	1	-3.29	-2.32	0.14 ^a	0	4	0.45	0.34
	Constant and trend														
	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10	Stat.	L	K	%5	%10
ΔGr	-3.48 ^b	3	4	-3.65	-3.29	-3.90 ^a	1	4	-3.23	-2.90	0.01 ^a	0	4	0.14	0.11
ΔBd	-3.90 ^b	3	2	-4.05	-3.71	-6.49 ^a	0	4	-3.23	-2.90	0.06 ^a	0	4	0.14	0.11

Notes: The maximum Fourier number is selected as 5. According to the Akaike information criterion, the maximum lag length is 3. The critical values of each test were taken from the table values in the related articles. L: lag length. K: Fourier number. a and b reflect 5% and 10% significance levels, respectively.

According to the results of FADF, FGLS, and FKPSS, the series contains unit root at constant and trend level. On the other hand, when the first differences of the series are taken, both are stationary I(1), that is, they do not include a unit root.

3.2. Asymmetric Causality Test

The asymmetric causality test developed by Hatemi-J (2012) is based on the causality method developed by Toda and Yamamoto (1995). For causality tests, it is sufficient to know the maximum degree of integration of the series in the model and to determine the model correctly. The methodology proposed by Toda and Yamamoto (1995) can be applied regardless of the order of integration of variables (Hacker and Hatemi-J, 2006: 1493; Toda and Yamamoto, 1995: 233). Differences in the stationarity of the series are also considered in this context. The most important feature of the asymmetric causality test is that the series also provides information about positive and negative shocks regarding the causality relationship. The results of the asymmetric causality test are given in Table 4.

Table 4. The Results of Asymmetric Causality Test

Hypothesis	VAR(p)	MWALD	Asymptotic chi-sqaure	Bootstrap Critical Values		
			p-value	%1	%5	%10
Bd ⁺ =>Gr ⁺	2	1.202	0.548	31.913	13.073	7.624
Bd ⁺ =>Gr ⁻	2	38.230*	0.000	26.657	13.498	8.579
Bd ⁻ =>Gr ⁻	1	1.297	0.255	14.473	6.607	4.031
Bd ⁻ =>Gr ⁺	2	0.014	0.993	30.181	12.379	7.875

Notes: * Indicates that it is statistically significant at the level of % 1. VAR(p) shows lag length. One lag was added to the VAR lag length according to Hacker and Hatemi (2006) for T:40.

According to these results, contractionary fiscal policies (Bd⁺ => Gr⁻) have a negative impact on economic growth.

4. Conclusion

Governments spend money to meet social needs and regulate economic activities. The main source of financing for expenditures is tax revenues. However, if tax revenues are less than public expenditures, budget deficits arise. According to classical economists, the intervention of the state in the economy disrupts the balance of full employment. For this reason, classical economists argue that the budget should be balanced and small. Keynes, on the other hand, accepts that economies are stabilized in underemployment. Therefore, Keynesian economics assumes that the full employment balance can be achieved through budget deficits. Ricardian equivalence hypothesis suggests that there is no relationship between budget deficit and economic growth. The aim of this study was to examine the relationship between budget deficit and economic growth using asymmetric causality test for Turkey based on data of the period 1980-2011. The findings showed that contractionary fiscal policies negatively affected economic growth. As a matter of

fact, Turkey is a developing country. And in developing countries, private sector investments are supported by the state. Therefore, while expansionary fiscal policies support growth, contractionary fiscal policies cause total demand to decline.

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