

THE RELATIONSHIP BETWEEN BUDGET DEFICIT AND PUBLIC DEBT IN TURKEY

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Introduction

The relationship between the budget deficit and public debt is one of the most important issues that should be dealt with especially in the developing countries with high inflation rates. Knowing that what the dominant fiscal regime has a considerable importance in terms of policy predictions regarding this relationship. However, there are considerably large differences of opinion in macroeconomic theory about how the monetary and fiscal policies in an economy will be shaped, and especially what the effects of budgetary deficits on the general level of prices will be. In this direction, while the price level is targeted, although the view that monetary policy is effective, while the piece level is determined, in other words, that fiscal policy is not effective is highly based on the past, the discussions on the validity of this view are still continuing today. The view arguing that fiscal policy does not have any effect in determination of price level and that monetary policy is effective is based on “Ricardian Equation Theorem”. The most important cause of discussing this theory today is the view of “Fiscal Theory of Price Level (FTPL)” introduced in 1990s.

According to Ricardian Equivalence Theorem, when monetary authority offers its bonds to public, fiscal authority has to reduce its current or future expenditures or to increase its current or future taxes for being able to realize the interest and capital payments of these debts. In other words, according to this theorem, the monetary and fiscal policies are dependent from each other. In return to this, the theory arguing that the monetary and fiscal policies are carried out in a coordinated way is called Fiscal Theory of Price Level. According to Ricardian Equivalence Theory, individuals have rational expectations and, thus, fiscal policies have no effect on the determination of price level, in other words, on total demand. In spite of this, according to Fiscal Theory of Price Level, monetary policy has no important effect on determining the price level. If any government continuously gives the budgetary deficits, the increases in these deficits cannot be closed in the forthcoming periods with the budgetary surplus and increases will be experienced in the monetary supply and general level of prices. With this way, according to FTPL, public debt load will decrease. However, due to the increase in public expenditures, the budgetary deficits, total demand, and thus, general level of prices will increase.

Turkey, with the financial liberalization process it has implemented in 1980s, experienced the large experiences of budgetary and account deficits. The large budgetary and account deficits experienced are of the main reasons for the crises experienced in 1994 and 2001. Following the 2001 Crisis, although some increases were experienced in the growth rates, the rises in account deficits continued. Those experienced after the 2008 Global Crisis led the relationship of budgetary and account deficits in country economies to be questioned again.

The aim of the study, considering the policies applied after the 2001 Crisis in Turkey, is to analyze the role of the monetary and fiscal policies in determination of price level in the context of Ricardian Equivalence Theorem. In this context, firstly, theoretical framework of Ricardian Equivalence Theory will be discussed then the empirical studies carried out on the subject will be given place. In the studies in the literature, the appropriate results were also reached for both theorem. Among the reasons for this difference, the fact that the method used and the period considered in the countries examined are different; application differences of economic policies of the countries; and differences in the, economic, social and political structures of the countries take place.

Ricardian Equivalence Hypothesis

In the traditional macroeconomic theories, in the determination of general level of price, the approach emphasizing the importance of monetary policy is defined as Ricardian Fiscal Policy (Saçkan, 2006:1).

Barro (1974), attracting attention the wealth effect of public expenditures, started the first discussion related to Ricardian fiscal policy and, attracting interest with his article titled “Are Government Bonds Net Wealth ?” published in “Journal of Political Economy” in 1974 for the first time, formed the base of many studies until now (Gedik, 2007:29). According to Barro (1974), public expenditures financed via borrowing instead of taxing will lead to the perception that the wealth of individual increases. Therefore, with crowding out effect raising the consumption, the investments and capital accumulation of the individuals will decrease. According to Ricardian Equivalence Theorem, since the individuals behave rationally, they know that borrowing of today will return to them as tax increase in the future period . Therefore, the change in public budget does not create any change in the present value of the budgets of the current and future periods (Uysal and Pehlivan, 2013:272). In other words, Barro (1974) argues the view that the increase occurring in public deficits, depending on public expenditures, and a tax discount made at the present time will lead to increase in the tax to be applied in the future (Gedik, 2008:246). However, the individuals, with the decrease of taxes, will know that the public deficits will not be in the future and will pay for this.(Şahin and Karanfil, 2015:99). Therefore, whether the finance of the public debt that occur is met by the taxes or borrowing, both form of financing will not also be effective on economic decisions. Buchanan (1976), in his study, suggested that the views put forward by Barro (1974) were previously introduced by Ricardo and the name of the theory passed into the literature of economics as “Ricardian Equivalence Theorem” (Songur, 2015:3).

According to Ricardian Equivalence Theorem, while the economic actors make the decisions of the consumption and saving, they take into consideration their lifelong incomes. Therefore, financing the budgetary deficit via borrowing is only considered as the redistribution of the taxes paid lifelong by these actors. Thus, the economic actors knowing that they will pay more tax in the future will go toward saving instead of spending today. Depending on the increase in savings, any increase will not be in the interest rates and thus the investments will not have been externalized(Ataç 2002: 203). Since it will not make crowding out effect on economy, the level of saving –investment remains the same and a real effect of borrowing does not occurs on the economy (Barro, 1989:38-39).

Ricardian Equivalence Theorem argues that in the measurement of economic activities of government, the real public expenditures is the main indicator but the finance form of these expenditures is not important. Ricardians think of that the form of financing the budgetary deficits delays the taxes. Hence, the individuals behaving rationally, predicting that there will not be any difference between paying for the taxes at the present time or in the future, fiscal policy financed via borrowing will not be any effect on the total demand and capital accumulation (Arıcan, 2005:84).

In Ricardian Equivalence Theorem, public deficit, as a result of lowering taxes, will lead to the more increase than expected. In other words, since the increase in the private savings will counterbalance the decrease in the national savings, financing public expenditures via the increases in taxes or borrowing does not create any effect on the total demand or interest rate (Barro, 1974:1095). The changes in the method of financing public expenditures do not generate any effect on the total demand, real interest rates, and current accounts balance .

The assumptions regarding Ricardian Equivalence Theorem argued by Barro are (Arıcan, 2005:85; Ataç, 2002:203):

- They assume that the individuals are immortal and that they will eternize.

- The individuals are rational and open-minded. They know the tax load the present debts will engender in the future.
- Individuals make a decision as if they live in the infinite time horizon.
- Capital market is perfect.
- It does not generate any effect on the fiscal policy, in which open finance is applied as fiscal instrument .
- All taxes are lump sum taxes. The public debts in the first period will be met by the taxes in the next periods.
- Public expenditures are constant.

The difference between Ricardian and non-Ricardian regimes can be expressed as follows. While in Ricardian and regime, monetary policy is a nominal anchor i.e. while the prices are affected by the monetary demand, in non-Ricardian regime, debt stock plays the role of nominal anchor (Canzoneri et al. 2001:1222). Monetary authorities can determine the interest in Ricardian regime, that is, interest is an external variable (Woodford, 2001:2). In non-Ricardian regime, since monetary authority cannot control interests, they cannot be kept responsible from general level of prices.

When Ricardian fiscal policy is valid, in case that the existing level of public debt varies, fiscal authority adapts noninterest surplus in such a way that it realizes the present value of budgetary constraint. In such a case, whatever the price level is, since noninterest surplus will be sensitive to the level of public debt, at every debt level, the present value of budgetary constraint are automatically provided. Hence, in determination of price level, while monetary policy is not effective, the equations of monetary supply and monetary demands are effective (Songur, 2015:4).

In the period of 1960-2014, applications of monetary and fiscal policies

In Turkey, in economy policies applied to 1980s, development plans became determinative and applications of monetary policies were determined in the framework of fiscal policies. As a result of fiscal policies applied in this process, due to the increasing public expenditures, total demand was kept high; however, the deficits occurring via this way were tried to be closed by the resource of central bank, in other words, monetary policies. Therefore, the primary target of monetary policy is to close the deficits of fiscal policy. The year 1980 is one of important turning points in terms of Turkish economy. Giving up import substitution industrialization policy implemented in 1960, when reached 1980, export –oriented industrialization policy was passed. Beginning from this date, liberalization and openness in the economic area have formed the basis of the new strategic approach.

In the post-1980 period, the most basic features of economic policies applied in Turkey is to go toward monetary targets and finance the budgetary deficits via borrowing increasingly. This process began in 1981 and, beginning from 1985, continued with passing to the sale of treasury bond and obligation, and implementation of open market transactions by Central Bank, beginning from 1987 (Özaktaş, 2007:59)

In the early 1980s, in Turkish economy, there was a common concern toward that inflation would rapidly rise in case of financing the public deficits with the increase in the monetary supply, while in case of financing them via borrowing, it would not create a negative effect on inflation. In this period, inflation was viewed as a monetary phenomenon. In 1986, an innovation was gone in the applications of monetary policies and, after this period, total monetary and credit supply was directed via the control of total reserves. For being able to apply this new regime of monetary policy, it was no longer necessary to finance the public deficits by the resources of Central bank. In this direction, for being able to meet the need to finance the public deficits, an arrangement was made in the public area (Kesriyeli, 1997:31). In this period, although meeting the need to finance public deficits by Central Bank was limited, completely eliminating it did not actualize until 2001.

In 1986, in terms of fiscal policy, just as in the arrangements in monetary policy, a new process was entered. As a result of constraints associated with meeting the deficit finance in economy from the resources of Central Bank, the rising fiscal deficits were especially tried to be met via domestic borrowing (Oktayer, 2010:437). However, at the beginning, although the method of domestic borrowing seemed not to create inflation, in the forthcoming periods, due to the economic and political uncertainties, it led to short term and higher interest borrowing. This borrowing, fostering budgetary deficits, made a great contribution to the inflationist process (Yay et al. 2001:51).

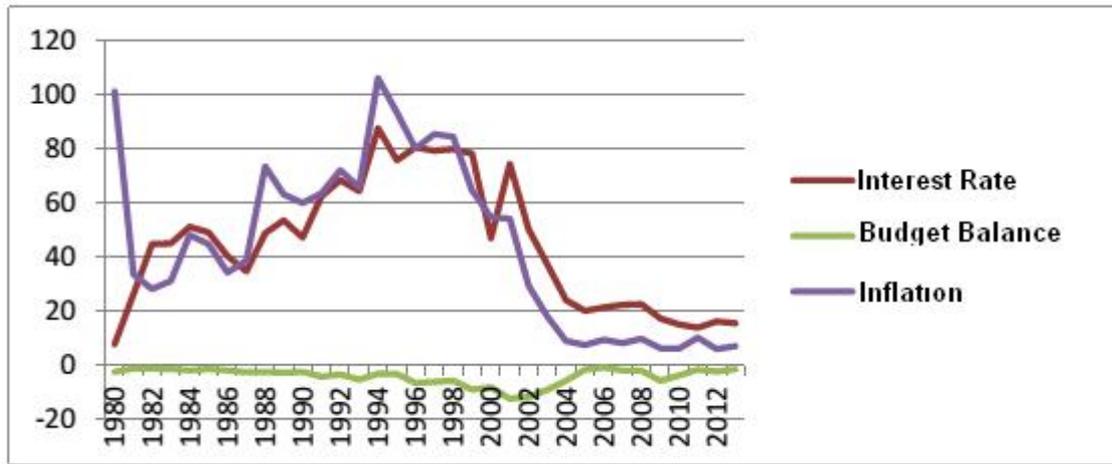
After 1990s, for financing public deficits reaching an important dimension with the increases in expenditures, interest rates was raised to attract short term capital to the country. this considerably raised the public sector. borrowing requirement . In financing public deficits, as a result of that the domestic and foreign borrowing reach the limit, the 1994 Crisis was experienced. The year 1994, in terms of Turkish economy, is the one, when the largest fiscal and account deficit was experienced. After 1994, that treasury referred to the resources of Central Bank was seriously limited. In the forthcoming years, Central Bank lowered the amounts of short termed advance it allocated to Treasury, but this made an effect increasing the amounts of domestic borrowing in financing Treasury. In this process, for fear that public deficits will increase inflation, in 1995, a policy was applied toward domestic borrowing and tight monetary policy was based on (Şahin and Karanfil, 2015:100).

In addition, since fiscal markets are generally a stable and vulnerable structure, that public net foreign borrowing entering the tendency to fall in 1998 falls to the negative values in the post 1994 period resulted in the large rises in the domestic debt stock (Yeldan, 2001:117). In 1997, Central Bank determined the monetary policy independently and signed a protocol with treasury about zeroing short term advances (Özaktaş, 2007:68).

In 1999, due to both earthquake disaster experienced and making decision of early election, fiscal policy was significantly loosened. At the end of the year, it was seen that a serious downsizing in economy was experienced and budgetary deficits increased. In 2000, due to the increase of public deficits, thereby, foreign borrowing requirement, Central Bank, could not gone toward price stability. This case gives an impression that fiscal policy was dominant in the regime of economic policy in that period(Songur, 2015:5)..

The year 2001 is virtually turning point in struggling with macroeconomic instabilities in terms of applications of the monetary and fiscal policies. With Transition to the Strong Economy Program, the target of noninterest budgetary surplus, one of the most important steps of providing public fiscal discipline, was introduced. With the same program, Central Bank was brought independence about choosing and applying the political instruments (Oktayer, 2010:438). In the post-2001 period, with the decisiveness Central Bank showed about reducing inflation, as a result of the policy of implicit inflation targeting it applies, inflation rates fell to one-digit numbers after long years. (Saçkan, 2006:23). In addition, again, in this period, fiscal policy was applied in the direction of primary surplus target. This case is an indicator of that the government determines its revenues and expenditures, considering the present value of budgetary constraint. All of these, in the post 2001 period, gives an impression that monetary policy, in other words, Ricardian regime, is dominant in the regime of economic policy. In this process, while fiscal indiscipline, which is the most important barrier in realizing price stability gradually decreased in this period, Central Bank of Turkish Republic (TCMB) applied effective policies toward reducing inflation (Temiz, 2008:6).

Figure 1: Budget Balance, Inflation and Interest Rate in the Period of 1980-2013



Source: Şahin and Karanfil, 2015, p.101

Beginning from the year 2000, the rates of deposit interest entering the tendency to fall gained continuity together with inflation targeting and, this rate being 80% in 1998, regressed to 16% in 2013(Şahin and Karanfil, 2015:101). In addition, it was passed from implicit inflation targeting applied in the period of 2002-2005, to open inflation targeting in 2016 and inflation rate began to fall to the desired level.

With “Law Draft of Fiscal Rule”, accepted in 2010, *it is aimed to make and strengthen macroeconomic stability permanent in the axis of fiscal sustainability and predictability*. With the fiscal rule predicted, while budgetary deficit is permitted in the rate of 1% of GDP, threshold growth rate was determined as 5% (TCMB, 2010). In addition, again, in 2010, in terms of applications of monetary policy, there are some innovations such as transition to the application of interest corridor and enlarging M2 monetary supply. While enlargement of M2 monetary supply, depending on the increase in foreign currency demand, stimulates the domestic demand, the application of interest corridor increased domestic credit volume (TÜSİAD, 2012).

In short, in terms of price stability, the monetary and fiscal policies are important, which will be applied in financing the budgetary deficits. Hence, in this study, in Turkish economy, in the period of 1960-2014, the relationship between ..., was discussed in the framework of Ricardian Equivalence Hypothesis .

Empirical Literature

Yıldırım (1995) analyzed the relationship between public deficits and interest rates specific to Turkish economy by the method of vector autoregressive (VAR) using the monthly data of the period between 1986:1 -1994:10. As a result of the analysis, it was reached the results Ricardo Equivalence Theorem. Between public deficits and interest rates and between the decisions of investment and saving, a significant relationship could not be found.

Domenech et al. (1997), for the period of 1979 -1985, analyzed the high interest rates and low level of saving and investment toward OECD countries by means of VAR model in terms of Ricardian Equivalence Theorem. As a result of analysis, the findings regarding that the existing public deficits in 1980s and 1990s increased the interest rates was reached. In other words, in OECD countries, Ricardian Equivalence Theory is not valid.

Canzoneriet al. (2001), in their studies, in order to test the presence of Ricardian regime, utilized VAR method. The results of analysis, in US, in the post-war period, showed that Ricardian approach was valid in collecting data. Especially, inflation rate supports the assumption of monetary approach

Tanner and Ramos (2002), in Brazil, between 199-2000, attempted to identify whether Ricardian Equivalence Theorem or fiscal theory of price level is dominant regime. As a result of the study, it was concluded that Ricardian equivalence theorem, based on monetary policy between the years of 1995-1997, was the dominant regime, while in the remaining years, fiscal policy was dominant in the country economy.

Kalulumia(2002), with the data of quarter period of 1957:1 -1993:4, for Germany, United Kingdom, and Canada, examined the effect of public borrowing on the interest rate. As a results of analyzes, any causality relationship was not met between interest rate and public borrowing. In return to this, in only Germany, there was a short term causality relationship between interest rate and public borrowing . In addition, in analyzes, with moving from the effect of public borrowing on interest rate was examined with moving from its effect on exchange rate and monetary demand. In only US economy, in the long term, between interest rate and public borrowing, a positive directional relationship was met. In general, the findings obtained from the analyzes carried out have a quality supporting Ricardian Equivalence Theorem.

Arican (2005), utilizing the data of the period 1988-2003, analyzed the validity of Ricardian Equivalence Hypothesis for Turkish economy by means of the methods of regression and Lagrange. The results obtained has a quality supporting Ricardian Equivalence Theorem.

Saçkan (2006), in his study, for Turkey, utilizing quarterly data belonging to the period of 1988-2005, examined the validity of fiscal theory of price level by means of VAR analysis. In the study, the period of 1988-2005 was dealt with by being divided into two sub-period as Ppro-2001 Crisis and Post -2001 According to the findings obtained, while in the period of 1988-2001, the dominant regime non-Ricardian Fiscal Policy, in other words, Fiscal Theory of Price Level, in the period of 2001-2005i it was Ricardian Fiscal Policy.

Daly and Siddiki (2009), with the annual data covering the period of 1960-2000, dealt with the validity of two deficit hypotheses in 23 OECD countries by means of co-integration analysis with structural vulnerability .The findings obtained indicate that Ricardian fiscal regime is valid in Canada, Germany, Sweden, Switzerland, United Kingdom, and USA.

Özmen and Koçak (2012) predicted the relationship between inflation, monetary supply, and budgetary deficit by means of ARDL approach in the context of Turkish economy, utilizing the quarterly period data of 1991-2011 in Turkish economy. According to the findings obtained from the analyses, while there was significant relationship between monetary supply and inflation. This also supports monetary view.

Uysal and Pehlivan (2013), in their studies, utilizing the annual data belonging to the period of 1995-2011, attempted to identify whether in the countries of European Monetary Union and candidate to European Union, Ricardian fiscal regime or non-Ricardian fiscal regime is dominant by means of panel OLS method. The findings obtained show that Ricardian fiscal regime is also valid in both group of countries.

Data and Methodology

In this study, the relation between public debt and budget deficit in Turkey during the years between 2006-2016 years has been evaluated using monthly data of public debt and budget deficit. Budget deficit data has been collected from statistic database of Ministry of Finance General Directorate of Budget and Fiscal Control in Turkey. Public debt data has been collected from Turkish Central Bank Statistic portal. Econometric analyses are covering monthly data between the years of 2006M1 and 2016 M1. Public Debt and Budget Deficit have been shortly titled PD and BD respectively in the following equations.

We applied Zivot-Andrews (1992) unit root test with structural breaks for stationary to the variables. Following the stationarity tests of the series, we analyzed the cointegration relationship based on Pesaran et al.(2001) bounds tests.

Autoregressive Distributed Lag Models (ARDL) and Vector Error Correction Model (VECM) methods were later used to check a co-integrated relationship between public expenditures and revenues in both the long-run and short-runs. The ARDL bound test approach has several advantages over the Johansen's cointegration method following (Habibi and Rahim, 2009: 1927): First the ARDL model its ability to detect long run relationships and solve the small sample size problem. Second the ARDL approach can be applied irrespective of whether the underlying regressors are purely first order integrated, $I(1)$, purely zero order integrated, $I(0)$, or a mixture of both. Third advantage is in ARDL, one can include dummy variable in the cointegration test process.

Empirical Results

Unit Root Tests

The stationary properties of two variables are investigated by unit root tests with structural breaks including Zivot-Andrews (1992). According to test results, Budget deficit and Public debt series are stationary at the level. These series are $I(0)$, however both of the series are the stationary in their first difference according to ADF unit root test¹.

Table 1. Zivot-Andrews Unit Root Test for Budget Deficit

Zivot-Andrews Unit Root Test for Budget Deficit			
Chosen break point: 2008M09			
		t-Statistic	Prob. *
Zivot-Andrews test statistic		-6.419439	0.000903
1% critical value:		-5.34	
5% critical value:		-4.93	
10% critical value:		-4.58	

¹ Tables of estimated and standart critical values of unit roots has not been presented in this article in order to save space. The tables could be taken from authors

Figure 2. Zivot-Andrew Breakpoints of Budget Deficit
Zivot-Andrew Breakpoints

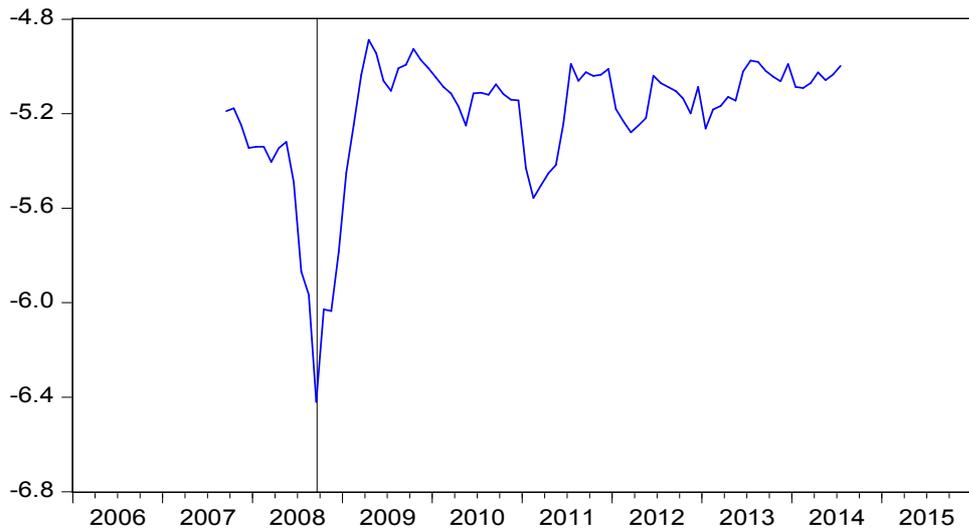
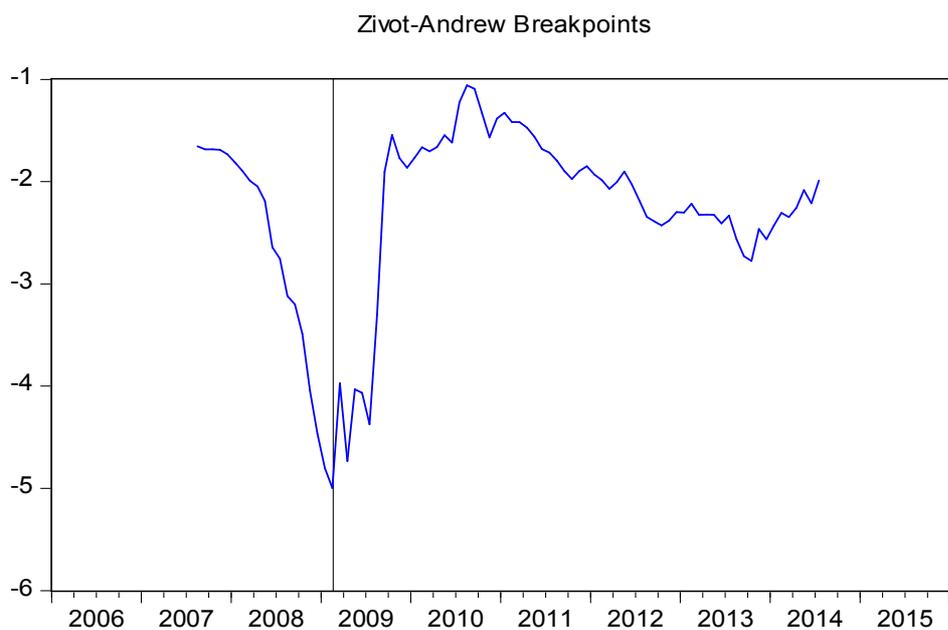


Table 2. Zivot-Andrews Unit Root Test for Public Debt

Zivot-Andrews Unit Root Test for Public Debt			
Chosen break point: 2009M02			
		t-Statistic	Prob. *
Zivot-Andrews test statistic		-4.998218	2.35E-06
1% critical value:		-5.34	
5% critical value:		-4.93	
10% critical value:		-4.58	

Figure 2. Zivot-Andrew Breakpoints of Public Debt



Bound Test Co-Integration Approach

After illustrating stationary properties of all time series, we employ Bounds Test approach (Pesaran et al.,2001) to determine the cointegration relationship among variables. The Unrestricted Error Correction model (UECM) should be constructed to perform Bound Test approach due to the cointegration relationship.

UECM specification used in this study is shown in following equation.

$$\Delta(BD)_t = \beta_0 + \beta_1(BD)_{t-1} + \beta_2(PD)_{t-1} + \sum_{i=1}^p \beta_3\Delta(BD)_{t-i} + \beta_4\Delta(PD)_{t-i} + u \quad (1)$$

where, ΔBD refers to the monthly percent change for the budget deficit, ΔPD is monthly percent change for public debt. In the equation 1, “p” refers to the number of lags and u^t refers to the error term of a time series.

We will test the null hypothesis of for our study and cointegration relation will be compared with calculated F statistics and tabulated F statistics values in Pesaran et al. (2001).

If the computed F-statistic falls outside the critical bounds, a conclusive decision can be made regarding co-integration without knowing the order of integration of the regression (Narayan and Narayan, 2004:103).

Table3.Bound Test Results

K	F Statistics	Critical Value at %5 Significance Level	
		Buttom	Upper
1	15.12	4.94	5.73

k : the number of independent variable in the UECM equation 1. Critical values of buttom and upper levels are taken from the table’s values at Pesaranet. al. (2001:300)

According to Table 3, estimated F statistics is higher than the upper bound of the critical values and so the null hypothesis of no co-integration is rejected. As a result, we found a significant long run cointegration relationship in the variables of UECM equation by employing Bound Test.

ARDL Model

Since Bound test supported the evidence of a long-run equilibrium among variables, we can employ ARDL model to determine the long and short run static relationship. ARDL model specification for our study is presented in equation 2.

$$\Delta(BD)_t = \beta_0 + \beta_1i(BD)_{t-i} + \beta_{2i}(PD)_{t-1} + ut \quad (2)$$

In order to determine the optimal lag length in equation 2, maximum lag number of 4 is taken and ARDL (3,1) model is selected using the Schwarz information criterion. The coefficients of long ARDL regression model are shown in Table 4.According to diagnostic checks, the model has no serial correlation, heteroscedasticity and misspecification problems.

Table 4. ARDL (3,1) Model Long and Short Term Parameter Estimations

Estimated Long Term Coefficient Using ARDL (3,1)			
Variable	Coefficient	T statistics	Prob
PD	-0.007	-0.344854	0.7309
C	1324	0.035042	0.9721
Error Correction Coefficient for the ARDL (3,1)			
Variable	Coefficient	T statistics	
ECT(1)	-1.046	-5.45	0.000
Diagnostic Check			
X^2_{LM}		2.12/0.08	
X^2_{WHITE}		1,06/0.39	
X^2_{RAMSEY}		0.12/0.72	

*denotes %1 significance level, ** denotes %5 significance level and X^2_{NORM} , X^2_{WHITE} , X^2_{RAMSEY} refer to autocorrelation, normality and Regression Equation Specification *Error* respectively .

According to results obtained from ARDL (3,1) model, computed t-statistics for the independent variable are not all statistically significant in the long run although they are statistically significant in the short-run. When the variables are out of long-run equilibrium, there are economic forces, captured by the adjustment coefficients, that push the model back to long-run equilibrium. The speed of adjustment toward equilibrium is determined by the ECT(1). ECT(1) is -1.046 which implies that the correction overshoots the long-run equilibrium.

Conclusions

The aim of the study, considering the public policies applied in Turkey to analyze the role of the fiscal policies in determination of Ricardian Equivalence Theorem. According to Ricardian Equivalence Theorem, when monetary authority offers its bonds to public, fiscal authority has to reduce its current or future expenditures or to increase its current or future taxes for being able to realize the interest and capital payments of these debts.

According to the ARDL model coefficients of public debt is negative as expected in theory. Both of the variables are not significant. Moreover, diagnostic test results show that the model has no autocorrelation and normality problem. According to the model results, again, heteroskedasticity problem is not been also observed. Results in regressions indicate it is statistically robust to estimate these models to get conclusions about the budget deficit and public debt. The estimation results imply that an extra TL of (real) public debt (for a given expenditure path) has a negative impact on Turkish budget deficit of 0.007 TL. Effect of the public debt on the budget is very small and insignificant. According to short run results error correction term is -1.046 which implies that the correction overshoots the long-run equilibrium.

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