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Hai Guo
Georgia State University, hguo1@student.gsu.edu

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Setting Discretionary Fiscal Policy within the Limits of Budgetary Institutions: Evidence from American State Governments

A Dissertation
Presented to
The Academic Faculty

by

Hai Guo

In Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy in Public Policy

Georgia Institute of Technology
August, 2008

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Setting Discretionary Fiscal Policy within the Limits of Budgetary Institutions: Evidence from American State Governments

Approved by:

Dr. Katherine G.Willoughby, Advisor
School of Policy Studies
Georgia State University

Dr. Robert J. Eger
School of Public Administration and Policy
Florida State University

Dr. Gordon A. Kingsley
School of Policy Studies
Georgia Institute of Technology

Dr. David L. Sjoquist
School of Policy Studies
Georgia State University

Dr. Sally Wallace
School of Policy Studies
Georgia State University

Date Approved: June 2nd, 2008

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LIST OF ABBREVIATIONS

G	the government goods
R	the total available resources to the society
t	tax rate
C	political cost function
S	political support function
ΔT	tax change
ΔS	spending change
ΔRf	reserve transfer
D	deficit
Sur	surplus
BBR	Balance Budget Requirement
TEL	Tax and Expenditure Limitation

SUMMARY

Unanticipated economic fluctuations exert pressure on state governments to adjust their discretionary fiscal policies to accommodate the changing fiscal situation. The state discretionary fiscal policy is characterized by two basic financial activities: taxation and expenditure. Generally, during economic boom periods, a state discretionary fiscal policy involves lowering taxes and/or increasing expenditures. During recessionary periods, discretionary fiscal policy involves increasing revenues by expanding tax bases and/or rates and/or making expenditure cuts. Even though states adjust fiscal policy as the economy fluctuates, the typical cyclical economic factors are not the sole determinant of such adjustments. State governments budgeting systems in the United States operate under a variety of budgetary institutions. The most prominent state government budgetary institutions include balanced budget rules (BBRs), tax and expenditure limits (TELs), and supermajority voting requirements for tax increases. This dissertation examines how these budgetary institutions affect state government choices of fiscal policy under different economic conditions.

The theoretical framework of this study is based on the pressure-group competition approach. With the assumption that politicians are self interest and maximize /minimize political support/cost while choosing the combination of tax and spending changes to deal with potential surplus or deficit. The tax payer group and special interest group exert pressure on politician while s/he makes the discretionary fiscal policy adjustments. TELs and BBRs set the constraints. To better understand the effect of state level TELs, a stringency index of state level TEL is constructed considering the major

structural features. The fixed-effect panel regressions are used for the analysis of impact of TEL and BBR and tax changes and the fixed-effect Tobit is adopted to test the impact of TEL and BBR on spending cuts after the budget is adopted. The result suggests that TEL plays a more important role affecting states' discretionary fiscal adjustment from the tax side, while BBR plays a more important role affecting states' discretionary fiscal adjustment from the expenditure side. Results of this research show that TEL exerts pressure on states that ***hinder*** state ability to deal with volatile fiscal situations, especially in the case of periods of budget crises.

CHAPTER 1

INTRODUCTION

Introduction

Flexibility is an important component of public budgeting. A governmental budgeting system should "have the capacity to accommodate unforeseen events and adapt to changing circumstances" (Lauth, 2002, p.198). Unanticipated economic fluctuations exert pressure on governments to make budget adjustments to accommodate such change. State governments are "revenue driven" entities – balanced budget requirements hold these governments to the expected or forecasted resources for any given budget year. Unexpected economic downturns cause revenue shortfalls, which then call for tax increases or the more immediate solution, budget cuts. Alternatively, periods of economic boom generate unexpected budgetary surpluses; this situation provides opportunities for elected officials to enact tax cuts or make additional budget allocations (Lauth, 2002; Forrester, 1993; Conant, 2003).

Thus, state governments must adjust their fiscal policies during economic downturns and upswings to balance budgets. Specifically, state discretionary fiscal policy is characterized by two basic financial activities: taxation and expenditure. Generally, during economic boom periods, a state discretionary fiscal policy involves lowering taxes and/or increasing expenditures. During recessionary periods, discretionary fiscal policy involves increasing revenues by expanding tax bases and/or rates and/or making expenditure cuts (Conant, 2003).

Even though states adjust fiscal policy as the economy fluctuates, the typical cyclical economic factors are not the sole determinant of such adjustments. State

governments budgeting systems in the United States operate under a variety of budgetary institutions. Alesina & Perotti (1996) define budgetary institutions as "all the rules and regulations according to which budgets are drafted, approved, and implemented." They identify three types of budgetary institutions: numerical targets on the budget, procedural rules, and the transparency of the budget. The most prominent state government budgetary institutions include balanced budget rules (BBRs), tax and expenditure limits (TELs), and supermajority voting requirements for tax increases.[1]

BBRs limit government activity by constraining state budgets; these budgetary institutions were employed with the birth of the United States as a resolution to the political conflict between the Federalists and Republicans. Federalists advocated for an active government, while Republicans preferred minimal government. One important compromise between these parties required adherence to the norm of a "balanced budget"—expenditure cannot exceed revenue (Hou & Smith, 2006). BBRs stipulate budget balance in some form at various phases of the budget process. Budget balance is defined different ways, but generally indicates the prohibition of operating a budget deficit in a particular budget year. State government BBRs "can be broadly categorized into three groups, depending on the stage in the budget process at which balance is required" (Poterba, 1996, p. 396). In the executive development stage, a governor must present a balanced budget to the legislature. In the legislative review stage, the legislature must pass a balanced budget. And at the conclusion of the budget year, the budget must balance; a deficit cannot be carried forward into the next fiscal year (Poterba, 1996; Hou and Smith, 2006).

[1] In this research, a supermajority voting requirement is regarded as a type of TEL. A stringency index of TELs is constructed and presented in Chapter 4 of this dissertation.

The motivation of imposing TELs on governments has arisen predominantly out of taxpayer dissatisfaction; essentially this movement has been driven by an association with the principle behind the American Revolution—"no taxation without representation." Even though the imposition of TELs can also be traced back to the birth of the United States, it was not; until the late 1970s that the adoption of TELs accelerated among state governments. Prior to that time, there existed just two state-level TELs. Compared with BBRs, TELs and especially state-level TELs are relatively new budgetary institutions for constraining the growth of state taxes or expenditures in some way. TELs "are designed to provide certain strictures to restrain the growth of governmental budgets either on the tax side of the spending side or on both" (Waisanen, 2007). Also, supermajority voting requirements, sometimes treated as another type of TEL, dictate that greater than 50 percent of the vote in both state houses is necessary to add new taxes or pass tax increases (Waisanen, 2007; Knight, 1998).

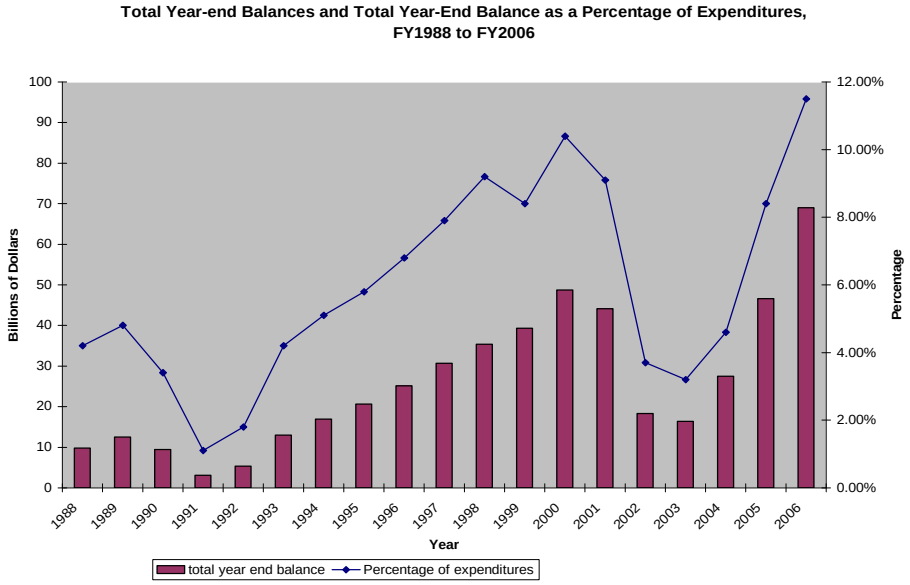
Obviously, such budgetary institutions constrain government ability to secure revenues and make expenditures, and therefore influence state level discretionary fiscal policy. The existence and effectiveness of BBRs and TELs vary from state to state. This dissertation examines how these budgetary institutions affect state government choices of fiscal policy under different economic conditions.

Rationale for the Research

Since the early 1990s, U.S. state governments have experienced dramatic economic fluctuations that coincide with swings in the national economy. In fiscal year (FY) 1990, revenue collections were lower than estimated in more than half of the states, and 34 states spent more money than collected (NASBO, 1990). The NASBO 2002 fiscal

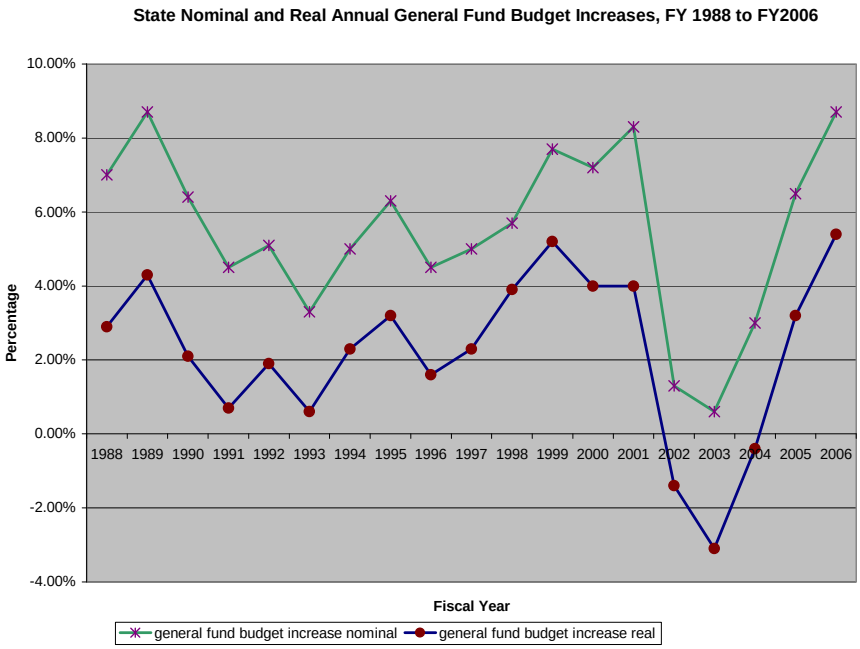
survey reports that, "amid slow growing national economy, state revenue shrunk at the same time that spending pressure is mounting." During an economic boom period (from 1994 to 2000) in between these two budgetary crises, state governments ran large surpluses.

State fiscal data (NASBO, 1988-2006) indicates that state year-end balances declined during the years of fiscal crisis, as did general fund budget growth rate. In this research, year-end balances and general fund growth rates are considered good reflections of state fiscal condition (Gramlich and Gordon, 1991; Sullivan, 1993; Poterba, 1995). Figure 1.1 provides a trend of total year-end balances and year-end balances as a percent of expenditures of state governments from FY 1988 to FY 2006. Figure 1.2 shows both nominal and real growth rates of aggregated general fund budgets for the 50 states for this same time period.



Source: NASBO, Fiscal Survey of the States (2006)

Figure 1.1 Year-end Balance and Year-end Balance as a Percentage of Expenditure



Source: NASBO, *Fiscal Survey of the States* (2006)

Figure 1.2 State General Fund Budget Increase

In FY 1989, the aggregated year-end balance of state governments was $12.5 billion, comprising 4.8 percent of state expenditures. This balance drops to $9.4 billion and 3.4 percent of expenditures in FY 1990. By FY 1991, the aggregated state year-end balance was the lowest of the past two decades, accounting for just 1.1 percent of expenditures. This balance recovered a bit in FY 1992 and then continued to increase for the rest of the decade. In fact, the economic boom in the latter part of the decade dropped huge surpluses into the states, dramatically increasing year-end balances. By FY 2000, the aggregated year-end balance in state governments was $48 billion and made up 10.4 percent of expenditures.

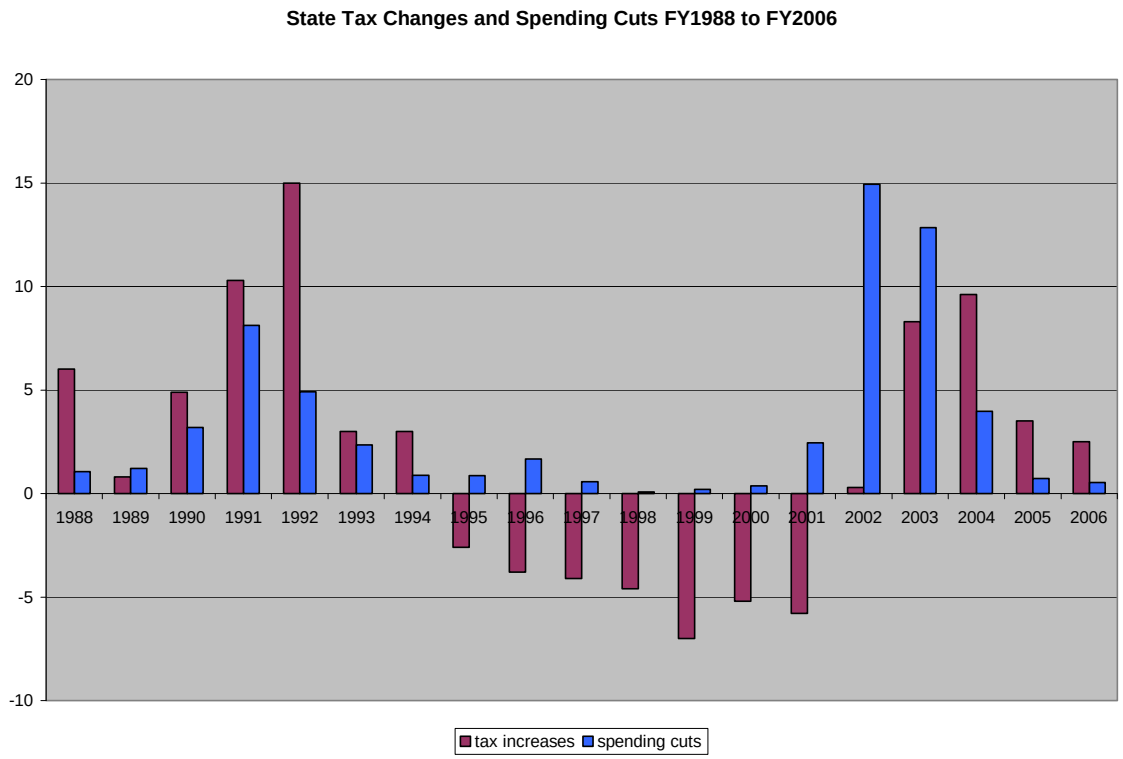
After a mild drop in FY 2001, year-ends balances began to drop steeply, to $18.3 billion in FY 2002 (3.7 percent of expenditures) and to $16.4 billion in FY 2003 (3.2 percent of expenditures). By FY 2004, states began a slow fiscal recovery from this second, albeit milder, economic recession.

Year-end balances only tell one side of the story, however. Examination of the general fund budget growth rate in the past two decades helps flesh out the fiscal health of states during these two decades. The nominal and real growth rate of state government general fund budgets in FY 1989 was 8.7 percent and 4.3 percent, respectively. These rates plummeted to 3.3 percent and 0.6 percent, respectively, by FY 1992. Then, both the nominal and real growth rates climbed to 8.3 percent and 4.0 percent, respectively by FY 2001, reflective of the economic boom at the time. During the somewhat milder recession in the early 2000s, however, the nominal growth rate of state general fund budgets dropped sharply to 1.63 percent in FY 2002. In this same year, the real growth rate realized negative growth of -1.4 percent. This rate kept declining into FY 2004, but then climbed in FY 2005.

A comparison of year-end balances and general fund budget growth rates between the two crisis periods with state government discretionary fiscal policy indicates that state responses to the two crises were different. For example, states tended to make more expenditure cuts and make fewer tax increasing actions in the most recent crisis when compared to the earlier one.

Current state level BBRs hold most of these governments to budget balance, in some form, at the end of a fiscal year. Even though states can employ various cosmetic accounting strategies to keep the budget in balance during a fiscal crisis (for example, accelerating revenue collections or deferring expenditure outlays) such methods do not solve the underlying fiscal problem. In fact, states must adjust their discretionary fiscal policy by either increasing taxes or cutting spending to eliminate potential deficits. Figure

1-3 shows the aggregated enacted tax changes and spending cuts by states in the past two decades.



Source: NASBO, *Fiscal Survey of the States* (2006)

Figure 1.3 State Tax Changes and Spending Cuts FY1988 to FY2006

During the fiscal crisis of the early 1990s, in the aggregate, states enacted more tax increases than spending cuts, whereas during the recession in the early 2000s, states enacted more spending cuts than tax increases. From FY 1990 to FY 1992, total tax increases and spending cuts enacted by all states was $30.2 billion and $18.6 billion, respectively. From FY 2002 to FY 2004, total tax increases and spending cuts enacted by all states was $18.6 billion and $31.8 billion, respectively. The change in state government fiscal condition and the aggregated summaries of state responses during two fiscal crises triggered the primary research question of this dissertation: *What affects the variation of the composition of state discretionary fiscal policies?* Furthermore, a second

wave of adoptions of TELs by states during the 1990s, which coincides with the economic boom period between these two recessions, provides another, different economic environment in which to examine state government fiscal response given the existence of these various budgetary institutions**.**

Traditionally, budgetary institutions are viewed as a "veil" having no direct impact on fiscal policy outcomes. According to the "institution irrelevance view," budgetary institutions simply summarize voters' preferences (Bail and Tieslau, 2000; Poterba, 1997; Poulson, 2004). For example, under this view, states with conservative electorates would limit government revenue and expenditure with or without TELs. The real impact on government fiscal policy arises from taxpayers' preferences, not from institutions. When budgetary institutions no longer satisfy voters' preferences, they are then voted out of existence.

Contrary to the "institution irrelevance view," the "public choice school" supports the idea that budgetary institutions affect government fiscal policy outcomes (Bail and Tieslau, 2000; Poterba, 1997; Poulson, 2004).There are three public choice models that highlight the relevance of budgetary institutions—the leviathan model, the median voter model, and the rent-seeking model. Using different assumptions about politicians' behavior, these models explain the impact of budgetary institutions on state fiscal policy outcomes, including impacts related to government size and growth. Still, relatively few studies have focused on the impact of budgetary institutions on state discretionary fiscal policy, particularly the impact of these institutions on the composition of state tax and spending changes. This dissertation focuses on short term discretionary rather than long term fiscal policy outcomes of state governments under different fiscal circumstances.

Each of these views is explained and the theoretical contributions of each to this research effort are presented in Chapter 2.

Schematic Model

As a result of unanticipated economic fluctuation, states may face budgetary deficits or surpluses; these deficits or surpluses are defined as "fiscal gaps" in this dissertation. A fiscal gap is regarded as the impetus for state government discretionary fiscal policy adjustments. In instances where gaps exist, self-interested politicians try to maximize their political support and minimize their political costs when making decisions on discretionary fiscal policy. The schematic model below illustrates the relationships of variables considered in this dissertation (Figure 1-4).

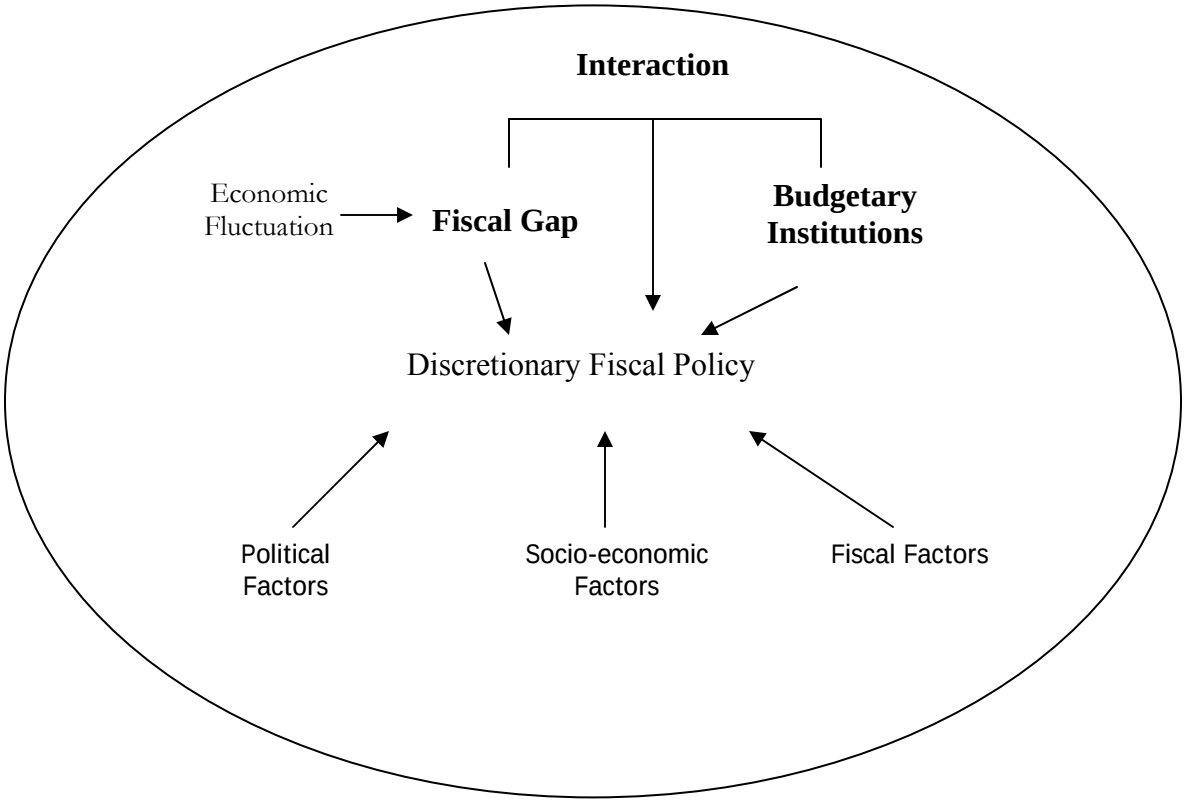


Figure 1.4: Schematic Model

Key factors considered here as explanations for resulting discretionary fiscal policy include state level budgetary institutions—BBRs and TELs—and their interaction

with the fiscal gap. Hereafter, the terms BBR and TEL used in this dissertation mean state-level BBRs and TELs. Other factors considered in this research include political factors, socio-economic factors, and fiscal factors. Political factors are defined as partisan composition of state government and election cycles. Socio-economic factors include state population, personal income and fiscal factors include beginning and ending balances (including budget stabilization fund balances) of state government general funds and revenue from the federal government. Chapter 3 provides a detailed discussion of these factors.

Compared to BBRs, TELs are a relatively new budgetary institution in states. The effectiveness and stringency of TELs vary across states; no two TELs are alike. In order to better understand how different TELs affect state fiscal policy, an index of TEL stringency is developed and presented in Chapter 4. Previous studies categorize TELs according to type, codification, adoption method, formula of limit, treatment of surplus, existence of waiver or exemptions, override provisions, and provisions of responsibility transferring to local governments. Empirical analyses of the effectiveness of TELs tend to focus on the type of limitation, in other words, whether it is a tax or expenditure limitation. And, studies regarding the existence of TELs pay particular attention to adoption methods and codification. However, limited studies consider other aspects of TEL structures. For example, New's (2001) study indicates that TELs requiring the immediate refund to taxpayers of any surplus provide an incentive to state policy makers to cut taxes. The TEL stringency index developed here strives to further discern the effects of other structural features on state discretionary fiscal policy.

Empirically, this dissertation engages a fixed-effects model to analyze a panel dataset covering the 47 continental state governments from FY 1988 to FY 2006, covering the two fiscal crises described earlier in this chapter and separated by a period of economic boom. Results from this analysis clarify whether discretionary fiscal policy adjustments vary with different stringency levels of budgetary institutions in state government in the United States.

Contributions of this Research

This dissertation contributes to the literature on state government fiscal behavior in several ways. First, most previous studies on the impact of the budgetary institutions focus on long term fiscal outcomes like government size and growth. This study chooses a difference measure of fiscal policy outcome—the results of discretionary fiscal policy choices by fiscal year. The focus here is the impacts of budgetary institutions on discretionary fiscal policy in the short term (by fiscal year). Using a theoretical framework based on the political support maximization/political cost minimization behavior of public policy decision makers, this study provides a better understanding of the factors that contribute to state discretionary fiscal policy choices. Second, this study constructs a stringency index of the newer budgetary institution in states—the TEL. Recently, some states have begun debating implementation of variously structured TELs, while other states with TELs are considering revising or doing away with such provisions (NCSL, 2006). Results of the present research quantify the stringency of TELs and provide guidance on TEL usefulness and effectiveness.

Next, by conducting a systematic and quantitative analysis on how BBRs and TELs affect state discretionary fiscal policy, this study provides a better understanding of

how existing institutions work. Specifically, if empirical results indicate the expected relationships between budget institutions and fiscal policy choice, this research will further confirm the public choice view that budgetary institutions matter. Essentially, economic fluctuations and the business cycles are external factors that influence budget balance in state government, and are beyond any one state's control. On the other hand, state government policy makers make decisions regarding budget and fiscal management that hold these governments to certain tax and spending changes and levels. Understanding the affects of budgetary institutions on discretionary fiscal policy outcome can help direct state policy makers to consider different ways to reach and maintain budget balance. Finally, knowing the impact of budgetary institutions on the ability of a state to make discretionary fiscal policy adjustments and making this information transparent can help citizens make more informed decisions when they asked to cast their votes regarding the creation of or amendment to such institutions.

Organization of the Study

This dissertation consists of seven chapters. The next chapter reviews past research about budgetary adjustments by state governments and the effects of TELs and BBRs. The third chapter provides the theoretical framework of this study and presents research hypotheses. The fourth chapter constructs a stringency index of TELs. The fifth chapter discusses data and econometric methods used in the analysis. The sixth chapter presents the empirical findings. The final chapter summarizes the findings, addresses policy implications and discusses the limitations of this study and directions for future research.

CHAPTER 2

BUDGETARY INSTITUTIONS AND STATE FISCAL POLICY OUTCOMES

This chapter examines the literature about state budget adjustments and the effects of BBRs and TELs on state fiscal policy outcomes. The first section reviews the public budgeting literature regarding state level mid-year budget adjustments. A second section examines the literature regarding the effect of TELs on state fiscal policy outcomes; a third section reviews research about the effects of BBRs on such fiscal policy outcomes.

Mid-Year Budget Adjustments

Literature regarding state government mid-year budget adjustments is pretty thin and generally focuses on the process of budget adjustments, also termed "rebudgeting" (Forrester and Mullins, 1992; Forrester, 1993; Nelson and Wilko, 2004). "Rebudgeting is what governments do to revise and update the adopted budget during the course of the fiscal year" (Forrester and Mullins, 1992, p. 155). Flexibility, as an important component of public budgeting, supports the ability to make these adjustments. Lauth (2002) acknowledges the necessity for a government to "have the capacity to accommodate unforeseen events and adapt to changing circumstances"(p.198). Unanticipated economic fluctuations exert pressure on governments to make budget adjustments to accommodate such change. Importantly, state governments are "revenue driven" entities – balanced budget requirements hold states to spending within the forecasted resources of any given budget year. Unexpected economic downturns cause revenue shortfalls, which then call for tax increases or perhaps the more immediate, easier solution, spending cuts. Alternatively, periods of economic boom generate unexpected budgetary surpluses; this

situation provides opportunities for elected officials to cut taxes and/or to make additional budget allocations (Forrester, 1993; Lauth, 2002; Conant, 2003).

The individual state case study of Georgia's mid-year appropriations from 1977 to 1986 indicates that a viable economy, conservative revenue estimates and the existence of a reserve fund make readjustments to the budget and particularly, allocation of a surplus possible (Lauth, 1988). Clynch (1988) examines budget adjustments from another perspective—regarding the allocation of cuts in Mississippi in the late 1980s. He finds that Mississippi budgeting decision makers consider the necessity and effectiveness of programs when facing severe financial difficulties and when making spending cuts. Another case study of the rebudgeting process conducted in Missouri by Forrester (1993) considers situations involving both budget enhancements and cuts. Missouri's case also indicates that economic fluctuation exerts pressure on government to rebudget. In the short run, the governor dominates rebudgeting by recommending budget cuts or supplemental appropriations. In the long run, the legislature oversees budget execution by setting constraints. Forrester (1993) suggests that a systematic comparison of rebudgeting at state and local levels is needed to further tease out its effects.

Blackley and Deboer (1993) conduct a study to explore the determinants of discretionary revenue in states in the early 1990s. Their analytical framework assumes reelection is the ultimate goal for the elected official—those responsible for making revenue and spending adjustments. These authors identify the motivations for elected officials to increase revenues, despite the political unpopularity of such decisions. These motivations arise from expenditure demand increases, upward service costs and recession.

Their empirical results show that both political and economic factors explain state government discretionary revenue increases in fiscal years 1991 and 1992.

While the above studies help to flesh out our understanding of the reasons behind state fiscal policy outcomes, none examine discretionary adjustments from both the revenue and expenditure sides. After the fiscal crisis in the early 1990s, Poterba (1994) conducted a study on how budgetary institutions and political factors affected a state's budgetary adjustments to fiscal crisis in the early 1990s; he considers both revenue and expenditure sides of the budget equation. During a fiscal crisis, state politicians need to make hard choices between tax increases and/or expenditure reductions, given that most state constitutions do not allow deficit financing of the operating budget for extended periods. Poterba (1994) employs budgetary institutions (anti-deficit rules and TELs) as well as political factors (partisan composition and gubernatorial election cycle) to explain the variation of states' discretionary fiscal policy adjustment from fiscal years 1988 to 1992. His findings show that tighter budgetary rules are associated with rapid budget adjustment from both the revenue and expenditure sides during a fiscal crisis period.

Though Poterba (1994) uses a small sample, tests the effect of these budgetary institutions and political factors on discretionary budget adjustment separately, and only considers an economic recessionary period, his work provides a guideline for the present research. This dissertation extends such effort by examining state budget adjustments during recessionary and surplus periods; also, this dissertation presents a theoretical framework for understanding the effects of budgetary institutions on state discretionary fiscal policy.

Effects of TELs on State Fiscal Policy Outcomes

Studies of the impacts of TELs on states generally concentrate on effects on government size and growth, and the results from such research are controversial. Bail (1982; 1990) conducted two studies on TEL constraints on state government tax burden and expenditure. By simulating a state's expenditure and revenue, given TEL provisions, and comparing these estimates with actual figures, the 1982 study concludes that TELs are ineffective in constraining state government growth. In the second study, Bail (1990) made a before-and-after comparison of TEL and non-TEL state revenues and expenditures. He identifies the period from 1977 to 1981 as tax revolt years (the first wave of TEL adoptions in the states). Still, he arrives at the same conclusions as he did in his first study—that TELs are ineffective in constraining state government growth.

Based on a theoretical model of budget-determination, Abram and Dougan (1986) empirically test the effect of constitutional constraints, including TELs, on governmental spending. Their findings show that TELs impact state government spending differently from their purported purpose of constraining government budget growth. That is, states with TELs exhibited *higher* spending than non-TEL states, though the spending difference between TEL and non-TEL states was not statistically significant. Abram and Dougan believe the TEL-states have limitations that are not at a binding level to have realized these "unexpected" results. Furthermore, the authors explain that the endogenous nature of TELs may also be the reason for such results. That is, states with higher spending growth are more likely to adopt TELs. In any case, a study resting on only one year (1980) of cross-sectional data is methodologically unsound.

Instead of directly using revenue or spending as the measure of government size, Howard (1989) compares the relative proportion of revenue and spending to personal income between TEL and non-TEL States. His analysis reveals that at the start of the 1980s, the ratio of revenue to personal income in states with TELs was even higher than states without such limitations. This pattern then shifted from 1982 to 1987. And, the ratio of general fund expenditures to personal income in states with expenditure limitations remained lower than states without such limitations throughout 1979 to 1987. However, these differences were not large enough indicate positive results from TELs. Howard surmises that the ineffectiveness of TELs is due to escape clauses and/or advisory only components of the limitations examined.

Cox and Lowery (1990) point out the inadequacy of Howard's (1989) simple comparison of the proportion of revenue and expenditure to personal income between TEL and non-TEL states, without controlling for regional adoption as well as different economic growth patterns. These authors compare three pairs of states—South Carolina and North Carolina; Michigan and Ohio; and Tennessee and Kentucky—to control for regional factors. In addition, in their interrupted time series analysis, they add unemployment rate, proportion of employment in the manufacturing industry, annual change of proportion of employment in the manufacturing industry, and federal grants as influencing variables. They conclude that TELs are not effective in constraining state government size. They argue that states can circumvent these limits by shifting the fiscal responsibility to the local governments, relying more on non-tax revenue, and/or increasing debt financing.

Dougan (1988) also used time-series data to study the effect of TELs on government spending. He examined the relationship between TELs and state government spending in 16 TEL states from 1960 to 1984. In his analysis, only seven states with TELs indicate reduced spending. Dougan (1988) also examined the non-TEL states using post-1977 compared to TEL states, since the late 1970s brought the first wave of TEL adoptions. His comparison of TEL and non-TEL states indicates no significant difference in budget choices between these states.

Studies on the effects of TELs in the 1980s further confirm their ineffectiveness as a constraint on government size or growth. The chief criticism of these studies however regards methodologies used; most employ only cross-sectional or pure time series without controlling for unobserved effects, or they neglect other factors affecting governmental revenue or spending (Bail, 1982; Abram & Dougan, 1986; Dougan, 1988; Howard, 1989).

On the other hand, more recent studies have contradicted this past work and have shown that TELs are effective in constraining growth of government. Stansel (1994) compares the five-year growth rate in per capita state spending before and after the enactment of TELs with the national average rate. He includes 18 TEL states in his comparison. The average five-year growth rate in per capita state spending of these 18 states is higher than the national average level, before the enactment of TELs. This average then falls below the national average after the enactment of TELs. Stansel argues that the effectiveness of TELs depends on their design. He applies the same comparison to TEL states, distinguishing their adoption method and codification. This comparison shows that the five-year growth rate of per capita state spending in citizen-initiated and

voter-approval TEL states fell after the enactment of the limitation. And the drop in percentage points is greater than that of all 18 TEL states as a whole, while in the legislature-approved TEL states, the five-year growth rate of per capita state spending increased. Both the constitutionally and statutorily determined TEL states realized the decline of the five-year growth rate, though the drop in percentage points was greater for constitutionally determined TEL states. Similar to Howard's study (1989), however, the lack of control of other factors may weaken the results of this study.

Elder (1992) examines the impact of state TELs on state tax burdens among 17 TEL states from 1950 to 1980. His study shows that expenditure but not revenue limitations are effective for reducing tax burden. He argues that the structural features of TELs may cause the differential effects of revenue and expenditure limitations. Still, there are problems with this study. Knight (1998) points out that excluding non-TEL states in such an analysis limits the variation across states. Elder considers TELs as experiments, using states before their adoption of TELs as part of the control group. Non-TEL states are not included in this control group. Still, Elder (1992) did control for socio-economic factors like population and personal income.

Shadbegian (1996) improved on Elder's study by including both TEL and non-TEL states as well as modeling the interaction between government size and personal income. Moreover, he uses per capita expenditure as a measure of government size, instead of using revenue as Elder did. Shadbegian also controls for population, income and federal grants to the state. Shadbegian (1996) analyzes state government budgets from 1972 to 1987 and finds that a TEL's effect on government size depends on state income. In a state with income below the mean, a TEL limits its per capita expenditure;

however, if a state's income is above the mean, a TEL increases the state's per capita expenditure. In terms of government growth, a TEL's effect is influenced by the state's income level. A TEL's limiting power is stronger in a low-income state than in a high-income state. Shadbegian's study indicates that income is an important factor to consider when examining the effects of TELs.

Valid studies of the fiscal impact of budgetary institutions cannot avoid the endogenous problem. This problem is especially apparent when examining the impact of TELs on state government taxation and spending. States with a strong culture of tax aversion tend to adopt TELs. In this case, it is not the TEL necessarily, but taxpayer preference that affects state fiscal policy. If taxpayer aversion to taxation is omitted from analysis, then results of such a study will be biased. Another problem is that taxation and spending increases over the long term contribute to the adoption of TELs. In such a case, TELs as well as tax and spending increases are mutually influenced. This simultaneity problem will also bias any analysis.

There are two ways to deal with such endogenous problems. One is to use a fixed-effect model, assuming that a state's tax aversion is a time-invariant constant. Another approach is to use instrumental variables to solve the simultaneity problem. Adam and Dougan (1986) recognize that the endogenous nature of TELs supports the conclusion that TELs are not effective constraints. However, these authors did not take any action to correct this problem in their 1986 study. Poterba (1996) suggests using a constitutional variable as one means to measure budget rules. Ruben (1995) confronts this endogenous problem by including instruments. Her choice of instruments includes direct legislation rules and voters' ability to recall elected officials. While her ordinary least square

estimates lead to the same conclusions as those of most previous studies (that TELs do not constrain government spending levels), the estimate with instruments indicates that state general expenditure as a percentage of personal income declined by two percent due to the adoption of TELs.

Besides these studies of the effectiveness of TELs, Knight's (2000) research focuses on the impact of supermajority voting requirements on state government effective tax rates. He argues that a supermajority voting requirement is an internal restriction on the legislature rather than an external restriction as imposed by a traditional TEL. A supermajority voting requirement provides more bargaining power to the minority party. By correcting the endogenous problem, he finds strong evidence that a supermajority voting requirement reduces a state's tax rate.

One of the concerns regarding the ineffectiveness of state level TELs in constraining government size or growth is that states may shift responsibility to the local government in order to remain within the limit. One of the explanations in Cox and Lowery's (1990) study is that states may have circumvented their limitations by the decentralization of state fiscal responsibility. Of their state comparisons, only the pair, North Carolina and South Carolina, to some extent, supports this "end run" hypothesis. The proportion of state revenue to total state and local revenue declined sharply in South Carolina, a TEL state, compared to that in North Carolina. The TEL in South Carolina had no provision prohibiting fiscal responsibility transfer to local governments. Still, Cox and Lowery do not consider this to be convincing evidence of decentralization due to the existence of a TEL, given that the total state and local revenues in both TEL and non-

TEL states in their study declined. Therefore, they do not regard this as a successful "end-run."

Rueben's (1995) instrumental model estimates indicate that general expenditures as a percent of personal income were lower in states with binding TELs; however, the reduction is partially offset by higher local spending in these states. Studies have also examined how state TELs, together with local limitations, affect the fiscal relationship between state and local governments (Joyce and Mullins, 1991, 1996; Skidmore, 1999). Joyce and Mullins (1991) first conducted a comparative series of revenue proportion under different combinations of state and local limitations. They find that state limitations slightly reduced the state share of total state and local revenue over time. States with both state and local limitations only showed a decline of local taxes. Joyce and Mullins draw the conclusion that state limitations are less binding than local ones. Later in 1996, these authors conducted another study on this issue using more sophisticated econometric models. Taking TELs as multiple treatments, the implicit control group consisted of the states with no TELs as well as states before the adoption of TELs. Furthermore, Joyce and Mullins included some social-economic control variables like population, personal income and economic structures. They still find that state-level limitations have a muted effect. Skidmore (1999) uses newly-adopted limitations to conduct his analysis. This study also concludes that state limitations marginally constrain state spending growth and are less binding than local limitations. Skidmore also points out a general trend of the centralization of state revenue systems.

After the fiscal crisis in the early 1990s, Poterba (1994) conducted a study on how budgetary institutions and political factors affect a state's response to fiscal crisis. This is

perhaps the only existing research to examine the effect of TELs on state government *short-run* discretionary fiscal policy. Poterba finds that TEL states tend to make tax increases less than non-TEL states as a means of closing budget gaps. He indicates that previous studies of the impact of TELs on government revenue and spending have faced the endogenous problem. States choosing to adopt a TEL may have had low demand for public expenditure. He argues that this endogenous problem can be circumvented by considering tax and spending changes in response to fiscal difficulties as a function of fiscal institutions. Poterba also studied the impact of the BBRs on state response to fiscal crisis; however, he ran separate regressions to test their impact.

Effects of BBRs on State Fiscal Policy Outcomes

Except for Vermont, all states have constitutional and/or statutory BBRs; still, the stringency level of these requirements varies across states. The Advisory Commission on Intergovernmental Relations (ACIR, 1987) developed an index to measure the stringency of BBRs, categorizing five types as:

1) The budget proposed by the governor must be balanced.
2) The budget signed by the legislature must be balanced.
3) The state can carry a deficit into one subsequent fiscal year.
4) The state cannot carry a deficit into the next budget year (some states have biennial or two-year budget cycles).
5) The state cannot carry a deficit into the next fiscal year.

The stringency index is constructed from zero to ten and is measured where zero means least stringent and ten means most stringent.

The National Association of State Budget Officers (NASBO, 1992) also conducts a survey on the state balanced budget requirements and divides BBRs into three broader categories:

1) The governor must propose a balanced budget.
2) The legislature must enact a balanced budget.
3) The state cannot carry forward a deficit.

Forty-three states require that the governor submit a balanced budget and 31 states require the governor to sign a balanced budget. Thirty-nine states require the legislature to pass a balanced budget. Twenty-four states cannot carry forward a deficit (Poterba, 1996).

State budget deficit crises have pushed scholars to explore the causes, particularly whether state fiscal institutions affect fiscal policy outcomes. Besides the ACIR's (1987) cross-sectional study on BBR's impact on deficit size, several other panel studies confirm ACIR's finding that states with more stringent requirements have smaller deficits. For example, Alt and Lowry (1994) constructed a simultaneous equation of revenue and expenditure using panel data from 1968 to 1987, with deficit carry-over as the indicator of stringency of the BBR. Their study focuses on the impact of partisan control over government on taxation and spending adjustments, combining the BBR. They find that states with a deficit carry-over constraint tend to reduce the deficit by adjusting taxes and spending more than states with no such constraints. Poterba (1994; 1996) also used the ACIR's stringency index to study the impacts of BBRs on state taxation and spending adjustments, when combined with deficit shock. His studies show that states with stringent BBRs that have an ACIR index above five tend to cut $27 more in response to a

$100 deficit than states with a weak BBR. And Poterba finds no significant impacts of BBRs on tax changes.

Alesina and Bayoumi (1996) examined the relationship between the budget surplus and the stringency of the BBR and found that states with more stringent BBRs tended to have greater budget surpluses than states with less stringent BBRs. Although the stringent BBR increases fiscal discipline and then reduces the budget flexibility of a state; however it has little effect on the variability of real state product. Bohn and Inman (1996) argue that, from a policy perspective, the focus should be on how each balanced budget rule — not the index of stringency — affect the deficit. Their criterion for whether the limitation is "tight" or "soft" depends on whether it is a constitutional or statutory requirement and whether the requirement regards the beginning-of-year or end-of-year balance. They consider a constitutional and statutory end-of-year balance as a "tight" limitation. They find that "tight" states, on average, had $100 more general fund surplus than "soft" states.

Levinson (1996) studied whether a stringent BBR worsens state business cycles. They argue that BBRs require a state to take pro-cyclical measures to fulfill the fiscal requirement; however, if state fiscal policies have real macroeconomic consequences, this will increase the business cycle volatility. Also, using the ACIR's stringency index to measure the strictness of state BBRs, they find that strict BBRs do worsen business cycle fluctuations, especially in large states, in which fiscal policy has more influence on macro economy than it does in small states.

Hou and Smith (2006) point out the inadequacy of previous measures of BBR stringency and provide a more comprehensive framework for understanding these

requirements. They regard BBRs as systems and differentiate the political and technical nature of these requirements. Instead of emphasizing the codification of the BBR (constitutional or statutory), they argue that political rules are more ambiguous and easier to be manipulated by the politicians while technical rules are more specific and harder to circumvent. They articulate nine articles about BBRs, according to different stages of the budget cycle and in the spectrum from political to technical. The previous categories of BBRs such as the governor must submit a balanced budget or the legislature must pass a balanced budget, and the governor must sign a balanced budget are regarded as political rules during stages of executive preparation and legislative review. "No deficit may be carried over to the next fiscal year (or biennium)" is the only technical rule in their study. In addition, they add five more technical rules. "Own-source revenue must match (meet or exceed) expenditures, and own-source revenue and general obligation (or unspecified) debt (or debt in anticipation or revenue) must match (meet or exceed) expenditures" are technical rules under stages of both executive preparation and legislative review. Another technical rule used is that a limit be in place on the amount of debt that may be assumed for the purpose of deficit reduction; this rule applies to all three stages of the budget process considered. In the stage of budget implementation, they include "controls are in place on supplementary appropriations, and within fiscal year controls are in place to avoid deficit" (Hou & Smith, 2006).

Based on this more comprehensive indicator of BBRs, Hou and Smith (2008a, 2008b) conduct several empirical studies to test the impact of such requirements on state own source revenue, spending, and various balances. These empirical studies show that the technical provisions of BBR are more effective for restraining state spending and

keeping the budget balanced. The contributions of this research are considered in the present dissertation; the measurement of BBRs used by Hou and Smith (2006, 2008a, 2008b) as applied here will be discussed with the description of explanatory variables later in this dissertation.

The literature thus presented about the influences of TELs and BBRs on state fiscal policy outcomes provides empirical support that such budgetary institutions do affect government fiscal policy. Most of the studies address the impacts of these institutions on long term fiscal outcomes; however a few have studied the impact of these institutions on short term discretionary fiscal policies. This dissertation pushes such work forward in two ways, by examining the affects of both BBRs and TELs (interactive effects) as well as considering their affects on short term rather than long term state level discretionary fiscal policy.

CHAPTER 3

THEORETICAL FRAMEWORK

Review of Public Choice Models

Traditionally, budgetary institutions have been viewed as a "veil," having no direct impact on fiscal policy outcomes. For example, the "institution irrelevance view" holds that budgetary institutions simply summarize voters' preferences (Bail and Tieslau, 2000; Poterba, 1997; Poulson, 2004). Scholars advocating this view consider that states with conservative electorates limit government revenue and expenditure, rendering TELs irrelevant. According to this view, government fiscal policy is influenced more by taxpayers' preferences than from such institutions. Voters determine whether budgetary institutions exist; when these institutions no longer support voters' preferences, they are voted out of existence.

In contrast, public choice theory finds budgetary institutions as influencing the fiscal policy outcomes of governments. Buchanan and Tullock (1962) pioneered the argument that budgetary institutions and rules impact collective choice and subsequently government policy outcomes. Three public choice models illustrate the influence of budgetary institutions on public policy. The Leviathan model put forth by Brennan and Buchanan (1980) indicates that budgetary institutions constrain the budget maximization behavior of politicians. Without the constraint of these institutions, politicians or bureaucrats will extract surplus from taxpayers and overspend at their preference level (see also, Knight, 1998). Dougan (1988) concurs that the Leviathan model makes a case

for the existence of TELs. That is, if government is considered a monopoly created by voters, elected officials will follow voter preferences by maximizing the size of government. TELs then serve as a constraint that curtails government expansion. Still, while these studies highlight the Leviathan model as a good explanation for the adoption of citizen-initiated TELs, they are less clear regarding the adoption of legislatively approved limitations.

Alternative public choice models challenge the assumption of politicians as budget maximizers. Instead, such models assume that politicians try to minimize political damage from raising taxes and/or cutting expenditures. For instance, the median voter model analyzes the different reasons and uses of various tax structures (Flowers, 1972; Sjoquist, 1981). This model indicates that government fiscal policy is consistent with the preferences of the median voter under majority rule. Dougan (1988) considers a second reason for TELs to be based on the median voter model. He argues that TELs work as a signal "in the period of change in the equilibrium size of the budget" (Dougan, 1988). Citizen-initiated TELs signify that voters are not satisfied with current budget levels and so set limits through TELs that hold the budget to voter preferences. Legislatively-approved TELs then signify protective strategies by legislators to limit possible political damage that could occur when voters are dissatisfied with budget levels.

Alm and Skidmore's (1999) exploration of TEL adoptions starts with the median voter model and then integrates elements of the Leviathan model to further flesh out reasons for fiscal policy outcomes. They point out the imperfection from both the demand and supply sides in a representative democracy system. Voters—the demand side—may be ill informed and under fiscal illusion. On the supply side, politicians and bureaucrats

have "the monopoly power in selecting an agenda on which a community votes" (Alm and Skidmore, 1999). According to this model, budget levels still reflect median voters' choices but these are greater than true median voters' preferences. In such circumstances, TELs can, to some extent, reduce the monopoly power of the government. Alm and Skidmore (1999) argue that the imperfection from both demand and supply lead to imperfect budget levels; therefore the adoption of TELs is necessary and provides gains.

The rent-seeking model provides another framework for understanding how budgetary institutions affect government discretionary fiscal policy to balance the budget. In the rent-seeking model that examines the effectiveness of TELs developed by Poulson (1994), a politician is regarded as a self-interested broker in the political market for wealth transfer. The taxpayer and rent-seeking groups represent supply and demand sides of the political market. Taxpayers provide the resources for wealth transfer by paying taxes to the government. The rent-seeking group is comprised of organizations demanding transfer "through special government privileges, special government expenditures, and special tax loopholes" (Poulson, 1994, p. 118). "Rent-seeking" refers to political actions that transfer wealth among groups; "rent" is defined as "excess returns over opportunity cost" to the politicians and the goal is to minimize the political costs associated with taxpayers' resistance to higher taxes. Politicians maximize the probability of reelection by shifting tax burdens to less sensitive taxpayer groups (Hettich and Winer, 1984).

The rent-seeking model regarding TELs is derived from the interest group approach or a pressure-group competition approach (Becker, 1983). Adam and Dougan's (1986) study took this approach to model the budget-determination process and

analyze the effects of budgetary institutions, including TELs. Instead of explicitly classifying the rent-seeking group, they classified groups as "relatively influential" and "relatively weak." The influential group gains net benefits from government spending while weak groups pay more in taxes than benefits received. Both groups can exert pressure on politicians through their political support or opposition. The politician in this model chooses those budget and tax levels that maximize their political support function.

Development of Theoretical Framework

The pressure-group competition model is relevant to the theoretical framework for the present research regarding the effects of budgetary institutions on state discretionary fiscal policy. Discretionary fiscal policy is characterized by government taxation and spending. Expansionary fiscal policy is exhibited when a government lowers taxes and/or increases spending; contractive fiscal policy is exhibited when a government increases taxes and/or cuts spending. In either environment, the politician is assumed to be self-interested in the political market, seeking to maximize political support. Taxpayer and rent-seeking groups (special interest groups) exert pressure on the politician. While the politician makes decisions regarding the composition of discretionary fiscal policy to accommodate different fiscal situations, s/he considers the political gain or loss associated with each option.

The state government politician faces several questions when contemplating fiscal policy actions, including: When should the state adjust discretionary fiscal policy? And, what should this adjustment look like? Regarding the second question, should the state make a tax or expenditure change, or both? Consider a government with elected budgetary decision makers who wish to maximize their political support—to be elected

again as well as to determine the budget based on economic and revenue forecasting according the utility function (or public support function):

$$U(G, R-G) \tag{3-1}$$

G is the government goods—public services delivered by the government

R is the total available resources to the society

R-G is the private sector resources.

Suppose G is financed by a flat tax on R with tax rate *t*. In practice, *t* can be regarded as the ratio of the government's revenue to total resources.

The utility function can also be written as:

$$U(G, R-R\times t) \tag{3-2}$$

As shown in Figure 2-1, maximizing the utility function will provide an optimum G^0 and t^0 (point *A*). Within the budget process, as the economic condition changes, assuming *R* falls due to a recession, *R* changes to R'. In order to provide the same level of G^0, t^0 needs to be increased to t^1 as shown by point *B* in Figure 3.1. The opposite option (Point *C*) of keeping the budget in balance is to cut G^0 to G^1 without changing t^0. Even though deficit financing is another option, in the long run, debt must be serviced with tax receipts. Any points along a straight line *BC* represent different combinations of tax increases and expenditure cuts to balance the budget.

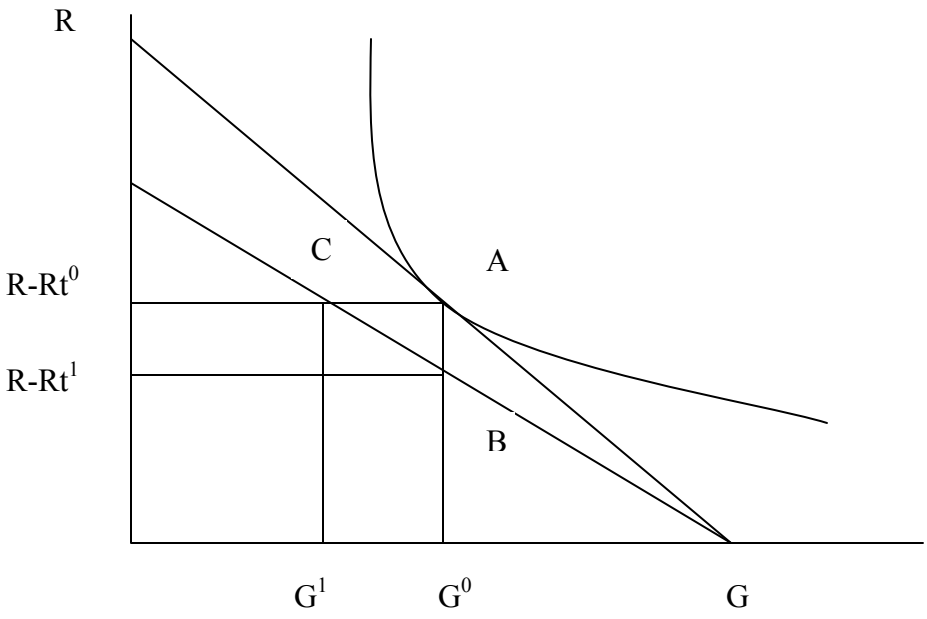


Figure 3.1: Fiscal Adjustments under Potential Deficit

Figure 3.2 shows the opposite circumstance; that is, when the economy grows, *R* increases. To provide the same level of G^0, the tax rate is reduced from t^0 to t^1as shown by point *B* in Figure 2-2. Should the tax rate remain at its original level of t^0, the public good provision can be increased from G^0 to G^1 (Point *C* in Figure 2-2). Any points along line *BC* represent different combinations of tax cuts and spending increases.

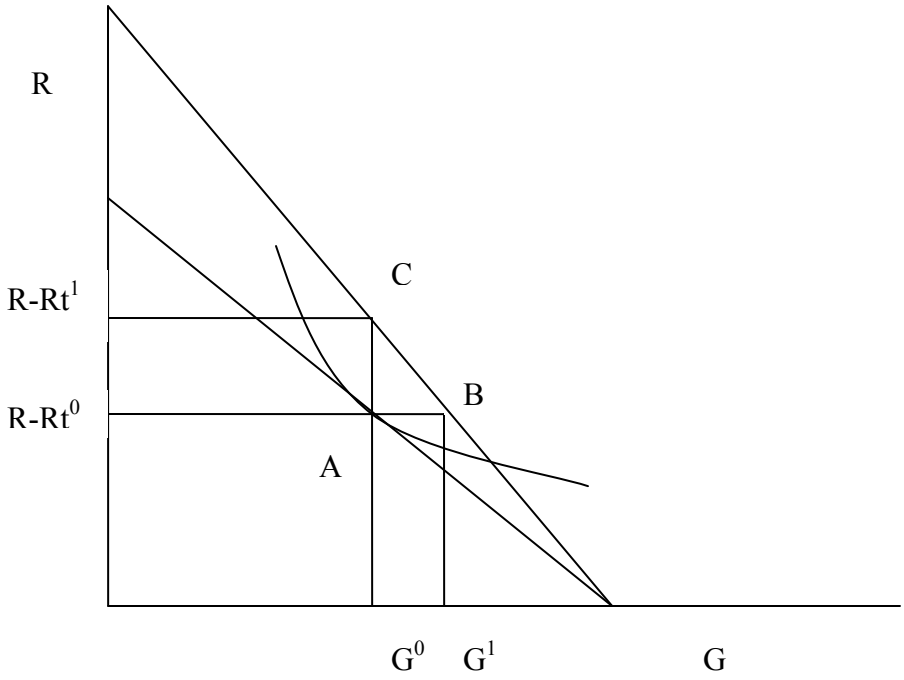


Figure 3.2: Fiscal Adjustments under Potential Surplus

The difference between G^0 and G^1 is the fiscal gap that a state must contend with. This begs the question, when to make a fiscal policy adjustment? Next, what should the adjustment look like?

As a revenue-driven entity, a typical state government starts the budget process with its revenue forecast. If the revenue projection is less than the budget requested, the state faces a potential revenue shortfall and deficit. Since most states operate with balanced budget requirements of some sort, politicians in this situation must adjust discretionary fiscal policy to close any potential gap—using budget stabilization or rainy day funds, proposing tax increases and/or expenditure cuts. After the budget is passed, revenue collections may still fail to meet projections and/or spending demand may

exceed appropriations. Once again, a budget gap emerges. Without further tax increases and/or expenditure cuts, the state will have a deficit by the end of the fiscal year. State government BBR rules (Hou and Smith, 2006) either require action toward deficit elimination within the fiscal year or by the end of the fiscal year (do not allow a deficit to be carried over to the next fiscal year). Even though states can use some cosmetic accounting methods, such as accelerating revenue collections or deferring purchases or the payment of purchases, such accounting tools do not solve the underlying fiscal problem. That is, in such situations, politicians still face hard choices involving tax increases and/or spending cuts.

Given a potential negative fiscal gap, the politician's goal is to minimize the political cost. Tax increases, spending cuts, and deficit financing come at certain political cost. The political cost is in the form of taxpayers' resistance to the tax increases, resistance often most concentrated in rent-seeking and/or special-interest groups. Such political pressure can be expressed mathematically using the following cost-minimization problem:

$$C = f(\Delta T, \Delta S, \Delta Rf, D; X) \tag{3-3}$$

Subject to $Gap = \Delta T + \Delta S + \Delta Rf + D$ (3-4)

where C is the total political cost of fiscal adjustments to close the budget gap. ΔT is the amount of tax increases, ΔS is the amount of spending cuts, ΔRf is the amount transferred from the reserve, and D is the deficit remaining in a particular year. *Gap* stands for the total budget gap occurring in the fiscal year. X is a vector of exogenous variables that affect the political cost, including budgetary institutions (BBRs and TELs), political factors, socio-economic factors, and fiscal factors.

In order to minimize political costs, the politician needs to choose a combination of each fiscal adjustment listed above, until the marginal political cost of each additional dollar of tax increase, spending cut, and deficit remaining are equal. The first order conditions show that:

$$\frac{\partial C}{\partial \Delta T} = \frac{\partial C}{\partial \Delta S} = \frac{\partial C}{\partial Rf} = \frac{\partial C}{\partial D} \tag{3-5}$$

It is assumed that the total political cost C is additively separable in each means of fiscal adjustments $(\partial^2 C / \partial \Delta T \partial \Delta S = 0)$. The assumption of separation implies that the marginal political costs of each fiscal adjustment are independent, as resistance is coming from different groups.

The opposite fiscal situation occurs when the economy is growing, as was exhibited in the United States in the late 1990s. When the projection of revenue exceeds the budget request, the state will realize a potential surplus. Again, once the budget is adopted, revenue may exceed that forecasted; and supplemental appropriations can expand spending or support tax cuts. States may also retain the surplus in the general fund or transfer it to other reserve funds. The effect of a BBR in this instance is weak, since the typical BBR does not require reaching a zero balance.

On the other hand, TELs curtail the growth of government revenue or spending through various limitations. Case studies of the effects of TELs in the states indicate the conduct of tax cuts to meet revenue and expenditure limits (Franklin and Wallis, 2004; Rafool, 1996). Also, some TELs require refunds to taxpayers of surplus funds. While budget stabilization or rainy day funds serve to cushion states from economic downturns, large surpluses give taxpayers reason to think that taxes are excessive and/or government spending is too tight. Especially in periods of surplus, politicians have ample reason to

make fiscal adjustments that can involve tax cuts, spending increases, and/or surplus retention (transfer to reserve funds).

Thus, in the case of a surplus, the goal of the politician remains to maximize his or her political support. While a deficit situation holds the politician to a political cost given the fiscal adjustment choices—tax and/or debt increases and/or spending cuts, a surplus provides opportunity to gain the most political support. That is, the politician will gain political support with whatever fiscal adjustment is taken. Tax cuts are favorable to taxpayers, while spending increases get support from rent-seeking and/or special-interest groups. Still, just like in a deficit situation, the politician chooses a set of fiscal adjustments in order to *maximize* his or her net political support function. Mathematically, this can be expressed in the following political support maximization problem:

$$S = (\Delta T, \Delta S, Sur; X) \tag{3-6}$$

$$\text{Subject to } PS = \Delta T + \Delta S + RS \tag{3-7}$$

where S is the net political support function of dealing with the potential surplus. PS is the total potential surplus in a fiscal year if no action is taken by the politician. ΔT is the dollar amount of total tax cuts and tax refunds. ΔS is the total discretionary spending increase and RS is the retained surplus either remaining in the general fund balance or transferred to the other reserve fund. X again is a vector of exogenous variables that affect the political cost, including budgetary institutions (BBRs and TELs), political factors, socio-economic factors, and fiscal factors.

In order to maximize political support, the politician needs to choose the combination of tax cuts, spending increases, and retained surplus, until the marginal political support of each additional dollar of the three means of fiscal adjustment are equal. The first order condition shows that:

$$\frac{\partial S}{\partial \Delta T} = \frac{\partial S}{\partial \Delta S} = \frac{\partial S}{\partial RS} \tag{3-8}$$

It is assumed that the total political support S is additively separable in each means of fiscal adjustment $(\partial^2 S / \partial \Delta T \partial \Delta S = 0)$. The assumption of separation implies that the marginal political support of each fiscal adjustment is independent, because the support is coming from different groups.

Essentially, minimizing political cost is equivalent to maximizing political support, considering the political cost as negative political support. Thus, combining the two fiscal situations—potential deficit and surplus, the discretionary fiscal policy adjustment can be expressed as solving the problem of maximizing political support function subject to the constraint of fiscal gap:

$$S = f(\Delta T, \Delta S, Rf, D, Sur; X) \tag{3-9}$$

Subject to $Gap = \Delta T + \Delta S + \Delta Rf + D + Sur$ (3-10)

where S is the total political support of fiscal adjustments to deal with the budget gap(potential deficit or surplus). ΔT is the amount of tax changes, ΔS is the amount of spending changes, ΔRf is the change of the reserve fund, D is the deficit remaining in a particular year, *Sur* is retained surplus. *Gap* stands for either positive or negative budget gap occurring in the fiscal year. X is a vector of exogenous variables that affect the

political cost, including budgetary institutions (BBRs and TELs), political factors, socio-economic factors, and fiscal factors.

Mathematically, this is equivalent to a utility function subject to budget constraints. Solving the utility maximization problem allows us to derive demand equations. In this case, solving the political support function will provide a set of "reaction equations" for discretionary fiscal policies, which are shown below:

$$\frac{\Delta T}{Gap} = f_1(Gap, X) \tag{3-11}$$

$$\frac{\Delta S}{Gap} = f_2(Gap, X) \tag{3-12}$$

$$\frac{\Delta Rf}{Gap} = f_3(Gap, X) \tag{3-13}$$

$$\frac{D}{Gap} = f_4(Gap, X) \tag{3-14}$$

$$\frac{Sur}{Gap} = f_5(Gap, X) \tag{3-15}$$

This set of equations is subject to

$$\frac{\Delta T}{Gap} + \frac{\Delta S}{Gap} + \frac{\Delta Rf}{Gap} + \frac{D}{Gap} + \frac{Sur}{Gap} = 1 \tag{3-16}$$

which needs to be estimated as a system. However, if explanatory variables are the same in each equation, the estimation of a system equation is equivalent to the estimation equation by equation (Wooldrige, 2002, pp.143-179). Thus, in the chapter providing the empirical analysis, equations 3-12 and 3-13 are estimated separately.

Discussion of Reserve Fund

Since the focus of this study regards the impact of budgetary institutions (BBRs and TELs) on state government discretionary fiscal policy (tax and spending adjustments), a brief discussion on how to treat the deposit and withdrawal of reserve funds is necessary. State fiscal policy choices are characterized through tax and expenditure actions. Gramlich (1991) argues that state governments should increase taxes and/or cut spending during economic booms and lower taxes and/or increase spending during economic recessions to counter the cyclical effect of the economy. State governments rarely implement such counter-cyclical fiscal policy in pure form, though most states implement such policy using a budget stabilization fund (BSF). Besides reducing/increasing taxes and cutting/increasing spending, most state governments manage one or more budget stabilization or rainy day funds—replenishing or shoring up the BFS when a surplus occurs and drawing from the BSF in the event of a revenue shortfall. When a state transfers surplus revenues into a BSF, it retains the tax revenue which could have potentially been translated into a tax cut or a refund to taxpayers. On the expenditure side, a surplus can potentially be used to increase spending, but with its deposit into a BSF, the state chooses not to increase expenditures. When a state draws from a BSF, the state then does not need to increase taxes (or increase as dramatically) as would be necessary to close the budget gap. On the expenditure side, drawing from a BSF helps the state avoid potential or very dramatic cuts in expenditures.

Part of the reason that states choose to adopt a BSF is to circumvent the fiscal constraints imposed by BBRs and TELs (Knight, 1998). Most states have budget stabilization funds, but funding rules and balance requirements vary from state to state.

Hou (2002) points out that "how to fund a BSF has been, and will remain, a political phenomenon in most states." Certainly, merely having a BSF with a zero balance does not help a state in the event of a budget crisis. What really matters is the management of such funds—how much a state is willing to deposit into a BSF during an economic boom and how much a state can and does withdraw from a BSF during an economic downturn. Politically, depositing surplus funds into a BSF is a less favorable option for a politician compared to either cutting taxes or increasing spending. On the other hand, during a recession, withdrawal from a BSF is more favorable politically than increasing taxes or cutting spending. Given this understanding of the management of budget stabilization funds in various economic environments, the assumption here is that state discretionary fiscal policy choices are made, given the balance change of the BSF in a particular fiscal year. For example, if a state with a surplus has made tax cuts and/or spending increases, it is assumed that the deposit into the BSF has already been made. And if a state has no balance in its BSF, it is treated the same as a state without such a fund.

Development of Hypotheses

BBRs and TELs impose fiscal discipline on state governments when they effect fiscal policies. As public choice theory implies, "The rules or institutions within which various groups operate are likely to affect the outcome of decisions made by these groups" (Bail and Tieslau, 2000, p. 257). Variations in these budgetary institutions lead to different state fiscal policies. "Without a strong balanced budget rule, a state forced to reduce taxes may decide to not reduce expenditures and run a deficit. But with a strong balanced budget rule, a state will be legally required to match reduced taxes with reduced

expenditures" (Knight and Levinson, 1998, pp.6-7). Budgetary institution effectiveness and the interaction among such institutions impacts state fiscal policy choices.

After a transfer into/out of a BSF, the politician typically must still make a decision regarding the composition of fiscal adjustments to deal with the budget gap (either positive or negative). The politician must consider the degree of resistance/support to be received from two opposing groups—taxpayers and rent-seeking/special interest groups. And, the existence of budgetary institutions—BBRs and TELs—imposes fiscal constraints on the state government and the politician that influence possible choices of fiscal adjustment. In a state with a stringent BBR, one that does not allow a deficit to be carried over to the next fiscal year, retention of a deficit will be extremely costly. A stringent BBR forces states and politicians to conduct more severe fiscal adjustments (be it from the revenue side or the expenditure side).

The existence of TELs and their stringency to some extent reflects the level of resistance to tax increases from the taxpayer group. One of Adam and Dougan's (1988) explanations for the passage of TELs is that these limitations are a sign of taxpayers' resistance to the expansion of government in the form of increased taxes or government spending. The purpose of this study is to identify how politicians respond to the existence of such budgetary institutions. States with TELs provide an environment in which the politician will be more constrained when making discretionary fiscal policy choices. Poulson (1994) divided TELs into two categories—strict, citizen-initiated ones and preemptive ones with legislative approval. Essentially, the structural features of TELs are important for determining stringency levels; these stringency levels will be articulated in a following chapter. In this study, the stringency level of TELs signifies the level of

resistance to tax increases by taxpayers. The more stringent the TEL, it is then assumed that the more constrained a politician will be in initiating tax increases.

Not surprisingly, the constraints on generating revenue increases from taxes with a broader base are greater than from those with a narrower base. For example, a small increase in a general sales tax might be easier to pass than a large increase in the gas tax. Therefore, any proposal to increase taxes with a broader base is relatively harder to push through than any proposal to increase taxes with a narrower base. While a rent-seeking group or special interest group may also exert pressure on the politician, the non existence of a TEL or a less stringent TEL signifies that the politician will be more collusive to the rent-seeking or special-interest group, and spending cuts will carry more political cost to the politician.

In all circumstances, the politician needs to choose the composition of fiscal policy that minimizes his or her political cost. The first set of hypotheses is stated below.

Hypothesis 1a: States with stringent BBRs will be more likely to increase taxes or cut spending to deal with a negative fiscal gap compared with states with less stringent BBRs.

Hypothesis 1b: States with TELs will be more likely to enact fewer tax increases and more spending cuts compared to states without TELs or with less stringent TELs.

Hypothesis 1c: States with stringent TELs will enact fewer increases of broad based taxes compared to states without TELs or those with less stringent TELs.

Similar logic applies to states in a surplus situation. Politicians again need to choose a fiscal policy—between tax cuts and spending increases. TELs as discussed above signify resistance from taxpayer groups. A stringent TEL and economic boom will provide an environment in which politicians have an incentive to enact tax cuts and

refunds. Making a fiscal adjustment from the tax side will garner greater support for the politician from the taxpayers group. Similar logic applies to actions taken regarding broader base taxes in a period of economic downturn. Cuts of broad based taxes by the politician will garner stronger support of more taxpayers. In this instance, a politician will also gain support from rent-seeking and/or special interest groups by increasing spending. Again, the politician needs to make fiscal policy choices that maximize political support. The second set of hypotheses that consider these relationships are listed below.

Hypothesis 2a: States with more stringent TELs are more likely to enact tax cuts and make spending increases than states with less stringent or no TELs.

Hypothesis 2b: States with more stringent TELs are more likely to cut broader based taxes than states with less stringent or no TELs.

Aside from the budgetary institutions of BBRs and TELs, other factors certainly contribute to discretionary fiscal policy taken by states. One important variable contributing to state discretionary fiscal policy is state political environment. Political economy literature explains that the party affiliation of the governor and party control of the state legislature impact state fiscal policy choices. Studies by Alt and Lowry (1994) and Poterba (1996) show that divided state governments tend to make fewer revenue adjustments to close budget gaps. Knight (2000) finds that states with a Republican-controlled legislature tend to have higher tax rates, while states with a Democrat governor tend to have lower tax rates. Another political factor worth noting is the election cycle. Politicians are more sensitive and cautious when making fiscal decisions during an election year than in lame duck years. For example, Besley and Case (1995) found that

incumbents significantly increase spending during their lame duck years than during their first year in office.

Almost all the studies on the effect of TELs on government size and growth are based on the state and local government public good demand model developed by Bergstrom and Goodman (1973) and Borcherding and Deacon (1972). This research considers this model as well. The primary variables affecting government and tax revenue growth considered here include personal income, federal grants to state and local governments, and population. Personal income is an indicator of state wealth. Specifically, an increase in personal income leads to higher demand of public goods and services which then requires more state government revenue. A study by Shadbegian (1996) shows that TELs have a different impact on government growth depending upon whether a state is categorized as high or low income. Population is also positively related to the demand for public goods and services; thus, population is expected to have a positive impact on revenue requirements.

The reduction of federal grants to state governments is regarded as a contributing factor to the fiscal crisis in the early 1990s (Poterba, 1996). In this environment, states needed to use more own source revenue to maintain public services. On the one hand, additional federal dollars decrease state need for own source revenue. On the other hand, more than half of federal grants are matching, requiring state contributions of a corresponding share of revenue to fund programs and services in order for this benefit to be realized. Ultimately, federal grants have a positive impact on state revenue requirements. The "fly paper" effect enhances this positive influence—that is, a state benefits from any federal dollars, matching or not, that land within its borders. Due to

data availability and time constraint issues, this research uses total federal grants as a control variable. The expected impact of federal grants is ambiguous.

CHAPTER 4

DEVELOPMENT OF A TEL STRINGENCY INDEX

Introduction

The early years of this new millennium brought renewed interest in state level tax and expenditure limitations. In 2005, 20 states either introduced TEL bills or changed law regarding existing TELs. For example, Maine enacted a statutory spending limit of general funds linked with personal income and population growth in 2005. Maine also proposed a Taxpayers Bill of Rights (TABOR), requiring voter approval on new taxes and tax increases; however, the act failed. Alternatively, in November 2005, Colorado suspended its TEL, a revenue limitation, with voters' approval (McGuire and Rueben, 2006). By 2006, almost one fourth of all states introduced bills regarding imposing new or changing existing TELs (National Council of Nonprofit Association, 2006). More recently, the State of Ohio adopted a statutory spending limit based on population growth and inflation rates.

The effectiveness and stringency of TELs vary across states. No two TELs are alike. In order to better understand how TELs affect state fiscal policy, this study develops an index that measures TEL stringency. Previous studies have categorized TELs according to type, codification, adoption method, formula of limit, and treatment of surplus, existence of waiver or exemptions, override provisions, and the provisions of transfer responsibility to local governments (Rafool, 1996; Mullins and Wallin, 2004). Empirical analyses regarding the effectiveness of TELs tend to focus on the type of limitation, that is, whether it is a tax or expenditure limitation. Studies of reasons for the

creation of TELs pay particular attention to adoption methods and codification. However, limited studies consider other aspects of TEL structures. New's study (2001) indicates that TELs requiring immediate refund of any surplus to taxpayers provide an incentive to politicians to cut taxes. This study strives to shed light on other structural features and so creates a TEL stringency index. Considering TELs as mechanisms of fiscal constraint imposed on state governments, the stringency index accommodates major structural features of these limitations.

Construction of Stringency Index

Types of Limitations

Development of a measure of TEL stringency begins with an analysis of the variety of types of limitations. Rafool (1996) regards limits on revenue, expenditure or appropriation as a traditional TEL, and voter approval/supermajority voting requirements for any tax increases as additional TEL provisions. According to this definition, just six states having traditional revenue limit, including: Colorado, Florida, Louisiana, Massachusetts, Michigan and Missouri. Florida's constitution was amended in 1994 and states that "State revenues collected for any fiscal year shall be limited to state revenues allowed under this subsection for the prior fiscal year plus an adjustment for growth."[2]

The most common type of limitation is the expenditure limit. Twenty-two states have this kind of limitation. Hawaii's constitution provides an example of this type of limitation. According to this state's constitution, "The legislature shall establish a general fund expenditure ceiling which shall limit the rate of growth of general fund

[2] Florida Constitution, Article VII, Section 1.

appropriations, excluding federal funds received by the general fund, to the estimated rate of growth of the State's economy as provided by law."[3]

Given that states are revenue driven, limits on revenue are more restrictive than expenditure ones. Also, Rafool (1996, p.3) argues that expenditure limitations are less restrictive than revenue limitations because "it is easier for states to control spending levels than to anticipate incoming revenues accurately." The least restrictive limitations are appropriation limits, which are based on the revenue estimation. Iowa statute states that "the state general fund expenditure limitation for a fiscal year shall be ninety-nine percent of the adjusted revenue estimate."[4] Such appropriation limits have neither a specific growth limit nor are they tied to any socio-economic index; such limits are more manipulative than other types of limitations. Besides Iowa, there are four other states with such appropriation limits, including: Delaware, Mississippi, Oklahoma, and Rhode Island.

To create the TEL stringency index, numerical scores are assigned to each type of limitation by state. A state with no tax and/or expenditure limitations receives a score of zero (0). States with the least restrictive appropriation limitations receive a TEL stringency score of 1; states with expenditure limitations receive a score of 2; and states with revenue limitations receive a score of 3. The TEL stringency index is an ordinal measurement. That is, one score higher or lower than another simply indicates more or less stringency; the index does not indicate exactly how stringent any specific TEL is (on an interval scale).

[3] Hawaii Constitution, Article VII, Section 9.
[4] Iowa Code, Section 8-54-3.

In addition to these basic limitations that directly control the growth of state revenue and/or expenditure, some states also impose restrictions on introducing new or increasing existing taxes, i.e. voter approval/supermajority voting requirements. For example, all tax increases need voter approval in Colorado. Tax increases that will yield over $70 million need voter approval in Missouri. Tax increases that cause revenue to exceed the spending limit require voter approval in Washington. All three of these states also have supermajority requirements, necessitating such legislative approval for tax changes. There are 13 other states that have supermajority requirements for tax increases (NCSL, 2006). In all of these states (16), introducing a new tax or increasing a tax requires a vote of approval by three fifths, two thirds, or three quarters of the legislature. A typical supermajority voting requirement is stated in Arizona's constitution: "An act that provides for a net increase in state revenues, as described in subsection B is effective on the affirmative vote of two-thirds of the members of each house of the legislature."[5]

The provision of voter approval and supermajority requirements complicates this analysis. That is, while voter approval/supermajority voting requirements are procedural requirements that curtail potential revenue increases, such requirements do not directly set revenue or expenditure limits. In most cases, states having traditional TELs also have adopted a supermajority voting requirement. Only Arkansas, Kentucky and South Dakota have a supermajority voting requirement in place without a traditional TEL. Florida, Louisiana and Mississippi adopted a supermajority voting requirement prior to establishing each of these states' TEL. Other states having such a requirement either adopted it at the same time or later than the creation of their TEL. In this study, a supermajority voting requirement is regarded as supplemental to any traditional TEL and

[5] Arizona Constitution, Article IX, Section 22(A).

therefore contributes to the effectiveness of the existing TEL; any state with such a voting requirement receives one point added to their TEL stringency index. Further, to account for specific percentages of legislative vote required, this percentage is converted to a numerical score and added to the TEL stringency score. For example, Michigan receives a score of 1.75 for its TEL and its supermajority voting requirement of three quarters of the legislature voting to support tax increasing. Likewise, Mississippi receives a score of 1.6 and Nevada a score of 1.67, indicative of the TELs in each state and specific supermajority voting requirements.

Limitation Formulations

State revenue and expenditure limitations are usually tied to a socio-economic index—a percentage of personal income, personal income growth rate, population growth and/or an inflation index usually serve as the basis for these limitations. Seven states hold revenues and/or expenditures to a percentage of personal income. For example, Michigan's revenue limitation as stated in its constitution:

> Effective with fiscal year 1979-1980, and for each fiscal year thereafter, the legislature shall not impose taxes of any kind which, together with all other revenues of the state, federal aid excluded, exceed the revenue limit established in this section. The revenue limit shall be equal to the product of the ratio of Total State Revenues in fiscal year 1978-79 divided by the Personal Income of Michigan in calendar year 1977 multiplied by the Personal Income of Michigan in either the prior calendar year or the average of Personal Income of Michigan in the previous three calendar years, whichever is greater.[6]

[6] Michigan Constitution, Article IX, Section 26.

Using this calculation, Michigan's revenue growth limit is 9.49 percent of the prior year's personal income. Louisiana and Missouri are the other states that limit revenue growth to a certain percentage of personal income.

Four states, Arizona, Idaho, North Carolina and Oregon, apply a percentage of personal income to limit expenditures. For instance, in Arizona "the legislature shall not appropriate for any fiscal year state revenues in excess of seven percent of the total personal income of the state for that fiscal year as determined by the economic estimates commission"[7]

Other states link their revenue or expenditure limitation to the personal income growth rate; often, these states use an across years average personal income growth rate. Wisconsin is the only state that ties its expenditure limitation to an annual personal income growth rate. Oregon and Texas use a two-year average personal income growth rate to limit expenditures. States using a three-year average growth rate as the limitation base include: Hawaii, Louisiana, Massachusetts, Montana, and South Carolina. New Jersey uses a four-year average growth rate to limit its expenditures. The limitation base for Connecticut and Florida is a five-year average growth rate.

Some newly established state expenditure limitations are tied with longer term average personal income growth rates. Indiana applies a six-year average while Maine and Washington use a ten-year average. These multiple-year averages take economic volatility into consideration. Also, an even more stringent limitation formula incorporates both population growth rate plus an inflation index (especially since population growth rate is significantly less than the personal income growth rate) (New, 2000). Alaska, Colorado, California, Nevada, Washington and Utah use such stringent indices as their

[7] Arizona Constitution, Article IX, Section 17.

limitation base. In Washington "[t]he state expenditure limit for any fiscal year shall be the previous fiscal year's state expenditure limit increased by a percentage rate that equals the fiscal growth factor. … 'Fiscal growth factor' means the average of the sum of inflation and population change for each of the prior three fiscal years."[8] Results of New's study (2000) show that a state with TELs that ties the limitation to the inflation rate plus population growth rate reduces state and local direct general expenditure by approximately $100.25 per capita more than a state with a TEL without such a provision. In the present research, the four states with a limitation based on population growth and inflation rate receive an additional point on the TEL stringency index. States that link their revenue or expenditure limitation to a percentage of personal income *or* personal income growth rate do not receive an additional point on the TEL stringency index.

Treatment of Surplus

Another factor that contributes to the stringency index of TELs in this study regards state treatment of a surplus. Such treatment, like base indices above, also varies from state to state. For example, four states require an immediate refund of any surplus over appropriated revenues to taxpayers; these states include California, Colorado, Hawaii, and Louisiana. California's constitution states that:

> Fifty percent of all revenues received by the State in a fiscal year and in the fiscal year immediately following it in excess of the amount which may be appropriated by the State in compliance with this article during that fiscal year and the fiscal year immediately following it shall be returned by a revision of tax rates or fee schedules within the next two subsequent fiscal years.[9]

[8] Washington Code, Chapter 42.135.
[9] California Constitution, Article XIII B, Section 2.a.

Louisiana has two TELs in place, its revenue limitation passed in 1979 by legislative vote, with a provision of immediate tax refund; the state's expenditure limitation passed in 1993 by legislative referendum and requires that the surplus be used to retire debt in advance of maturity. Some states transfer any such surplus to a budget stabilization fund before issuing any refund to taxpayers; the excess of a certain percentage of the general fund or the limit of the budget stabilization fund goes back to the taxpayer as a tax rebate. States with this type of provision include Florida, Massachusetts, Michigan, Missouri, and Oregon. For example, Michigan's constitution states:

> For any fiscal year in the event that Total State Revenues exceed the revenue limit established in this section by 1% or more, the excess revenues shall be refunded pro rata based on the liability reported on the Michigan income tax and single business tax (or its successor tax or taxes) annual returns filed following the close of such fiscal year. If the excess is less than 1%, this excess may be transferred to the State Budget Stabilization Fund.[10]

Finally, some states transfer any surplus to their cash reserve fund or a special education fund or use the surplus to pay debt or match federal program funding. New (2000) argues that TELs requiring an immediate tax refund of any surplus to taxpayers provide an incentive for politicians to cut taxes; such provisions therefore strengthen the restrictiveness of any such TELs. The equity issue makes the tax refund problematic, however. High-income taxpayers will gain a higher percentage of any refund. Case studies of Missouri and Colorado indicate that legislators considered or enacted tax cuts to prevent exceeding those state's limitations. (Rafool, 1996; Franklin and Wallis, 2004) Given the research regarding TELs and tax refunding requirements, the present TEL

[10] Michigan Constitution, Article IX, Section 26.

stringency index applies one additional point to scores for those states that require taxes be refunded to taxpayers in the event of a surplus. States without any such TEL refunding provision do not receive this additional point on the TEL index.

Waiver Provisions

Most TELs also have waiver and exemption provisions. A waiver clause usually requires the governor to declare an emergency under unforeseen events and then warrant action by the legislature; most require legislative approval for the declaration of the waiver or exemption to the TEL due to the emergency. There are six states that require a simple majority vote by the legislature to exceed the TEL. Most of the TELs require at least three-fifths of the legislative votes as in Delaware, Florida, Mississippi, Oregon and Connecticut. A two-third vote requirement is the most common and is found in 19 states. Three states, Arkansas, Alaska and Oklahoma, require a three-fourths legislative vote in order to override the limit. An example of the waiver clause can be found in Connecticut's constitution: "…unless the governor declares an emergency or the existence of extraordinary circumstances and at least three-fifths of the members of each house of the general assembly vote to exceed such limit for the purposes of such emergency or extraordinary circumstances."[11]

Such waiver or exemption provisions are accounted for in the TEL stringency index developed here. Specifically, the percentage of votes required to override the TEL is converted to numerical scores—the greater the number of legislative votes needed to override the TEL, the higher the stringency score. If the waiver provision requires voter instead of legislative approval, the state's TEL stringency index receives an additional

[11] Connecticut Constitution, Article XXVIII, Section 18b.

point. If the state's TEL has no such provision, which indicates no allowance of waiver, a state's TEL stringency index also receives an additional point.

Responsibility Transfer to Local Governments

Another element of state government TELs examined in this research is the provision of transfer responsibility to local governments. If a TEL does not prohibit transferring responsibility to the local government, then a state does not need to make tax and/or spending changes, but can instead pass the burden on to its local governments. Fourteen states having such transfer provisions. A typical provision regarding the transfer of responsibility to local governments can be seen in Michigan's constitution:

> The state is hereby prohibited from reducing the state financed proportion of the necessary costs of any existing activity or service required of units of Local Government by state law. A new activity or service or an increase in the level of any activity or service beyond that required by existing law shall not be required by the legislature or any state agency of units of Local Government, unless a state appropriation is made and disbursed to pay the unit of Local Government for any necessary increased costs.[12]

States with a provision that *prohibits* passing such responsibility to local governments receive one additional point on their TEL stringency score.

Description of the Stringency Index

Based on this review of the structural features of state TELs, the TEL stringency score of a state equals the sum of scores received from each feature that exists. Table 2-1 details these structural features and subsequent stringency scores of the states having TELs as of January, 2007. This table also notes codification and adoption, although

[12] Michigan Constitution, Article IX, Section 29.

legal format is not considered in the assignment of TEL stringency scores. Figure 2-1 visually displays the TEL stringency scores by state on a map of the United States.

As of January 2007, 34 states have 49 tax and/or expenditure limits in place (including 16 states with a supermajority voting requirement as a limitation on revenue). Arkansas, Kentucky, and South Dakota have just a supermajority voting requirement to increase taxes as a limitation. Thirteen states have a hybrid TEL in place. For example, Colorado and Louisiana each have traditional revenue and expenditure limitations as well as a supermajority voting requirement. Before 1970, only Arkansas and Louisiana were operating under a supermajority voting requirement. That decade brought the first wave of TEL adoptions in the states. By the end of 1979, an additional 12 TELs were adopted by 11 states. The 1990s brought a second wave of TEL adoptions, when 20 TELs were adopted by 16 states. The mean and median stringency scores for TELs, as of January 2007 and as represented in Table 2-1, are 3.9 and 3.1, respectively. Colorado has the most stringent TEL, with a score of 9. Excluding three states having only a supermajority voting requirement for tax increases in place, Rhode Island has the least stringent TEL with a score of 2.

Colorado, with the most stringent TEL as measured here, has aroused great attention among scholars and policy makers (Rafool, 1996; James and Wallis, 2004). Colorado first adopted a statutory spending limit in 1991 (SB91-1262) that limits general fund expenditures to the lesser of 106 percent of prior year's appropriation or five percent of the prior two years' personal income. On November 3, 1992, voters in Colorado adopted a more stringent TEL, known as Amendment One or the Taxpayer Bill of Rights (TABOR). This amendment is embedded in the state constitution as Article X, section 20.

Table 4-1 Stringency Index of State TEL

State	Year	Type	Supermajority voting requirement	Waiver votes required	Formula of Limitation	Treatment of surplus	Provision of responsibility transfer	Total Stringency Score	Adoption Method	Codification
AK	1982	Exp		3/4 L	POP+CPI	none	none	**3.75**	R	C
AR	1934		3/4 L				none	**1.75**	R,C	C
AZ	1978	Exp	2/3 L	2/3 L	7.23% of Inc	none	yes	**5.34**	R	C
CA	1979	Exp	2/3 L	V	Pop+CPI	Refund	yes	**7.67**	C	C
CO	1991	Exp		1/2 L	6% of prior year's Appr	none	none	**2.5**	L	S
CO	1992	Rev	1/2 V	E,1/2 V	POP+CPI	Refund	yes	**9**	C	C
CT[i]	1991 1992	Exp		E 3/5 L	INC G	BSF Debt	none	**2.6**	L	S,C
DE	1980	Appro	3/5 L	E 3/5 L	INC G	Other funds	none	**3.2**	R	C
FL[ii]	1994 1996	Rev	2/3 V	2/3 L	5 year Ave INC G	BSF and Refund	yes	**7.67**	R,C	C
HI	1978	Exp		2/3 L	3 year Ave INC G	Refund	none	**4.67**	CC	C
IA	1992	Appr		none	Rev Est	Other funds	yes	**3**	L	S
ID	1980	Exp		none	5.33% of INC	none	none	**3**	L	S
IN	2004	Exp		1/2 L	INC G	none	none	**2.5**	L	S
KY	2000		3/5 L					**1.6**	L	S
LA	1979	Rev	2/3 L	1/2 L	% of tax Rev in FY 1978-79 to 1977 INC	tax surplus fund refund	none	**6.17**	L	S

Table 4-1 Continued

State	Year	Type	Supermajority voting requirement	Waiver votes required	Formula of Limitation	Treatment of surplus	Provision of responsibility transfer	Total Stringency Score	Adoption Method	Codification
LA	1993	Exp		2/3 L	3 year Ave INC G	Debt	none	**2.67**	R	C
MA	1986	Rev		1/2 L	wages and salaries G	BSF Refund	yes	**5.5**	C	S
ME	2005	Exp		1/2 L	INC G	none	none	**2.5**	L	S
MI	1978	Rev		E 2/3 L	9.49% of INC	BSF, Refund	yes	**5.67**	C	C
MO	1980	Rev	1/2 V	E 2/3 L	5.64% of INC	general revenue fund, Refund	none	**7.67**	C	C
MS	1982	Appr		None	Rev Est	Other funds	yes	**3**	L	S
MT[iii]	1981	Exp		E 2/3 L	INC G	none	none	**2.67**	L	S
NC	1991	Exp			7% of INC	general fund	none	**2**	L	S
NJ	1992	Exp		2/3 L	4 years Ave INC G	none	yes	**3.67**	L	S
NV	1979	Exp	2/3 L		POP+CPI	none	none	**4.67**	L	S
OH	2006	Exp		2/3 L	POP+CPI	none	none	**3.67**	L	S
OK	1985	Appr	3/4 L		Rev Est	BSF	none	**2.75**	R	C
OR[iv]	1979/2001	Exp	2/3 L	1/2 L	2 years ave INC G/8% of INC	Refund	yes	**6.17**	L,R	S
RI	1992	Appr		None	Rev Est	BFS	none	**2**	R	C
SC	1980 1984	Exp		E 2/3 L	INC G	Other funds	none	**2.67**	R	C

Table 4-1 Continued

State	Year	Type	Supermajority voting requirement	Waiver votes required	Formula of Limitation	Treatment of surplus	Provision of responsibility transfer	Total Stringency Score	Adoption Method	Codification
TN	1978	Exp		1/2 L	INC G	none	yes	**3.5**	CC	C
TX	1978	Exp		E 1/2 L	INC G	none	none	**2.5**	R	C
UT[v]	1988	Exp		E 2/3 L	POP+CPI	none	yes	**4**	L	S
WA[vi]	1993/2004	Exp	2/3 L	V	POP+CPI	Other funds	yes	**5.67**	C	S
WI	2003	Exp		2/3 L	INC G	BSF	none	**2.67**	L	S

Rev= Revenue
Exp= Expenditure
Appr=Appropriation
INC= Personal Income
CPI= Inflation rate

E= Emergency
Est=Estimate
G= growth
L=Legislative
R=Voters Referendum

V=Voters
C= Constitution
CC= Constitution Convention
S=Statute
BSF= Budget Stabilization Fund

Sources: State constitutions and statutes, Rafool (1996) and Mullins & Wallin (2004).

i Connecticut's statutory restriction remains in effect unless the legislature defines the term or growth restriction by 3/5 votes.
ii Florida's supermajority voting requirement in 1971 requires 3/5 legislative votes to increase the corporate tax, which is adopted through voter referendum. In 1996, the state adopted a voter approval requirement (through citizen initiative) which requires 2/3 votes of the people to increase or impose new taxes.
iii Montana's revenue limit was invalidated in 1998.
iv Oregon amended its TEL formula from two years average personal income growth rate to no greater than eight percent of projected personal income in the same biennium.
v Utah amended its TEL formula from a personal income, population growth plus inflation to population growth plus inflation growth.
vi Washington's revenue limit was invalidated in 1999? In 2004, it amended its TEL formula from population plus inflation to a 10 year average personal income growth rate, effective in the 2007 biennium. This table recognizes the formula prior to 1999.

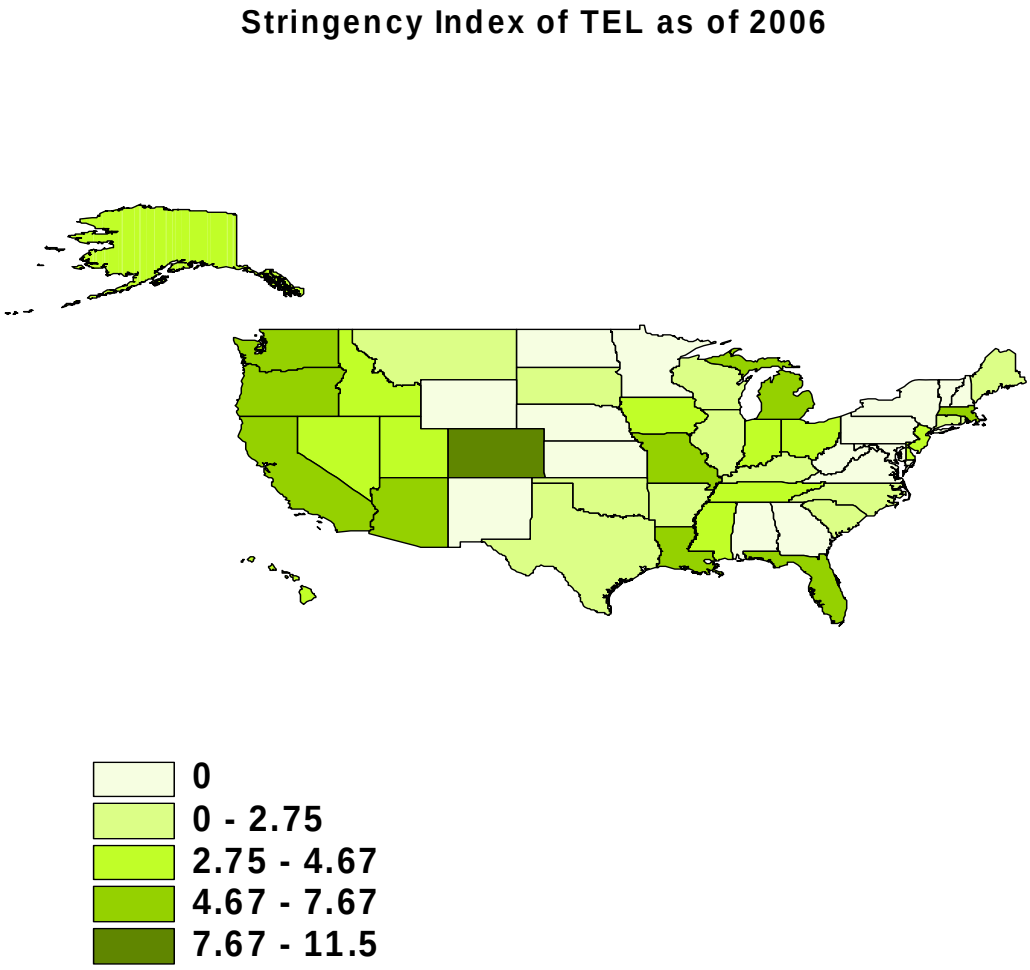


Figure 4.1: Stringency Index of State TELs

Colorado's TABOR contains the most stringent components of TELs, as measured in this research. First, TABOR includes a revenue limit based on the population growth rate and an inflation rate. TABOR also requires an immediate tax refund to the taxpayers, in the event of a surplus. Further, voter approval is required to impose new taxes, increase taxes or override the revenue limit. Even though an emergency can be declared by two-thirds of the state legislature, such an emergency cannot be declared due to economic conditions, revenue shortfalls, or for salary increases. And TABOR requires that voters approve any such increases under emergency at the next election. The amendment also allows local governments to reduce or end their subsidy for any state-mandated program, except for K-12 education; this prevents the state from transferring responsibility for maintaining any limit to local governments.

Colorado's TABOR, combined with a previously imposed spending limit, constrained this state's revenue generation and spending. In 1998, Colorado was unable to pass a proposal to retain $1 billion in five years for capital investment in transportation and education. To live within TABOR, the state had to enact 17 temporary tax cuts totaling $241 million in fiscal year 2000 to 2001. Moreover, TABOR also triggered permanent tax cuts. In fiscal 2001, the state income tax rate was reduced from five percent to 4.63 percent; and, the sales and use tax rate was reduced from three percent to 2.9 percent. As a result, taxes were permanently cut by $579.5 million (James and Wallis, 2004).

Regional Difference of TEL Stringency Index

Examination of regional differences of TELs across the states is interesting. Table 4-2 presents mean TEL stringency scores by region. TELs are most prevalent in

the Far West region of the United States—all six states in that region have some form of TEL in place. The Far West has adopted the most stringent TELs, with an average stringency score of 5.4, compared to the national average of 4.0. The Rocky Mountain area also has a higher average stringency score; four out of five states in this region have TELs in place. Colorado boosts the average stringency score of this area. Eleven out of 16 Southern states have TELs in place. Though TELs are prevalent in this area, the average stringency score for Southern states is 3.5 and falls 0.5 points lower than the mean score for all states. Only two states in the Atlantic area have adopted TELs, this region has an average TEL stringency score of 3.4. The New England region indicates states with the least stringent TELs; the average score in this region is 3.2.

Table 4.2: Regional Differences in the Adoption and Stringency of TELS

Region	Number of TEL States (% of Region)	Average TEL Stringency Score
Far West (6)	6 (100.0%)	5.4
Rocky Mountain (5)	4 (80.0%)	4.7
Plains (7)	3 (43.0%)	4.1
Great Lakes (5)	4 (80.0%)	3.6
Southeast (12)	8 (67.7%)	3.5
Southwest (4)	3 (75.0%)	3.5
Mid-Atlantic (5)	2 (40.0%)	3.4
New England (6)	4 (67.0%)	3.2

TEL Codification and Stringency Index

Among all the states having TELs, 29 states have TELs imposed by constitution and 20 have TELs imposed by statutes. Constitutional TELs are often regarded as more restrictive than statutory ones, given the greater difficulty in amending state constitutions (New, 2001; Poulson, 2005; Resnick, 2004; Sepp, 1999). However, this assumption is

challenged by Hou and Smith (2006). In their study of BBRs, they argue that the stringency of such restrictions depends more on specific content than on codification method. In some states where TELs are constitutionally imposed (as in South Carolina, Tennessee, Connecticut, Hawaii and Texas), the growth restriction components are defined in statutes, which can be modified by the legislature. In addition and as noted earlier, most TELs have a waiver provision that allows the legislature to override the limit. Thus, codification of TELs is not considered here to automatically contribute to the stringency of the measure. Comparing TEL stringency scores between those determined by state constitution versus state statute confirms this point. The mean stringency score of constitutional TELs is 4.3, only 0.9 points higher than the mean stringency score of statutory TELs (3.4). This difference is not statistically significant.

TEL Adoption Method and Stringency Index

The passage of California's Proposition 13, a symbol of the start of a tax revolt in states in the late 1970s, launched the first wave of tax and expenditure limitation adoptions in these governments. Fourteen out of 49 TELs have been adopted through citizen initiative, 16 TELs have been adopted by state legislatures, 17 by legislative referendum, and two by state constitutional convention. Alm and Skidmore (1999) examined TELs passed at the state and local levels from 1978 to 1990 and found that economic prosperity enhanced tax resistance, thereby increasing the probability of passing TELs in the state election. However, this study does not differentiate adoption methods of TELs. Tax resistance may well explain the passage of TELs through the citizen initiative process or legislative referendum; however, 17 state TELs were

proposed and passed by the state legislature. Why should legislators impose such limits on themselves?

The rent-seeking model considers the budgetary institution's design, for instance, the TEL, as a dynamic process. The budgetary institution's effectiveness in terms of imposing fiscal discipline depends on the interaction between the politician, the taxpayer group, and the rent-seeking group. In this model, taxpayers initiate a budgetary institution to constrain the public budget in order to protect them from rent-seeking activities. The rent-seeking group will influence the politician to protect their interests. The politician's response to the two opposing groups will determine the budgetary institution's effectiveness (Poulson, 1994). Using the rent-seeking model, budgetary institutions like TELs can be categorized into four types, based on stringency.

First, politicians may work as altruists and fully support the taxpayer group. This will lead to more stringent and effective budgetary institutions that impose fiscal discipline on the government. Such an institution constrains government fiscal expansion. Second, politicians may respond more to the rent-seeking group than to the taxpayer group. In order to avoid the strict fiscal constraint initiated by voters and to maximize their own interests, politicians will create preemptive budgetary institutions, which reduce the taxpayer group's incentive to initiate stricter budgetary institutions. And politicians need to convince the rent-seeking group that these preemptive institutions will prevent dramatic reduction of financial transfers imposed by the taxpayer group. Third, politicians can create preemptive institutions to benefit and support the rent-seeking group while sacrificing benefits of competing rent-seeking groups. This kind of budgetary institution will reshuffle the composition of expenditures among rent-seeking

groups, but serve as a less effective or less certain fiscal constraint. Fourth, the politician may work at the opposite extreme from the altruist, imposing totally ineffective budgetary institutions which can be easily circumvented.

Theoretically, TELs adopted through citizen initiative are more stringent than ones adopted through legislative votes. The adoption method is different from other structural features of TELs, as discussed above. This study considers that the contents of TELs are stronger determinants of their stringency than their adoption methods; therefore this research constructs the stringency index by quantifying the specific features of the limitations rather than their adoption procedure. Nonetheless, Table 4-3 illustrates that the stringency index for states with TELs adopted through citizen initiative are higher than the scores for states with TELs adopted by other means. The average stringency score of states with TELs adopted by citizen initiative is 7.14, more than twice the average score of states with legislature-approved TELs; 2.52 points higher than those with TELs adopted by legislative referenda; and 3.05 points higher than those with TELs adopted by constitutional convention. Using the t-test to compare means, the average stringency score of TELs adopted through citizen initiative is statistically higher than TELs created through these other methods.[13]

Table 4.3: TEL Adoption Method and Stringency Index

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Adoption Methods	Number of States	Average Stringency Score
Citizen Initiative	6	7.14
Legislative Referendum	9	3.62
Constitution Convention	2	4.09
Legislature	16	3.33

[13] The t-test statistics are 5.9 (comparing citizen initiative with legislative approval), 4.8 (comparing citizen initiative with legislative referenda), and 3.67 (comparing citizen initiative with constitution convention), with p-values of 0.000.

As shown in Tables 4-4 and 4-5, two-thirds of TELs adopted through citizen initiative are revenue limitations; half of them have the limitation formula based on population plus inflation, two thirds of them have a tax refund provision, and all of them require the limit to be adjusted if the responsibility is transferred to local government. Among 16 states with TELs that are enacted by the legislature, only one is a revenue limitation, two have a tax refund provision and two have provisions that require the limit to be adjusted if the responsibility is transferred to the local governments.

Table 4.4: TEL Adoption Method and Type of Limitation

Limitation / Adoption Method	Revenue Limitation	Expenditure Limitation	Appropriation Limitation
Citizen Initiative (6)	4 (66.7%)	2 (33.3)	0
Legislative Referendum (9)	1 (11.1%)	5 (55.6%)	3 (33.3%)
Constitution Convention (2)	0	2 (100%)	0
Legislature (16)	1 (6.3%)	13 (81.3%)	2 (12.5%)

Table 4.5: TEL Adoption Method and Other Structural Features

Structural Features / Adoption Method	Population plus Inflation	Personal Income Growth	Other Formulas	Tax Refund Provision	Responsibility Transfer Provision
Citizen Initiative (6)	3	2	1	4	6
Legislative Referendum (9)	1	6	3	2	2
Constitution Convention (2)	0	2	0	1	5
Legislature (16)	3	10	3	2	2

The construction of the stringency index covers major structural features of existing state-level TELs. Stringent TELs may help restrain state governments' growth; however, as the economy fluctuates, these limitations exert pressure on state governments to handle volatile fiscal situations. The construction of the stringency index not only provides a better understanding of the structure of TELs, but also facilitates research on the impact of TELs on state fiscal policy.

CHAPTER 5

DATA AND RESEARCH METHODOLOGY

This chapter begins with the introduction of data sources followed by a discussion of the econometric methods used in this study.

Data Sources

The unit of analysis of this effort is state government, and the time period of study is from fiscal years (FY) 1988 to 2006, covering two fiscal crises separated by a period of economic boom. The data used for this dissertation comes from various sources. Fiscal surveys conducted by NASBO since fiscal 1988 will be accessed. The primary source of fiscal data is the Fiscal Survey of the States conducted by the National Association of State Budget Officers (NASBO). Each year, NASBO publishes a spring and fall issue of fiscal surveys based on state responses. These surveys contain fiscal data regarding actual general fund revenues and expenditures in the last fiscal year, estimates of general fund revenues and expenditures of the current fiscal year as projected at the beginning of the fiscal year and the ending balance of the general and budget stabilization funds. NASBO also began to collect information on state budget cuts after adoption in each fiscal year since the mid-1980s. Data on tax and fee changes have been collected since 1988. States are asked to provide information on tax and fee increases/decreases of more than $1 million adopted in the last legislative session. The category of revenue changes includes

personal income tax, corporate income tax, cigarette tax, motor fuel tax[14], alcoholic beverages tax, and other taxes and fees. Virtually all 50 states respond to these surveys. This fiscal data is used to construct the dependent variables and some independent variables for this study.

The Bureau of Economic Analysis provides data on personal income and population by state. Federal grant data is obtained from the United States Bureau of Census State Government Finance dataset. *The Book of the States* by the Council of State Governments provides data on governors' party affiliation and partisan composition of the state legislature. Finally, the National Council of State Legislatures provides up-to-date information on state TELs. The stringency index of TELs by state constructed in Chapter 4 takes advantage of this information as well as state constitutions and code. In regard to the other budgetary institution, BBRs, the measures used are taken from the recent study by Hou and Smith (2006).

Estimation Methodology

As discussed earlier in Chapter3, solving the problem of minimizing political costs/maximizing political support yields a set of "reaction equations" for discretionary fiscal policies. The same set of explanatory variables in each equation allows the estimation of equations separately (Wooldrige, 2002, pp. 143-179). In order to conduct a quantitative analysis of the relations between government fiscal policy choices and budgetary institutions over time the panel regression technique is used. The following two equations will summarize the econometric models in a simple way.

$$\Delta tax_{it} = \alpha_0 + FS_{it}\,\alpha_1 + Inst_{it}\,\alpha_2 + FS_{it} * Inst_{it}\,\alpha_3 + X_{it}\,\alpha_4 + \mu 1_{it} \qquad (5\text{-}1)$$

[14] Each fiscal survey preface indicates that "the survey presents aggregate and individual data on states' general fund receipts, expenditure and balances." Therefore, all the tax sources here are regarded as general fund revenue receipts.

$$\Delta spending_{it} = \beta_0 + FS_{it}\beta_1 + Inst_{it}\beta_2 + FS_{it}*Inst_{it}\beta_3 + X_{it}\beta_4 + \mu 2_{it} \quad (5\text{-}2)$$

Where *i* indexes cross-section observations (states) from 1 to 47[15] and *t* indexes time series from 1 to T (1988—2006), the vector *Δtax* and *Δspending* contains observation of the two dependent variables in this study (real per capita tax changes and spending cuts of state *i* in year *t*). The matrix *FS* is a vector of fiscal situation (potential surplus or deficit) of stat *i* in year *t*. The Matrix *Inst* contains observations of the BBRs and TELs of state *i* in year *t*. The matrix *FS*Inst* is a vector of interaction terms between the fiscal situation and budgetary institutions. The Matrix *X* contains observations of the socio-economic, political and fiscal variables of this study of state *i* in year *t.*

There are two major approaches to analyze panel date—the fixed effect model and the random effect model. A fixed-effect model is defined as:

$$Y_{it} = x_{it}'\beta + \varepsilon_{it} + \alpha_i + \delta_t \quad (5\text{-}3)$$

where α_i represents the state-fixed effects and δ_t the year-fixed effects. The fixed-effects model allows the error term ε_{it} to be correlated with state effects α_i, which is a more robust specification than random effect model. The assumption of the random effect model requires that unobserved effect α_i is independent. The random effect is more suitable if the group effect is randomly chosen from a large population. In this study, the unit of analysis is state government, and almost all state governments are included, so the unobserved state effect is no longer random. Theoretically, the fixed model is a better fit for this study. The Hausman test is a common procedure for choosing between the fixed and random effect methods. The test results show that the fixed effect method is more appropriate for this study.

[15] Nebraska is excluded from the analysis due to non-partisan legislative elections.

In addition, the fixed effect model can reduce the endogenous problem in this study. The study of the effect of budgetary institutions on fiscal policy faces two kinds of endogenous problem. One is the simultaneous problem. States with rapid spending growth may be more likely to adopt TELs, since the dependent variable in the study is the tax and spending change instead of the overall revenue or expenditure growth. The discretionary fiscal policy is chosen, given that the TEL is already in place. The nature of the dependent variable circumvents this simultaneity problem.

Another endogenous problem arises from the fact that the existence of a TEL may also be a function of voters' preference. A non-TEL state with fiscally conservative voters may adopt the same composition of tax and spending changes to deal with a potential fiscal surplus or deficit. Not including voters' preferences will cause the omitted variable problem. However, voters' preferences are hard to measure in this case. Potentially, a fixed-effect model can help eliminate this problem, assuming that voters' preference is time invariant, which is included in the unobserved state effects α_i. Therefore, the fixed-effect model is favorable for this study, both theoretically and practically.

The econometric analysis of panel data faces the challenge of potential heteroskedasticity and serial correlation in the error term. In the presence of heteroskedasticity and autocorrelation, the estimation of standard error or the regression model is not accurate; thus, the inferential *t* statistics, dividing the standard error by the coefficient, will be misleading. The Breusch-Pagn/Cook-Wesberg test shows the existence of heterskedasticity in this study's error terms, and the Wooldridge (2002) test confirms the existence of autocorrelation. One approach for handling these two problems

is to adopt the Newey-West estimation procedure, which deals with these two problems. This procedure yields ordinary least square estimates with heteroskedasticity and autocorrelation (HAC) standard errors. State and year fixed effects will be included in the Newey-West regression.

In the case of tax changes, we have the data on both sides of the changes—tax increases and cuts. When using tax change as the dependent variable and running the regression on all independent variables, there is an implied assumption that the impact of the independent variables on tax change is symmetrical. The potential fiscal surplus or deficit is the major driving force for the state to enact tax changes; however, potential surplus and deficit are two opposite fiscal circumstances for states. State fiscal policy adjustment with respect to tax change will be different. In addition, as hypothesized previously, states with stringent TELs are less likely to increase taxes in response to a potential deficit than non-TEL states and more likely to cut taxes than non-TEL states. Without differentiating the positive and negative values of a fiscal gap, the restriction of the same adjustment dynamic is imposed. To deal with this asymmetric issue, the spline regression or piecewise regression technique is adopted. Green (1997, 388-390) briefly discusses the application of the spline function in linear regression. The threshold value is called knots. The next chapter explains how to differentiate these two fiscal situations—potential surplus and deficit—and how to apply the spline linear regression technique in the analysis.

Another methodological issue arises when examining the effect of budgetary institutions on spending change. NASBO's fiscal surveys only report spending cuts but not increases after the budget is adopted. In addition, states do not cut spending each year.

Among all 893 observations in the dataset (47 states multiplied by 19 years), 597 (67 percent) observations have a value of 0 for the dependent variable—spending cuts. As a result, we have a censored dataset, as defined by Breen (1996). The dependent variable—spending change—is known exactly only if states enacted spending cuts, while independent variables are observed regardless of whether states enacted spending cuts or not.

To handle this, the Tobit fixed-effect model is adopted, which is defined as:

$$Y_{it}* = x_{it}'\beta + \varepsilon_{it} + \alpha_i + \delta_{it} \tag{5-4}$$

$$Y_{it} = \max(0, y_{it}*); \varepsilon_{it} \sim N(0, \sigma_\varepsilon^2) \tag{5-5}$$

where $Y_{it}*$ is the latent variables, which are unobserved if $Y_{it}*<0$. The coefficient of β is the expected value of the underlying latent variables. The unconditional expected value of the realized variable is expressed as follows:

$$E(y_i \mid x_i) = \Phi_i(x'_i\,\beta + \sigma\frac{\phi_i}{\Phi_i}) \tag{5-6}$$

where Φ_i is normal cumulative function and ϕ_i is the normal density function.

The partial effect of x variables on the dependent variable is no longer the coefficient β; it varies because both the cumulative and density function changes. The common practice for interpreting Tobit model results is to consider the marginal effect holding other variables at their mean. To be further accessible to interpret the Tobit results, this study follows the McDonald and Moffitt decomposition to disaggregate the total marginal effect into two parts. The first part is the change of the dependent variable above the limit, multiplied by the probability of being above the limit. The second part is the change of the probability of being above the limit multiplied by the expected value of the dependent

variable that is above the limit. (McDonald & Moffitt, 1980) Mathematically the two parts are expressed as below:

$$\frac{\partial E(y)}{\partial x_i} = \Phi(z) \times (\frac{\partial E(y \mid y > 0)}{\partial x_i}) + E(y \mid y > 0) \times \frac{\partial \Phi(z)}{\partial x_i} \tag{5-7}$$

where z = $\frac{x'\beta}{\sigma}$ denotes the z-score for an area under the normal curve, σ is the standard deviating of the error term. This equation can also be expressed as:

$$\frac{\partial E(y)}{\partial x_i} = \Phi(z) \times \beta_i (1 - z\frac{\phi(z)}{\Phi(z)} - (\frac{\phi(z)}{\Phi(z)})^2) + \phi(z) \times (z + \frac{\phi(z)}{\Phi(z)})\beta_i \tag{5-8}$$

The econometric software—LIMDEP (Version 8.0) provides a procedure to obtain estimates of the Tobit fixed effect model. The McDonald and Moffitts decomposition is obtained by calculating P (scalar of the marginal effect— $\Phi(z)$), P1 (scalar of the change effect above limit), P2 (the scalar of the change in the probability of being above the limit).

In sum, the fixed-effect model with Newey-West standard error is chosen to analyze the impact of the budgetary institutions on tax changes. The linear piecewise regression technique is used to handle the asymmetrical response to positive and negative fiscal gaps. The fixed-effect Tobit model is adopted to conduct the analysis of the impact of the budgetary institutions with respect to spending cuts. The marginal effect and McDonald and Moffitt decomposition are calculated to provide better interpretation of the estimation results.

CHAPTER 6

EMPRICAL RESULTS

This chapter presents and discusses the empirical results of the fixed-effect model with New-West Standard error that analyzes the impact of budgetary institutions on tax changes. The first section introduces variables and descriptive statistics. The second section presents the regression models and results of estimation. A third section presents an interpretation of results and a final section summarizes the findings.

Dependent Variables

States adjust their discretionary fiscal policy primarily in response to change in fiscal situations. States will either increase taxes and/or cut spending in the event of a potential deficit and cut taxes and/or increase spending in response to a potential surplus. Of course, there are other reasons for tax increases, like efficiency or equity purposes (Hou and Moynihan, 2008). For example, a state may decide to substantially increase its funding of education in order to allow local governments to reduce property taxes. However, revenue shortfalls resulting from economic downturns necessitate resource decisions; policy makers must take revenue actions or readjust or revise the state revenue system (Hou and Moynihan, 2008). Unfortunately, the nature of the dataset does not distinguish tax changes between those planned versus those induced by a fiscal situation change. This is one of the caveats of this research.

States might have the luxury of waiting until the next fiscal year to cut taxes or may have to raise taxes during a year with potential deficits. Therefore, dependent

variables included here are real per capita tax change in year t, year t+1 and real per capita spending cuts in year t. In order to test the hypotheses regarding the impact of TELs on tax changes with broad or narrow tax bases, the net tax changes are divided into two parts—major tax changes and non-major tax changes. NASBO's fiscal surveys provide data on tax changes by type of revenue including individual income, corporate income, sales, cigarette/tobacco, motor fuels, alcohol and other taxes as well as fees. The sum of net tax changes from individual income taxes, sales taxes, and corporate income taxes is defined as major tax change while changes to the rest of the tax sources and fees are defined as non-major tax changes. The same set of independent variables is used in these three models. The cases used in the dataset represent 47 continental state governments over the period of FY 1988 through FY 2006. Table 6-1 provides the descriptive statistics for these dependent variables.

Table 6.1: Descriptive Statistics of Dependent Variables

Variable	Obs	Mean	Std. Dev.	Min	Max
TAXCHANGE	893	9.90	49.37	-179.77	413.65
MAJORTAXCHANGE	893	3.48	40.35	-179.97	389.35
NMAJORTAXCHANGE	893	6.42	21.11	-94.6	160.19
SPENDINGCUTS	893	12.68	29.01	0	229.59

Independent Variables

To proceed with the analysis, it is important to first construct the potential budget gap or surplus. Poterba's 1995 study of state responses to the early 1990s fiscal crisis provides a measure of fiscal shock, which is expressed as follows:

$DEFICITSHOCK=EXPSHOCK_{it} - REVSHOCK_{it}$, where:

$EXPSHOCK_{it}$ = actual $outlays_{it}$ - $\Delta SPEND_{it}$ - forecast $outlays_{it}$; and

$REVSHOCK_{it}$ = actual $revenues_{it}$ - ΔTAX_{it} - forecast $revenues_{it}$.

The budget process starts with the revenue projection given the economic forecast. As the fiscal year starts, the economic condition may change and actual revenue and expenditure diverge. The difference between the actual revenue/expenditure and projected revenue/expenditure captures this aspect of change. However, actual revenue and expenditure also incorporate discretionary fiscal adjustments. For example, if the revenue estimation already indicates a shortfall for spending demand, legislators may take action to impose a surtax to counter this shortfall. Actual revenue includes this adjustment. From the expenditure side, if a state enacts budget cuts after the budget is adopted, the actual expenditure already excludes the amount of the cuts. Therefore, simply taking the difference between actual and estimated revenue/expenditure cannot capture the true fiscal shock (Poterba, 1995).

This study follows this approach to construct the potential fiscal gap. The fiscal gap is calculated as:

$$\text{Fiscal Gap}_{it} = (\text{Actual Revenue}_{it} - \text{Estimated Revenue}_{it} - \Delta TAX_{it}) - (\text{Actual expenditure}_{it} - \text{Estimated Expenditure}_{it} - \Delta SPEND_{it}) \quad (6\text{-}1)$$

The "positive fiscal gap" means "potential surplus" and "negative fiscal gap" means "potential budget gap" (deficit). Table 6-2 presents the summary statistics of the real per capita fiscal gap.

Table 6.2: Summary Statistics of Fiscal Gap (47 continental state governments)

Fiscal Year	Per Capita Fiscal GAP				Number of States			
	mean	std.	min	max	Positive Gap	Negative Gap	Enact Tax Increase	Enact Spending Cut
1988	-13.43	88.42	-361.63	351.87	20	28	29	13
1989	14.25	72.56	-320.35	201.57	34	13	15	11
1990	-44.24	108.75	-452.73	118.23	15	32	27	19
1991	-80.18	131.91	-700.19	64.02	12	35	26	30
1992	-57.83	103.2	-377.13	134.53	10	38	30	35
1993	-6.27	68.43	-181.04	178.96	22	24	28	23
1994	6.09	58.73	-240.9	176.7	28	19	26	9
1995	6.99	60.96	-163.5	194.04	32	16	16	12
1996	46.88	78.65	-78.39	415.65	40	8	6	13
1997	34.95	51.51	-98.48	138.9	42	6	9	8
1998	50.32	58.83	-119	210.04	40	8	10	0
1999	47.02	79.01	-127.09	220.56	40	8	4	1
2000	43.52	69.74	-128.25	241.82	40	8	11	6
2001	8.22	70.32	-140.09	270.63	28	20	8	18
2002	-75.04	108.15	-524.71	162.71	9	39	15	38
2003	-36.58	93.90	-199.89	246.88	13	35	26	40
2004	-9.75	76.3	-206.83	243.41	22	26	35	18
2005	36.67	76.2	-109.77	361.09	35	13	22	4
2006	43.81	69.10	-112.05	203.98	36	11	24	2

As Table 6.2 shows, the constructed fiscal gap corresponds to the fiscal conditions in each fiscal year. As the fiscal condition improved a little bit in FY 1989, the average fiscal gap was favorable with two-thirds of states showing a positive fiscal gap. The fiscal condition deteriorated sharply from FY 1990 to FY 1992. In each of these three consecutive fiscal years, over two-thirds of the states had a negative fiscal gap. The average fiscal gap became favorable again in FY 1993 and remained positive until FY 2001, which covers the economic boom period. As another fiscal crisis fell on the states in the early years of 2000, the average fiscal gap became negative again. Then as the fiscal condition improved in FY 2005, the average fiscal gap turned positive. Table 6-2 also shows the number of states that enacted tax increases and spending cuts in each

fiscal year. Comparing the two periods of fiscal crisis, state response shows a slight difference. From FY 1990 to FY 1992, on average, 28 states enacted tax increases and spending cuts. From FY 2002 to FY 2004, the average number of states enacting tax increases and spending cuts is 25 and 32, respectively.

The variable for the fiscal gap to be used in the analysis is named PERGAP. As discussed in Chapter 5, the impact of fiscal gap might be asymmetric. A brief examination of the dataset can demonstrate this differential impact. The correlation between per capita real tax change and per capita fiscal gap is -0.67, regardless of the sign of the fiscal gap. Given that the fiscal gap is positive—potential surplus—the correlation between these two variables is -0.51. The correlation is -0.63 under the circumstance of potential deficit—negative fiscal gap. To illustrate the different impact of the interaction term between the stringency of TEL and fiscal gap, per capita real tax change is regressed on the TEL index, fiscal gap, and their interaction separately, given the sign of the fiscal gap. Table 6.3 provides the results of these two regressions. Regression results show that the coefficient of the fiscal gap is different depending upon if the fiscal gap is positive or negative. Moreover, the sign of the interaction term flipped when the fiscal gap changed from positive to negative. This confirms the necessity of differentiating the fiscal situation while testing the budgetary institutions' impact on the tax change in one model.

Table 6.3: Regression to Show Asymmetric Effect

Independent Variables	PERGAP>0		PERGAP<=0	
	Coef.	t	Coef	t
TELINDEX	-0.11	-0.13	-0.35	-0.43
PERGAP	-0.09	-1.42	-0.45	-21.18
TELGAP	-0.04	-3.11	0.03	4.56
Intercept	6.56	1.43	10.93	5.9

The solution to this asymmetric issue is to apply the spline linear regression technique in the analysis. In this case, the value 0 of fiscal gap is the knot. To implement the spline regression technique, the variable PERGAP is categorized into two variables, PERPGAP if PERGAP>0 and PERNGAP if PERGAP<=0.[16] Table 6-4 details the descriptive statistics of the independent variables including PERPGAP and PERNGAP. And Table 6-5 defines independent variables.

The variables measuring budgetary institutions include those for TELs and BBRs. The stringency of TELs measured for each state by fiscal year is presented in Chapter 4; these scores range from 0 to 11.5. States without a TEL in a fiscal year are coded as 0. The State of Colorado has the highest TEL stringency index since FY 1993 with a score of 11.5.

[16]See *How Can I Run a Piecewise Regression in Stata.* UCLA: Academic Technology Services, Statistical Consulting Group, from http://www.ats.ucla.edu/STAT/stata/faq/piecewise.htm (accessed March 31st, 2008). This webpage provides several methods to run piecewise regression in stata. I followed the "Try 3: Combined Model, coding for separate slope and intercept to ease the interpretation of the coefficient later.

Table 6.4: Variable Names and Summary Statistics

Variable Name	Obs	Mean	Std. Dev.	Min	Max
TELINDEX	893	2.34	2.76	0.00	11.50
BBR	893	4.11	1.72	0.00	7.00
PERPGAP	893	31.35	50.98	0.00	443.94
PERNGAP	893	-30.32	63.88	-700.19	0.00
TELPGAP	893	177.78	289.08	0.00	2517.16
TELNGAP	893	-171.92	362.21	-3970.07	0.00
BBRPGAP	893	125.80	211.41	0.00	1775.77
BBRNGAP	893	-125.47	306.32	-4201.13	0.00
REP	893	0.19	0.39	0.00	1.00
DEM	893	0.22	0.41	0.00	1.00
DGOV	893	0.45	0.50	0.00	1.00
ELEC	893	0.24	0.43	0.00	1.00
LAMEDUCK	893	0.06	0.23	0.00	1.00
POP	893	5705.87	6040.22	453.69	36500.00
PERCAPINC	893	25.67	4.78	15.27	43.57
PERRFED	893	990.73	776.25	64.94	11889.25
PERRENDBSF	893	106.59	118.87	-367.02	902.17
PERRBEGIN	893	66.28	94.7	-275.4259	745.48
BIENNIAL	893	0.19	0.39	0	1

Table 6.5: Variable Definitions

Variable Name	Variable Definition
TELINDEX	Stringency index of TEL, states having no TEL at all or no TEL at a particular fiscal year is coded as 0
BBR	BBR index, number of articles a state has according to Hou & Smith's (2006) paper
PERPGAP	Positive Real per capita fiscal gap(potential surplus)
PERNGAP	Negative Real per capita fiscal gap(potential deficit)
TELPGAP	Interaction between positive real per capita fiscal gap and TEL index
TELNGAP	Interaction between negative real per capita fiscal gap and the TELindex
BBRPGAP	Interaction between positive real per capital fiscal gap and the BBR index
BBRPGAP	Interaction between negative real per capital fiscal gap and the BBR index
REP	Dummy variable coded as 1 if both houses are controlled by Republican and the governor is Republican
DEM	Dummy variable coded as 1 if Both houses are controlled by Democrat and the governor is Democrat
DGOV	Dummy variable coded as 1 if the government is divided and the Governor is from Democrat party
ELEC	Dummy variable coded as 1 if it is gubernatorial election year
LAMEDUCK	Dummy variable coded as 1 if it is the last year for the governor to be in the office and cannot be reelected due to term limit
POP	Population in thousand, controlling the state size
PERCAPINC	Real per capita personal income in thousand
PERRFED	Real per capita federal grant
PERRENDBSF	The sum of real per capita general fund year-end balance and budget stabilization fund balance
PERRBEGIN	Real per capita beginning balance of general fund
BIENNIAL	Dummy variable coded as 1 if the budget cycle is biennial

BBR stringency is measured using an index derived from Hou and Smith's (2006) study, with scores ranging from 0 to 7. As reviewed in Chapter 2, Hou and Smith (2006) developed a new framework for categorizing BBRs consisting of nine articles; the more articles a state has, the more stringent the BBR.

The two variables measuring budgetary institutions interact with the fiscal gap. The rationale for including interaction terms is that the fiscal gap is the major driving force for the state to make discretionary fiscal policy. The various constraints set by the budgetary institutions influence state fiscal policy adjustments differently.

Another important set of factors examined in this study characterize a state's political environment. In the political economy literature, a governor's party affiliation and the party controlling the state legislature influence state policy. This research controls for these political factors when examining the impact of budgetary institutions on discretionary fiscal policies. Three dichotomous variables—REP, DEM and DGOV—measure state government party affiliations. REP indicates that Republicans hold the majority of seats in both legislative houses as well as the party of the governor. DEM indicates that both houses are under the control of Democrats and the governor is a Democrat. DGOV represents a divided government with a Democratic governor and Republican legislature; this is contrasted with a divided government with a Republican governor and Democratic legislature. Another two variables measuring state political environment are ELEC and LAMEDUCK, which indicate election year and if the governor is administrating the state in a lame duck year.

The socio-economic factors included in this study are POP, PERRINC and PERRFED. POP is state population in millions and measures state size. PERRINC is real

per capita personal income in thousands and measures state wealth. PERRFED is real per capita federal grants and measures state revenue other than own source.

As discussed in the theoretical framework chapter, discretionary fiscal policy adjustments are made given the level of retained surplus and deficit financing. PERRENDBSF indicates the per capita real year-end general fund balance plus the balance of budget stabilization fund. PERRBEGIN is the real per capita beginning balance of a fiscal year.

Relative Use of Tax Increases and Spending Cuts

The focus of this study is whether the existence of budgetary institutions, especially TELs, affects state discretionary fiscal policy responses to fiscal gap changes. Before conducting more sophisticated econometric analysis of the data, a simple comparison between TEL and non-TEL states with respect to their relative use of tax increases and spending cuts, actions taken in light of a deficit. This comparison is shown in Figure 6-1. The total tax increases and spending cuts enacted from FY 1988 to FY 2006 are calculated for each state. Total tax increases are divided by total spending cuts for each state, which provides a ratio of the relative use of tax increases and spending cuts across years for each state. Figure 6-1 shows the distribution of this ratio among states. States noted in ***bold*** and larger font indicate the existence of a TEL. The mean of the ratio for the TEL and non-TEL states are 2.33 and 1.78, respectively. This simple comparison indicates a general picture of the different composition of discretionary fiscal policies between TEL and non-TEL states. More sophisticated econometric analysis is needed to further flesh out the relationship of budgetary institutions to state discretionary fiscal policy.

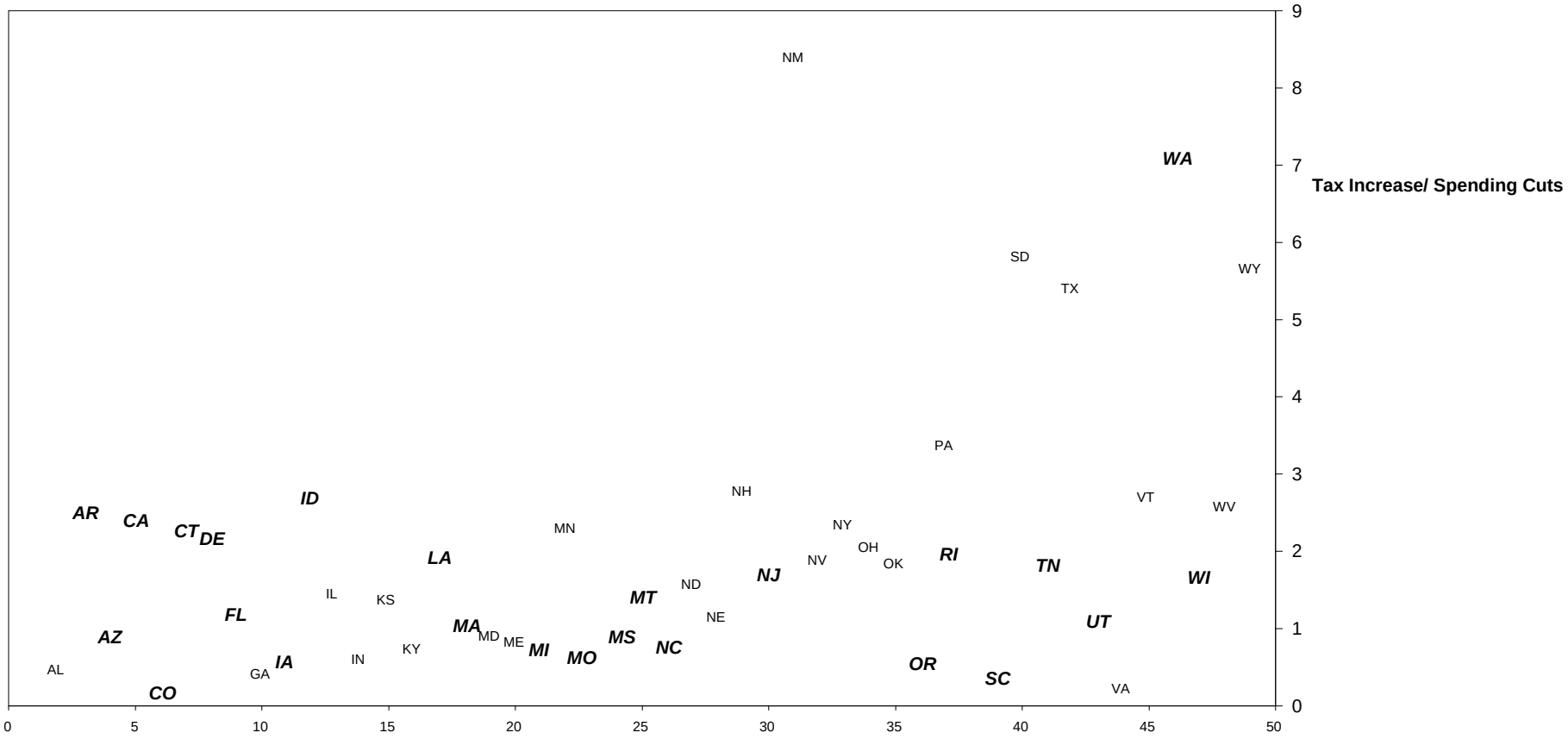

Figure 6.1 Ratio of Relative Use of Tax Increase and Spending Cut

Estimation Results of Fixed-Effect Panel Regressions

Table 6.6 presents results of the estimation of the model with total real per capita tax change in year t as the dependent variable. And Table 6.7 shows the result of estimation of the model with total real per capita tax changes in year t+1 as the dependent variable. The coefficients of key variables in Table 6.7 are not statistically significant. The impact of budgetary institutions on the tax changes of year t+1 is not as apparent as that on year t. The following interpretations focus on the estimation results shown in Table 6.6.

Table 6-6: Model 1 - Fixed-Effect Model with New-West Standard Error (Dependent Variable--Total Real Per Capita Tax Changes in Year t)

Independent Variables	Coef.	Newey-West Std. Err.	t
TELINDEX	1.566	1.018	1.54
BBR	-1.120	7.316	-0.56
PERPGAP	-0.130	0.100	-1.30
PERNGAP	-0.539	0.084	-6.43***
TELPGAP	-0.024	0.017	-1.44
TELNGAP	0.060	0.016	3.67***
BBRPGAP	-0.026	0.025	-1.04
BBRNGAP	-0.022	0.023	-0.99
REP	-9.074	4.522	-2.01**
DEM	3.776	3.535	1.07
DGOV	-6.909	4.037	-1.71*
ELEC	-4.809	2.867	-1.68*
LAMEDUCK	-0.142	4.331	-0.03
POP	0.376	2.030	0.18
PERCAPINC	-2.633	1.931	-1.36
PERRFED	-2.475	1.675	-1.48
PERRENDBSF	0.103	0.267	3.86***
PERRBEGIN	-0.101	0.029	-3.49***
BIENNIAL	-7.470	56.08	-0.13
Number of observations	893		
F(82, 811)	153.312		
Prob>F	0.00		

* significant at 10%;** significant at 5%;*** significant at 1%

Table 6.7: Model 2 - Fixed-Effect Model with Newey-West Standard Error (Dependent Variable--Total Real Per Capita Tax Changes in Year t+1)

Independent Variables	Coef.	Newey-West Std. Err.	t
TELINDEX	-0.675	1.565	-0.43
BBR	-10.523	8.597	-1.22
PERPGAP	0.039	0.086	0.46
PERNGAP	0.009	0.081	0.12
TELPGAP	-0.013	0.015	-0.89
TELNGAP	0.015	0.012	1.25
BBRPGAP	-0.014	0.019	-0.73
BBRNGAP	-0.007	0.020	-0.36
REP	-7.866	6.534	-1.20
DEM	-0.260	5.113	-0.05
DGOV	-1.455	6.109	-0.24
ELEC	15.564	5.058	3.08
LAMEDUCK	-2.823	6.942	-0.41
POP	0.002	0.003	0.75
PERCAPINC	0.004	0.002	1.60
PERRFED	0.881	3.450	0.26
PERRENDBSF	-0.218	0.047	-4.63
PERRBEGIN	0.047	0.044	1.07
BIENNIAL	42.097	48.913	0.86
Number of observations	846		
F(82, 811)	142.76		
Prob>F	0.00		

* significant at 10%;** significant at 5%;*** significant at 1%

The focus of this study is to examine the impact of budgetary institutions on the states' discretionary fiscal policy under different fiscal situations. The key budgetary institutional variables are the TEL stringency index and the BBR index. The coefficient of the TELINDEX shows a positive relationship between the tax change and the stringency level of TEL which, however, is not statistically significant. With the interaction term in the model, the coefficient on TELINDEX is showing the impact while controlling the fiscal gap at the value of zero. Thus the main effect on TELINDEX cannot

provide much information about the hypothesis. The same logic is applied to the coefficient of BBR, which is negative but not statistically significant.

The more important variables are the fiscal gap and interaction terms between the fiscal gap and TEL stringency scores. There are two variables measuring fiscal gap—PERPGAP and PERNGAP. As discussed before, tax changes in response to potential surplus or deficit are not symmetrical. The test of the difference between these two coefficients is statistically significant with a t-score of 4.5. Again, with the interaction terms in the model, the coefficients of fiscal gap show state tax changes with respect to fiscal gap while holding TELINDEX at zero. In most cases, positive fiscal gaps are associated with tax cuts, and negative fiscal gaps are associated with tax increases. As expected, the negative coefficient of PERPGAP (-0.13) shows that as the potential surplus increases by $100 or with $100 more potential surplus, non-TEL states' tax cuts will be $13; however, this coefficient is not statistically significant. The coefficient of PERNGAP shows this variable to be negatively associated with the dependent variable ($p<5$ percent). The value of the coefficient of PERNGAP indicates that a potential deficit of $100 will lead to $54 in tax increases for non-TEL states. Figure 6-2 illustrates this change of the slope, given the sign of the fiscal gap.

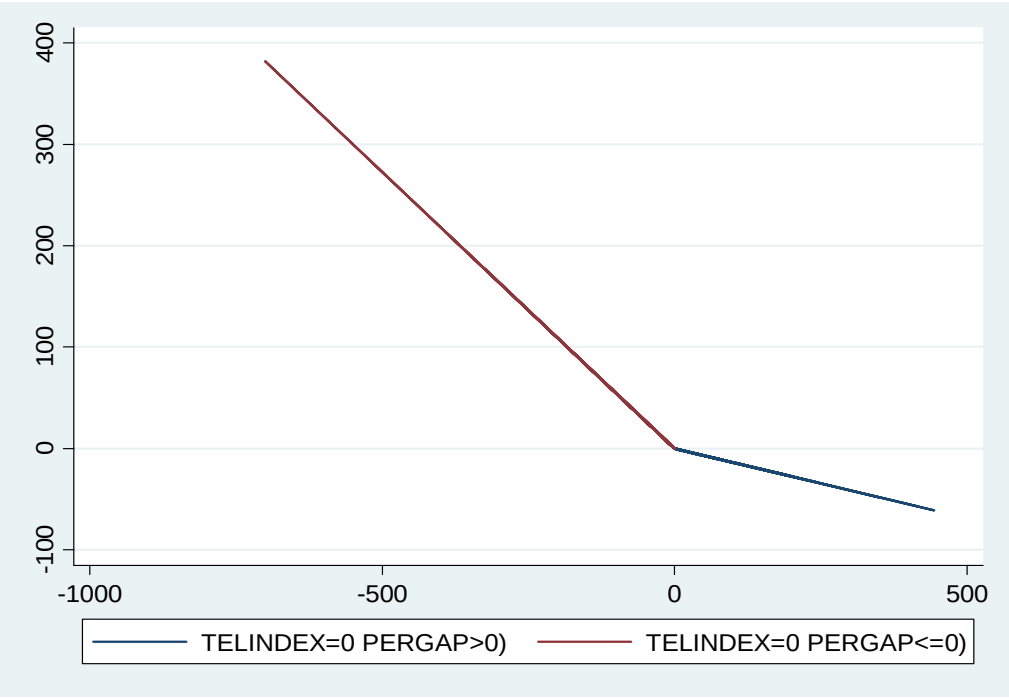

Figure 6.2: Plot of Expected Tax Change in Response to Fiscal Gap (non-TEL States)

The coefficients of the interactions between TEL stringency scores and fiscal gaps present the average net tax changes in response to the same level of fiscal gap between TEL states and non-TEL states. Since TELINDEX is an ordinal level variable, the partial effect of TELINDEX depends on the level of the fiscal gap. To better illustrate the effect of the interaction terms, several substantive values of TELINDEX are considered and the fiscal gap is plotted against the tax change. Together with a value of 0 for TELINDEX, the value of TELINDEX at its 25th percentile, median, and 75th percentile are plugged into the estimated equation and the fiscal gap is plotted against net tax change holding other variables at their mean value. Figure 6-3 shows the plot when the fiscal gap is positive.

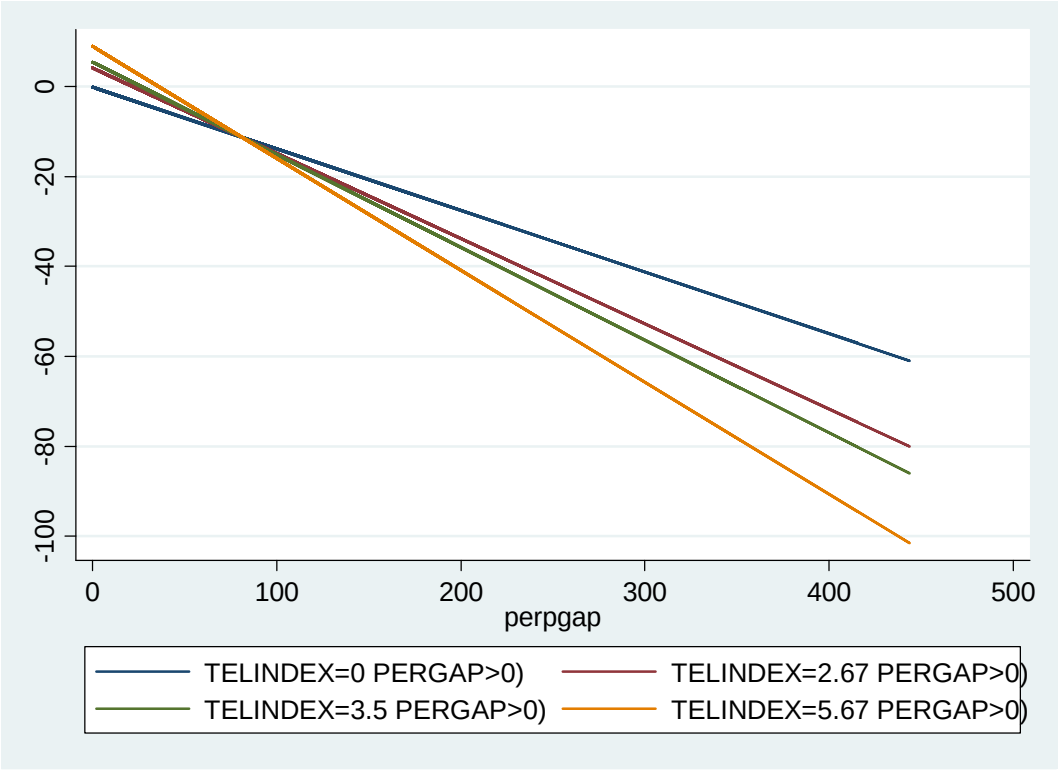

Figure 6.3: Plot of Expected Tax Changes in Response to Positive Fiscal Gap

As TELINDEX increases, as TELs become more stringent, the slope gets steeper. Considering the tax change here as tax cuts, on average, a TEL state will cut more taxes compared with a non-TEL state. And, the more stringent the TEL a state has, the more taxes will be cut in the event of a potential surplus. Figure 6.4 shows the same plot when the fiscal gap is negative, indicating a potential deficit. As TELINDEX increases, the slope gets flatter, exactly the opposite from the situation exhibited when a potential surplus exists. Tax changes here are mostly tax increases, on average TEL states increase less taxes than non-TEL states, in the event of a potential deficit, and the more stringent the TEL, the state will increase fewer taxes. The opposite sign of these two interactions terms—TELPGAP and TELNGAP lead to these results. The difference between the

coefficients of these two interaction terms is statistically significant with a t-score of -3.09.

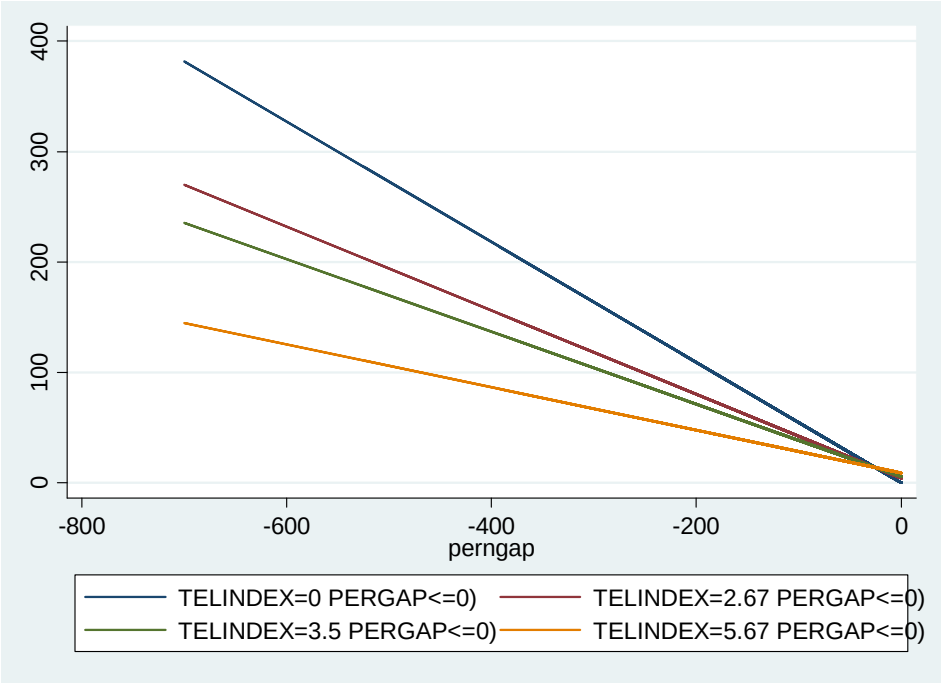

Figure 6.4: Plot of Expected Tax Changes in Response to Negative Fiscal Gap

Figure 6.5 shows the plot of fiscal gap against net tax change with the TELINDEX valued at 5.67—the 75th percentile value of the variable. Results indicate that, on average, a $100 potential surplus will induce $24 in tax cuts, and a $100 deficit will induce a $20 tax increase. Again compared with the non-TEL states, on average, a state with a TEL stringency score of 5.67 will cut $11 more in taxes and increase $34 less in taxes, given that the potential surplus or deficit is $100.

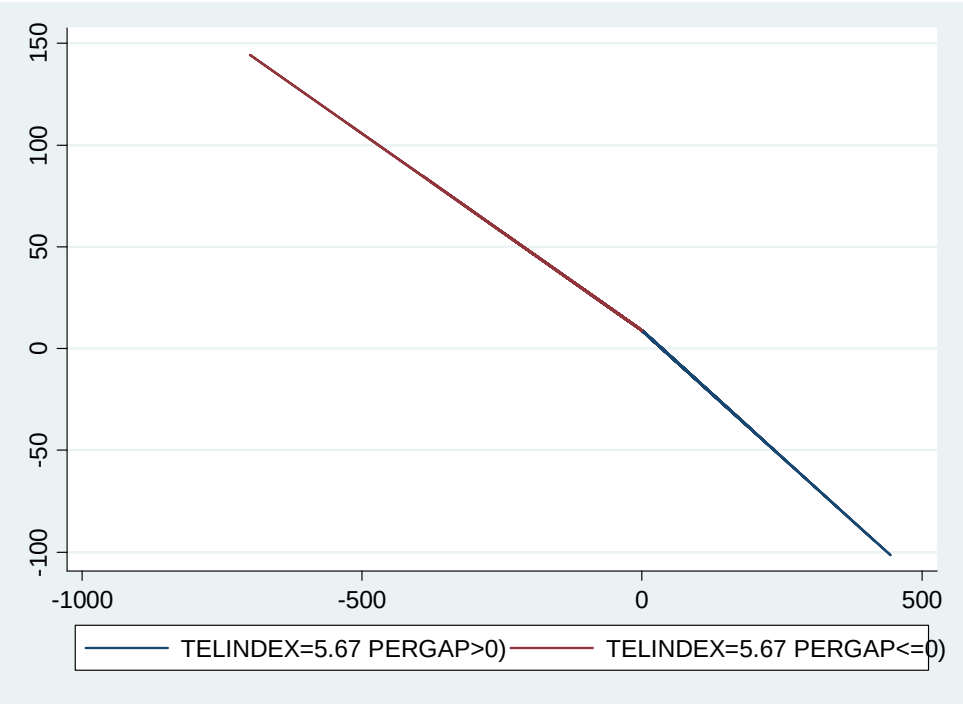

Figure 6.5: Plot of Expected Tax Changes in Response to Fiscal Gap (TELINDEX=5.67)

The two interaction terms between BBR and fiscal gap have the same sign, and this difference is not statistically significant, with a t-score of 0.19. This indicates that the impact of BBR on the tax change is symmetrical. In the sample, given a positive fiscal gap, a state with a stringent BBR will tend to make less tax cuts, whereas given a negative fiscal gap, a state with a stringent BBR will tend to make more tax increases; however, the coefficient of these two interaction terms is not statistically significant.

Among the political variables, the coefficient on REP is negative and is statistically significant at the five percent level, indicating that on average, a state government with a Republican governor and both houses under control of the Republican Party will increase taxes less and/or cut taxes more by $9.04 compared with a divided government with a Republican governor. The coefficient on DEM is positive, indicating that a unified Democratic government will increase taxes more or cut taxes less by $3.78

compared with a divided government with a Republican governor; however, these results are not statistically significant. The coefficient on DGOV is negative and significant at the ten percent level, indicating that a divided government with a Democratic governor, on average, increases taxes less or cuts taxes more than a divided government with a Republican governor. Further examination of the dataset indicates that this might not totally counter the expectation that Democratic governments are "pro-tax." Among the observations indicating a divided state government with a Republican governor, 72.6 percent shows that both houses are controlled by the Democrats. This explains to some extent why the sign on DGOV is negative.

Two other political variables considered here are ELEC and LAMEDUCK, though neither is statistically significant. The coefficient on ELEC is negative as expected, indicating that during election years, states, on average, will increase taxes less or cut taxes more.

The socio-economic control variables—POP and PERCAPINC PERRFED—do not indicate significant impact on tax changes in the model. The coefficient of the beginning balance is negative and statistically significant, indicating that with surpluses from the previous fiscal year, states have less need to increase taxes in order to close any budget gap. The coefficient of total ending balance, including any BSF, shows a significant and negative relationship with tax changes, as expected. As discussed in the theoretical framework section, states may choose to retain any surplus and cut fewer taxes. Also, some states may have a negative balance of the general fund and maintain a budget gap that is not completely closed. In this case, fewer tax increases are enacted.

Table 6.8 provides estimation results of the fixed-effect model with Newey-West standard errors with major tax changes and non-major tax changes as dependent variables. The sum of the coefficient of each independent variable in these two models equals the coefficient in the first model. For example, the coefficient on TELINDEX is 1.673 in the model with major tax changes as dependent variables and -0.107 in the model with non-

Table 6.8: Models 3 and 4 - Fixed-Effect Model with Newey-West Standard Error (Real Per Capita Major and Non-Major Tax Changes)

Dependent Variables	Real Per Capita Major Taxes Change (model3)			Real Per Capita Non-Major Taxes Change (model4)		
Independent Variables	Coef.	Newey-West Std. Err.	t-stat	Coef.	Newey-West Std. Err.	t-stat
TELINDEX	1.673	0.864	1.94**	-0.107	0.751	-0.14
BBR	-10.091	6.043	-1.67	8.980	4.017	2.23**
PERPGAP	-0.040	0.080	-0.50	-0.090	0.045	-1.98**
PERNGAP	-0.398	0.073	-5.43***	-0.140	0.038	-3.65***
TELPGAP	-0.032	0.016	-2.02**	0.008	0.005	1.53
TELNGAP	0.067	0.021	3.19***	-0.007	0.005	1.45
BBRPGAP	-0.019	0.021	-0.89	-0.007	0.010	-0.72
BBRNGAP	-0.028	0.022	-1.27	0.005	0.008	0.67
REP	-5.197	3.825	-1.36	-3.877	2.771	-1.40
DEM	5.058	3.169	1.60	-1.282	1.732	0.74
DGOV	-4.841	3.385	-1.43	-2.068	2.698	-0.77
ELEC	-3.356	2.590	-1.30	-1.454	1.566	-0.93
LAMEDUCK	0.825	3.659	0.23	-0.968	3.179	-0.30
POP	3.370	1.950	1.73	-3.0***	1.220	-2.46**
PERCAPINC	-3.512	1.626	-2.16	0.879	1.028	0.85
PERRFED	-1.274	1.506	-0.85	-1.201	0.580	-2.07**
PERRENDBSF	8.296	2.201	3.77	2.023	1.457	1.39
PERRBEGIN	-0.074	0.029	-2.60	-0.027	0.016	-1.71*
BIENNIAL	41.58	46.04	0.90	-49.05	28.75	-1.71*
Number of observations	893			893		
F(82, 811)	61.37			176.65		
Prob>F	0.00			0.00		

* significant at 10%;** significant at 5%;*** significant at 1%

major tax changes as dependent variables. The sum of these two coefficients—1.566—is the coefficient of TELINDEX in the model using real per capita total tax changes as the dependent variable.

The interpretation of the coefficient remains the same with those in Model 1. However, it is necessary to further examine those variables with different signs in the two models, especially the interaction terms. The interaction terms reveal how the effect of a fiscal gap changes, given different stringency levels of TELs or BBRs. As noted, the TEL and BBR measures are ordinal-level variables. One way to simplify the interpretation here is to plug in several substantive values of the ordinal-level variables. For purpose of illustration, median values for TELs and BBRs are used, 3.5 and 4.0, respectively. I begin with an examination of non-TEL state response to a fiscal gap with respect to tax changes. The coefficient of PERPGAP is -0.04 in the major tax change model. With a $100 positive fiscal gap, the expected major tax change for a non-TEL state will be -$4 or tax cuts of $4. The expected major tax cuts for a TEL state with a median stringency score will be -$15.2 or tax cuts of $15.2. Thus, the coefficient of TELPGAP is -0.032 in the major tax change model, indicating that with a $100 positive fiscal gap (potential surplus), the expected major tax cuts for a TEL state with a median stringency score will be $11.2 more than those made in a non-TEL state; whereas, the coefficient of TELPGAP is 0.008 in the non-major tax change model indicating that with a $100 positive fiscal gap (potential surplus), the expected non-major tax cuts for a TEL state with a median stringency score will be $2.8 less than those made in a non-TEL state.

The coefficient of TELNGAP is 0.067 in the major tax change model, indicating that with a $100 negative fiscal gap (potential deficit), the expected major tax increases for a TEL state with a median stringency score will be $23.45 less than those made in a non-TEL state; whereas, the coefficient of TELNGAP is -0.007 in the non-major tax change model, indicating that with $100 negative fiscal gap (potential deficit), the

expected non-major tax increases for a TEL state with a median stringency score will be $2.45 more than those made in a non-TEL state.

While the coefficients of TELPGAP and TELNGAP in the non-major tax change model are not statistically significant, those in the major tax change model are statistically significant. These results are interpreted to mean that the stringency level of TELs changes the effects of the fiscal gap on major tax changes but not on non-major taxes. Finally, another interaction term that has a different sign in these two models is BBRNGAP; however, none of these coefficients is statistically significant.

Dummy Variables Approach

The above analyses identified specific TEL stringency scores in order to examine the affects of TELs on tax changes. This was necessary because the variable, TELINDEX is measured at the ordinal level, but regression treats the variable as a interval level one or continuous. The value of the coefficient can not be interpreted as one unit change of the stringency index leading to certain amount change of the dependent variable, holding other variables constant. Another way to overcome this measurement problem is to use a set of dummy variables to categorize TEL stringency scores. Since the TEL stringency index has 21 discreet values, it is not practical to include so many dummy variables in the model. Instead, TEL stringency scores are divided into three groups. The first group is non-TEL states with scores of zero (0). The second group is weak TEL states and a third group is strong TEL states. The cut index value for weak and strong TEL states is 4.67. That is, states with TEL stringency scores greater or equal to 4.67 are treated as strong TEL states; all others are weak TEL states.

Such group provides that all strong TEL states include revenue limitations and almost all have a provision of a tax refund requirement.

This same analytical and grouping logic applies to the measure of BBR stringency as well. That is, a dummy variable—SBBR—is created to measure the stringency of BBR. Hou and Smith (2006) consider BBRs as a system of requirements containing four political rules and five technical rules. They also argue that political rules are more ambiguous and easier to be manipulated by the politicians while technical rules are more specific and harder to circumvent. Hou and Smith (2006) establish three articles in their framework as constraints on budget adjustments. These include: controls on supplementary appropriations, fiscal year controls are in place to avoid deficits, and no deficit may be carried over to the next fiscal year. Therefore, the coding scheme for this dummy variable—SBBR is that 1 indicates that a state has at least one of these three rules, and 0 means there is no such rule in a state.

Table 6.9 presents the estimation results using dummy variables to measure the stringency of TELs and BBRs. The dependent variables are real per capita total tax changes, real per capita major tax changes and real per capita non-major tax changes. The estimation results remain consistent with that shown in earlier models. The coefficients of PERPGAP and PERNGAP are -0.13 and -0.539 (statistically significant), respectively, in Table 6.3, indicating the partial effects of fiscal gap on real per capita total tax change for non TEL states and those with no BBR. In Table 6.5, the coefficients on these two

Table 6.9: Models 5, 6 and 7 - Fixed-Effect Model with Dummy variables for TEL and BBR

Dependent Variables / Independent Variables	Real Per Capita Total Tax Change (model5)		Real Per Capita Major Tax Changes (model6)		Real Per Capita Non-Major Tax Changes (model7)	
	Coef.	t	Coef.	t	Coef.	t
WTEL	8.050 (7.162)	1.12	0.693 (6.263)	0.11	7.357 (3.803)	1.93*
STEL	16.565 (9.993)	1.66	18.355 (8.244)	2.23**	-1.790 (8.813)	-0.2
TBBR	13.868 (81.711)	0.17	-25.725 (70.49)	-0.36	39.593 (53.845)	0.74
PERPGAP	-0.167 (0.068)	-2.44	-0.075 (0.046)	-1.63	-0.092 (0.039)	-2.36**
PERNGAP	-0.505 (0.081)	-6.26***	-0.422 (0.066)	-6.42***	-0.083 (0.026)	-3.23***
WTELPGAP	-0.010 (0.093)	-0.10	0.033 (0.095)	0.35	-0.042 (0.054)	-0.79
WTELNGAP	0.311 (0.095)	3.29***	0.278 (0.107)	2.60**	0.034 (0.05)	0.68
STELPGAP	-0.068 (0.132)	-0.51	-0.126 (0.129)	-0.97	0.058 (0.045)	1.29
STELNGAP	0.425 (0.096)	4.44***	0.343 (0.108)	3.17***	0.082 (0.04)	2.03**
SBBRPGAP	-0.132 (0.101)	-1.31	-0.122 (0.092)	-1.32	-0.011 (0.054)	-0.2
SBBRNGAP	-0.238 (0.114)	-2.09**	-0.170 (0.119)	-1.43	-0.068 (0.044)	-1.53
REP	-8.505 (4.546)	-1.87*	-4.731 (3.934)	-1.20	-3.775 (2.812)	-1.34
DEM	3.786 (3.448)	1.10	4.647 (3.12)	1.49	-0.861 (1.753)	-0.49
DGOV	-6.546 (4.183)	-1.56	-4.417 (3.595)	-1.23	-2.130 (2.809)	-0.76
ELEC	-4.626 (2.811)	-1.65	-3.042 (2.545)	-1.20	-1.585 (1.582)	-1
LAMEDUCK	0.946 (4.205)	0.22	1.791 (3.542)	0.51	-0.845 (3.031)	-0.28
POP	0.0002 (0.002)	-0.12	0.002 (0.002)	1.36	-0.003 (0.001)	-2.01**
PERCAPIN	-3.000 (1.831)	-1.64	-3.842 (1.535)	-2.50**	0.842 (1.002)	0.84
PERRFED	-2.244 (1.688)	-1.33	-1.015 (1.449)	-0.70	-1.229 (0.592)	-2.08**
PERRENDB	0.108 (0.027	3.98***	0.089 (0.022)	4.05***	0.019 (0.014)	1.31
PERRBEGI	-0.100 (0.028)	-3.53***	-0.078 (0.027)	-2.85***	-0.023 (0.015)	-1.52
BIENNIAL	-10.302 (54.525)	-0.19	21.422 (45.171)	0.47	-31.724 (31.177)	-1.02
Number of observations						
F(82,811)						
Prob>F						

Newey-West Standard Error in Parentheses
* significant at 10%;** significant at 5%;*** significant at 1%

variables in the first column (real per capita total tax change as the dependent variable) are -0.167 and -0.505, respectively, (both statistically significant). The coefficient of -0.167 means that on average, as a positive fiscal gap increases by $100, the real per capita tax increase is $16.7 for a non TEL state with no technical budget adjustment rules (BBR). The coefficient of -0.505 means that, on average, as a negative fiscal gap increases by $100, the real per capita tax cuts is $50.5 for a non TEL state with no technical budget adjustment rules (BBR).

The coefficients of the interaction terms are consistent as well. The coefficient of TELPGAP is -0.024 in Table 6.3 and not statistically significant. The coefficients of WTELPGAP and STELPGAP are -0.01 and -0.068, respectively (in the first column of Table 6.5); these are not statistically significant. The coefficient of TELNGAP is 0.06 and statistically significant in Table 6-3, while the coefficients of WTELNGAP and STELNGAP are 0.311 and 0.425, respectively; both are statistically significant. The coefficient of 0.311 is interpreted to mean that, on average, as a negative fiscal gap increases by $100, the real per capita tax increase for a weak TEL state will be $31.1 less than a non-TEL state. The coefficient of 0.425 means that, on average, as a negative fiscal gap increases by $100, the real per capita tax increase for a stringent TEL state will be $42.5 less than that in a non TEL state. The coefficient of STELNGAP has a greater value than that of WTELNGAP, which means that a state with a strong TEL will increase fewer taxes to close any negative fiscal gap than a state with a weak TEL.

The coefficients of BBRPGAP and BBRNGAP are -0.026 and -0.022, respectively (see Table 6.3). The coefficients of SBBRPGAP and SBBRNGAP in the first column of Table 6.5 are -0.132 and -0.238, respectively (and statistically significant).

The coefficient of -0.238 indicates that, on average, as a negative fiscal gap increases by $100, the real per capita tax increase will be $23.8 more in a state with budget adjustment rules in the BBR than a state without such rules. The sign of the other variables remains this same in the model using dummy variables for both TEL and BBR. Results are consistent in the models using real per capita major and non-major tax changes as dependent variables as well.

Estimation of Tobit Fixed-Effect Model

If the spending adjustment data is complete and includes the spending increases made after the budget is adopted, this same analysis could be conducted regarding the expenditure side of the budget equation. Unfortunately, NASBO's fiscal survey data only provides data on *spending cuts* after the budget is adopted. To account for this, the second model uses spending cuts as the dependent variable and treats zero entries as left censored. Normally, spending adjustments would have positive values for spending increases and negative values indicative of spending cuts. Since the dependent variable in this model is spending cuts only, the value of spending cuts is converted to a positive one. Moreover, to simplify interpretation, the sign of the fiscal gap is also flipped. The positive value on fiscal gap now indicates a potential deficit, and a negative value on fiscal gap indicates a potential surplus. Table 6.10 provides the estimation results of the fixed-effect Tobit model.

Table 6.10: Model 8 - Fixed-Effect Tobit Model Estimation (Dependent Variable: Real Per Capita Spending Cuts)

Variables	coef.	Std. err.	t	marginal effect	Decomposition	
					$\frac{\partial \Phi(z)}{\partial x_i}$	$\frac{\partial E(y \mid y^* > 0)}{\partial x_i}$
TELINDEX	-0.005	0.75	-0.01	-0.003	-0.002	-0.002
NPERGAP	0.26	0.14	1.88*	0.18	0.083	0.093
NTELGAP	0.01	0.01	1.16	0.01	0.005	0.005
NBBRGAP	0.06	0.03	1.97**	0.04	0.019	0.021
REP	-7.73	4.18	-1.85*	-5.26	-2.475	-2.784
DEM	9.67	7.41	1.31	6.58	3.094	3.481
DGOV	7.47	4.07	1.84*	5.08	2.390	2.689
ELEC	9.13	5.05	1.81*	6.21	2.920	3.285
LAMEDUCK	-16.26	15.07	-1.08	-11.06	-5.203	-5.854
POP	-0.92	0.25	-3.76**	-0.63	-0.295	-0.331
PERCAPIN	1.13	0.55	2.07**	0.77	0.362	0.407
PERRFED	-4.15	2.60	-1.60	-2.82	-1.328	-1.494
PERRENDB	-8.06	1.53	-5.28***	-5.48	-2.578	-2.901
PERRBEGI	0.03	0.04	0.78	0.02	0.009	0.010
No. of observations	893					
Log likelihood	-1680.168					
p	0.68					
p1	0.32					
p2	0.36					
mu	0.53					

* significant at 10%;** significant at 5%;*** significant at 1%

The coefficient on TELINDEX is negative, but not significant; it only shows the impact of TELINDEX when the fiscal gap is zero, due to the inclusion of the interactions terms. As expected, there is a positive relationship between the fiscal gap and spending cuts. On average, the total marginal increase in spending cuts with one more dollar of fiscal gap (potential deficit) is $0.18, holding other independent variables at their mean. This is calculated by multiplying the Tobit coefficient of the fiscal gap with the marginal effect scalar P. The total marginal effect is decomposed into $0.08, which is the effect of an additional dollar of fiscal gap, given that spending cuts are made; the figure $0.09 is the effect weighted by the probability of conducting any spending cut at all. The

multiplication of the Tobit coefficient of fiscal gap and the change effect scalar P1 yields the first part of the marginal effect of $0.08. And, the multiplication of the Tobit coefficient of fiscal gap and the scalar of the change in the probability of being above the limit P2 yields $0.09. In this case, effects due to change of probability are slightly more significant, accounting for 53 percent of the total marginal effects. Since the decomposition scalar remains the same for all the variables, the interpretation of other variables only focuses on total marginal effects.

The coefficient and marginal effect on the interaction terms do not yield the true partial effect of the interaction terms (Ai and Norton, 2003). First, to calculate marginal effect, variables are held at their mean; however, the mean of the interaction term is not the multiplication of the mean of those two variables. The econometric software used here cannot make this adjustment automatically. The marginal effect of the interaction terms in Table 6.10 is calculated with manual adjustment of the multiplication of the mean of the two interacted variables. Second, the partial effect of the interaction term should be the cross derivative of the expected value of the dependent variable. Therefore, neither the Tobit coefficient nor marginal effect with common procedure can yield the correct interpretation of the interaction terms. Instead of calculating the cross derivative to get partial effect of the interaction term, the expected value of spending cuts is calculated holding other variables at their mean, but allowing TEL stringency scores to vary. The calculation of the expected value of spending cuts uses the coefficient on the interaction term. Figure 6.6 shows the scatter plot between expected spending cuts and all possible values of TELINDEX in the sample in order to show the impact of TELs on spending cuts.

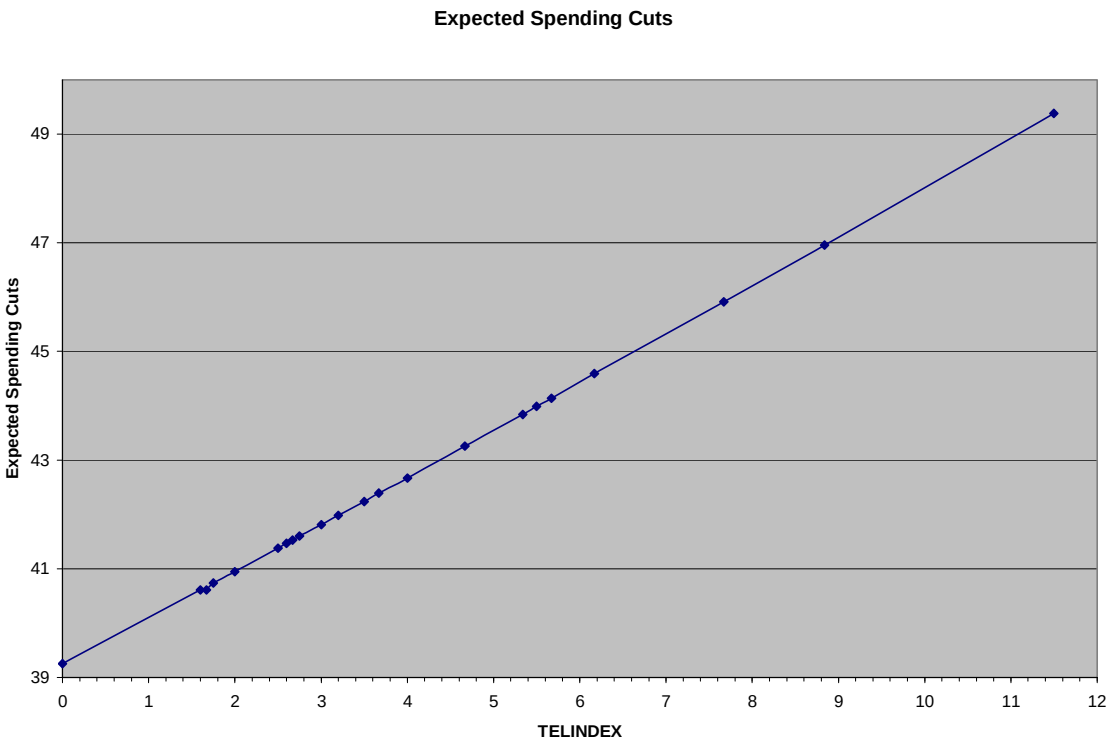

Figure 6.6: Plot of Expected Spending Cuts to TEL Stringency Scores

As Figure 6.6 shows, the expected spending cuts of a non-TEL state (TELINDEX=0) are $39.25, given the fiscal gap is held to the mean value of $70.33. And expected spending cuts increase to $40.21, while the TELINDEX is 1.6, which is the lowest stringency score in the sample. As TELs become more stringent, expected spending cuts increase.

The same calculation is conducted to examine the interaction between the fiscal gap and BBR. As Figure 6.7 shows, when the value of the variable BBR is zero, expected spending cuts are $43.06, whereas when the value of the variable BBR is seven, expected spending cuts are $69.83. With more stringent BBRs, expected spending cuts increase.

The coefficient of the interaction term is statistically significant, thus the calculated expected value is statistically significant.

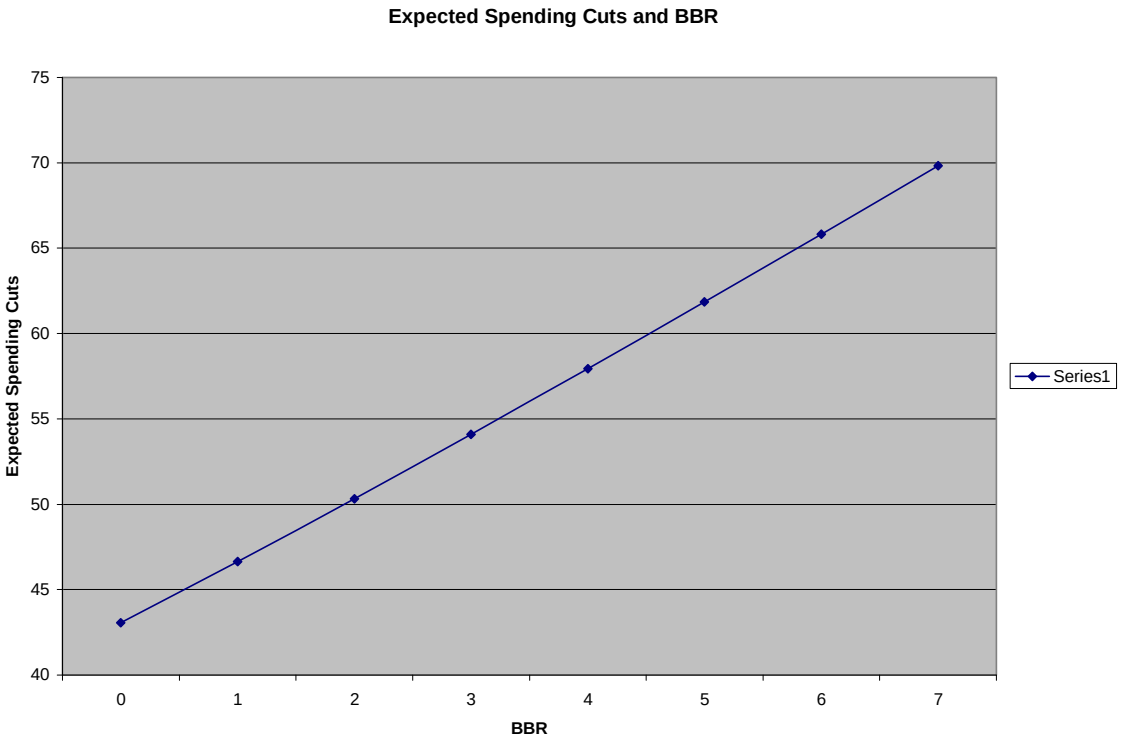

Figure 6.7: Plot of Expected Spending Cuts to BBR

Among the political factors, REP is negatively associated with spending cuts and statistically significant at the ten percent level. DEM and DGOV are positively associated with spending cuts, though only DGOV is statistically significant at the ten percent level. Results indicate that a unified Republican government, on average, cuts $5.26 more in taxes than a divided government with a Republican governor. A unified Democrat government, on average, cuts $6.58 more in taxes compared to a divided government with a Republican governor. And a divided government with a Democrat governor, on average, cuts $5.08 more in taxes than a divided government with a Republican governor.

The variable ELEC is negatively associated with spending cuts at the ten percent level. And the variable LAMEDUCK indicates positive impact on spending cuts, although this relationship is not statistically significant. The calculated marginal effect shows that during election years, spending cuts, on average, are $6.21 higher than in non-election years. And, the average spending cut is $16 less in a lame duck year.

Among the socio-economic factors, population shows a statistically significant negative effect on spending cuts. According to the calculated marginal effect, on average, a one million increase in population leads to $0.63 less in spending cuts. Per capita income has a statistically positive impact on spending cuts. A one thousand dollar increase in per capita income leads to $0.77 more in spending cuts. The coefficient of federal grants is negative but not statistically significant.

The year-end general fund balance including the balance of any BSF indicates a statistically significant negative impact on spending cuts. The marginal effect of this variable shows that one dollar increase in the year-end balance will lead to an $8.06 decrease in spending cuts. The coefficient of beginning balance is positive, but not statistically significant.

The approach of using dummy variables for TEL and BBR stringency scores is applied to the spending cuts model. Table 6.11 presents the estimation results using these dummy variables, which are consistent with models using the ordinal level index for both TELs and BBRs. The coefficients of NWTELGAP and NSTELGAP are 0.106 and 0.158, respectively, and the coefficient of NSTELGAP is greater than that of NWTELGAP. The coefficient of NTELGAP in Table 6.10 is 0.01.

Table 6.11: Model 9 - Fixed-Effect Tobit Model Estimation (Dummy variables for TEL and BBR)

Variables	coef.	Std. err.	t	marginal effect	Decomposition	
					$\frac{\partial \Phi(z)}{\partial x_i}$	$\frac{\partial E(y \mid y^* > 0)}{\partial x_i}$
WTEL	5.379	16.30	0.33	3.012	1.183	1.829
STEL	5.754	4.60	1.25	3.222	1.266	1.956
NPERGAP	0.304	0.22	1.37	0.170	0.067	0.103
NWTELGAP	0.106	0.16	0.65	0.059	0.023	0.036
NSTELGAP	0.158	0.15	1.08	0.088	0.035	0.054
NSBBRGAP	0.153	0.08	1.98**	0.086	0.034	0.052
REP	-8.627	19.17	-0.45	-4.831	-1.898	-2.933
DEM	3.602	2.79	1.29	2.017	0.792	1.225
DGOV	4.554	2.48	1.84*	2.550	1.002	1.548
ELEC	7.493	3.39	2.21**	4.196	1.648	2.548
LAMEDUCK	-24.954	16.91	-1.476	-13.974	-5.490	-8.484
POP	-0.011	0.00	-3.09***	-0.006	-0.002	-0.004
PERCAPIN	1.956	0.99	1.97**	1.095	0.430	0.665
PERRFED	-4.401	4.94	-0.89	-2.465	-0.968	-1.496
PERRENDB	-0.093	0.02	-5.84***	-0.052	-0.020	-0.032
PERRBEGI	0.046	0.08	0.57	0.026	0.010	0.016
No. of observations	893					
Log likelihood	-1649.908					
p	0.56					
p1	0.22					
p2	0.34					
mu	0.71					

* significant at 10%;** significant at 5%;*** significant at 1%

Although none of coefficient on WTEL, STEL, NPERGAP, WTELGAP and STELGAP are statistically significant, results indicate that in the sample, on average, as a negative fiscal gap increases, stringent TEL states tend to enact more spending cuts. The coefficient of NBBRGAP in Table 6.10 is 0.06 and the coefficient of NSBBRGAP in Table 6-11 is 0.153; both are statistically significant. These results indicate that, on average, as a negative fiscal gap increases, states with more stringent BBRs tend to enact more spending cuts. The sign of other variables in the two tables remain the same,

indicating that using dummy variables for the variables, TEL and BBR, does not change model results significantly.

Discussion of the Results

This dissertation examines the impact of two budgetary institutions on state government discretionary taxing and spending adjustments in response to different fiscal situations. The estimations of the four models provide partial support for the hypotheses stated in Chapter 3. Model 1 provides positive evidence that states with stringent TELs will enact fewer tax increases to deal with potential deficits. The counterpart fiscal adjustment to deal with the potential deficit spending cuts is examined using Models 8 and 9 that engage a Tobit fixed-effect model. Results of Models 8 and 9 reveal that expected spending cuts of states with more stringent TELs are higher than those for non-TEL states or state with less stringent TELs; however, these results are not statistically significant.

There is no statistically significant evidence to support the consideration that stringent TELs will lead states to make more total tax cuts when the fiscal condition is favorable; however, results of Models 3 and 6 reveal that states with stringent TELs compared to other states do enact more tax cuts from major tax sources including individual income tax, corporate income tax, and sales tax. Combined with the results of Models 4 and 7, there is evidence that compared to states without TELs or those with less stringent TELs, TEL states and states with stringent TELs tend to enact fewer tax increases with a broader tax base and cut more taxes with a broader base.

The results of Models 8 and 9 provide evidence that states with stringent BBRs will enact more spending cuts compared to states with less stringent BBRs; however,

Model 1 provides no evidence that BBRs affect state tax changes. These finding suggest that TELs play a more important role in affecting state discretionary fiscal adjustments from the tax side, while BBRs play a more important role in affecting state discretionary fiscal adjustments from the expenditure side. One caveat, however, is that spending changes considered in this research do not include discretionary spending increases. The impacts of budgetary institutions on spending increases need further examination to address this aspect of expenditure change. Another caveat of this study is the failure here to distinguish tax changes between those planned for versus those induced by a fiscal gap; future research should consider this component of tax change.

CHAPTER 7

CONCLUSIONS

This study examines the impact of tax and expenditure limitations (TELs) and balanced budget requirements (BBRs) on state government discretionary fiscal policy. State governments enact tax and spending changes as the economy fluctuates. However, economic factors alone cannot explain the composition of such fiscal policy adjustments. This research focuses especially on the more recently created budgetary institution, the TEL; its structural features are evaluated and an index of stringency is constructed. The empirical analyses conducted employs a fixed-effect panel with Newey-West Standard error and a fixed-effect Tobit regression to test the impact of TELs and BBRs on real per capita tax changes and spending cuts. Controlling for state and year effects, fixed-effect panel regression can help reduce the endogenous problem. Newey-West Standard error handles the problem of heterskedasticity and autocorrelation, and adopting a fixed-effect Tobit model of spending cuts deals with the problem of a censored data set. Guided by a theoretical framework that is based on a view regarding pressure-group competition, results indicate that 1) states with stringent TELs will enact fewer tax increases to deal with potential deficits; 2) TEL states and states with stringent TELs tend to enact fewer tax increases with a broader tax base and cut more taxes with a broader base when compared to states without TELs or those with less stringent TELs; and 3) the spending cuts of states with more stringent TELs are larger than those for non-TEL states or state with less stringent TELs.

TEL Stringency Index

Development of a stringency score to measure TELs is an important contribution of this research. This work examined major structural features of existing state level TELs and devised a means of measuring each relevant component which when added together comprise a TEL stringency score for each state. Components of TELs examined include the formula of the limitation, any required treatment of a surplus, the existence of a waiver or exemption of the limitation, any override provisions, and the existence of provisions to transfer responsibility to local governments. The final TEL stringency index for each state is equal to the sum of scores of each feature; individual feature scores are weighted equally.

Examination of TEL stringency scores across states indicates that the Far West region of the United States is most comprehensive in its use and the stringency of these limitations. That is, all states in this region have a TEL in place; the average TEL stringency score of the states in this region is significantly higher than the average for all other regions of the United States. TELs are least prevalent in the Atlantic area of the United States. Only two states in this area have adopted TELs and the average TEL stringency score of this area is lower than the national average score. Alm and Skidmore (1999) find that income growth increases the likelihood of TEL adoption; populations with higher incomes exhibit greater resistance to taxes. This might explain why TELs are more prevalent in the Far West region of the United States, that is, in states where income and income growth is higher. Also, while no significant difference in stringency scores exists between states with constitutionally and statutorily created TELs, states where TELs have been adopted by citizen initiative tend to have higher TEL stringency scores

than scores of states where TELs have been adopted by the legislature. This could be the result of the more direct influence of taxpayers to TEL development in citizen initiative states, rather than development that filters through legislatures in the other states.

Impacts of TELs and BBRs

A backdrop for this research is consideration of the pressure-group competition approach to government fiscal policy choice. That is, the politician is assumed to be a self-interested broker in the political market who tries to maximize his/her political support or minimize his/her political costs. In this political market, taxpayers' and special interest groups are competing. The politician gains political support or incurs political cost, depending upon which combination of discretionary fiscal policy s/he chooses to handle different fiscal situations. The politician faces pressure from taxpayer resistance to increasing taxes as well as pressure from special interest group demands for increased spending. To maximize political support and minimize political cost, a politician chooses the combination of the discretionary fiscal policy in which marginal support/cost of each action is equal. In such circumstances, TELs and BBRs constrain the politician's choices. This research measures the stringency of these limitations and requirements and then examines how stringency influences fiscal policy choices.

Specifically, this study tests the impacts of TELs and BBRs on state tax changes and spending cuts separately. Three sets of fixed-effect panel regressions examine tax changes. The dependent variables for these three regressions are: 1) net real per capita tax changes; 2) net real per capita tax changes from major tax sources (including individual and corporate income and sales taxes); and 3) net real per capita tax changes from non-

major tax sources (including cigarettes/tobacco, motor fuels, alcohol and other taxes and fees). The potential fiscal gap (either surplus or deficit) is the major driving force for states to adjust their discretionary fiscal policies; TELs and BBRs interact with any fiscal gap.

It is hypothesized that in the face of a potential deficit, a stringent TEL leads a state to enact fewer tax increases and more tax cuts. Estimation results from models presented here confirm enactment of fewer tax increases in states with stringent TELs, though no confirmation that these states make more tax cuts. Still, results do confirm that states with stringent TELs do enact significantly more tax cuts *from major tax resources*, than do states with less stringent or no TELs. It is also expected that states with stringent TELs will make fewer major tax increases as well as fewer non-major tax cuts compared with non-TEL/less stringent TEL states. The combined results of Models 3, 6 and 4, 7 provide statistically significant support for such expectations. Finally, it is expected that states with stringent BBRs that are facing a potential deficit will enact more tax increases than states with less stringent or no BBRs. Results from this research do not support this expectation.

A fixed-effect Tobit model is adopted in this research to test the impact of TELs and BBRs on spending cuts after the state budget is adopted. The lack of data regarding discretionary spending increases creates a censored sample data set, thereby necessitating the use of the Tobit model to overcome this problem. It is hypothesized that when faced with a potential deficit, states with stringent TELs will enact more spending cuts compared to states with less stringent or no TELs. Tobit results do not provide statistically significant support for this hypothesis. On the other hand, Tobit results

confirm an expectation that states with stringent BBRs will enact more spending cuts when facing a deficit, compared to states with less stringent or no BBRs.

These findings suggest that TELs may be the more important factor affecting state discretionary fiscal policy from the tax side, while BBRs are a more important factor affecting state discretionary fiscal policy from the expenditure side. Stringent TELs may help restrain state governments' growth; however, as the economy fluctuates, it also exerts pressure on state governments to handle volatile fiscal situations. Stringent TELs hinder state government ability to raise taxes to close a budget gap, while stringent BBRs force state government to enact more expenditure cuts to close a budget gap. In the end, stringent TELs and BBRs have the potential to prevent state government from providing an adequate level of public services during a period of budget crisis.

Implications of Research

This dissertation presents results that have theoretical implications. First, this work adds to the literature regarding the public choice view that budgetary institutions do affect fiscal policy outcomes. The theoretical framework that undergirds this work extends the application of a pressure group competition approach to the determination of state fiscal policy by measuring and analyzing the impacts of budgetary institutions on discretionary fiscal policy choices of states across different economic conditions that include periods of economic boom and bust. The quantitative analyses provide a clearer look into how TELs and BBRs affect a state's choice of discretionary fiscal policy in response to these different fiscal situations.

Second, most previous studies on the impact of budgetary institutions in states have focused on *long term* fiscal policy outcomes, like government size and growth. This

study chooses a *short term* perspective of fiscal policy outcomes—the combination of discretionary fiscal policy choices by fiscal year. Results here provide strong evidence that TELs and BBRs have more impact on state discretionary fiscal policy choices in circumstances of a budget deficit rather than those of a budget surplus. Understanding such distinctive influences of these types of limitations on state discretionary fiscal policy can help state budget decision makers to formulate better, more realistic strategies to effectively deal with fiscal stress.

Perhaps the most important contributing component of this work regards policies relating to the future development of TELs in the states. Recently some non-TEL states have begun debating the usefulness of such limitations and are considering creating new TELs, while other states with TELs are debating the revision or sunset of existing provisions (NCSL, 2006). Most notable is the fact that the state with the most restrictive TEL—Colorado—suspended its TEL for five years in November, 2005.

Just this past legislative session (2008), Georgia legislators deliberated about creating a constitutional requirement to set limitations on state government taxation and expenditures. According to House Resolution No. 956 (2007), beginning in fiscal year 2011, spending of Georgia state government "shall not exceed the amount of any preceding fiscal year or the amount of spending of the immediate preceding fiscal year adjusted for inflation and population growth." With legislative approval, excess revenue would be transferred to the State's Revenue Shortfall Reserve after funding local schools to accommodate student enrollment. A two-thirds' vote from both houses of the General Assembly would be required to override the spending limit; a precondition for overriding is that the Revenue Shortfall Reserve is depleted.

The present research effort provides some argument against such a TEL in Georgia. That is, the findings here show that TELs exert pressure on states that ***hinder*** these governments' ability to deal with volatile fiscal situations, especially during periods of budget crises. Better advice to Georgia would be to examine its tax structure and counter-cyclical devices for flexibility and elasticity before considering the imposition of TEL. An unstable revenue structure coupled with economic downturn will lead to a revenue shortfall. A strict TEL only hinders state ability to raise taxes to close any budget gap. A well managed (well stocked) countercyclical device, like a budget stabilization or reserve fund, provides some flexibility to a state to manage through a budget crisis more smoothly; such flexibility would be offset given a strict TEL, however.

In fact, examining Georgia fiscal policy during the budget crisis in early 2000s demonstrates that the State dealt successfully with the fiscal downturn because of its stable revenue structure and well functioning countercyclical devices (Lauth, 2003). It is difficult to understand how a TEL would benefit Georgia. At the very least, if a TEL became politically popular and did pass, results of this research suggest that any limitation include a waiver provision that recognizes TEL effects in periods of unanticipated economic fluctuation.

Another implication of this study regards the role of state government in a fiscal federalism system. As federal support to states continues to decline, state governments increasingly will need to rely on their own source revenues to provide public services. States with stringent TELs will be especially hampered in their ability to increase taxes, and thereby suffer when looking for new tax resources. And, state-level TELs impact the fiscal relationship between state and local governments. That is, findings from this study

indicate such relationship to be further exacerbated, more so than previously indicated in past research (see Joyce and Mullins, 1991 and 1996, and Skidmore, 1999). For example, the Georgia House in 2008 passed HR 1246, also known as the Property Tax Reform Amendment, which would eliminate property tax on cars and cap assessment limits on residential and commercial property taxes (Hudson, 2008). This would centralize the revenue system in Georgia. Couple such centralization of revenue generation with a state-level TEL, and local governments stand to lose substantially with even a slight economic downturn.

Ultimately, understanding the affects of budgetary institutions on discretionary fiscal policy adjustments can help direct state policy makers to consider different ways to reach and maintain budget balance. And especially given a focus on government performance and results, knowing the impact of budgetary institutions on the ability of a state to meet its obligations and making this information transparent can help citizens to make more informed choices when casting their votes regarding the creation of or amendment to such institutions.

Limitations and Directions for Future Research

This study examines the impact of the state-level TELs and BBRs on state discretionary fiscal policy adjustment. Several problems with this research have been acknowledged. One caveat of this study is its' failure to distinguish tax changes between those planned versus those induced by fiscal gap; this needs to be considered in future research. Another caveat is the lack of data on discretionary spending increases. This makes the dataset for the spending change model a left-censored sample. Even though the

Tobit model is adopted to address this problem, it would be much better to have complete information on state spending changes.

One way to enhance this research would be to conduct in depth analysis of several states across the same timeframe. This study conducts quantitative analysis across all continental state governments, which supports the generalization of results. Still, each state has a different fiscal situation, political culture, and organizational environment. Case studies of several states on how the budget process is affected by these budgetary institutions would supplement understanding of this issue.

Finally, this research could be replicated at the local government level. As sub-units of state governments, local governments also operate under certain budgetary institutions and face fiscal challenges as the economy fluctuates. In addition, the fiscal relationship between state and local governments is affected by the existence and stringency of budgetary institutions. For example, exactly how budgetary institutions affect transfers of responsibility requires further study. In the end, both the relatively new budgetary institution of the TEL as well as the BBR bring up new policy issues for governments and the results here provide great fodder for future studies.

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