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**How to Achieve and Sustain Fiscal Discipline in Turkey:
Rising Taxes, Reducing Government Spending
or
A Combination of Both?**

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ABSTRACT

The main purpose of this paper is to investigate the relationship between tax revenue and government spending in order to make some policy suggestions on how to achieve fiscal discipline in Turkey. We have used the cointegrated vector autoregression (VAR) method along with the Granger causality test (1969). The empirical findings indicate that there is a uni-directional causality running from spending to tax revenue. In other words, our findings support the spend-and-tax hypothesis for fiscal discipline in Turkey over the period of 1975-2011. Since there is a uni-directional causality, running from government spending to tax revenue, spending restrictions are required to reduce budget deficits, and reducing government spending is a better solution than increasing tax revenue to obtain optimal fiscal discipline in Turkey.

Keywords: Fiscal Discipline, Fiscal Policy, Government Revenue, Government Expenditure, Causality Test.

JEL codes: E62, H62

1. Introduction

Fiscal discipline is a concept that covers all key aggregates, like total government spending, total government revenue, fiscal balance and public debt that make the fiscal performance of a country better in an economy. Constraints on government spending are necessary but not sufficient for fiscal discipline. A realistic policy action for both providing and sustaining fiscal discipline should also focus on other measures such as government total revenue, budget deficit or surplus, and debt burden, which are closely related with it. Typically; therefore, in an economy in order to be able to talk about

fiscal discipline, cuts in government spending should be accompanied by constraints on other budget aggregates. Otherwise, governments may find it easier to meet deficit targets by increasing revenue than by decreasing its spending. Fiscal discipline is a very important concept for macroeconomic sustainability in Turkey just as in other countries. Together with a stability-oriented monetary policy, it is the main pillar of the ongoing successful macroeconomic performance of Turkey, reflecting itself, among the others, with a reduction in budget deficits, borrowing costs, and inflation, strong and high performance in growth, and a more suitable investment climate.

Turkey's remarkable macroeconomic performance has shown itself with growth rates of 9.2% and 8.5% for the last two years [2011, 2012], placing it as one of the fastest growing economies around the world. Unlike most other countries, the unemployment rate in Turkey has recorded a considerable decline since 2009, dropping from 14% to 11.9% in 2010 to 9.8% in 2011, and 8.4 % in July 2012. Similarly, the budget deficit as a percentage of GDP has decreased from 5.5% in 2009 to 1.3% in 2011 and 0.7% in August 2012, reflecting a much lower ratio than the Maastricht criteria of 3%. Here, it is very important to diagnose which factors have contributed to Turkey's strong resilience against the impacts of the global crisis which started in the year 2008. Undoubtly, among the other factors in more recent years Turkey's achievements can mostly be attributed to the outcome of economic policies being implemented for last ten years under the administration of a strong ruling government.

Focusing on fiscal discipline has played a crucial role in this success. Turkey has implemented an economic programme based on long-lasting fiscal discipline, together with a stability-oriented monetary policy, and an improved banking sector supervision including a regulatory framework after experiencing bitter consequences of derailed public finance and high and chronic inflation during the 1990s. All these measures have increased the credibility of economic policies implemented and have boosted the confidence of both investor and consumer in the Turkish economy, resulting in an increase in both domestic demand and employment. Providing fiscal discipline, first of all, entails constraints on both the amount of government spending and its components. In addition to this, it requires realistic government revenue and spending approximates. Furthermore, it necessitates a number of institutional arrangements, ranging from restrictions on main fiscal aggregates, such as government spending, taxation, public debt, budget deficits through formal laws, to public commitments by the executive with or without the commitment of the legislature.

Many agree that a persistently large budget deficit may turn out to be a major problem for an economy. Determination of the interdependent direction between tax revenue and government spending would assist policy makers to recognize the source of any fiscal imbalances that might exist. Consequently, this would facilitate efforts to develop a suitable strategy for future fiscal reforms; therefore, in this paper we have investigated the relationship between tax revenue and government spending to make some policy suggestions to countries which face or have experienced chronic budget deficits like Turkey. By doing so, we hope to explore the causes of budget deficit and attempt to set goals for realistic, achievable and applicable fiscal discipline.

The main theoretical and empirical contributions of this paper have revolved around; i) understanding the impact of government spending and/or taxes on the fiscal discipline performance of the Turkish economy, ii) helping the realisation of medium-term fiscal objectives for Turkish economy, iii) presenting the costs and instability variations in public revenue, which are mostly due

to the fluctuations in public spending in the Turkish economy, iv) compiling the studies done so far on the revenue-spending nexus and thus making contribution to the literature.

The rest of the paper is organised into six sections: Section 2 focuses more deeply on theoretical approaches to fiscal discipline while Section 3 presents an overview of empirical literature in brief. Section 4 defines data and empirical methodology and Section 5 examines empirical findings. In the final section, conclusions and policy suggestions drawn from the paper are provided.

2. Theoretical Approaches to Fiscal Discipline

The causal relationship between tax revenue and government spending has remained an empirically controversial issue in public finance literature. Over the past three decades, a large number of studies have investigated the relationship between tax revenue and government spending. This is not surprising given the importance of the subject in public economics, since in particular the direction of causality has important implications for government budget deficits.

The experiences of both developed and developing countries in the past decades have showed how government budget deficits have had a significant impact on the economies. Such an imbalance tends to reduce national savings and economic growth. Therefore, it is expected that a decrease in budget deficit triggered by reducing government spending and/or rising revenue would stimulate economic growth. This reality has made the relationship between government spending and government revenue one of the most interested topics in public finance. Determination of the interdependent direction between these two variables would assist policy makers to recognize the source of any fiscal imbalances that might exist. Consequently, this would facilitate efforts to develop a suitable strategy for future fiscal reforms. In a word, analysing the relationship between government spending and government revenue has attracted significant interest in the literature. However, it has remained an empirically controversial issue in the field of public finance, especially for developing countries (Petanlar & Sadeghi, 2012).

Establishing the long-term relationship between government spending and tax revenue would assist policy makers to trace any source of fiscal imbalances in the economy (Aregbeyen & Ibrahim, 2012). Identifying the form of the relationship between government revenue and government spending is of vital importance for policy makers or governments who desire to take appropriate policy measures to reduce budget deficits. If there is a bi-directional causality running from government revenue to government spending, its implication is that to attack the problem of continuously increasing budget deficits, the government should be cautious, as simply raising revenue, cutting spending, or simply changing both sides without taking into account the interdependence between the two may be ambiguous in their impact on fiscal situations. On the other hand, if there is a uni-directional causality running from government revenue to government spending, higher taxes will lead to widening rather than reducing budget deficits; and raising taxes in order to cut budget deficits only result in an increase in government spending. This means that lower deficits which require lower taxes and tax hikes, by means of reducing budget deficits, may not be a viable option. However, it is possible that an increase in taxes combined with spending cuts will lessen budget deficits. In contrast, if there is a uni-directional causality running from spending to revenue, a spending restraint is required to reduce government deficits and reducing spending should be the optimal solution to the current budget deficits (Wolde-Rufael, 2008).

The causal relationship between government revenue and government spending is an important issue for fiscal policy. In the literature some scholars and researchers use government revenue, while the others use tax revenue. In this paper both of them have been taken into account.

There are four hypotheses that explain observed spending-tax revenue behavior:

The first hypothesis argued by both Friedman (1978) and Buchanan & Wagner (1978) is the tax-and-spend which contends that raising taxes will simply lead to more government spending. According to this hypothesis, government revenue changes government spending. In other words, there is a uni-directional causality between tax revenue and government spending which runs from tax revenue to government spending. Friedman (1978) implies that when tax revenue increases, government spending also increases, which leaves the budget deficit unchanged.

Friedman (1982) puts his point about tax-and-spend as follows:

"... You cannot reduce the deficit by raising taxes. Increasing taxes only results in more spending, leaving the deficit at the highest level conceivably accepted by the public. Political rule number one is government spends what government receives plus as much more as it can get away with."

This means that if revenue is raised, then the government increases its spending. Hence, according to Friedman (1978), cutting government revenue is a remedy to reduce budget deficits. Moreover, putting a limit on taxation is essential so as not to enlarge the size of government.

On the other hand, Buchanan & Wagner (1978) share the same view that taxes give rise to government spending but the direction of the causal relationship is negative. Their point of view is that with a cut in taxes the public will perceive that the cost of government programs has fallen. As a result they will demand more programs from the government that if undertaken will result an increase in government spending. Higher budget deficits will then be realized since tax revenue will decline and government spending will increase. Their remedy for budget deficits is, therefore an increase in taxes (Mehrara et al., 2011). Buchanan & Wagner (1978) also warn that the tax-and-spend prediction may be distorted due to the fact that changes in tax rates are accompanied by intense political debate and controversy over economic impact and income distributional issues. Deficit financing rather than tax financing may then become the source of growth in spending (AbuAl-Foul & Baghestani, 2004). This hypothesis suggests that spending should be controlled and reduced to the level of revenue. In that sense, a country with a persistent budget deficit should not rely heavily on taxation, as it could jeopardise growth.

The second hypothesis is the spend-and-tax which suggests that any change in government spending causes changes in government revenue and thus infers a uni-directional causality that runs from government revenue to government spending. This hypothesis was asserted by Barro (1979) and Peacock & Wiseman (1979). They claim that government spending changes government revenue. According to the spend-and-tax hypothesis, government first increases its spending and then resultantly increases its revenue.

Peacock & Wiseman (1979) put forward the notion that economic and political uncertainties would justify the reverse fiscal policy for spending and would subsequently hike taxes. In effect, a temporary increase in government spending would raise taxes permanently. In essence, it equates to the Ricardian equivalence theorem assuming an absence of fiscal illusion (Hong, 2009).

Peacock & Wiseman (1979) point out that a severe crisis that initially forces up government spending, more than taxes, is capable of changing public attitudes about the proper size of government. This leads to a displacement of fiscal variables as some of the tax increases originally justified by the crisis situation become permanent tax policies.

The spend-and-tax hypothesis advocates the anti-thesis of the tax-and-spend hypothesis. It is built on the tenet that government spending causes government revenue. This hypothesis relies on the reverse relation, with revenue responding to prior spending changes. In line with the Ricardian equivalence theorem, Barro (1974) maintains that the public fully anticipates and capitalizes the future tax liability implied by present government borrowing. Thus, in the absence of fiscal illusion, increases in government spending lead to increases in tax revenue. Peacock & Wiseman (1979) see natural, economic, or political crises as justifications for spending hikes that are subsequently approved by tax increases. According to this hypothesis, spending cuts are desired solutions to reduce the budget deficit, especially in the absence of crises (Narayan & Narayan, 2006).

The third hypothesis is the fiscal synchronization, which was argued by Musgrave (1966) and Meltzer & Richard (1981). It asserts that government revenue decisions are not made in isolation from government spending decisions. These decisions are made concurrently. Therefore, there is a bilateral causality between government revenue and government spending.

According to the fiscal synchronization hypothesis, there is a feedback relationship between government revenue and government spending and both interact interdependently. This hypothesis also asserts that government revenue and government spending are decided simultaneously together with other economic considerations.

Under the fiscal synchronization hypothesis, citizens decide on the level of government spending and taxes. This is done through comparing the benefits of government to a citizen's marginal cost. Barro's tax smoothing model (1979) provides further credence to the fiscal synchronization hypothesis. His model, based on the Ricardian equivalence theorem, points out that today's deficit-financed government spending results in future tax increases (Narayan & Narayan, 2006). The fiscal synchronization hypothesis postulates that the revenue and spending decisions are made simultaneously, by analyzing costs and benefits of alternative government programs. This hypothesis, therefore, precludes uni-directional causation from revenue to spending or from spending to revenue (AbuAl-Foul & Baghestani, 2004).

Finally, the fourth hypothesis is the fiscal-neutrality proposed by Baghestani & McNown (1994) which asserts that none of the above hypotheses fully explains the relationship between government spending and government revenue. Both government spending and government revenue are determined by long-term economic growth, reflecting the institutional separation between government revenue and government spending which infers that government revenue decisions are made independently from government spending decisions.

In contrast to the hypothesis above, advocates of the fiscal-neutrality hypothesis suggest that there is no inter-temporal causality between government spending and government revenue. This lack of a causal link is due to many important actors with divergent interests and agendas and that the disagreement between parties or groups in the decision-making process is a cause of the growing pattern of government debt. The greater this conflict is among these interest groups, the more difficult it is to enact deficit-reducing measures (Wolde-Rufael, 2008).

Consequently, if this subject is taken into consideration from the political side, the nature of the relationship between government spending and tax revenue will be essential for three reasons. First of all, if tax revenue causes government spending, budget deficits can be eliminated by policies aimed at stimulating tax revenue. Secondly, if the fiscal synchronization hypothesis does not hold, it implies that spending decisions are made in isolation from revenue decisions, which can lead to serious budget deficits should government spending increase more rapidly than tax revenue. And finally, if government spending causes tax revenue, this means that government acts as one who spends first, and later raises taxes to meet the spending. However, it should be kept in mind that such a situation can induce capital outflow due to the fear of paying higher taxes in the future (Narayan & Narayan, 2006).

Broadly speaking, there are three reasons why the link between government spending and government revenue is important. Firstly, if the tax-and-spend hypothesis holds, budget deficits can be avoided by implementing policies that stimulate revenue. Secondly, if bi-directional causality does not hold, then government revenue decisions are made independently from government spending decisions. And finally, if the spend-and-tax hypothesis holds, then government spends first and pays for this spending later by raising revenue (Petanlar & Sadeghi, 2012).

3. An Overview of the Empirical Literature

The empirical literature on the relationship between government revenue and government spending is quite voluminous (See, Appendix). It seems from the appendix that the vast majority of the studies on the revenue-spending nexus have mainly employed the Granger causality test. Here, therefore, it can be said that there has been consensus on this methodology as used in recent studies on the revenue-spending nexus.

Masenyetse & Motelle (2012) investigated the relationship between government spending and government revenue in Lesotho for the period of 1991-2009. Their findings based on error-correction model indicate that revenue-spending hypothesis holds for Lesotho. Petanlar & Sadeghi (2012) explored the relationship between oil revenue and government spending using annual data for the period of 2000-2009 and found evidence of a positive uni-directional long-term relationship between oil revenue and government spending for oil exporting countries.

Mehrara, Pahlavani & Elyasi (2011) analysed the case of 40 Asian countries for the period of 1995-2008. Their findings revealed that there is a bi-directional causality between government revenue and government spending, supporting the fiscal synchronization hypothesis for all the countries analysed. Hye & Jalil (2010) examined causality between government revenue and government spending in Romania using quarterly data for the period of 1998:1-2008:3. They found that there is a bi-directional long-term causality between the government spending and government revenue. On the other hand, the study of Afonso & Rault (2009) indicated that the spend- and-tax hypothesis is supported in the case of Italy, France, Spain, Greece and Portugal while tax-and-spend evidence is present notably for Germany, Belgium, Austria, Finland and the UK for a different period. A study by Wahid (2008) also looked at that the relationship between government revenue and government spending for Turkey for the period of 1975-2003 and showed that government spending leads to an increase in tax revenue.

As also reported in the appendix extensively, there is quite a large body of literature on fiscal discipline, most of it focusing on developing economies. These studies together with their covering period, country specification, method, and empirical results are presented in the Appendix. As shown from the appendix, studies take into consideration different methods, country specification, period, and empirical methods. The empirical findings of them; therefore, change from country to country, depending largely on country specification, model or method chosen, types of variables, and the period of study.

4. Data and Empirical Methodology

In the paper we have used annual data collected from T.R. Ministry of Development, T.R. Ministry of Finance, and T.R. Prime Ministry Undersecretariat of Treasury. The sample covers the period from 1975 to 2011. In the paper GS and GR denote government spending and tax revenue, respectively. All variables reported in the paper are measured as a proportion of GDP and written in log (ln) form in year t . The logarithmic series ensure variance stationary for the purpose of regressions.

We have followed three steps in empirical methodology. First, we have begun with the investigation of univariate characteristics of the data which are used in our sample. It is important that the presence of unit root in the variables is determined because using such data in a regression model violates one of the assumptions of the classical regression model and may lead to spurious results (Masenyetse & Motelle, 2012). For this purpose, then, we have used the Augmented Dickey Fuller (ADF-1979) test.

Secondly, we have investigated the existence of the long-term relationship between government spending and tax revenue by using the Johansen (1988) cointegration test. The Johansen and Juselius procedure [(Johansen, 1988), (Johansen & Juselius, 1990)] is preferable to test cointegration for more than two series. Two tests statistics are suggested to determine the number of cointegration vectors based on likelihood ratio test (LR): the trace test and maximum eigenvalues test statistics (Al-Qudair, 2005):

The Trace Test (λ_{trace}) is defined as:

$$\text{Trace} = -T \sum_{i=k+1}^n \log(|\lambda_i|)$$

The null hypothesis is that the number of cointegration vectors is $\leq k$, where $k=0$, $k=1$ or $k=2$ against the alternative hypothesis. The maximum eigenvalues test (λ_{max}) is defined as:

$$\lambda_{\text{max}} = -T \log(1-\lambda_i)$$

We start with the null hypothesis of no cointegration ($k=0$) against the alternative of $k \leq 1$ and $k \leq 2$. When the two tests produce conflicting results, the maximum eigenvalues test is considered since the alternative hypothesis is an equality.

Thirdly, we have investigated the causality between government spending and tax revenue. The causality between government spending and government revenue known as Granger causality is concerned with the relevance of the past information of a variable in predicting the value of the order [(Granger, 1969), (Granger, 1988)].

Charemza & Deadman (1997) provide the following formal definition of causality: “X is a Granger cause of Y, if the present value of Y can be predicted with better accuracy by using past values of X rather than by not doing so, other information being identical.”

The test is performed by estimating the autoregressive processes for Y and X as defined by:

$$Y_t = \sum_{j=1} \alpha_j Y_{t-j} + \sum_{j=1} B_j X_{t-j} + \varepsilon_t \quad (1)$$

$$X_t = \sum_{j=1} \theta_j X_{t-j} + \sum_{j=1} \gamma_j Y_{t-j} + \varepsilon_{t2} \quad (2)$$

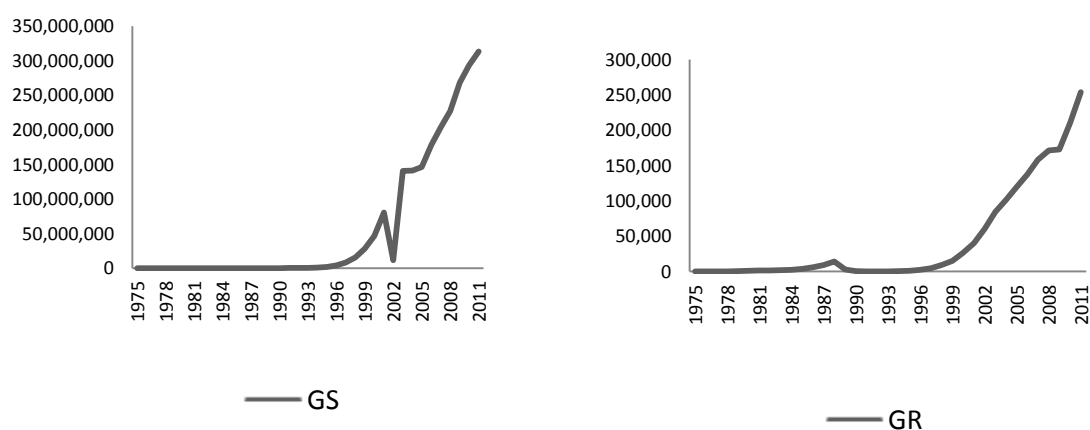
The following results are possible in regard to the Granger causality test:

- i) there is a uni-directional causality from X to Y if the coefficients on the lagged X in equation 1 are statistically different from zero and the estimated coefficients on the lagged Y in equation 2 are not statistically different from zero.
- ii) there is a uni-directional causality from Y to X if the coefficients on the lagged X in equation 1 are not statistically different from zero and the estimated coefficients on the lagged Y in equation 2 are statistically different from zero.
- iii) there is a bi-directional causality when the estimated coefficients on lagged X in equation 1 and the estimated coefficients on lagged in equation 2 are both statistically different from zero. Finally, there could be no causality between X and Y (Masenyetse & Motelle, 2012).

5. Empirical Findings

Figure 1 presents the series of GS and GR for the period of 1975-2011. As shown from the figure, there is a parallel trend between government spending and tax revenue. Both increased steadily throughout mid-2009 whereas GS and GR rised throughout the first quarter of 2002.

Figure 1 Logarithmic Trends of Variables, 1975-2011



The starting point for our empirical analysis is to investigate unit root test in levels and first differences so as to determine the univariate properties of the tax revenue and government spending. The findings are presented in Table 1. As shown from the table, we could not reject the null hypothesis of unit roots for both variables in level forms. The null hypothesis, however, was rejected when the ADF test was applied to the first difference of each variable. This means that the

measured ADF statistics are less than their critical values in all variables, implying that the variables are not level stationary. With a technical expression, the first differences of the InGR and InGS are stationary, indicating that all these variables are in fact integrated of order one $I(1)$.

Table 1 Results of ADF Unit Root Test, 1975-2011

Series	Level, Constant & Trend	Critical Value		First Difference Constant	Critical Value	
		%5	%1		%5	%1
GS	-1.5543(3)	-2.7723	-3.9910	-8.5432(3)*	-3.8811	-4.7732
GR	-0.4391(3)	-2.5542	-3.5523	-6.6634(3)*	-3.1227	-3.9271

Note: The number in parentheses indicates the selected lag order of the ADF models. The critical values are obtained from MacKinnon (1991) for the ADF test. The ADF tests examine the null hypothesis of a unit root against the stationary alternative. Asterisk (*) denote statistical significance at 1% . E-Views 6.1 was used for all computations.

Based on the results in Table 1, we have proceeded with the Johansen (1988) multivariate cointegration test, which allows us to analyse the long-term relationship between tax revenue and government spending. Before performing the Johansen cointegration tests, we specify the relevant order of lags (p) of the vector autoregression (VAR) model. The Akaike Information Criterion (AIC) is issued to determine the optimal lag length. The AIC criteria yields VAR (3). The results obtained from the Johansen analyses are presented in Table 2.

The maximum eigenvalue and trace statistics are used to test the null hypothesis of no cointegration for these time series. Table 2 reports eigenvalue and trace statistic (likelihood-ratio statistic) to determine the number of cointegration vectors (k) using Johansen's maximum likelihood approach. We start with the null hypothesis of no cointegration ($k=0$) against the alternative of $k \leq 1$ and $k \leq 2$.

Table 2 Johansen Cointegration Test Results, 1975-2011

Trace Test						Maximum Eigenvalue Test				
Series	Null	Alternative	Statistic	% 5 Critical Value	Prob**	Null	Alternative	Statistic	% 5 Critical Value	Prob**
InGS,	$k=0$	$k \geq 1$	32.7644	10.9923	0.00**	$k=0$	$k=1$	24.2211	9.0055	0.00
InGR	$k \leq 1$	$k \geq 2$	3.7765	4.8743	0.00	$k \leq 1$	$k=2$	3.3666	3.0099	0.03

Note: Asterisk (*) denotes statistical significance at 1%. Asterisk (**) donates probability. E-Views 6.1 was used for all computations.

In InGS-InGR, the trace statistic for variables is 32.7644 which means that it is higher than 90% critical value of 10.9923. Hence we reject the null hypothesis $k=0$, in favour of the general alternative $k \geq 1$. As is evident in Table 2, the null hypothesis of $k \leq 1$ cannot be rejected at a 90% level of significance.

Turning to the maximum eigenvalue test, for variables is 24.2211 which means that it is higher than 90% critical value of 9.0055. The eigenvalue test shows that the null hypothesis of no co-integration ($k=0$) is rejected at a 90% level of significance in favour of the specific alternative, that there is one co-integration vector, $k=1$. The presence of cointegration among the variables implies that there is a long-term relationship between variables for the sample period considered. It can be concluded, therefore, that InGS and InGR are cointegrated over the period of 1975-2011.

After the cointegration test, we continued with the Granger causality test. Seeing that the Granger causality test is very sensitive to the selection of lag length, it is determined by Akaike Information Criteria (AIC). The results are reported in Table-3, showing that there is a uni-directional causality running from government spending to government revenue. Now, therefore, we can say that the results support for the spend-and-tax hypothesis for Turkey over the period of 1975-2011.

Table 3 Granger Causality Test Results, 1975-2011

Null Hypothesis	Lags	F-Statistics	Probability
GR does not Granger cause GS	3	14.4501*	(0.0012)
GS does not Granger cause GR	3	17.9044*	(0.0545)

Note: Asterisk (*) denotes statistical significance at 1%.

As shown in Table 3 the null hypothesis, which indicates that government spending does not cause Granger causality on government revenue, cannot be rejected. Thus an increase in government spending leads to more government revenue. The results indicate that the government has to implement structural adjustment reforms to ensure fiscal discipline for Turkey.

6. Conclusion and Policy Suggestions

In this paper, we have tried to investigate the relationship between government spending and government revenue in Turkey for the 1975-2011 period. For this purpose, we have applied both the cointegration test and Granger causality method for the Turkish economy to examine the reasons behind the budget deficits.

The empirical findings of the paper suggest that spending restrictions are required to reduce budget deficits and reducing government spending is a better solution than increasing tax revenue to obtain optimal fiscal discipline in Turkey. This means that the empirical findings of the paper support the spend-and-tax hypothesis for Turkey. According to the findings, policy makers should focus mainly on the spending side of the budget in order to provide and sustain fiscal discipline in Turkey. This result implies a rejection of the tax-and-spend hypothesis in favor of the spend-and-tax proposition in the case of Turkey, supporting the hypothesis of Barro (1979), and Peacock & Wiseman (1979). In other words, the findings reveal that the uni-directional causal impact of government spending on taxes is significantly positive, unlike that hypothesized by Friedman (1978), and Buchanan & Wagner (1978). Therefore, from the perspective of policy making and the budget deficit solution debate, it appears that raising government spending in Turkey should prove an optimal solution to the current budget deficit predicament. In this context, Turkish policymakers for a more effective fiscal discipline should focus more on constraining government spending, less on government revenue. This policy can help to avoid the costs and instability that variations in revenue generate mostly due to the fluctuations in spending. Turkey should use expenditure based policies in order to control its budget deficits.

Some other policy suggestions drawn from the paper may be summarised as follows:

- ❖ Providing and sustaining fiscal discipline, first of all, entail some changes in budgetary institutions to establish and maintain government spending constraints.
- ❖ The targets of fiscal discipline should be realistic, achievable and applicable, which mean that optimal fiscal discipline targets must be irrefutable and pave the way for lower fiscal deficits and less spending.

- ❖ The importance of providing and sustaining of fiscal discipline should always be kept in mind not only by bureaucrats, but also by politicians. In this regard, a political commitment is essential which is made by the government or cabinet members in single party governments. In coalition governments an agreement among the governing parties, and in some cases party leaders has vital importance for providing and sustaining fiscal discipline. Perceiving the optimal fiscal discipline rules or optimal fiscal constraints is ultimately the responsibility of government. If politicians are not involved in selecting the fiscal constraints, they cannot be expected to take steps necessary to implement them.
- ❖ Policy makers should target medium term fiscal discipline. Because the medium-term is a suitable term for targeting fiscal constraint. Firstly, constraining total spending or the deficit typically requires implementing action over several years. Secondly, it is easy to evade fiscal discipline when targets pertain only to the current or the next financial year. And finally impact of cyclical swings or policy shocks on the fiscal policy can be only assessed in the medium-term.
- ❖ For fiscal discipline focusing only on balanced budget rule and accommodating fiscal policy may not result in a desirable outcome. It should be kept in mind that the budget is sensitive to changes in the business cycle and it is difficult to keep in balance at times when output declines and unemployment increases.
- ❖ Restrictions on fiscal discipline should not center only on government spending and/or deficits. They should also cover other key aggregates, such as taxation, and public debt. It is possible for politicians to weaken fiscal discipline by only targetting budget deficits through increasing taxes in accordance with government spending. Similarly, it is possible for politicians to weaken fiscal discipline by only focusing on government spending. While government spending is kept fixed, cutting taxes will result in rising deficits.
- ❖ For fiscal discipline the components of government spending are also important along with the amount of spending. To obtain optimal fiscal discipline, government spending must be modified by not only total government spending but also various components of government spending in order to examine their separate effects on fiscal discipline.

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Appendix

Selected Studies on Revenue-Spending Nexus*

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Dizaji (2012)	1970-2008, 1990:2-2009:1	Iran	Oil Price, Oil Revenue/GDP, Government Total Spending/GDP, Government Current Spending, Government Capital Spending, Money Supply	SVAR Model, Unrestricted VAR Model	The results of SVAR model is running from oil revenue to GDP ratio to government total spending/GDP. On the other hand, the results of the impulse response functions and variance decompositions analysis for both VAR and VEC models indicate that there is a strong causality, running from government revenue to government spending (both current and capital) while the evidence for the reverse causality is very weak.
Al-Khulaifi (2012)	1980-2011	Qatar	Government Revenue, Government Spending	Granger Causality Method	There is a uni-directional causality that runs from government revenue to government spending, supporting the revenue-spending hypothesis.
Elyasi & Rahimi (2012)	1963-2007	Iran	Government Revenue, Government Spending	Granger Causality Method	There is a bi-directional causal relationship between government spending and revenue in both long-term and short-run.
Petanlar & Sadeghi (2012)	2000-2009	Oil Exporting Countries ^a	Oil Revenue, Government Spending	P-VAR Framework	There is a possitive uni-directional long-term relationship between oil revenue and government spending.

* Selected studies are reported according to chronological order.

^a Egypt, Indonesia, Algeria, Venezuela, Iran, Kwait, Tunisia, Colombia, Malaysia, Kazakestan, Brazil, Argentina, Trinida, Tobago, Bolivia, and Russia.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Subhani, Hasan, Osman & Rafiq (2012)	1979-2010	Pakistan	Government Revenue, Government Spending	Granger Causality Method	Government revenue causes government spending.
Masenyetse & Motelle (2012)	1991-2009	Lesotho	Government Revenue, Government Spending	Granger Causality Method	The results based on error-correction model indicate that revenue-spending hypothesis valid.
Ali & Shah (2012)	1976-2009	Pakistan	Government Revenue, Government Spending, GDP	Granger Causality Method, Johansen Co-Integration Test	There is no long-term relationship among the variables.
Aregbeyen & Ibrahim (2012)	1970-2008	Nigeria	Government Revenue, Government Spending	Autoregressive Distributed Lag (ARDL) Technique	Government revenue drives government spending in Nigeria. The tax- spend hypothesis is therefore confirmed.
Sikdar & Mukhopadhyay (2011)	1971-2008	India	Central Government Revenue, Central Government Spending	Granger Causality Method	There is a bi-directional Granger causality between spending and revenue, supporting the fiscal synchronization hypothesis.
Vamvoukas (2011)	1970-2006	12 EMU Member States ^b	Government Revenue, Government Spending	Panel Data Methods of GTOLS and GMM	The fiscal synchronization is significantly influenced by both government spending and revenue components.
Ravinthirakumaran (2011)	1977-2009	Sri Lanka	Government Revenue, Government Spending	Engle-Granger's Approach of Co-Integration Model	There is a bi-directional causality exists between government revenue and government spending.

^b Belgium, Germany, Ireland, Greece, Spain, France, Italy, Luxemburg, Netherlands, Austria, Portugal, and Finland.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Mehrara, Pahlavani & Elyasi (2011)	1995-2008	40 Asian Countries ^c	Government Revenue, Government Spending, GDP	Granger Causality Method	There is a bi-directional causal relation between government revenue and government spending, supporting the fiscal synchronization hypothesis for all countries.
Saunoris & Payne (2010)	1955:1-2009:1	UK	Government Revenue, Government Spending, GDP	Asymmetric Error Correction Model	Government revenue responds to short-run changes in government spending as well as asymmetrically to budgetary disequilibrium.
Keho (2010)	1960 - 2005	Ivorian	Government Revenue, Government Spending	Granger Causality Method	A positive long-term uni-directional causality running from revenue to spending.
Sadiq (2010)	1980-1981 2009-2010	Pakistan	Federal and Provincial Taxes, Federal Spending	Granger Causality Method	There is no strong causality in either direction between tax revenue and government spending.
Hye & Jalil (2010)	1998:1-2008:3	Romania	Government Revenue, Government Spending	Autoregressive Distributed Method	There is a bi-directional long-term causal relationship exists between the government spending and its revenue.
Aslan & Taşdemir (2009)	1950-2007	Turkey	Government Revenue, Government Spending	Engle-Granger Method, Gregory-Hansen Method	The fiscal synchronization hypothesis suits well for the public finance behavior of government in the last 50 years.
Maynard & Guy (2009)	1985-2008	Barbados	Tax Revenue, Government Spending	Engle-Granger Co-Integration Model	There is a uni-directional causality from government spending to revenue.

^c Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Pakistan, Tajikistan, Turkmenistan, Uzbekistan, China, Hong Kong; China, Korea, Mongolia, Bangladesh, Bhutan, India, Maldives, Nepal, Sri Lanka, Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Philippines, Singapore, Thailand, Viet Nam, Fiji Islands, Kiribati, Marshall Islands, Palau, Papua New Guinea, Samoa, Solomon Islands, Tonga, Vanuatu, Australia, Japan, and New Zealand.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Hong (2009)	1970-2007	Malaysia	Government Revenue, Government Spending, GDP	Cointegration Test, Error Correction Method	An increases in government spending rises taxes.
Afonso & Rault (2009)	1960-2006 EU15 ^d , 1998-2006 EU25 ^e	EU Countries	Government Revenue, Government Spending, GDP	Panel Data Analysis	The spend- and -tax hypothesis is supported in the case of Italy, France, Spain, Greece and Portugal while tax-and-spend evidence is presented notably for Germany, Belgium, Austria, Finland and the UK.
Chang & Chang (2009)	1992-2006	15 OECD Countries ^f	Government Revenue, Government Spending	Panel Data Approach	There is a bi-directional causality between government revenue and government spending, supporting the fiscal synchronization hypothesis.
Aisha & Khatoon (2009)	1972-2007	Pakistan	Tax Revenue, Government Spending	Granger Causality Method	There is a uni-directional causality from government spending to government revenue.
Wahid (2008)	1975-2003	Turkey	Tax Revenue, Government Spending	Granger Causality Method	Government spending causes tax revenue to increase.
Raju (2008)	1951-2004	India	Tax Revenue, Government Spending	Granger Causality Method	There is a bi-directional causality between government spending and government revenue.

^d Austria, Belgium, Denmark, Finland, France, Germany, Greece, Italy, Ireland, Luxembourg, the Netherland, Portugal, Spain, UK and Sweden.

^e EU 15 Countries, Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Latvia, Malta, Poland, Slovakia and Slovenia.

^f Australia, Austria, Belgium, Canada, Demark, Finland, France, Germany, Ireland, Italy, Korea, the Netherlands, Switzerland, t he UK, and the US.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Wolde-Rufael (2008)	Change from country to country	13 African Countries ^g	Government Revenue, Government Spending	Granger Causality Method	There is a bi-directional causality running between government spending and government revenue for Mauritius, Swaziland and Zimbabwe; no causality in any direction for Botswana, Burundi and Rwanda; uni-directional causality running from revenue to spending for Ethiopia, Ghana, Kenya, Nigeria, Mali and Zambia; and a uni-directional causality running from spending to revenue for Burkina Faso only.
Zanella (2008)	1836-1889 1844-1889	Brazil	Government Revenue, Government Spending	Granger Causality Method	The government could not tax effectively because of local interest groups, in particular landowners, the model supported was the spend-to-tax hypothesis.
Konukçu & Tosun (2008)	Change from country to country ^h	The Russian Federation, Belarus, The Kyrgyz Republic, Kazakhstan	Government Revenue, Government Spending	Granger Causality Method	The tax- and -spend hypothesis in Belarus and the Russian Federation, and fiscal synchronization in Kazakhstan and Kyrgyz Republic.

^gBotswana (1971-2003), Burkina Faso (1973-2003), Burundi (1967-2003), Ethiopia (1964-2003), Ghana (1965-1998), Kenya (1970-2004), Mali (1976-2003), Mauritius (1966-2003), Nigeria (1969-2003), Rwanda (1968-2002), Swaziland (1971-2003), Zambia (1964-1999), Zimbabwe (1976-1997).

^hThe Russian Federation (1999:1-2006: 10), Belarus (1999:1-2002: 12), The Kyrgyz Republic (1999:1-2006:12), and Kazakhstan (1999:1-2007:4).

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Amoah & Loloh (2008)	1983-2007	Ghana	Government Revenue, Government Spending	Granger Causality Method	Causality was found to run from spending to revenue in the long-term supporting spend-tax hypothesis, while revenue Granger cause spending in the short-run in support of tax-spend hypothesis.
Mahdavi & Westerlund (2008)	1963-1997	50 US State-Local Government	Tax Revenue, Government Spending	Short-Run Exogeneity Test	The evidence on the short-term dynamics is consistent with the tax-and-spend hypothesis at the one percent level of significance. The size of the government at the state-local level is not determined by spending demand, but rather by resource supply.
Eita & Mbazima (2008)	1977-2007	Namibia	Government Revenue, Government Spending	Granger Causality Method	There is uni-directional causality from government revenue to government spending.
Carneiro (2007)	1999:1-2004:4	Angola	Oil Revenues, Government Spending, GDP	VAR Method	The government spending and GDP respond positively and significantly to innovations in oil revenue.
Gounder, Narayan & Prasad (2007)	1968:1-2003:4	Fiji Island	Government Revenue, Government Spending	Granger Causality Method	There is bi-directional causality running between government spending and customs duties; and in the long-term there is evidence of fiscal synchronization.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Narayan & Narayan (2006)	Change from country to country	12 Developing Countries ⁱ	Government Revenue, Government Spending	Toda and Yamamoto Test, Granger Causality Method	For Haiti, government spending Granger causes government revenue, which is consistent with the spend-and-tax hypothesis; for Mauritius, El Salvador, Haiti, Chile and Venezuela government revenue Granger causes government spending, consistent with the tax-and-spend hypothesis; and for Peru, South Africa, Guatemala, Uruguay and Ecuador there is neutrality between government revenue and government spending, inconsistent with the fiscal synchronization hypothesis.
Al-Qudair (2005)	1964-2001	Saudi Arabia	Government Revenue, Government Spending	Granger Causality Method	There is a bi-directional causal relationship between government spending and government revenue.
Tsen & Kian-Ping (2005)	1965-2002	Malaysia	Government Revenue, Government Spending	Johansen Cointegration Test	Government revenue was found to Granger cause spending in Malaysia.
Carneiro, Faria & Barry (2005)	1981-2002	Guinea-Bissau	Government Revenue, Government Spending	Granger Causality Method	Government spending are determined ahead of government revenue, which is known in the literature as the spend-tax hypothesis.

ⁱ Mauritius (1966-2000), South Africa (1960-2000), Peru (1970-2000), Guyana (1961-1966), Haiti (1967-1997), Chile (1973-1996), Uruguay (1969-1996), Venezuela & Ecuador (1950-1996), El Salvador (1954-1996), Guatemala (1958-1996), and Paraguay (1958-1993).

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Narayan (2005)	Change from country to country	Nine Asian Countries ^k	Government Revenue, Government Spending	Granger Causality Method	The results show that for Indonesia, Singapore, Sri Lanka and Nepal government revenue Granger causes government spending, which is consistent with the tax-and-spend hypothesis. In the long-term, government spending Granger causes government revenue in the case of Indonesia and Sri Lanka, while government revenue Granger causes government spending in the case of Nepal.
AbuAl-Foul & Baghestani (2004)	Egypt (1977-1998), Jordan (1975-2001)	Egypt, Jordan	Government Revenue, Government Spending, GDP	Granger Causality Method	Empirical results support the tax-and-spend hypothesis for Egypt and the fiscal synchronization hypothesis for Jordan respectively.
Hussain (2004)	1973-2003	Pakistan	Tax Revenue, Government Spending	Granger Causality Method	There is a uni-directional causality from government spending to revenue.
Moalusi (2004)	1976-2000	Botswana	Tax Revenue, Government Spending	Granger Causality Method	There is a negative uni-directional relationship between government revenue and spending.
Fasano & Wang (2002)	1975-2000	Oil Dependent Countries	Government Revenue, Government Spending	VECM Method	The results show that government spending follow oil revenue.

^k India (1960–2000), Indonesia (1969–1999), Malaysia (1960–1996), Nepal (1960–1996), Pakistan (1960–2000), Philippines (1960–2000), Sri Lanka (1960–2000), Thailand (1960–2000), Singapore (1963–1995).

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Chang & Hong-Ho (2002a)	1967-1999	Taiwan	Tax Revenue, Government Spending	Granger Causality Method	There is a uni-directional Causality, running from government revenue to government spending. Thus the tax- and-spend hypothesis is supported for Taiwan.
Chang & Hong Ho (2002b)	1977-1999	China	Tax Revenue, Government Spending, GDP	Cointegration Test, VAR Method, Granger Causality Method	Government spending, supporting the fiscal synchronization hypothesis.
Islam (2001)	1929-1997	US	Government Revenue, Government Spending	Granger Causality Method	The causality is uni-directional, running from government spending to government revenue.
Li (2001)	1950-1997	China	Government Revenue, Government Spending	VAR Model	There is a bi-directional causality between government spending and revenue.
Abdul Aziz, Habibullah, Azman-Saini & Azali (2000)	1960-1997	Malaysia	Tax Revenue, Government Spending	Granger Long-term Non- Causality Method	There is a bi-directional causality between government spending and tax revenue.
Abdul Aziz & Shah (2000)	1960-1997	Malaysia	Tax Revenue, Government Spending	Toda-Yamamoto Test	There is a bi-directional causality between the tax revenue and government spending.
Kollias & Makrydakias (2000)	1955-1993	Greece, Portugal, Spain and Ireland	Tax Revenue, Government Spending	Cointegration Test	Bi-directional causality between government spending and revenue exists in Greece and Ireland, while causality is running from revenue to spending in Spain. There is no causal link between government spending and revenue in Portugal.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Mithani & Khoon (1999)	1970:1-1994:4	Malaysia	Government Revenue, Government Spending	Seasonal Cointegration Test	There is a uni-directional causal influence from government spending to government revenue, supporting the spend-and-tax hypothesis in the short-run.
Pinar (1998)	1924-1997	Turkey	Government Revenue, Government Spending	Error Correction Model	The budgetary development are determined by government spending and revenue play a passive or accommodating role.
Darrat (1998)	1967-1994	Turkey	Tax Revenue, Government Spending	Granger Causality Method	The multivariate error-correction model suggests that taxes uni-directionally Granger-cause negative changes in spending.
Payne (1998)	1942-1992	Forty-Eight Contiguous States ¹	Local Government Revenue, Government Spending	Error Correction Model	In the case of twenty-four states, the tax-spend hypothesis is supported. In the case of eleven states, the fiscal synchronization hypothesis is supported, which suggests that revenue-spending decisions are jointly determined.
Dahlberg & Johansson (1998)	1974-1987	Swedish	Local Government Revenue, Government Spending	Panel Data Analysis	Government spending causes government revenue but revenue do not cause spending.

¹ Alabama, Arizona, Arkansas, California, Colorado, Connecticut, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Maine, Maryland, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada, New Hampshire, New Jersey, New Mexico, New York, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Virginia, Washington, West Virginia, Wisconsin, and Wyoming.

Appendix (continued)

Study	Period, Country or Countries, and Species of Variables			Method or Methods	Empirical Findings
	Period	Country	Species of Variable		
Hasan & Lincoln (1997)	1961- 1993	UK	Tax Revenue, Government Spending	Cointegration Test	Tax revenue causes government spending.
Payne (1997)	1942-1992	Canada	Tax Revenue, Government Spending, GDP	Error Correction Model	Government spending causes tax revenue.
Hondroyiannis & Papapetrou (1996)	1957:1993	Greece	Government Revenue, Government Spending	Johansen Co-Integration Test, VECM Method	A long-term relationship prevails between these two variables whereas one way causality exists from government spending to government revenue.
Owoye (1995)	1961-1990	G-7 Countries ^m	Tax Revenue, Government Spending	Cointegration Test, Error-Correction Methodology	There is a bi-directional causality between tax revenue and spending in all countries except Japan and Italy. In Japan and Italy, causality runs from tax revenue to government spending.
Anderson, Wallace & Warner (1986)	1946-1983	US	Real Federal Spending, Real Federal Tax Revenue, GDP	Granger Causality Method	There is a casual relationship between government spending and government revenue, running from spending to revenue.
Furstenberg, Green & Jeong (1986)	1954 - 1982	US	Government Revenue, Government Spending	VAR Model	Government spending leads to government revenue.

^m US, Canada, Germany, France, Japan, Italy, and UK.

Source: Prepared by the authors.