

AN ANALYSIS OF POLITICAL AND INSTITUTIONAL POWER DISPERSION: THE CASE OF TURKEY

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This study examines the effects of fragmented governments and fiscal authorities on budget deficits in Turkey along with political business cycle effects. For econometric analysis we will use annual data from the period 1960 to 2009. This article sheds light on various dispersion indices and their use in the field of political power and fiscal performance. The results show that the power dispersion indices of governments and fiscal institutions significantly explain the increases in the ratio of budget deficit to gross national product. The article draws attention to the unification and better coordination of fiscal authorities in Turkey. The analysis has important policy implications for Turkey and other developing countries from the viewpoint of fragmented political and administrative dispersion of power and poor budget performances. (JEL P16, H72, C22, C43)

I. INTRODUCTION

In developing countries, in particular, not only are the governments the largest employers, but also the government budgets constitute the most important resource allocation mechanism. In these countries, on average, 30% of the gross domestic product (GDP) is allocated by the government budgets. The purpose of this article is to investigate the government budgets in relation to a number of political events and institutional factors in Turkey. In this regard, we consider elections and military-backed governments as political events. The institutional factors that are considered include organizational fragmentation of the budgetary institutions and the coalition governments. Examining the effects of the elections on budget deficits might give an indication of the existence of political business cycles in

Turkey.^{1,2} The novelty in our approach is that we introduce a new power dispersion index which is suitable for the conditions of Turkey

1. As Schuknecht (1996, 158) states, in order to analyze the political business cycles in developing countries, fiscal variables are more appropriate than monetary variables because in these countries the economy is not highly monetized. As we think that this is also the case in Turkey, we will deal only with fiscal variables.

2. The budget deficits are not the only variables that may be affected by the elections. The number of public sector employees and the prices of goods and services produced by the public sector may also exhibit a pattern concurrent with the elections. The effects of these variables on current budget deficits may not be important in the short run, but their long-lasting effects may be serious. These issues are important and should be dealt with separately. These are left for future research.

*We would like to thank all the anonymous referees and the editor Wade Martin for their valuable comments and insights. All remaining errors and omissions are our own.

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ABBREVIATIONS

DW: Durbin-Watson Statistic
GDP: Gross Domestic Product
GNP: Gross National Product
LM: Lagrange Multiplier
MOF: Ministry of Finance
OECD: Organization for Economic Co-operation and Development
MOF: Ministry of Finance
OLS: Ordinary Least Squares
PBC: Political Business Cycle
PDI: Power Dispersion Index
RSS: Residual Sum of Squares
SER: Standard Error of Regression
SPO: State Planning Organization
UT: Undersecretariat of Treasury

and probably for other developing countries that have fragmented fiscal authorities under the coalition governments. These and similar issues are investigated extensively in developed countries, but less often in developing countries (see Alesina and Perotti 1995, 1996). Therefore, the analysis in this article is expected to be useful for the policymakers in Turkey and other developing countries.

In Turkey, since 1983, there have been two separate organizations responsible for the preparation and implementation of the budget, whereas only a single organization was responsible before 1984. These organizations are the Ministry of Finance (MOF) and the Undersecretariat of Treasury (UT). UT is responsible for financial aspects of the budget especially including debt management of the budget and some important transfer expenditures such as funds, subsidies, and incentives. The MOF determines the appropriation of current and transfer expenditures, regulates the dates of the expenses, and accrues and collects the revenues. It is known that the State Planning Organization (SPO) is the third organization that is involved in the budget process; but as the SPO mainly prepares the macroeconomic framework of the budget, it may be considered as more an advisory board of the government rather than an administrative board. For this reason, we will consider only the MOF and the UT in our analysis. We claim that the power division between these two organizations exacerbates the political power dispersion of coalitions. To test this claim, we will test the previous power dispersion indices and then introduce an index that takes into account the interaction between these organizations and the number of parties in the coalitions. Analysis will shed light on the necessary fiscal reforms and fiscal policies required to reduce budget deficits.

This article is organized as follows: Section II reviews the literature and explains the model used. The historical background of main economic events in Turkey and the data used in the analysis are explained in Section III. Empirical results are provided in Section IV. Policy implications are discussed in Section V. And finally, Section VI gives the conclusions.

II. REVIEW OF LITERATURE AND THE MODEL

The topic of how political and institutional considerations affect the national fiscal policy

formation recently attracted the attention of many researchers. This line of argument starts with the seminal study by Roubini and Sachs (1989a) which is based on a cross-section data of 14 Organization for Economic Co-operation and Development (OECD) countries. They show that the tax smoothing hypothesis cannot fully account for the differing magnitude of the budget deficits because it does not take the various institutional arrangements in the political processes into account. They test a semi-reduced form equation to see effects of the political power dispersion on the budget deficits. This model is consistent with both the tax smoothing hypothesis that is championed by Barro (1979) and the traditional Keynesian model of fiscal deficit discussed by De Haan, Sturm, and Jan Sikken (1999, 166). The Roubini and Sachs model is as follows:

$$(1) \quad Y_t = a_0 + a_1 YL_t + a_2 UN_t + a_3 RB_t + a_4 DN_t + a_5 POL_t + v_t$$

where the dependent variable (Y) is the net public debt/GDP ratio. YL is the lagged dependent variable, UN is the change in the unemployment rate, RB is the change in debt service costs, DN is the change in real GDP growth rate, POL is the political-institutional variable and v_t denotes the error term.³ Their results show that public debt increases as the number of parties in a coalition government increases. As suggested by the game theory, coalition governments find it difficult to cooperate. This is referred to as the Prisoner's Dilemma (Varian 1994). As coalition partners have different constituencies, each party will veto spending cuts that interfere with the interests of their respective constituencies.

Although researchers agree that political factors in determining the budget deficits should be taken into account, there is no consensus on how to measure the effect of these factors. Edin and Ohlsson (1991) rightly object to the way the political power dispersion index is

3. The countercyclical variable in the basic model is expressed as "the change in the growth rate of GNP." But some researchers prefer to use only "the growth rate" of the GNP (e.g., see Volverink and De Haan 2000). In this study, we also prefer to use the growth rate.

constructed by Roubini and Sachs.⁴ The Roubini and Sachs index (POL) implicitly assumes that the increase of public debt under a minority government is three times as large as that under a two-party majority coalition. According to Edin and Ohlsson, the political index should have a nonlinear form with which every class of government's political cohesion could be tested separately. They construct separate indices, namely POL1, POL2, and POL3, which account for the cohesion of the two-party governments, three and more party governments, and the minority governments, respectively. Using these dummy variables in Model 1, they find that the estimated significant political effect which is interpreted by Roubini and Sachs as the coalition effect is in fact entirely because of the effect of the minority governments. They find that none of the POL variables were significant for the European Union countries. They conclude that government debt accumulation is positively associated with the frequency of government changes.

The De Haan and Sturm (1997) study differs from De Haan and Sturm (1994) in three aspects. First, they use gross debt/GDP ratio as the dependent variable instead of net debt/GDP ratio. Second, they consider the data of 21 OECD countries instead of 14. Third, their sample period (1982–1992) differs from that of the previous studies (1960–1985). They use the same class of political variables like POL1, POL2, and POL3 and estimate a model similar

4. Roubini and Sachs test the proposition that multiparty coalition governments have a bias toward larger budget deficits by creating an index, POL_t . This index measures political structure (e.g., degree of cohesion) of the national government. POL is defined as follows:

$$POL_t = \begin{cases} 0 & n = 1 \\ 1 & \text{if } n = 2 \\ 2 & n \geq 3 \\ 3 & \text{minority government} \end{cases}$$

where n is the number of the parties in the government. Roubini and Sachs also use the variable $(POL_t \times D_t)$, where D_t is a dummy variable which is equal to 0 for high growth periods and equal to 1 for adverse economic circumstances. This variable gives more significant results than POL_t itself. On the other hand, Roubini (1991) uses frequency of government change—including both regular and irregular changes as a proxy for the degree of political instability. He finds that the greater the frequency of government changes the larger will be the budget deficits. This verifies the proposition of Alesina and Tabellini (1990) who assert that alternative governments after elections strategically influence the choice of their successors. Roubini and Sachs also conclude that military regimes are more successful than democratic ones in stabilization.

to Model 1. They find that none of these dummy variables are significant in explaining the gross and net debt to GDP ratios, and the government consumption and investment spending in GDP. They redo the analysis for the 1960–1985 period, and find again that the effects of power dispersion index are insignificant.

The most recent research on fragmented governments and dispersion of political power was performed by Perotti and Kontopoulos (1998), Kontopoulos and Perotti (1999), De Haan, Sturm, and Beekhuis (1999), Volkerink and De Haan (2000), Franzese (2002), Ricciuti (2004), and Huber, Kocher, and Sutter (2003). Perotti and Kontopoulos base their research on 1960–1985 data of 20 OECD countries. They define fragmentation as the number of the decision makers (size fragmentation) and the dispersion of the structure of the process in which decision makers interact (procedural fragmentation). They use the number of the parties in the coalition and the number of the spending ministers to measure the two forms of fragmentation, respectively. They use the central government expenditures and deficits as dependent variables. Their results show that fragmentation does matter, especially for transfers and personnel payments. Kontopoulos and Perotti (1999) stress that spending has a public-good-effect while the burden of the spending is a public bad. Effects of the spending are internalized by the decision makers while the (tax) burden of it is borne by the whole economy.

De Haan et al. (1999) base their research on the data of 20 European countries for the period 1979–1995. Their model is a variant of Model 1 above. Their dependent variables are growth of gross and net debt for both central and general government. In contrast to Roubini and Sachs (1989a) and Edin and Ohlsson (1991), they cannot find supporting evidence in favor of POL or POL1, POL2, and POL3 type variables. They conclude that it is the number of parties in a government that matters for the debt/GDP ratio, not whether or not the government has majority in the parliament. Volkerink and De Haan (2000) use a panel of 22 OECD countries over the 1971–1996 period with central government expenditures and deficit as the dependent variable in Model 1. They propose new variables such as the government's position with respect to the parliament, ideological complexion, and political fragmentation of the government. They conclude that the impact of the number of ministers is more robust than the number of parties

in the government, and political fragmentation does not seem to affect the deficit.

Ricciuti (2004) uses data of the 19 OECD countries for the period 1975–1995. As for institutional fragmentation, Ricciuti uses the number of the veto players and their orientation in the decision-making procedures in addition to Roubini and Sachs's (1989) POL index. Moreover, he uses roles of the house and the senate and the threshold values for the representation to measure political cohesion. For the first time, Ricciuti uses the elections as an explanatory variable and finds that the number of spending ministers, institutional fragmentation, elections, electoral years, and a mandatory limit on a re-election have significant effects on government expenditures. Huber, Kocher, and Sutter (2003) test the influence of strength and power dispersion of coalition governments on the size of annual debt accumulation in OECD countries from 1970 to 1999 by using Model 1. They propose and use the Banzhaf index of voting power to measure the fragmentation degree within the coalition government and to address the power of coalition members for making or breaking governments. They use the standard deviation, which is named "Dispersion," to measure dispersion of the voting power of parties in coalition governments. They conclude that they do not find any support for the hypothesis that stronger governments have lower budget deficits or accumulate less debt. They find that a higher dispersion of voting power of coalition members of a government leads to less debt accumulation. This means that equally strong coalition partners tend to block each other and cause non-cooperative outcomes, whereas differing levels of voting power of coalition partners are better in achieving a successful stabilization of their debt levels.

In addition to the effects of the fragmentation in governments, several researchers also examine the effects of elections on budget deficits. Assuming that governments are able to move the economy according to their desires, and voters behave in a myopic manner, models developed for this purpose show that politicians are inclined to run budget deficits (decrease unemployment) before the elections and follow contractionary budget policies (decrease inflation) after the elections (Nordhaus 1975, 1989). However, the contraction after the elections is usually postponed and the expected austerity never happens. These models are called political business cycle (PBC) models.

The macroeconomic fluctuations may also be explained by the partisanship attitudes of the governments. For example, Hibbs (1977) shows that governments broadly act in accordance with their parties' economic and social objectives and their class-defined political constituencies. Schuknecht (1996) examines PBCs and partisanship behaviors for a set of developing countries. He finds that governments of developing countries engage in expansionary fiscal policies before the elections to enhance their re-election prospects and contractionary policies after the elections. Franzese (2002) states that incumbents seem more prone to manipulate direct transfers than macroeconomic policies, at least for electoral purposes; and perhaps more prone to manipulate the timing of policy implementation than policies themselves.

As the preceding review makes it clear, this topic is studied mostly in developed countries, but less often in developing countries. Therefore, the analysis in this article has important policy implications for Turkey and other developing countries. There are a few studies on this topic in Turkey. Özatay (1999) uses quarterly data for the period of 1985–1995 to show that elections have significant effects on economic policies. He also finds some evidence of inflationary effects of these populist policies, as the prices of the public goods and services increase after the elections. He uses the money base, net assets of the central bank, fiscal variables such as government expenditures and the public sector prices as dependent variables. He suggests institutional changes such as the independence of the central bank. Ergun (2000) investigates the electoral cycles during the period of 1985–1999. She uses extensive series of monthly data to test the existence of political business cycles from monetary, fiscal, and pricing policy perspectives. She finds that before the elections, fiscal expenditures especially transfer payments and the monetary aggregates increase, while tax revenues and the prices of public goods and services decrease. Kuştepelı and Önel (2005) tested the effects of fragmentation and polarization of the coalition governments by using Edin and Ohlsson's POL1, POL2, and POL3 variables and a variable for the ideology of governments. They used 1976–2004 data for Turkey. They found that fragmentation of the coalition governments have only minor effects in increasing the debt/GDP ratio. The ideology of governments has significant effects only if the number of parties in the government is taken into account.

In general, they conclude that fragmentation, polarization, and ideology do not play important roles in explaining the budget deficits in Turkey.

III. ECONOMIC BACKGROUND AND THE DATA

In this study, we analyzed the period of 1960–2009 in Turkey. This period covers a number of important political and economic events. The period 1960–1980 was characterized by import substitution policies. On January 24, 1980, the Structural Adjustment and Stabilization program was implemented. This date marks the beginning of a period during which major policy switches occurred. Some of these changes are as follows. In July 1980, interest rate ceilings were abolished. In May 1981, the exchange rate began to float. In 1983, the foreign trade regime was liberalized and export-led growth policies were adopted. The UT was separated from the MOF. Eventually, the Treasury became a powerful government body managing the debt and cash-flow policies. This increased the number of fiscal authorities responsible for the economic and fiscal policies. The so-called institutional fragmentation occurred after this period (i.e., after 1983). In addition to the MOF and the Treasury, the SPO was also involved in economic decisions. The SPO continued to draft 5-year plans and annual investment programs. The early 1960s, 1970s, and the early 1980s witnessed the military-backed governments. The early 1960s, the late 1970s, and the 1990s were characterized by coalition governments. Petroleum price shocks occurred in 1974 and 1979 that overlap with the second period of coalition governments. According to Sayari (1996/1997), the third period of coalition governments began after the 1991 elections, which was mainly caused by the failure of completion of economic reforms. One-party dominance that began in 1983 ended in 1991. Turkey experienced two financial crises: one was in 1994, and the other was in 2001, both of which occurred during coalition periods. The 1994 crisis stemmed from an unsustainable level of public debt; and the 2001 crisis originated from an unsustainable fixed exchange rate regime, based on the neo-Keynesian approach to the sticky price models and inertial inflation. After 2001, the floating exchange rate regime was put into effect and financial institutions were tightened to create tight money and credit policies.

In this study, we propose to examine the effects of economic and political events, such as the power dispersion among the political and fiscal authorities, on the budget deficit. Thus, the dependent variables are the ratios of budget deficit, expenditure, and revenues to gross national product (GNP). The explanatory variables are GNP growth rate, inflation rate, the volume of trade/GNP ratio as an index of openness of the economy, and a number of dummy variables representing the economic and political events referred to above. Our basic model follows the Roubini and Sachs model given in Model 1, except that we cannot include the unemployment rate and cost of public debt among our explanatory variables, as no reliable and complete series exist for Turkey with these variables during the period under consideration. Instead we use the GNP growth rate, inflation rate, and openness index to capture the income and price effects.

Table 1 shows the dates of the elections, the types of governments, and the duration of the governments in Turkey. We can observe from this table that Turkey has been governed by coalition governments for several periods of time during the 1960–2009 period.

Table 2 shows the average deficit/GNP ratio, growth rate, and the inflation rate over some subperiods in the 1960–2009 period.

From Table 2, we first observe that the inflation rate and the budget deficits were the worst during the 1984–2009 period. The best period in all terms was the period of 1962–1970. Second, during the military or military-backed governments (1960–1961, 1971–1973, and 1981–1983), the budget deficits and inflation were higher than they had been during the elect governments of the 1962–1974 period, but lower than they had been during the elect governments of the 1974–1980 and 1984–2009 periods. Third, despite the higher budget deficits and inflation rates, the period of 1984–2009 witnessed lower average growth rate compared to the average growth rate of the 1960–2009 period. The extraordinary governments seem to be successful on average compared to the elect governments of the whole period. Figure 1 shows that the budget deficit/GNP ratio was always negative after 1970; 1976 was the beginning of a high inflationary period. From 1976 to 2004, the inflation rate was always at two-digit levels and even in 1980 and 1994 reached three-digit numbers. Since 2005 onwards, the inflation rate dropped to single-digit numbers.

TABLE 1
Elections and Governments in 1960–2009, Turkey

Date of the Elections	Duration of the Government	Parties in the Government
—	November 25, 1957 to May 27, 1960	DP
October 15, 1961 (CE)	May 30, 1960 to October 28, 1961	Extraordinary
—	November 20, 1961 to June 1, 1962	CHP + AP
November 17, 1963 (LO)	June 25, 1962 to December 2, 1963	CHP + YTP + CKMP + BG
—	December 25, 1963 to February 13, 1965	CHP + BG
October 10, 1965 (CE)	February 20, 1965 to October 22, 1965	AP + CKMP + MP + YTP
June 2, 1968 (LO)	October 27, 1965 to October 27, 1969	AP + CKMP + MP + YTP
October 12, 1969 (CE)	November 3, 1969 to February 14, 1970	AP
—	March 6, 1970 to March 12, 1971	AP
—	March 26, 1971 to December 3, 1971	Extraordinary
—	December 11, 1971 to April 17, 1972	Extraordinary
—	May 22, 1972 to April 10, 1973	Extraordinary
October 14, 1973 (CE); December 9, 1973 (LO)	April 15, 1973 to December 16, 1973	AP + CGP
—	January 26, 1974 to September 16, 1974	CHP + MSP
—	November 16, 1974 to March 31, 1975	Temporary (N)
June 5, 1977 (CE)	March 31, 1975 to June 21, 1977	AP + MSP + MHP + CGP
—	June 21, 1977 to July 3, 1977	CHP(N)
December 11, 1977 (LO)	July 21, 1977 to December 31, 1977	AP + MSP + MHP
—	January 5, 1978 to October 17, 1979	CHP + BG + CGP + DP
—	November 12, 1979 to September 12, 1980	AP (minority)
—	September 22, 1980 to November 24, 1983	Extraordinary
November 6, 1983 (CE); March 25, 1984 (LO)	March 1, 1983 to December 21, 1987	ANAP
November 29, 1987 (CE)	December 21, 1987 to November 9, 1989	ANAP
March 26, 1989 (LO)	November 9, 1989 to June 23, 1991	ANAP
October 20, 1991 (CE)	June 23, 1991 to November 20, 1991	ANAP
—	November 21, 1991 to June 25, 1993	DYP + SHP
March 27, 1994 (LO)	June 25, 1993 to October 5, 1995	DYP + SHP/CHP
December 24, 1995 (CE)	October 5, 1995 to October 30, 1995	DYP + SHP/CHP
—	October 30, 1995 to March 6, 1996	DYP + SHP/CHP
—	March 6, 1996 to June 28, 1996	ANAP + DYP
—	June 28, 1996 to June 30, 1997	RP + DYP
—	June 30, 1997 to January 11, 1999	DSP + ANAP + DTP
April 18, 1999 (CE and LO)	January 11, 1999 to May 28, 1999	DSP (Minority)
—	May 28, 1999 to November 18, 2002	DSP + MHP + ANAP
November 3, 2002 (CE)	(November 18, 2002 to March 14, 2003)	AKP
March 28, 2004 (LO); July 22, 2007 (CE); March 29, 2009 (LO)	(March 14, 2003 to Present)	AKP

Notes: CE, central elections; LO, local ones; CHP, Republican People's Party; DSP, Democratic Leftist Party; DYP, True Path Party; RP, Wealth Party; SHP, Social Populist Party; ANAP, Motherland Party; AP, Justice Party; MHP, Nationalist Movement Party; MSP, National Salvation Party; DP, Democrat Party; CGP, Republican Security Party; AKP, Justice and Development Party.

Source: Sanal, Turker (1995), *Türkiye Cumhuriyeti 50 Hükümeti* (Turkish Republic and its 50 Governments), Sim Matbacılık, 390 p. and The Website of the Turkish Grand Assembly (<http://www.tbmm.gov.tr>).

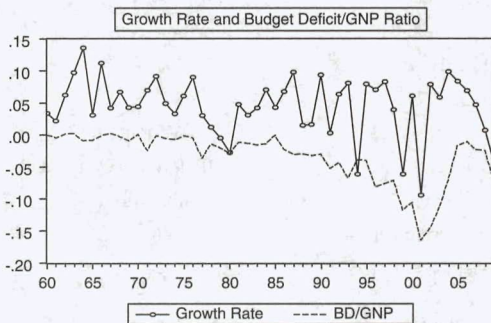
TABLE 2

The Growth, Inflation, and Deficit During the Period 1960–2009, Turkey

	Growth	Inflation (%)	Deficit/GNP
Extraordinary government (1960–1961; 1971–1973; 1981–1983)	0.051	18	-0.010
Elect government (1962–1970)	0.072	5	-0.009
Elect government (1974–1980)	0.028	43	-0.016
Elect government (1984–2009)	0.041	48	-0.058
Elect government (1960–2009)	0.045	39	-0.038

FIGURE 1

The GNP Growth, and the Ratio of the Budget Deficit-to-GNP (BD/GNP), 1960–2009, Turkey



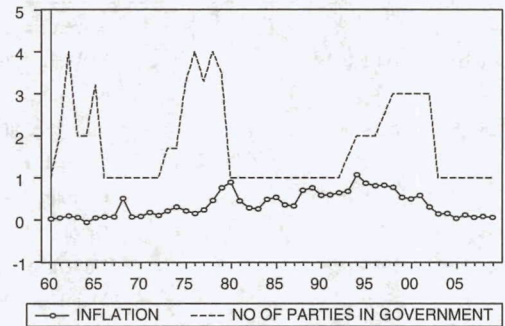
This was because of the gradual ending of populist economic policies and the successful privatization projects, all of which were coordinated with the help of the International Monetary Fund.

Figure 2 exhibits the inflation rate and the number of parties in the governments. It shows that there are three main coalition periods between 1960 and 2009. The first is during 1961–1969 just after the first extraordinary government; the second is during 1973–1979 just before the third extraordinary government; and the third coalition period is from 1991 to November 2002.

Table 1 together with Figures 1 and 2 shows that there might be a correlation between the political and the economic instability, yet the direction of the causality is not clear. The burden of the stability depends on the high growth performance and the “soft budget constraint”

FIGURE 2

The Rates of Inflation and Number of Parties in the Government, 1960–2009, Turkey



of the state (Önis and Riedel 1993). In other words, to satisfy the majority of voters, regardless of the cost of the resources, the governments should provide a positive growth rate and, at the same time, should increase the budget transfers.⁵ Atiyas (1996) makes a similar argument. Atiyas and Sayin (1997) propose a principal-agent model to understand the budgetary allocation issue in Turkey. They consider the voters as the principals during the elections but, after the elections, the politicians become the principals and bureaucrats become the agents. It is a very difficult task for principals to manage the agents because of the loose and discretionary legislation. This increases the mismanagement of public resources.

IV. EMPIRICAL RESULTS

The political business cycle models assume that the incumbents follow expansionary policies just before the elections and reverse the trend after the elections to smooth the negative effects of pre-election budget deficits. In such models the elections are assumed to be exogenous and the deficits are endogenous. However, the election time can be endogenous. Incumbents can prefer to hold elections when the social and economic conditions are in their own favor. To test whether opportunistic election time hypothesis is valid for Turkey, Tutar and Tansel (2000) performed a Hausman-Wu test, and found that there is no problem of

5. Gazioglu (1986) found that if the growth rate in Turkey falls, then the size of the sustainable budget deficit is reduced thereby increasing the inflation.

endogeneity of the election time in Turkey.^{6,7} In this study, the data set covers the period 1960–2009. In using the 1960–2009 data set, we clearly aim to see the effect of the power dispersion as the fiscal authority was only one (i.e., MOF) before the 1984 and two (MOF and UT) from 1984 onwards.⁸ For the whole period after 1983, we use the openness index to capture the structural policy switch from import substitution to export promotion policy. The explanatory variables are the lagged values of the dependent variable, inflation rate, the openness index, growth rate of GNP, and some electoral and political dummies. The definitions of the variables are given in the next section.

A. Variables

The Dependent Variables. The dependent variables are Budget Deficit/GNP, Budget Expenditures/GNP, and Budget Revenues/GNP. The budget deficit is defined as “budget revenues minus budget expenditures.”

Explanatory Variables.

Openness index. Volume of trade/GNP. The volume of trade is defined as the sum of the export and import values. This variable is assumed to capture the structural policy changes that occurred after 1983.

Military-backed governments. Dummy variable for extraordinary (military-backed) governments.

6. Heckelman and Berument (1998) investigated such an issue. By using Hausman procedure with instrumental variable technique, they found some evidence for endogenous elections in Japan, but not in England.

7. To apply the Hausman-Wu test, Tutar and Tansel have estimated a predicted value of elections with the following equation: $Elections = f(\text{Deficit/GNP}_t, \text{Deficit/GNP}_{t-1}, \text{real budget expenditures}, \text{real supplementary budgets})$. Then they used the predicted values of “elections” and its original data series in the following equation: $\text{Deficit/GNP} = f(\text{wars-terrorism}, \text{number of parties} \times \text{number of fiscal authorities}, \text{elections}, \text{predicted elections})$ and found residual sum of squares (RSS₀) and standard error of regression (SER). They also estimated: $\text{Deficit/GNP} = f(\text{wars-terrorism}, \text{number of parties} \times \text{number of fiscal authorities}, \text{elections})$ and found RSS₁. Finally they computed $X^2(E) = (RSS_0 - RSS_1)/SER$ where critical value of $X^2(E)$ is approximately $F(1, 37) = 4.10$. If the $X^2(E)$ is less than F -value, then it implies that there is no endogeneity problem and OLS gives consistent estimates. As they found that $X^2(E) = 0.0035$, there is no endogeneity problem of elections for the period 1960–1996. See Stewart (1991, 144–5) and Heckelman and Berument (1998) for more details of the Hausman-Wu test in this context.

8. The Treasury was a general directorate in the MOF until December 31, 1983.

Extraordinary governments were in office during three periods: May 30, 1960 to October 28, 1961; March 26, 1971 to December 16, 1973; and September 12, 1980 to November 24, 1983. This variable takes the value of 1 during the extraordinary years, 0 otherwise.

Election. Dummy variable for elections. Created by using Schuknecht's (1996) definition as follows. We expect economic expansion this year (t) if the election is held within January to April in the next year ($t + 1$); and the contraction in the same year (t) if the election is held in January or February in that year (t); and contraction in the next year ($t + 1$) if it is held between March and December of the year (t).

We use the values 1, -1, and 0 for next, previous, and current years, respectively, for the election dummy. We took both the nationwide local and the central elections into account. Local elections are held for municipalities. Central elections are held for the parliament.

Number of authorities. This is the number of fiscal authorities. There was only one organization during the period 1960–1983, which was the MOF. The number of fiscal authorities was two after 1983. The UT was separated from the MOF and began planning and implementing the budget's cash flow and transfer policies including the management of the debt service. This variable takes the value of “1” before 1984, and “2” for 1984 onwards.

Number of parties. The number of parties (P) in the government. If the number of parties is equal to or greater than two, then it indicates a coalition. To find P , we take the number of months into account by multiplying P by the monthly duration of a cabinet in force within a year. Therefore, we use 1 when referring to whole year while we use the number of months over 12 if the governance is less than a year.

Roubini-Sachs index (POL). This index is the political dispersion index constructed in an identical way to that of Roubini and Sachs (1989a). (See footnote 4 of this article.)

POL1, **POL2**, and **POL3** are political dummy variables used by Edin and Ohlsson (1991). POL1 assumes a value of 1 for two-party coalitions and 0 otherwise; POL2 assumes a value of 1 for three or more party coalitions and 0 otherwise; POL3 assumes a value of 1 for minority governments and 0 otherwise.

Fractionalization index (FI). Fractionalization index might be used to find the degree of dispersion in a coalition government. It shows the probability that two randomly selected individuals are not from the same group. This index is also used to define that two randomly selected ministers are not from the same party in a coalition government. Fractionalization index (FI) is defined as follows:

$$FI_j = 1 - \sum_{i=1}^k n_{ij}^2$$

where $i = 1, \dots, k$ and $n_{ij} = N_i/M_j$. Here, N_i represents party i 's seats in the government M_j . FI_j increases as the number of the parties in the coalition increases and reaches a maximum if every seat belongs to a different party. Therefore, if the government consists of one party, FI takes the value of 0, whereas it takes the value of 1 if every seat belongs to a different party in the government. If the seats are equally shared in a two-party coalition, then it will take the value of 0.5 (for more information on the fractionalization index see Annett 2000 and Alesina et al. 2002). We derived the polarization index for Turkey according to the number of ministers in the coalition governments (for data on coalitions see <http://www.tbmm.gov.tr>).

Polarization index (PI). We will also use the polarization index to see the comparative power of coalition members. Polarization index measures how much any two randomly selected coalition members' powers are equal or how far they are from each other. Accordingly, if two parties have equal sizes in a two-party coalition, then the right-hand side of the following formula will be equal to 0 and PI will assume the value of 1; if one of them approaches 100% while the other approaches 0%, then the PI will approach the value of 0. As is the case with the fractionalization index, if the number of the coalition partners are increasing in the government, and if their powers in the cabinet are different from each other, then the polarization index will approach 1. PI is defined as follows:

$$PI_j = 1 - \sum_{i=1}^k (0.5 - n_{ij}/0.5)n_{ij}$$

where $i = 1, \dots, k$ and $n_{ij} = N_i/M_j$. Here, N_i represents party i 's seats in the government M_j . For more information on the polarization index, see Chakravarty, Majumder, and Roy (2007) and

Araar (2008). We derived the polarization index for Turkey according to the number of ministers in the coalition governments as we did for the fractionalization index.

Dispersion index. According to Huber, Kocher, and Sutter (2003) dispersion of power within a coalition government can be measured also by the standard deviation of the number of the ministers of the parties in the coalition government. Coalitions with equally strong parties will have lower standard deviation, whereas coalitions with one predominant party will have larger values of standard deviation (i.e., Dispersion). It is expected that higher scores of dispersion demonstrate lower levels of debt and budget deficit, because one strong party in a coalition can put pressure on other coalition members to stabilize the budget. For Turkey, we derived the "Dispersion" index by finding the standard deviations of the coalition governments. Simply, if the number of the ministries of the coalition partners in the government is close to each other, the "Dispersion" assumed smaller values; but if the coalition members' number of ministries is very much different from each other, the "Dispersion" assumed higher values. Therefore, it is expected that if the "Dispersion" increases, then the budget deficit should be affected positively.

Banzhaf index. The Banzhaf index shows bargaining power of a shareholder in a company or that of a coalition member in a government. Sometimes the power of a coalition member cannot be represented by the percentage of seats in the parliament, but its power can also depend on its coalition making or breaking power. The Banzhaf index is usually formulated by the ratio of the probability of swing votes that will be able to determine the failure or success of a coalition to the probability of all set of coalitions (for more information see Banzhaf 1965; Straffin 2002; Huber, Kocher, and Sutter 2003). For example, if there are four parties (A, B, C, and D) in a parliament, and if a government needs to have at least 51% of the seats and if Party A, B, C, and D have 49%, 49%, 1%, and 1% of the seats, respectively, then the voting power of Party C and D will be 0 and that of A and B will be 50-50. The Banzhaf index consists of the sum of such possibilities of voting power of coalition members. The denominator of the Banzhaf index is found by the formula of 2^{n-1} where n represents the total number of coalitions. However, voting power of a party just before establishing

a government is different (probably less) than after the establishment of the coalition government; because before the establishment, the party, which is endowed with establishing the government, may go to any party to offer partnership. But after the establishment, every member of the coalition government will feel more powerful because the decrees and draft laws require unanimity of the cabinet members; and it is known even by the smaller coalition partners that ending a coalition is not easy, even for the bigger partner. For this reason, we assume that only unanimity of the votes will make sense to pass a decree, which means that the numerator of the Banzhaf index is just 1. Therefore, the power of a coalition is just equal to the probability of $1/2^{n-1}$. In other words, the bigger the number of coalition members, the less will be the chances of making a decision.

BIXNA and PDI indices. These are our dispersion indices. BIXNA is a special kind of the Banzhaf index which accounts also for the number of fiscal authorities. In our model, we propose that if the number of the fiscal authority is more than one, then it means that the fiscal authority that is related to the secondary coalition partner will also behave like another coalition partner; and thus there will be a synchronization problem between these two fiscal authorities. In fact, in the coalition period of 1990s in Turkey, the UT and MOF were shared among the coalition parties. Consequently, usually the UT was related to the coalition party to which the MOF was not related. Therefore, in contrast to previous studies, we propose that fragmentation of a coalition partner should be measured by $n = \text{number of coalition parties} + \text{number of additional fiscal authority after 1983}$. This variable is almost equal to the inverse of our power dispersion index (PDI), which is defined as $\text{PDI} = \text{Number of Parties} \times \text{Number of Authorities}$ in Tutar and Tansel (2000). Our index BIXNA, which is roughly PDI, is a special kind of the Banzhaf index with the number of authorities. They both cover the interaction between the power of coalition parties and the fiscal authorities, which was overlooked in the previous studies. In our indices, the interaction means that the probability of making the right decision decreases, as two fiscal authorities cannot act together. In this study, we will add the *additional* fiscal authority as an *additional* player into 2^{n-1} . The motivation behind this idea is as follows. The annual budget laws are

implemented by the bureaucrats of the MOF and the Treasury. As the budget revenues, expenditures, and public debt management need synchronization of the fiscal authorities, cooperative behaviors during the implementation process become as crucial as the projections of the governments. Also, the governments depend on the support of the bureaucrats, especially during the coalitions, to play the prisoners' dilemma game against other coalition partners.⁹ Therefore, the *additional* fiscal authority will behave like another coalition partner with respect to the *first* fiscal authority, which is mostly related to the main coalition partner; and this will make the synchronization more difficult. Consequently, our dispersion indices (BIXNA and PDI) differ from that of previous studies because our indices take fiscal authorities into account as a player.

B. Results of the Analyses (1960–2009)

The dependent variables are the ratios of budget deficit-to-GNP (BD/GNP), budget expenditures-to-GNP, and budget revenues-to-GNP. The dependent variables refer to the consolidated budget which includes the central (ministries) and annexed (universities, state water affairs directorate, state highways directorate, state rural affairs directorate, etc.) budgets; and excludes the budgets of state economic enterprises and the municipalities. Roubini and Sachs (1989a), Edin and Ohlsson (1991), De Haan and Sturm (1997), and Huber, Kocher, and Sutter (2003) use either debt/GNP or the quantity of money/GNP as the dependent variable. We could not use the debt/GNP because we have problems in unification of external and internal debt as well as their interest rates. In the 1990s, the maturity of the debt was usually more important than the amount of debt itself. On the other hand, as the financial deepening was not stable during most of the data period, we also do not use quantity of money/GNP as a dependent variable. Thus, we prefer to use the budget variables as the dependent variables, which have quite stable definitions for the whole period.

The ordinary least squares (OLS) estimation results are shown in Tables 3, 4, and 5. In every table there are eight models, each of

9. Spending items such as transfers to the State Economic Enterprises, incentives from nonbudgetary funds to the agricultural sectors or big infrastructure projects, etc., increase in salaries are good examples for the prisoner's dilemma cases that are subject to the games among coalition partners.

TABLE 3
 OLS Estimation: The Effects of Various Political Factors on Budget Deficit-to-GNP Ratio (BD/GNP), 1960–2009, Turkey

No. of Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Dependent Variable	BD/GNP	BD/GNP	BD/GNP	BD/GNP	BD/GNP	BD/GNP	BD/GNP	BD/GNP
Constant	-0.004 (.54)	-0.006 (.70)	-0.020 (1.96)**	-0.021 (2.14)*	-0.008 (.97)	-0.001 (.12)	-0.005 (.53)	0.004 (.39)
DEPVAR (-1)	0.646 (6.02)*	0.653 (6.16)*	0.660 (6.09)*	0.651 (6.07)*	0.702 (6.49)*	0.646 (5.64)*	0.494 (4.11)*	0.596 (5.29)*
Growth	0.179 (2.87)*	0.184 (2.95)*	0.180 (2.83)*	0.183 (2.92)*	0.189 (2.87)*	0.141 (2.05)*	0.101 (1.53)	0.148 (2.34)*
Election	-0.001 (.34)	-0.002 (.48)	-0.001 (.30)	-0.001 (.34)	-0.001 (.34)	-0.002 (.48)	-0.003 (.75)	-0.002 (.58)
Inflation	-0.003 (.28)	-0.000 (.02)	-0.003 (.32)	-0.001 (.11)	0.002 (.15)	-0.006 (.60)	-0.012 (1.13)	-0.001 (.15)
Military-backed government	-0.001 (.09)	-0.001 (.09)	-0.000 (.00)	-0.000 (.05)	0.002 (.23)	0.003 (.33)	0.008 (.85)	-0.003 (.32)
Volume of trade/GNP	-0.036 (1.62)	-0.034 (1.54)	-0.035 (1.56)	-0.034 (1.56)	-0.030 (1.32)	-0.041 (1.71)**	-0.03 (1.74)**	-0.030 (1.41)
Fractionalization index	-0.023 (2.24)*	—	—	—	—	—	—	—
Polarization index	—	-0.016 (2.30)*	—	—	—	—	—	—
Banzhaf index	—	—	0.015 (1.85)**	—	—	—	—	—
BIXNA	—	—	—	0.016 (2.14)*	—	—	—	—
DISPERSION	—	—	—	—	-0.001 (1.13)	—	—	—
POL	—	—	—	—	—	-0.005 (1.53)	—	—
POL1	—	—	—	—	—	—	0.001 (0.19)	—
POL2	—	—	—	—	—	—	-0.044 (3.06)*	—
POL3	—	—	—	—	—	—	0.020 (1.08)	—
PDI	—	—	—	—	—	—	—	-0.006 (2.44)*
R ²	0.82	0.82	0.82	0.82	0.81	0.81	0.84	0.83
Adjusted R ²	0.79	0.79	0.78	0.79	0.77	0.78	0.81	0.80
Durbin-Watson	2.04	2.01	2.01	2.03	1.96	1.95	2.09	2.10
F-statistics	27.04	27.22	25.90	26.73	24.35	25.11	23.39	27.70
Breusch-Godfrey serial correlation LM test (F-stat)	0.41 (.66)	0.24 (.79)	0.42 (.66)	0.89 (.42)	0.10 (.90)	0.12 (.89)	0.41 (.66)	1.05 (.36)
Normality (Jarque-Bera)	1.85 (.40)	2.76 (.25)	2.54 (.22)	3.39 (.18)	4.25 (.12)	1.09 (.58)	0.66 (.72)	0.70 (.71)

Notes: The numbers in parentheses are absolute value of *t* statistics. The numbers in parentheses nearby the tests show the probability of not rejecting the null hypotheses of the corresponding tests. Breusch-Godfrey Serial Correlation LM Test (*F*-Stat) is conducted with two lags. The figures in parentheses show the probability values. The zero probability value strongly indicates the presence of serial correlation. Under the null hypothesis of a normal distribution, the Jarque-Bera statistic is distributed as χ^2 with 2 degrees of freedom. The numbers in parentheses show the probability values. A small probability value leads to the rejection of the null hypothesis of normal distribution.

* and ** show the significant coefficients at 5% and 10% significance level, respectively.

TABLE 4
 OLS Estimation: The Effects of Various Political Factors on Budget Expenditure-to-GNP Ratio (BE/GNP), 1960–2009, Turkey

No. of the Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Dependent Variable	BE/GNP	BE/GNP	BE/GNP	BE/GNP	BE/GNP	BE/GNP	BE/GNP	BE/GNP
Constant	0.076 (4.24)*	0.077 (4.21)*	0.102 (4.66)*	0.105 (4.89)*	0.071 (3.90)*	0.078 (4.42)*	0.106 (5.10)*	0.074 (4.39)*
DEPVAR (-1)	0.620 (6.57)*	0.629 (6.60)*	0.626 (6.57)*	0.622 (6.64)*	0.674 (7.13)*	0.528 (5.11)*	0.490 (4.60)*	0.536 (5.69)*
Growth	-0.362 (3.96)*	-0.366 (3.95)*	-0.362 (3.91)*	-0.369 (4.05)*	-0.380 (4.06)*	-0.277 (2.97)*	-0.290 (3.04)*	-0.318 (3.69)*
Election	-0.002 (.38)	-0.001 (.23)	-0.002 (.43)	-0.002 (.39)	-0.002 (.43)	0.001 (.21)	-0.000 (.07)	-0.000 (.09)
Military-backed government	0.010 (.78)	0.009 (.70)	0.009 (.73)	0.010 (.79)	0.008 (.63)	0.006 (.52)	-0.006 (.48)	0.016 (1.32)
Inflation	-0.042 (2.64)*	-0.043 (2.66)*	-0.041 (2.55)*	-0.045 (2.79)*	-0.045 (2.69)*	0.044 (2.79)*	-0.036 (2.26)*	-0.053 (3.39)*
Volume of trade/GNP	0.125 (3.28)*	0.121 (3.14)*	0.125 (3.25)*	0.123 (3.25)*	0.113 (2.94)*	0.169 (4.01)*	0.134 (3.49)*	0.127 (3.53)*
Fractionalization index	0.037 (2.55)*	—	—	—	—	—	—	—
Polarization index	—	0.024 (2.30)*	—	—	—	—	—	—
Banzhaf index	—	—	-0.027 (2.32)*	—	—	—	—	—
BIXNA	—	—	—	-0.028 (2.64)*	—	—	—	—
DISPERSION	—	—	—	—	0.003 (2.23)*	—	—	—
POL	—	—	—	—	—	0.014 (2.82)*	—	—
POL1	—	—	—	—	—	—	-0.010 (1.06)	—
POL2	—	—	—	—	—	—	0.056 (2.82)*	—
POL3	—	—	—	—	—	—	-0.028 (1.05)	—
PDI	—	—	—	—	—	—	—	0.011 (3.56)*
R ²	0.90	0.90	0.90	0.90	0.90	0.90	0.91	0.91
Adjusted R ²	0.88	0.88	0.88	0.88	0.88	0.89	0.89	0.90
Durbin-Watson	2.08	2.08	2.04	2.09	1.94	2.13	1.82	2.36
F-statistics	52.86	51.36	51.47	53.40	50.96	54.67	42.95	60.51
Breusch-Godfrey serial correlation LM test (F-stat)	0.79 (.46)	0.67 (.52)	0.62 (.54)	0.88 (.42)	0.08 (.93)	0.45 (.64)	0.37 (.69)	3.58 (.04)*
Normality (Jarque-Bera)	2.81 (.25)	3.63 (.16)	2.72 (.26)	3.39 (.18)	2.03 (.36)	0.82 (.66)	1.70 (.43)	0.27 (.12)

Notes: The numbers in parentheses are absolute value of *t* statistics. The numbers in parentheses nearby the tests show the probability of not rejecting the null hypotheses of the corresponding tests. Breusch-Godfrey Serial Correlation LM Test (F-Stat) is conducted with two lags. The figures in parentheses show the probability values. The zero probability value strongly indicates the presence of serial correlation. Under the null hypothesis of a normal distribution, the Jarque-Bera statistic is distributed as χ^2 with 2 degrees of freedom. The numbers in parentheses show the probability values. A small probability value leads to the rejection of the null hypothesis of normal distribution.

* and ** show the significant coefficients at 5% and 10% significance level, respectively.

TABLE 5
 OLS Estimation: The Effects of Various Political Factors on Budget Revenues-to-GNP Ratio (BR/GNP), 1960–2009, Turkey

No. of the Model	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Dependent Variable	BR/GNP	BR/GNP	BR/GNP	BR/GNP	BR/GNP	BR/GNP	BR/GNP	BR/GNP
Constant	0.084 (4.23)*	0.085 (4.23)*	0.095 (4.47)	0.096 (4.53)*	0.081 (4.12)*	0.090 (4.72)*	0.097 (4.46)*	0.083 (4.34)*
DEPVAR (-1)	0.554 (5.44)*	0.555 (5.41)*	0.553 (5.45)	0.554 (5.48)*	0.578 (5.75)*	0.475 (4.59)*	0.514 (4.78)*	0.519 (5.22)*
Growth	-0.197 (2.72)*	-0.198 (2.705)*	-0.198 (2.73)	-0.200 (2.77)*	-0.209 (2.92)*	-0.156 (2.19)*	-0.187 (2.40)*	-0.178 (2.54)*
Election	-0.003 (.79)	-0.003 (.724)	-0.003 (.83)	-0.003 (.81)	-0.003 (.90)	-0.003 (.681)	-0.003 (.72)	-0.002 (.62)
Military-backed government	0.009 (.95)	0.008 (.86)	0.010 (.98)	0.010 (.99)	0.010 (1.07)	0.009 (.96)	0.001 (.13)	0.013 (1.31)
Inflation	-0.050 (3.63)*	-0.050 (3.54)*	-0.050 (3.66)	-0.051 (3.72)*	-0.054 (3.90)*	-0.056 (4.14)*	-0.046 (3.23)*	-0.056 (4.10)*
Volume of trade/GNP	0.097 (3.93)*	0.097 (3.88)*	0.098 (3.98)	0.097 (3.92)*	0.096 (3.94)*	0.118 (4.68)*	0.092 (3.56)*	0.091 (3.79)*
Fractionalization index	0.014 (1.24)	—	—	—	—	—	—	—
Polarization index	—	0.007 (.91)	—	—	—	—	—	—
Banzhaf index	—	—	-0.011 (1.30)	—	—	—	—	—
BIXNA	—	—	—	-0.011 (1.41)	—	—	—	—
DISPERSION	—	—	—	—	0.002 (1.78)**	—	—	—
POL	—	—	—	—	—	—	—	—
POL1	—	—	—	—	—	—	-0.008 (1.12)	—
POL2	—	—	—	—	—	—	0.012 (0.83)	—
POL3	—	—	—	—	—	—	-0.008 (0.37)	—
PDI	—	—	—	—	—	—	—	0.005 (2.18)*
R ²	0.85	0.85	0.85	0.85	0.86	0.86	0.86	0.86
Adjusted R ²	0.83	0.82	0.83	0.83	0.83	0.84	0.82	0.84
Durbin-Watson	2.09	2.08	2.10	2.11	2.13	2.25	1.87	2.24
F-statistics	33.74	33.09	33.88	34.16	35.27	37.33	25.52	36.73
Breusch-Godfrey serial correlation LM test (F-stat)	0.47 (.63)	0.41 (.67)	0.51 (.61)	0.64 (.53)	0.79 (.46)	1.41 (.26)	0.53 (.59)	1.25 (.30)
Normality (Jarque-Bera)	3.14 (.21)	2.94 (.23)	0.49 (.17)	3.51 (.17)	2.41 (.30)	2.91 (.23)	1.16 (.56)	5.33 (.07)*

Notes: The numbers in parentheses are absolute value of t statistics. The numbers in parentheses nearby the tests show the probability of not rejecting the null hypotheses of the corresponding tests. Breusch-Godfrey serial correlation LM test (F -Stat) is conducted with two lags. The figures in parentheses show the probability values. The zero probability value strongly indicates the presence of serial correlation. Under the null hypothesis of a normal distribution, the Jarque-Bera statistic is distributed as χ^2 with 2 degrees of freedom. The numbers in parenthesis show the probability values. A small probability value leads to the rejection of the null hypothesis of normal distribution.

* and ** show the significant coefficients at 5% and 10% significance level, respectively.

which explains the same dependent variable. The explanatory variables are lagged dependent variables, growth rate, the dummy for elections, inflation, the dummy for extraordinary governments, and openness index (volume of trade as a percentage of GNP). The lagged dependent variable allows slow adjustment of budget deficits and also accounts for inertial influences (see De Haan and Sturm 1997; Schuknecht 1996). One-period-lagged-dependent variables are used as explanatory variables in models as suggested by the Akaike's Information Criterion test and economic models. In addition to these variables, in the models, there is always one of the eight indices with which we try to explain the power dispersion in Turkish governments between 1960 and 2009. As we explained above, these indices are the fractionalization index, polarization index, POL, POL1-POL2-POL3, Dispersion, Banzhaf index, our new index BIXNA (a type of Banzhaf index enlarged with the number of fiscal authorities), and our previous index PDI (number of coalition parties \times number of fiscal authorities). We can see the trend of the indices in Figure 3, which clarifies that there is a close relationship among the fractionalization index, polarization index, Banzhaf index, and BIXNA index, while Dispersion and PDI have almost similar trend lines. In order not to crowd Figure 3, we depicted POL, POL1, POL2, and POL3 in Figure 4.

In Table 3, we show the effects of these eight indices on the BD/GNP.

According to Table 3, all of the models have high explanatory power because all the coefficients of determination (R^2 values) are above 80% and F -statistics are rather high. The

FIGURE 3

The Trends in Power Dispersion Indices, 1960–2009, Turkey

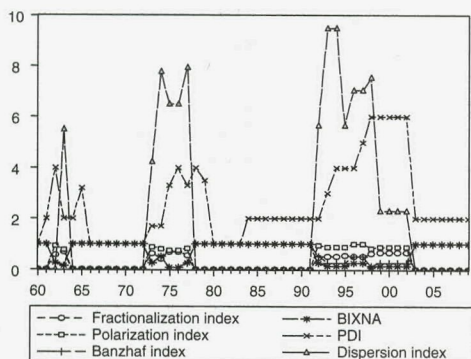
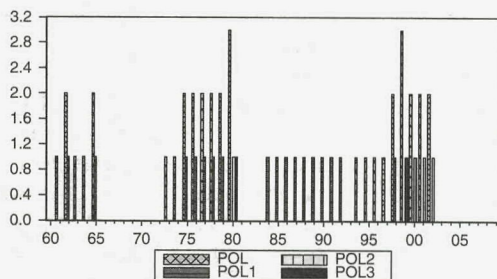


FIGURE 4

The Trends in POL, POL1, POL2, and POL3, 1960–2009, Turkey



Durbin-Watson (DW) statistic shows that there is no first-degree autocorrelation in any of the models. However, as there is a lagged dependent variable in the models, we also checked the Lagrange multiplier (LM) statistic, which is quite successful in determining the autocorrelation when there is a lagged dependent variable on the right-hand side of the model. As we see in Table 3, Breusch-Godfrey serial correlation LM test with two lags confirms that there is no autocorrelation in the residuals of the models. We conclude that the models are successful and have high explanatory power.

In general, the models show that elections and military-backed governments cannot explain the budget deficits significantly, but lagged dependent variable and GDP growth affect the budget deficits statistically significantly and positively. In other words, budget deficits increase as growth rate increases. The ratio of volume of trade-to-GNP affects budget deficits negatively, but its coefficients are significant only in Models 6 and 7. Except the Dispersion Index, POL, POL1, and POL3, all indices explain the budget deficit/GNP ratio statistically significantly. We expect that as fractionalization and polarization of the government increase, the budget deficit also increases. The Banzhaf index and BIXNA explain the budget deficit significantly and positively because as the number of coalition members and fiscal authorities increase, the probability of reaching a consensus in the governments and fiscal authorities decrease; and thus this mechanism increases the prisoner's dilemma cases and hence the deficit. As PDI is almost the inverse of BIXNA, it affects the budget deficit negatively and significantly, as expected. The index of "Dispersion" and POL also affect the budget deficits negatively, but

their coefficients are not statistically significant. Among POL1, POL2, and POL3, only POL2 is statistically significant, and its coefficient is negative, as expected. It means that if the number of the coalition partners is three or more, then the budget performance of the governments decreases significantly.

In Table 4, we present the regressions of the budget expenditures/GNP ratio on all the same explanatory variables as in Table 3. As the R^2 values are 90% or above and F -statistics are rather high, all models have high explanatory power. The DW statistic shows that there is no first-degree autocorrelation in any of the models. However, as there is a lagged dependent variable in the models, we again checked the LM tests for autocorrelation. In Table 4, the Breusch-Godfrey serial correlation LM statistics with two lags show that there is no autocorrelation in the models except Model 8. For this model we performed the ARCH LM test and found that there is no ARCH problem in the model. Except Model 8, we can conclude that the models in Table 4 are successful and have high explanatory power.

As we observe from Table 4, again elections and military-backed governments do not explain budget expenditures significantly. However, in all models the lagged dependent variable, growth rate, inflation, and volume of trade-to-GNP ratio explain the budget expenditures statistically significantly. The coefficients of growth rate and inflation are negative and coefficient of volume of trade-to-GNP is positive, as they are projected in the economic theory. For example, as the budget appropriation has a ceiling, sudden increases or decreases in GNP or inflation, by definition, decrease or increase the percentage of budget deficits with respect to GNP.

Except POL1 and POL3, power dispersion indices also show the existence of dispersion in the coalition governments in terms of budget expenditures. Fractionalization and polarization of the government increase the budget expenditures significantly and positively. The Banzhaf index and BIXNA explain the budget expenditures significantly and negatively. For example, as the number of coalition members and fiscal authorities increase, BIXNA and thus the probability of reaching a consensus gets lower, and thus expenditures decrease more slowly. As "Dispersion index" and PDI have significantly positive coefficients, we can claim that power dispersion in the government increases

the expenditures. POL also affects the budget expenditure positively and significantly. Among POL1, POL2, and POL3, again only POL2 is statistically significant and its coefficient is positive, as expected.

Table 5 shows the regression results of budget revenues/GNP ratio on all the explanatory variables as in Tables 3 and 4 and one of the power dispersion indices. The R^2 values and F -statistics show that all models have high explanatory power. The DW statistic shows that there is no first-degree autocorrelation in any of the models. However, as there is a lagged dependent variable in the models, we again checked for this using the LM test for autocorrelation. The LM test statistic confirms that there is no autocorrelation in the models. However, according to the Jarque-Bera test, Model 8 does not have normal distribution of the residuals. Therefore, except Model 8 (PDI), we can conclude that the models in Table 5 are quite successful and have high explanatory power.

The results in Table 5 show that again elections and military-backed governments do not explain budget revenues significantly. However, almost in all models the lagged dependent variable, growth rate, inflation, and volume of trade-to-GNP ratio explain the budget revenues statistically significantly with the expected signs. The coefficients of growth rate and inflation are negative and coefficient of volume of trade-to-GNP is positive, which is suitable to the economic theory. Inflationary processes usually shrink the tax base. On the other hand, if the tax system is based on the expenditures for goods and services rather than on the income especially in recent decades, as is the case in Turkey, budget revenues-to-GNP ratio does not increase as GNP grows. Moreover, as there is usually a lag in the tax collection of the past incomes, the current growth rate might not be able to show positive effects on the revenues. The negative effect of inflation on revenues/GNP shows the existence of Tanzi effect. The openness index (volume of trade-to-GNP ratio) affects the revenues positively and significantly.

Except "Dispersion," POL, and PDI, neither of the dispersion indices statistically significantly affect the budget revenues. Quite interestingly, the coefficients of "Dispersion," POL, and PDI are positive which means that power dispersion in the government causes revenues to increase. This might be happening for three reasons. First, because of the power dispersion, coalition members cannot put pressure on the

others to decrease the tax rates or announce tax amnesties, both of which require unanimity in the cabinet. Second, the revenue side of the budget is controlled only by the MOF, so there is no other tax authority that might cause power dispersion. Third, as most of the taxes are indirectly collected, the politicians cannot intervene with the budget revenues. For these reasons, fractionalization, polarization, Banzhaf, and BIXNA indices are not significant in explaining the budget revenues.

In summary, election dummy is not statistically significant in any of the models. Therefore, the annual data does not show the existence of PBCs for gross sum of expenditures and revenues in Turkey between 1960 and 2009. However, PBCs might be detected by shorter frequency of data (i.e., monthly and/or quarterly data) and for subtotals of the budget expenditures such as subsidies and other transfers or nonbudgetary funds.

V. POLICY IMPLICATIONS

This study shows that there is a great deal of power dispersion in the coalition governments in Turkey. As the data cover quite a long period, almost half a century, it means that fragmented governments and fiscal authorities are the main reasons for low budget performance or at least these two indicators go hand-in-hand. The first important implication of the analysis is that the dispersion of the power might be eliminated by the unification or better synchronization of the MOF and the Treasury. This may also allow the existence of a powerful and single fiscal authority that can resist pressures from political constituencies. This unification is also crucial for the coordination of the fiscal authorities. Moreover, the government should eliminate the asymmetry between the rules of revenue accrual and expenditure accrual to increase the strictness in favor of rules rather than discretion. For example, in Turkey, according to the Turkish Constitution, taxes can be imposed only by a new act while most of the transfers (such as duty losses¹⁰ of State Economic Enterprises and all kinds of incentives) can be increased by a cabinet decree or approval of the finance ministry. This fact also allows dispersion of the expenditures to increase.

10. If a government assigns a duty to any State Economic Enterprises such as government banks, to intervene with goods and credit markets to favor a sector, then losses accrued from this duty is called duty loss.

Turkey's experience might shed light on many developing countries in some respects. First, coalitions and power dispersions in the government are decreasing the fiscal discipline. Second, fragmentation of the fiscal authorities (i.e., administrations) is exacerbating the dispersion problem in the government. Therefore, a strict fiscal coordination should always be a priority for the governments during coalition periods. The first thing that may be recommended for Turkey and other developing countries is to unify all fiscal authorities or provide better coordination of revenues, expenses, cash flow, and financial side of a budget. To depict the importance of the subject, we can think of cases in which the MOF tries to increase the tax collection, but at the same time the UT tries to sell the state bonds to the same taxpayers. Another example is the case in which the MOF releases a big percentage of appropriation while the UT is unable to provide enough financing resources. Moreover, the MOF cannot know the future burden of the debts and cannot plan a multigeneration model for interest payments and cash flow without the UT. For these reasons, the fragmented fiscal and economic authorities in such developing countries should be unified or at least in the short run, tied to a single minister or to a secretary. By doing so, cash flow of the budget might be smoothed and activities of the UT cannot hinder the MOF's activities or vice versa. The other implication for the developing countries is that spending money from the budget should be as difficult as accruing and collecting taxes. Developing countries that are suffering from severe budget deficits should even think about making an act for better coordination of fiscal authorities and transparent and simple rules of spending to curb the prisoner's dilemma cases. The concept of fiscal authorities should not only include the MOF and the UT, but also include the pricing policies of state economic enterprises, extra budgetary, and social security funds. Thus, the budget should be strict, plain, transparent, and accountable to the public and should be prepared in a multigeneration manner. Moreover, the budget expenses should be very much parallel to the seasonality in the revenues to smooth the economic activities in the markets also.

From the viewpoint of future research, this study implies that fragmentation in fiscal authorities, which has been overlooked in previous studies, should be dealt with more often. In fact, the behavior of the budget and treasury

bureaucrats might be just as important as coalition members, because they know the technical details of the budget better than the politicians. Especially during the short-tenured coalition governments and the transition periods of government changes, the budget expenditures and debts are governed by the bureaucrats. Therefore, the bureaucrats behave like acting finance ministers or secretaries. Moreover, both policy makers and researchers should treat budget expenditures and revenues separately because they have different procedures of accruals. The political business cycles should be analyzed with quarterly data instead of annual data to capture the short-run effects of the budget. In addition to this, one can compare the projected appropriation and realized appropriation to see the effects of PBCs on the budgets, because salaries and the transfer items usually increase and long-term investments usually decrease before the elections. Also, in economies whose state economic enterprises are holding a significant portion of the manufacturing or service sector such as that in Turkey, the governments can manipulate the prices of the public goods and services according to the PBCs (e.g., see Özatay 1999). Therefore, the analysis on these kinds of off-budget political instruments should be made separately.

Another interesting topic for future research is the causality between economic crises and fragmentation in power. Turkish data show that there is a definite relationship between economic crises and coalition periods because the 1974, 1977–1980, 1994, and 2001 crises in Turkey occurred during the coalition periods. Detecting the direction of the causality or simultaneity between the economic crises and the fragmentation in the government will shed light on important points in developing countries that are newly democratized.

Finally, the effects of the privatization incomes of the state should be analyzed very carefully because their effects might be followed as an off-budget item, as in the case of Turkey. In recent decades, since Turkey's privatization incomes reached a considerable amount, the budget deficit might have been affected by the privatization incomes. These are left for future research.

VI. CONCLUSIONS

This article investigates the effect of political and institutional power dispersion such as coalitions, fragmented governments, and fiscal

authorities on various measures of the state budget-to-GNP ratio in Turkey. Although this topic is studied extensively in developed countries, it is investigated less often in developing countries. Therefore, the analysis of the experiences of Turkey provides important policy implications for Turkey and other developing countries. The regression analysis for Turkey during the period 1960–2009 through the Roubini and Sachs model shows that fragmentation in the fiscal authorities, for example, the separate MOF and the treasury exacerbate the negative effects of fragmented (i.e., coalition) governments. Thus a power dispersion index or variable should cover the interaction between the fiscal authorities as well as the coalition parties that are authorized to prepare and implement the budget. Our indices BIXNA and to a certain degree PDI, which are the novelties of this article, both of which incorporate the interaction between coalition members and the fiscal authorities, have been very successful in explaining the poor budget deficit performances in the models. The analysis indicates that a separate Treasury from the MOF under the existence of coalition governments adversely affects the consolidated budget deficits in Turkey. Sound fiscal policies should begin with the unification or better coordination of the Treasury with the MOF to reduce the negative effects of political power dispersion.

In this article, the existence of PBCs is also tested. The regression analysis indicates that annual data does not show the existence of PBCs. Future research should address the political business cycles by using quarterly or monthly data and the changes in subbudget items for election and nonelection years.

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