

Summer 8-8-2017

# Essays on Fiscal Institutions, Public Expenditures, and Debt

Rahul Pathak

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# Essays on Fiscal Institutions, Public Expenditures, and Debt

Rahul Pathak

## ABSTRACT

### ESSAYS ON FISCAL INSTITUTIONS PUBLIC EXPENDITURES AND DEBT

By

RAHUL PATHAK

August 2017

Committee Chair : Dr. Sally Wallace

Major Department : Department of Public Management and Policy

This three-essay dissertation focuses on the political economy of fiscal rules in a comparative context and highlights their unintended consequences – an issue that has received relatively little attention in public financial management literature. The first essay examines whether numerical limits on deficits, or balanced budget rules, influence the composition of public spending, particularly in the social sector. Using a combination of fixed effects and GMM regressions on a large panel of developed and developing economies, this essay finds that while deficit targets are effective in improving fiscal balances, they also tend to reduce social spending on health and social protection. This effect is particularly prominent in democratic countries, which often witness overspending problems. Countries that are considering adoption of such rules should carefully examine the effects of these requirements on expenditures that may have long-term positive externalities. Policymakers should explore mechanisms to minimize the distortionary effects of fiscal limits on spending composition.

The second essay focusses on whether the adoption of deficit targets by subnational governments in India influenced the composition of public spending. Using a combination of

fixed effects and GMM regressions, this essay finds that the adoption of Fiscal Responsibility and Budget Management (FRBM) legislation by Indian states improved their budget balances significantly. However, the post-FRBM period also witnessed significant cuts in development spending. Furthermore, states have reduced their capital outlay and social spending after the adoption of fiscal responsibility laws. Reduced expenditure on development, and capital projects may affect long-term economic growth, therefore future amendments to the FRBM law should explore mechanisms to minimize the distortionary impacts of fiscal targets on the composition of subnational spending.

The third essay shifts attention to the effect of supermajority voting requirements on credit ratings and borrowing costs in the subnational debt market in the United States. Using a combination of generalized ordered logit and linear regression analyses on a sample of general obligation bonds issued by American state governments between 2001 and 2014, this essay finds that states with supermajority voting requirements for tax increases are more likely to receive a lower credit rating on their bonds. Furthermore, on average, the states with a supermajority voting requirement pay a premium of 18 to 21 basis points in true interest cost for their bonds. States that are considering adopting supermajority requirements should consider the unintended effects in terms of lower credit ratings and higher borrowing costs while adopting or designing such fiscal rules. The findings of this dissertation inform the policy debate on the subject and improve our understanding of the impact of fiscal institutions that are being increasingly adopted to regulate the behavior of governments across the world.

ESSAYS ON FISCAL INSTITUTIONS PUBLIC EXPENDITURES AND DEBT

BY

RAHUL PATHAK

A Dissertation Submitted in Partial Fulfillment of the Requirements for  
the Degree of Doctor of Philosophy

In the Andrew Young School of Policy Studies  
Of Georgia State University

Andrew Young School of Policy Studies  
Georgia State University, Atlanta, GA  
2017

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## ACCEPTANCE

This dissertation was prepared under the direction of Rahul Pathak's Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Public Policy in the Andrew Young School of Policy Studies of Georgia State University.

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To you, the Reader

Since you decided to read a public finance dissertation...even after that title!



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## CHAPTER I: INTRODUCTION

Over the past few years, two issues have assumed center stage in public finance discussions, the redistributive role of government, and public-sector debt. Any discussion of these issues is incomplete without appropriate attention to politics and institutions. The political process shapes institutions, which in turn affect different public finance outcomes. In this context, one of the central questions that public finance scholars grapple with is how various political and fiscal institutions affect key outcomes such as deficits, debts, revenues, and expenditures. Furthermore, it is important to examine whether the institutional choices that governments make are causing any distortionary effects and how to mitigate such effects.

In the aftermath of the Great Recession, these questions have regained prominence as countries around the world are grappling with high deficits and sluggish growth. The institutions of economic and fiscal governance in the Eurozone have come under constant scrutiny as divergence between institutions and socio-political priorities continue. Citizens across the industrialized and developing countries are questioning the priorities of their governments, and support for institutions that curtail political discretion seems to be increasing. In this context, several countries have adopted rules that impose additional constraints on fiscal policy by specifying numerical targets that governments are expected to pursue. According to the International Monetary Fund, only five countries had such numerical fiscal rules in 1985, but that number has increased to around ninety countries at present. Fiscal rules have also gained popularity at the subnational level across the developing and the developed world. Several subnational governments have adopted numerical limits and procedural rules to regulate the behavior of state policymakers. These institutions could assume the form of strict numerical limits (e.g., balanced budget requirements and expenditure or debt limits), procedural

requirements (e.g., medium-term reviews in several African countries and supermajority requirements in the United States) or a combination of the two (e.g., fiscal responsibility frameworks in Latin American and Asian countries).

The previous research on the impact of these rules has focused on the implications of these constraints on stated goals of fiscal performance and deficit reduction. However, the rules that regulate the behavior of policymakers and expect to alter the direction of fiscal policy are likely to have repercussions beyond the stated mandate, an issue that has received relatively little attention in the academic literature. Therefore, in this dissertation project, I focus on the unintended consequences of fiscal rules in an attempt to further the debate on their benefits and costs. The next three chapters of this dissertation are organized around this common theme.

Chapter 2 focuses on numerical fiscal rules in a cross-country context and examines the impact of numerical fiscal limits on social sector spending. I argue that fiscal rules such as balanced budget requirements change the institutional environment in which policymakers allocate resources, and thus they may alter the composition of public spending. Chapter 3 extends this thesis and focusses on subnational fiscal rules in the Indian states. In both these chapters, I find evidence for the changing composition of government expenditure and a decline in public investment under the rules-based fiscal regime. Chapter 4 shifts attention to the impact of legislative supermajority requirements for tax increases in the U.S. on municipal market outcomes. I find that the states with supermajority requirements receive lower credit ratings on their bonds and pay higher interest costs on their general obligation debt.

## CHAPTER 2

### THE BALANCING ACT

Do Balanced Budget Rules Reduce Social Sector Spending?



## 2.1 INTRODUCTION

In 2017, several States in the United States voted to hold a convention of states with a key focus on adding a balanced budget amendment to the U.S. Constitution (U.S. News, 2017). The balanced budget amendment proposes that the federal government spends no more than the tax revenues it collects, thus reducing outstanding debt and deficits. Such proposals are not limited to the United States, as several countries are modifying their institutional architecture to reduce debt and deficits. In the last thirty years, the popularity of rule-based fiscal policy has increased in both industrialized and developing economies. Currently, around ninety-six countries around the world have numerical fiscal rules that impose limits on budgetary aggregates (Lledó, Yoon, Fang, Mbaye, & Kim, 2017). Some countries (e.g., members of the European Union) have adopted these rules under supranational treaties, a few have enacted these limits under the influence of donor agencies (e.g., Jamaica),<sup>1</sup> and the remaining have adopted the rules through domestic political processes (e.g., Brazil and India).

The increasing popularity of fiscal rules has motivated substantial scholarly work focusing on their impact on budgetary balances and fiscal discipline. However, limited research has examined the unintended consequences of these rules. For e.g., the impact of these rules on the composition of public spending has been understudied despite a high likelihood that these targets introduce a short-term focus in fiscal policy that leads to distortionary expenditure cuts and austerity measures. Some studies that have examined the spending impacts of fiscal rules have focused on OECD countries, and the policy prescriptions to

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<sup>1</sup> In the recent years, the International Monetary Fund has strongly advocated the introduction of fiscal rules in developing countries. In Turkey, adoption of fiscal rules was one of primary recommendations of IMF while discussing their stand-by agreement in 2008. Jamaica adopted a numerical fiscal rule based on the recommendations of IMF during the tax reform initiative in 2014.

developing countries are based on such evidence which may be wholly inappropriate (Cordes et al. 2015; Dahan & Strawczynski, 2013; Guichard et al., 2007). Developing countries face a different set of development challenges and public investment requirements than OECD countries, and restrictions on short-term deficits and debt may affect how these countries approach questions of long-term economic growth and development.<sup>2</sup>

This essay examines the impact of fiscal rules on the composition of public spending using a large panel of developed and developing economies. Specifically, I explore whether sovereign governments that adopt numerical limits on deficits or balanced budget rules (BBRs) allocate fewer resources to the social sector (education, health, and social protection). The empirical results suggest that while deficit targets are effective in improving fiscal balances, they also tend to reduce social spending. However, the magnitude of the effect varies substantially across alternative estimation approaches.

The rest of the essay proceeds as follows. Section 2.2 summarizes previous research on fiscal rules explaining the reasons for their adoption and evidence of their impact on spending and public investment. Section 2.3 outlines my theoretical argument and lays out the key hypotheses. Section 2.4 provides details of data, variables, and empirical strategy. Section 2.5 summarizes the results. The last section discusses limitations of the analysis and provides conclusions.

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<sup>2</sup> Short-term deficits and debt are not viewed as major problems in the traditional public finance literature (Barro, 1979).

## 2.2 PREVIOUS RESEARCH

Several researchers in economics and political science have studied fiscal rules – exploring the rationale for their adoption and evaluating their effectiveness under a variety of political conditions. Public choice scholars believe that balanced budget rules may solve the overspending problem that arises from political budget cycles and collective action problems in democratic systems. Several explanations for overspending due to political budget cycles have been discussed in the literature – inability of the voters to understand intertemporal budget constraints (Buchanan & Wagner 1977; Wagner 1976); imposing constraints on opposition parties that may control future governments by accumulating more debt (Alesina & Tabellini, 1990; Persson & Svensson, 1989; Van Der Ploeg, 1984); information asymmetry and principal-agent problems (Brender & Drazen, 2005; Rogoff, 1990; Rogoff & Sibert, 1988; Shi & Svensson, 2006). Furthermore, collective action problems arise because legislators and interest groups benefit from higher public spending for their constituents. As the number of decision makers in the political system increases, governments run higher deficits due to pork barrel bargaining (Baron & Ferejohn, 1989; Weingast, Shepsle, & Johnsen, 1981). In parliamentary systems, ministers lobby for higher allocation for their ministries, and, in decentralized systems, subnational governments with soft budget constraints may overspend, leading to higher deficits (Alesina, Baqir, & Easterly, 1999; von Hagen & Harden, 1995; Wyplosz, 2005). Some scholars suggest the adoption of fiscal rules by governments may ameliorate some of these problems.

Critics argue that stringent fiscal rules may deepen recessions, since the discretionary approach to fiscal policy plays a key role in dealing with business cycles. Strict adherence to fiscal rules also hinders tax-smoothing and makes it more difficult to achieve traditional public finance goals of stabilization, fairness, and efficiency (Alesina, 2012; Barro, 1979; Kopits, 2001;

Wyplosz, 2005). Critics also argue that fiscal rules will be redundant if the underlying preferences of voters and elected representatives already favor fiscal discipline (Poterba and Von Hagen 1999; Schick 2004), and often, the markets may provide a sufficient nudge to maintain fiscal balances. If externally imposed rules do not reflect the preferences of either voters or policymakers, they are unlikely to comply, leading to target violations or creative accounting (Calderon & Schmidt-Hebbel, 2008; Milesi-Ferretti, 2004; Jürgen von Hagen & Wolff, 2006).

Research on the effectiveness of fiscal rules is not conclusive. However, several studies suggest that under certain conditions, fiscal rules may be useful in controlling deficits and improving fiscal balances (Krogstrup & Wälti, 2008; Poterba & Von Hagen, 1999; Von Hagen, 2006). Studies of subnational governments in the United States and Europe find fiscal rules do control deficits (Alt & Lowry, 1994b; Bohn & Inman, 1996; Grembi, Nannicini, & Troiana, 2015; Krogstrup & Wälti, 2008; Poterba, 1994). Cross-country evidence is mixed, but a few studies focusing on OECD countries do find that fiscal rules improve budget balances (Badinger, 2011; Dahan & Strawczynski, 2013; Sacchi & Salotti, 2015).

Fewer studies explore the relationship between fiscal rules and public spending. Dahan and Strawczynski (2013) examine the effect of adopting fiscal rules on budget deficits, government expenditure and its composition in a panel of 22 OECD countries during 1960 to 2010. They focus on four kinds of rules: balanced budget rules, expenditure rules, participation in the Maastricht Treaty, and participation in the Stability and Growth Pact (SGP). On the spending side, they focus on three expenditure components (government consumption, social transfers, and government investment). They find that the fiscal rules reduce budget deficits, but also decrease social transfers relative to government consumption (Dahan and Strawczynski,

2013). Guichard et al. (2007) focus on fiscal consolidation efforts in 24 OECD countries during 1978-2005 and find that the consolidations that emphasize cuts in social spending have a higher chance of 'success' in meeting fiscal targets. Galí et al. (2003) examine the effect of fiscal rules on public investment in the context of the Maastricht Treaty and Stability and Growth Pact during 1980-2002. They find a decline in public investment in EU countries during the period, but they argue that it is part of a global trend and started much before the Maastricht Treaty was signed. Using data from 1985 to 2013, Cordes et al. (2015) find that the expenditure rules decreased public investment only in emerging economies, and not in industrialized economies. They contend that better budgetary frameworks and procedures in industrialized economies mitigate the adverse effects, while the emerging economies might be employing across-the-board spending cuts for short-term compliance. A few country case-studies in Latin America also find an adverse effect of fiscal targets on infrastructure spending (Calderón & Servén, 2012; Easterly, Irwin, & Servén, 2008; Servén, 2007).

In summary, most of the literature on the impact of fiscal rules has focussed on deficits and fiscal discipline, leaving the spending impacts relatively understudied. Furthermore, evidence on the impact of fiscal rules is particularly weak in cross-country and developing country contexts, mainly because of the limited availability of data. In the next section, I outline the theoretical arguments that inform my hypotheses about the impact of fiscal rules on the composition of public spending, and why we might expect a reduction in social spending in response to the adoption of numerical fiscal limits.

## 2.3 THEORY AND HYPOTHESES

Before outlining my theoretical argument, it is useful to define what qualifies as a fiscal rule. The International Monetary Fund (IMF) defines a fiscal rule “as a long-lasting constraint on

fiscal policy through numerical limits on budgetary aggregates with primary goals such as deficit reduction, balancing the budget or controlling public spending” (Bova, Kinda, Muthoora, & Toscani, 2015; Kinda, Kolerus, Muthoora, & Weber, 2013; Lledó et al., 2017; Schaechter, Kinda, Budina, & Weber, 2012). The IMF classifies fiscal rules into four categories of balanced budget rules, expenditure rules, revenue rules, and debt limits. In this essay, I follow the IMF’s definition, but focus only on numerical limits on deficits or balanced budget rules.

### *Why may fiscal rules reduce social spending?*

When policymakers confront a short-term deficit target, they should undertake a careful cost-benefit analysis – cutting expenditures with the lowest marginal social welfare and enacting taxes or fees that minimize deadweight loss. In addition, policymakers may employ the equity criterion to evaluate the revenue and expenditure portfolio, consider the positive externalities of expenditures, such as education and health, and account for long-term benefits of public investment in certain sectors such as education, health, and infrastructure.<sup>3</sup> However, given the administrative realities of everyday policymaking, such revenue and expenditure analysis is rare. When policymakers focus on short-term rule compliance, they are to reduce social investments in education, health, and social security to meet fiscal goals. Several political-economy factors may lead to such an outcome.

*Administrative Ease and Flexibility.* Political agents who have the task of balancing the budget have limited options. Revenue instruments like new taxes or fees are unpopular with voters, have a time lag that does not help in meeting short-term targets and have cascading

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<sup>3</sup> The World Bank employs a somewhat similar framework to evaluate spending in the public expenditure reviews. See Pradhan (1996) and Shah (2005) for details.

behavioral implications. Therefore, policymakers view expenditure cuts (particularly social expenditures) as more feasible options. Therefore, we should expect to see expenditure reduction, especially reduction in social expenditures, in response to fiscal targets. By the same logic, we should not expect to see a significant increase in revenue collection in the aftermath of fiscal rule adoption, particularly in the developing economies.

*Visibility of Budget Cuts.* Furthermore, a political agent who intends to meet the fiscal target without losing political support has an incentive to cut expenditure items that are less visible to voters (e.g., long-term investments in teacher training and upgrading hospital infrastructure) than more visible items (e.g., filling potholes or laying off public sector workers).<sup>4</sup> Furthermore, electoral cycles and short time horizon of political agents may also contract public investment on long-term capital projects whose benefits accrue beyond the electoral tenure.

*Political Power of Beneficiaries.* In addition, an extensive political economy literature highlights that poor voters have less information and ability to lobby than non-poor voters, which decreases the social allocations they receive (Bardhan & Mookherjee, 2000; Grossman & Helpman, 1996; Ravallion, 2006). Thus, during budget cuts, pro-poor budget items are more prone to cuts than spending that is supported by powerful interest groups.<sup>5</sup> As a result, social expenditures on public health, education, and social protection that benefit lower-income households more, should witness a larger decrease under a rule-based fiscal regime.

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<sup>4</sup> This argument is an extension of the literature on political budget cycles, which makes a distinction between visible and invisible expenditures and argues that political agents focus more on visible expenditures during the election years (See Rogoff & Sibert, 1988; Rogoff, 1990). Budgeting scholars also highlight that during cutbacks, a significant focus is on 'back office operations' that are relatively less visible (Bourdeaux, 2016)

<sup>5</sup> Previous studies on fiscal consolidation and cutback budgeting provide some support to this thesis (Bourdeaux, 2016; Cornia, Richard, & Stewart, 1987; Cornia & Stewart, 1993; Hicks, 1991; Ortiz & Cummins, 2013; Ravallion, 2004, 2006).

## *Does the impact of fiscal rules vary across country groups?*

Fiscal rules may reduce social spending much more in developing economies because of several factors. First, developing economies have weaker electoral accountability and low institutional protection for social sector programs. In their study of OECD countries, Dahan & Strawczynski (2013) found that the negative effect of fiscal rules on social allocations is especially evident in countries with weaker legal protection for social rights. If their findings are valid, we should expect to see the particularly negative impact of fiscal rules in developing economies that typically have a weaker social rights framework. Second, governments in developing economies often lack the institutional capacity to undertake appropriate revenue and expenditure analysis that should accompany rules-based fiscal policy making. Also, budgetary processes in most of the developing economies are still evolving, and ad-hoc budget cuts are much more common under such conditions. Third, increasing tax collection in developing economies is particularly challenging because of their large informal sector, weaker tax administration, and lower tax compliance. Therefore, most of the burden of meeting deficit goals falls on expenditures.

Also, political scientists highlight that electoral cycles and collective action problems in legislatures are some of the key reasons for high deficits in democracies and parliamentary systems (Alesina & Passalacqua, 2015; Alesina, Perotti, & Tavares, 1998; Cheibub, 2006; Hallerberg & Marier, 2004; Hankla, 2013). Thus, if the fiscal rules are effective in countering the political budget cycles and collective action problems – then we should expect to see the rules reducing spending more in democratic political systems. Furthermore, if the rules are effective in countering collective action problems that arise in the legislatures – then we should see that fiscal rules are more effective in the parliamentary systems.



Based on these expectations, I formulate two broad hypotheses for this study.

Hypothesis 1: The adoption of balanced-budget requirements leads to a disproportionate reduction in social sector spending (education, health, and social protection).

Hypothesis 2: The negative impact of balanced budget rules on social spending is particularly high in developing economies, democratic countries, and parliamentary systems.

## 2.4 DATA AND METHODS

Cross-country datasets on fiscal rules and expenditures have improved substantially during the last few years, enabling meaningful cross-country comparisons. The IMF's Fiscal Rules Database provides fairly comprehensive information on fiscal rules based on a review of legislative and budgetary documents (Bova et al., 2015; Lledó et al., 2017).<sup>6</sup> Furthermore, the International Food Policy Research Institute (IFPRI) compiles the Statistics of Public Expenditures for Economic Development (SPEED) database. It starts with the IMF's Government Finance Statistics (GFS), but improves it by filling in missing observations using country budget documents and standardizes estimates to allow for meaningful inter-temporal and cross-country comparisons.<sup>7</sup> In addition, I use information from several other publicly available databases for the control variables: World Development Indicators, Fiscal

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<sup>6</sup> Organizations such as OECD and the European Union maintain their data on fiscal rules for the member countries. The coding in the IMF and OECD database may differ since the IMF classifies a fiscal rule if it is considered binding for a minimum of three years and does not include pay-as-you-go targets (Schaechter et al., 2012). However, IMF is the only source that provides a comprehensive coverage for developing countries.

<sup>7</sup> IFPRI data covers 147 countries and reports expenditures using the Classification of Function of Governments (COFOG). There are two popular ways of classifying government expenditures: The functional classification and the economic classification. The functional approach (COFOG) classifies government expenditures based on the purpose, such as education, health, and defense. The organizational structure of governments across the countries varies substantially, and the structure varies over time within countries. Therefore, COFOG enables more meaningful comparisons of government outlays across countries and over time. On the other hand, the economic classification focusses on economic categories such as capital expenditure, transfers, and grants.

Decentralization Indicators, and Database of Political Institutions from the World Bank, and the Polity IV project.

Across these models, the key dependent variables are different fiscal outcomes related to deficits, revenues, and expenditures. I begin with a simple analysis of the impact of fiscal rules on aggregate fiscal outcomes. I use three fiscal measures – fiscal balance, total expenses, and tax revenues – as dependent variables to examine the overall impact of balanced budget rules. To allow comparison across these indicators, I operationalize these variables as a percent of the gross domestic product. Next, I examine my primary hypothesis – that balanced budget rules reduce social spending. I classify spending on education, health, and social protection as social sector spending and use the natural logarithm of constant dollar spending, adjusted for purchasing power, as the key dependent variable in the spending specifications. To gain a better understanding of sectoral patterns, I also examine the impact of fiscal rules on individual spending categories: education, health, social protection, primary sector (agriculture, mining, and fuel), transport and communications, defense, and ‘other’ spending (includes general government expenditures). The main independent variable is a dummy for balanced budget rules that varies over country-years.

I control for a variety of factors that may influence the dependent and key independent variables. First, I include a set of demographic variables to capture the demand for public services. The key variables in this category are log of total population, to account for overall demand, and the proportion of the elderly and children in the population, to account for dependency ratio, and for higher demand for social expenditures such as education and health. Second, I include a set of variables to account for economic conditions and resource availability

- log of per capita gross domestic product to account for the size of the economy, economic growth in the previous fiscal year to account for growth in the available resources, and the unemployment rate to capture the economic performance and labor market situation. Third, a set of control variables capture the variation in the institutional environment and political system. These include a dummy coded one if the economic ideology of the government leans towards the left, a dummy for country-years with executive or legislative election to account for the political budget cycles. In all the spending regressions, I control for percent of expenditure by subnational government to account for fiscal decentralization – the transfer of spending authority from central to provincial governments. Finally, I include year dummies to account for business cycle effects. Table 2.1 provides the summary statistics for all the variables.

The public expenditure database from IFPRI provides information for 147 countries. I begin by merging the expenditure data with the other data sources (Table 2.1). Given the nature of this data, I drop 41 countries that have outlier values on several variables that could only be attributed to reporting errors or extreme economic or political circumstances (e.g., extremely high surplus/deficits or economic growth/decline or no social spending for several years). In the reduced sample of 106 countries, several variables have missing information. Therefore, those observations drop out, leading to a final sample of 95 countries. Finally, the fiscal decentralization measure has several missing observations; therefore, when I control for it in the social spending regressions, I lose another one-third of the countries, leaving me with a final sample of 62 countries. Table 2.2 provides a list of all country-years that are included in the social spending regressions.

Table 2.1: Summary Statistics

Variable (Operationalization) (Source)	All Countries				High Income Countries				Middle and Low Income Countries			
	Mean	SD	Min	Max	Mean	SD	Min	Max	Mean	SD	Min	Max
Fiscal Balance (% of GDP) (Source: WDI, World Bank)	-1.80	3.88	-14.85	20.34	-1.54	4.52	-12.39	20.34	-2.00	3.28	-14.85	19.57
Revenue (% of GDP) (Source: WDI, World Bank)	24.49	9.79	3.26	51.70	30.45	9.37	3.26	51.70	20.38	7.74	4.57	49.30
Expense (% of GDP) (Source: WDI, World Bank)	25.42	10.32	2.81	59.07	31.22	10.39	4.15	54.57	21.04	7.80	2.81	59.07
Social Spending (billion 2005 \$ppp) (Source: SPEED, IFPRI)	116.89	345.71	0.02	3885.29	227.45	496.40	0.32	3885.29	35.83	105.85	0.02	1335.33
Education Spending (billion 2005 \$ppp) (Source: SPEED, IFPRI)	14.95	32.05	0.01	528.63	21.62	30.62	0.14	139.38	10.05	32.23	0.01	528.63
Health Spending (billion 2005 \$ppp) (Source: SPEED, IFPRI)	14.05	36.63	0.01	335.43	27.45	51.78	0.01	335.43	4.30	12.02	0.01	180.30
Social Protection (billion 2005 \$ppp) (Source: SPEED, IFPRI)	45.59	150.15	0.00	1730.21	91.84	217.80	0.03	1730.21	11.22	36.29	0.00	313.20

Primary Sector (Mining, Agriculture, Fuel) (Source: SPEED, IFPRI)	4.86	18.53	0.00	417.89	4.94	7.62	0.00	56.67	4.84	22.83	0.01	417.89
Transport and Communication (Source: SPEED, IFPRI)	6.20	14.68	0.00	203.97	10.33	17.48	0.00	130.51	3.33	11.54	0.01	203.97
Defense Spending (billion 2005 \$ppp) (Source: SPEED, IFPRI)	13.71	51.96	0.00	630.40	21.16	74.94	0.02	630.40	7.67	17.09	0.00	166.51
Other spending (billion 2005 \$ppp) (Source: SPEED, IFPRI)	55.40	117.30	0.09	1323.95	78.75	134.22	0.34	785.58	40.44	102.43	0.09	1323.95
Total (billion 2005 \$ppp) (Source: SPEED, IFPRI)	139.72	332.36	0.11	3235.93	248.54	455.41	0.80	3235.93	73.34	199.64	0.11	3134.46
Balanced Budget Rule (1=Yes) (0=No) (Source: FAD, IMF)	0.28	0.45	0.00	1.00	0.52	0.50	0.00	1.00	0.16	0.36	0.00	1.00
Total Population (million) (Source: WDI, World Bank)	54.18	163.82	0.19	1350.70	26.82	50.89	0.26	314.11	69.29	198.98	0.19	1350.70
Percent Children (Age 15 or less) (Source: WDI, World Bank)	29.51	10.53	13.13	51.79	20.05	5.06	13.13	45.25	34.73	9.02	13.36	51.79
Percent Seniors (Age 65 or more) (Source: WDI, World Bank)	8.03	5.14	0.70	24.29	12.67	4.68	0.70	24.29	5.47	3.22	2.18	18.98

Per Capita GDP (2011 \$ppp, Thousands) (Source: WDI, World Bank)	16.45	17.28	0.35	114.52	33.97	17.77	8.27	114.52	6.73	4.94	0.35	24.88
Economic Growth (%) (Source: WDI, World Bank)	3.71	4.55	-29.59	34.50	2.88	3.39	-14.81	18.33	4.16	5.02	-29.59	34.50
Subnational Exp. Share (% of total spending) (Source: WDI, World Bank)	25.13	19.65	0.37	98.76	26.11	15.94	4.56	98.04	24.32	22.28	0.37	98.76
Unemployment Rate (% of labor force) (Source: WDI, World Bank)	8.13	4.86	0.70	29.80	7.86	4.07	1.50	25.60	8.27	5.24	0.70	29.80
Left Government (1=Yes) (0=No) (Source: WDI, World Bank)	0.29	0.45	0.00	1.00	0.32	0.47	0.00	1.00	0.27	0.44	0.00	1.00
Election Year (1=Yes) (0=No) (Source: DPI, World Bank)	0.28	0.45	0.00	1.00	0.30	0.46	0.00	1.00	0.28	0.45	0.00	1.00
Parliament (1=Yes) (0=No) (Source: DPI, World Bank)	0.40	0.49	0.00	1.00	0.73	0.45	0.00	1.00	0.21	0.41	0.00	1.00
Democracy (1=Yes) (0=No) (Source: Polity Data Series)	0.62	0.49	0.00	1.00	0.87	0.33	0.00	1.00	0.48	0.50	0.00	1.00

Table 2.2: Countries-Years Included in the Social Spending Regressions  
(Determined by the availability of all dependent and independent variables)

Mid & Low Income Panel (N=34)	Years Available	High Income Panel (N=28)	Years Available
Afghanistan	2006-2011	Australia	1992-1997
Albania	1995-1998	Belgium	1992-1998
Argentina	1992-2001	Canada	1992-2007
Azerbaijan	2008-2011	Chile	1992-2002
Belarus	1992-2011	Croatia	1997-2011
Bolivia	1992-2001	Czech Republic	1993-2011
Brazil	1992-1994, 1997-1998, 2006-2011	Denmark	1992-2000
Bulgaria	1992-2011	Finland	1992-1998
China	2003-2004	France	1995-1997
Colombia	1998-2000	Germany	1992-1999
Costa Rica	2002-2011	Hungary	1993-1999
Dominican Republic	1992-1996	Israel	1992-1999
Ethiopia	2002	Italy	1995-1999
Guatemala	1992-1993	Latvia	1997-2011
India	1992-2009	Lithuania	1997-1999
Indonesia	1992-1998	Luxembourg	1992-1997
Iran	1999-2009	Netherlands	1992-1997
Jamaica	2004-2007	Norway	1992-1999
Jordan	2008-2009	Poland	1994-2000
Kazakhstan	1998-2011	Portugal	1992-1994, 1995
Kyrgyzstan	1998-2001, 2006	Republic of Korea	2006-2011
Malaysia	1992-2001	Slovenia	1997-2011
Mauritius	1992-1999, 2002-2011	Spain	1992-1997
Mexico	1992-2000	Sweden	1992-1999
Panama	1992-1994	Switzerland	1992-2008
Peru	2004-2011	Trinidad and Tobago	1993-1995
Moldova	2004-2011	United Kingdom	1992-1998
Romania	1992-2001	United States of America	1992-2001
Russia	1999-2001, 2005-2006		
South Africa	1995-1999		
Thailand	1992-2002		
Tunisia	2008-2011		
Uganda	1998-2003, 2004, 2007, 2010-2011		
Ukraine	1999-2011		

Note: Country Income classification based on GNI per capita ([The World Bank Group](#))

In the first set of fixed-effects regressions, I begin by examining whether the balanced budget rules have the stated impact on fiscal balances, and how aggregate spending and tax revenues respond to the adoption of fiscal rules. The primary specification in fixed effects model assumes the form of equation 2.1,

$$y_{it} = \gamma D_{it} + \beta x_{it} + \alpha_i + \mu_t + \varepsilon_{it} \quad (2.1)$$

where  $y_{it}$  is the fiscal outcome of interest, and  $D_{it}$  is a dummy for the balanced budget rule. The parameter  $\gamma$  measures the impact of the balanced budget rule on the fiscal outcome. All other covariates are included in the vector  $x_{it}$ , and  $\beta$  is a vector of coefficients associated with the covariates. In addition,  $\alpha_i$  denotes a full set of country dummies,  $\mu_t$  captures the time effects, and  $\varepsilon_{it}$  is the error term with  $E(\varepsilon_{it}) = 0$  for all  $i$  and  $t$ .

Though the fixed effects estimator removes all the time-invariant country characteristics from the estimates, it arguably produces biased estimates since potential endogeneity is not completely ruled out. Furthermore, the social spending regressions may particularly suffer from a serial correlation problem, given the nature of the expenditure series. I follow Wooldridge (2003) and Drukker (2003) to examine the existence of serial correlation in the spending specifications and reject the null hypothesis of no serial correlation. To partially address this concern, we can modify the specification and introduce the lagged value of the dependent variable on the left-hand side of equation 2.1. However, such an approach leads to dynamic panel bias – the correlation between the lagged values of dependent variable ( $y_{it-1}$ ) and fixed effects in the error term ( $\mu_t$ ) (Nickell, 1981). System GMM estimator introduced by Arellano & Bond (1991), Arellano and Bover (1995), and Blundell & Bond (1998) helps in addressing this issue. GMM estimator purges the fixed effects by differencing the data and uses lagged levels



and lagged differences of independent variables as internal instruments; therefore, addressing the endogeneity problem while avoiding the dynamic panel bias.

Though the system GMM estimators are one of the more reliable estimators in this study area – they rely on strong assumptions about instrument validity (Roodman, 2009a, 2009b). Therefore, for all the GMM specifications, I report the p-values for first-order (AR1) and second-order (AR2) autocorrelation and the Hansen J statistic. A well-specified model should reject the null for AR1 and fail to reject the null for AR2 and the Hansen test. Fixed-effects and GMM estimators rely on different assumptions and have their unique advantages. The fixed-effects estimator is more transparent about its assumptions, but suffers from potential endogeneity and serial correlation problem. The GMM estimator, on the other hand, assists in addressing these problems, but since it uses lagged levels and differences to create an instrument matrix, it is less transparent. For most of the specifications, I report both the estimates, but when the fixed-effects and GMM estimate yield inconsistent estimates, the latter estimate is methodologically superior if the instrument validity assumption is met.

To examine the patterns in sector-wise spending, I repeat the fixed effects and GMM models outlined above for eight key expenditure categories across developed and developing economies – which leads to several regressions. In order to represent these results in a concise form, I summarize the coefficients on the key independent variable – the dummy for balanced budget rules – in a graphical format with 90 percent confidence intervals in Figures 2.1 and 2.2 and include detailed tables in the appendix (Tables A1- A4). In the end, I also test the political component of the second hypothesis – examining the variation in effects across democracies and parliamentary systems. I employ interaction terms for balanced budget rules and political

systems to estimate the plausible differences. Information on institutionalized democracy comes from the Polity IV Annual Time Series data, and countries with the democracy score of six or more are coded as institutionalized democracies. Information on parliamentary systems is available as a dummy variable from the World Bank's Database of Political Institutions.

## 2.5 RESULTS AND DISCUSSION

In this section, I summarize the results of the empirical analysis in three parts. First, I examine the relationship between fiscal rules and aggregate fiscal outcomes – deficits, spending, and tax revenues. Second, I examine the key hypothesis – that BBRs lead to a reduction in social sector spending and examine sector-wise variation in the impact of BBRs. Third, I examine whether the political environment influences how BBRs impact social spending.

Table 2.3 reports the results from four sets of fixed-effects regressions examining the impact of balanced budget rules on fiscal surplus, expenses, and tax revenues. Columns 1– 3 report the results for the full sample and columns 4 – 6 show the results for just the democratic countries. Columns 7 – 9 summarize the results for developing economies, and columns 10 – 12 summarize the results for high-income countries. The overall impact of balanced budget rules on fiscal balances is positive and significant, which suggests that the constraints imposed by balanced budget requirements are effective. The deficit-to-GDP ratio is 0.9 percentage points lower in countries with BBRs, on average, than countries without BBRs. Column 4 shows the results for the subsample of democratic countries, and demonstrates that the impact of BBRs on budget balances is significantly stronger in democracies. Furthermore, BBRs significantly improve fiscal balances in high-income economies but have an insignificant impact on developing economies. There are two ways to interpret the insignificant impact in

developing economies: Developing economies may not be complying with the rule or they may not be able to improve their fiscal balances despite making an effort to meet the targets. A significant reduction in spending in developing economies (Column 8) provides some evidence for the latter explanation. BBRs also significantly reduce expenditure-to-GDP ratios in all but high-income countries. Typically, high-income economies have better budgetary frameworks and therefore the impact of fiscal targets is perhaps evenly distributed across revenue and spending. Furthermore, the effect of balanced budget rules on tax revenue-to-GDP ratio is insignificant across all the specifications. These results are also broadly consistent with the previous studies that find a positive relationship between fiscal rules and budget balances (Dahan & Strawczynski, 2013), and suggest that fiscal rules do not reduce public investment in industrialized economies, but do so in developing economies because of relatively weaker public financial management (Cordes et al., 2015).

Thus, BBRs appear to be effective in improving budget balances and cutting spending. Table 2.4 examines if the social spending cuts are the primary instrument that governments use to achieve deficit goals. The dependent variable is log of spending in constant PPP dollars. I exponentiate the regression coefficients (using the `exp` stata command) to convert them into expected percentage change – therefore, negative coefficients assume values less than one and positive coefficients assume values more than one. Columns 1 and 3 present the results of the fixed effects regressions and Columns 2 and 4 summarize the results for system GMM regressions.

Table 2.3: Balanced Budget Rules and Key Fiscal Outcomes (Percent of GDP)

Country Fixed Effects, 1990-2012

	Full Sample		Democratic Countries			Middle and Low-Income			High-Income			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Cash Surplus as % of GDP	Spending as % of GDP	Tax revenue as % of GDP	Cash Surplus as % of GDP	Spending as % of GDP	Tax revenue as % of GDP	Cash Surplus as % of GDP	Spending as % of GDP	Tax revenue as % of GDP	Cash Surplus as % of GDP	Spending as % of GDP	Tax revenue as % of GDP
Balanced Budget Rule (1=Yes, 0=No)	0.89*	-1.90***	-0.01	1.20**	-2.18***	-0.05	-0.09	-2.30***	-0.77	1.78**	-1.31	0.84
	(0.52)	(0.52)	(0.44)	(0.46)	(0.61)	(0.43)	(0.47)	(0.78)	(0.65)	(0.70)	(0.80)	(0.62)
Population (Logged)	-6.76*	-0.62	-2.97	-8.35*	6.09	-4.99	-2.77	3.59	-1.60	-11.17**	1.95	-2.56
	(3.99)	(3.76)	(2.25)	(4.56)	(6.12)	(4.10)	(4.89)	(5.16)	(3.79)	(4.69)	(5.37)	(3.47)
% Children	-0.17	-0.16	-0.05	0.10	-0.40*	-0.18	-0.23*	-0.04	-0.04	-0.35	0.21	0.18
	(0.12)	(0.14)	(0.09)	(0.16)	(0.24)	(0.15)	(0.13)	(0.14)	(0.11)	(0.24)	(0.24)	(0.15)
% Seniors	-0.85	-0.05	-0.60***	-0.42	-0.28	-0.67***	-0.06	0.55	-0.26	-0.87	-0.17	-0.41
	(0.53)	(0.41)	(0.22)	(0.57)	(0.48)	(0.24)	(0.66)	(0.61)	(0.44)	(0.62)	(0.50)	(0.26)
GDP (Logged)	-0.27	4.06**	0.94	-3.45**	6.02*	-0.23	3.55	1.89	0.42	-9.43***	10.12**	0.02
	(3.36)	(1.93)	(1.08)	(1.63)	(3.39)	(1.58)	(3.75)	(1.73)	(1.12)	(2.70)	(3.99)	(2.49)
Economic Growth	0.14***	-0.17***	-0.01	0.19***	-0.23***	0.04	0.12***	-0.17***	-0.05*	0.11	-0.23***	0.06
	(0.04)	(0.03)	(0.03)	(0.04)	(0.04)	(0.03)	(0.04)	(0.03)	(0.03)	(0.07)	(0.05)	(0.04)
Unemployment Rate	-0.08	0.34***	-0.06	-0.15**	0.46***	0.04	0.14*	0.16	-0.07	-0.31***	0.47***	-0.05
	(0.07)	(0.09)	(0.07)	(0.06)	(0.09)	(0.06)	(0.07)	(0.11)	(0.11)	(0.09)	(0.11)	(0.07)
Left Ideology	0.44*	-0.15	0.80***	0.43	-0.39	0.46*	1.29**	-0.56	1.28***	-0.25	0.03	0.23
	(0.26)	(0.34)	(0.27)	(0.26)	(0.39)	(0.23)	(0.54)	(0.52)	(0.36)	(0.27)	(0.51)	(0.26)
Election Year	-0.24**	0.27***	-0.10	-0.27**	0.37***	-0.12*	-0.28*	0.38***	0.06	-0.22*	0.26*	-0.22**
	(0.10)	(0.09)	(0.07)	(0.12)	(0.11)	(0.07)	(0.16)	(0.12)	(0.10)	(0.11)	(0.13)	(0.09)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,479	1,546	1,615	1,021	1,046	1,082	820	879	946	659	667	669
Number of Countries	94	96	97	68	68	69	58	60	61	36	36	36

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1 Robust standard errors in parentheses

Notes: (1) All the dependent variables ([Surplus](#), [Expense](#), and [Tax Revenue](#)) obtained from World Development Indicators. (2) Democratic Countries are identified as the countries with institutionalized democracy index of six or higher in [Polity IV Annual Time Series](#). (3) Income classification based on GNI per capita ([The World Bank Group](#))

Table 2.4: Balanced Budget Rules and Social Sector Spending, 1990-2012

(Dependent Variable: Logged Social Spending, Exponentiated Coefficients)

	High-Income Countries		Middle and Low-Income Countries	
	(1)	(2)	(3)	(4)
	Fixed Effects	System GMM	Fixed Effects	System GMM
Balanced Budget Rule	0.913 (0.092)	0.954* (0.027)	0.646** (0.121)	0.806** (0.073)
Population (Logged)	0.228 (0.377)	1.142*** (0.053)	1.038 (1.729)	1.224*** (0.086)
% Children	1.094 (0.129)	1.006 (0.010)	1.003 (0.021)	0.988 (0.010)
% Seniors	1.546*** (0.220)	1.016 (0.017)	0.852 (0.162)	0.967** (0.015)
GDP (Logged)	5.066* (4.636)	1.429*** (0.155)	2.422 (1.620)	1.296*** (0.101)
Unemployment Rate	1.044* (0.024)	1.015** (0.007)	1.007 (0.020)	0.991 (0.009)
Economic Growth	0.999 (0.010)	1.005 (0.005)	0.994 (0.008)	1.002 (0.004)
Left Ideology	0.953 (0.114)	1.044 (0.042)	1.291 (0.278)	1.033 (0.040)
Fiscal Decentralization	0.995 (0.005)	0.994*** (0.002)	1.002 (0.003)	1.000 (0.001)
Election Year	0.986 (0.028)	0.974 (0.026)	0.995 (0.040)	1.014 (0.032)
Lag Social Spending		2.389*** (0.087)		2.154*** (0.124)
Year Dummies	Yes	Yes	Yes	Yes
Observations	243	240	284	275
Number of Countries	28	28	34	34
ARI (p-value)		0.016		0.019
AR2 (p-value)		0.515		0.090
Hansen (p-value)		1.00		1.00

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

Across all the specifications, countries that have a balanced budget rule spend less on aggregate social spending. However, the results vary across the country-income groups and two estimation approaches. In the high-income panel, countries with a balanced budget rule appear to spend 95 percent as much as the countries without a rule in the GMM estimates. The fixed-effects estimate is larger in magnitude and insignificant. Similarly, in the developing economies, countries with balanced budget rules spend 80 percent as much as the countries without a rule in the GMM estimates. The fixed-effect is also significant in this case, but the magnitude of coefficient seems to be an overestimate.<sup>8</sup>

To examine the sector-wise trends, I examine the impact of balanced budget rules on disaggregated spending categories. Figure 2.1 shows the results of two specifications for developing economies and summarizes coefficients on the balanced budget rule dummy with 90 percent confidence interval. Figure 2.2 does the same for developed economies, and detailed tables are available in the Appendix. As in Table 2.4, the fixed-effects estimates are larger in magnitude and have wider confidence intervals than the GMM estimates in both panels. Figure 2.1 shows that the developing economies with BBRs reduce spending across most of the categories, but only two categories witness significant decreases – health and social protection. The GMM estimates for the middle and low-income countries suggest that developing economies with a fiscal rule, on average, spend around twenty percent less than the countries without the fiscal rule. Only one category – other spending which includes general government – carries a positive sign across the two estimates, but it is insignificant in the GMM estimates.

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<sup>8</sup> I also calculate the models without the fiscal decentralization control to check for possible bias introduced by the missing data. Larger sample and omitting fiscal decentralization changes the coefficients in some models, however, the overall findings remain consistent. For example, appendix Table A5 reproduces estimates in Table 2.4 without the fiscal decentralization control. The coefficients on the fiscal rule variable for high-income countries becomes insignificant, but for middle and low-income countries the results remain consistent and significant.

The only other spending category yielding significant impact is the primary sector spending which includes spending on agriculture, fuel, and mining. On the other hand, the results for high-income countries in Figure 2.2 resonate with the findings of Table 2.3 and 2.4. In the GMM specifications, developed economies show a significant decrease in total spending and only one subcategory – social protection. On average, developed economies with a fiscal rule spend 94 percent as much as the economies without a fiscal rule. These results are consistent with the findings in previous studies like Dahan & Strawczynski (2013), which find a significant reduction in social transfers in OECD economies with the fiscal rules. Expenditure on health yields substantially inconsistent estimates across the two estimation approaches. Three categories of education, transport and communications, and ‘other’ spending yield positive but insignificant coefficients in the GMM specification.

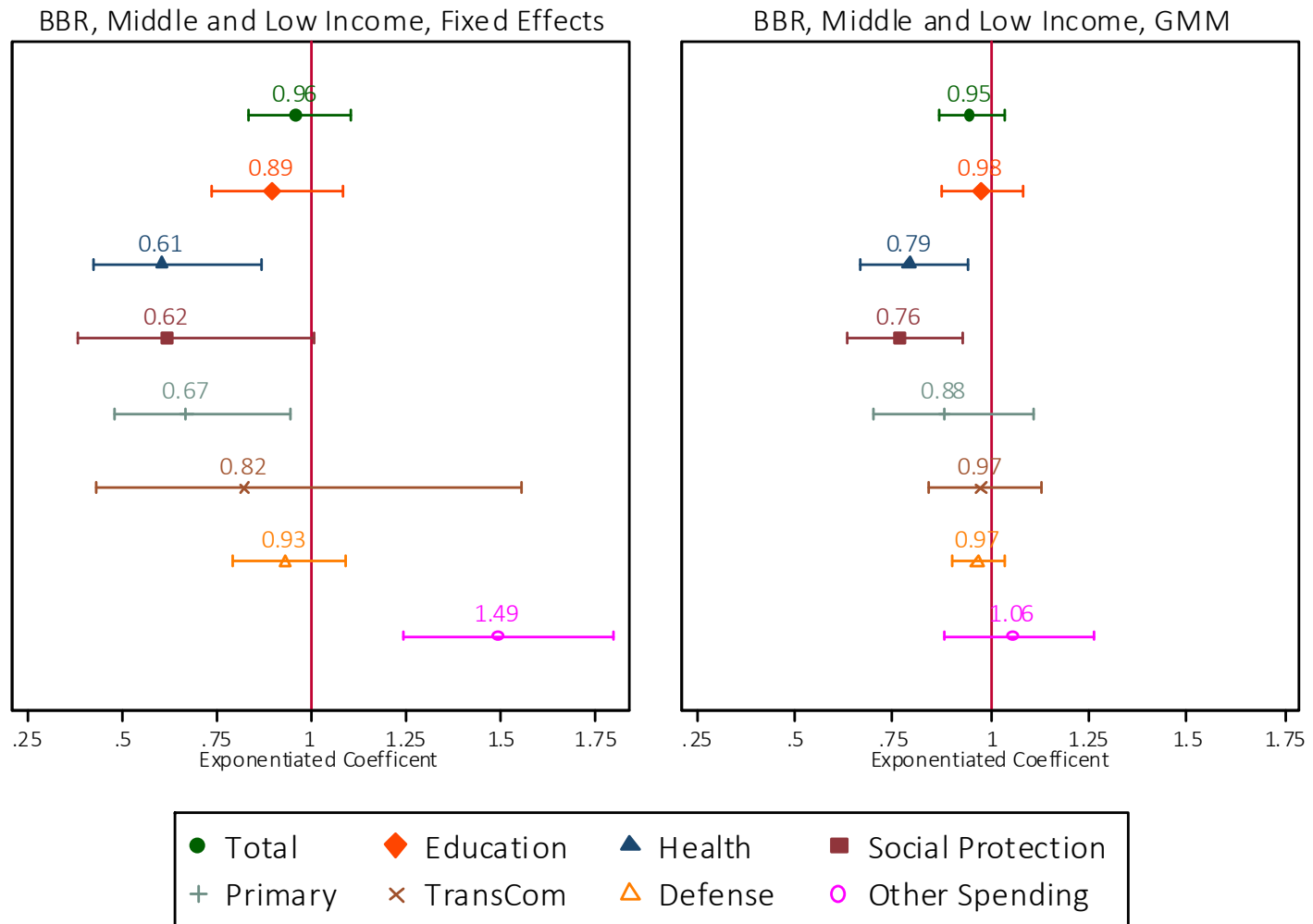


Figure 2.1: Balanced Budget Rules and Sector Wise Spending in Developing Economies  
 (Dependent Variable: Logged Sector Wise Spending, Exponentiated Coefficients)



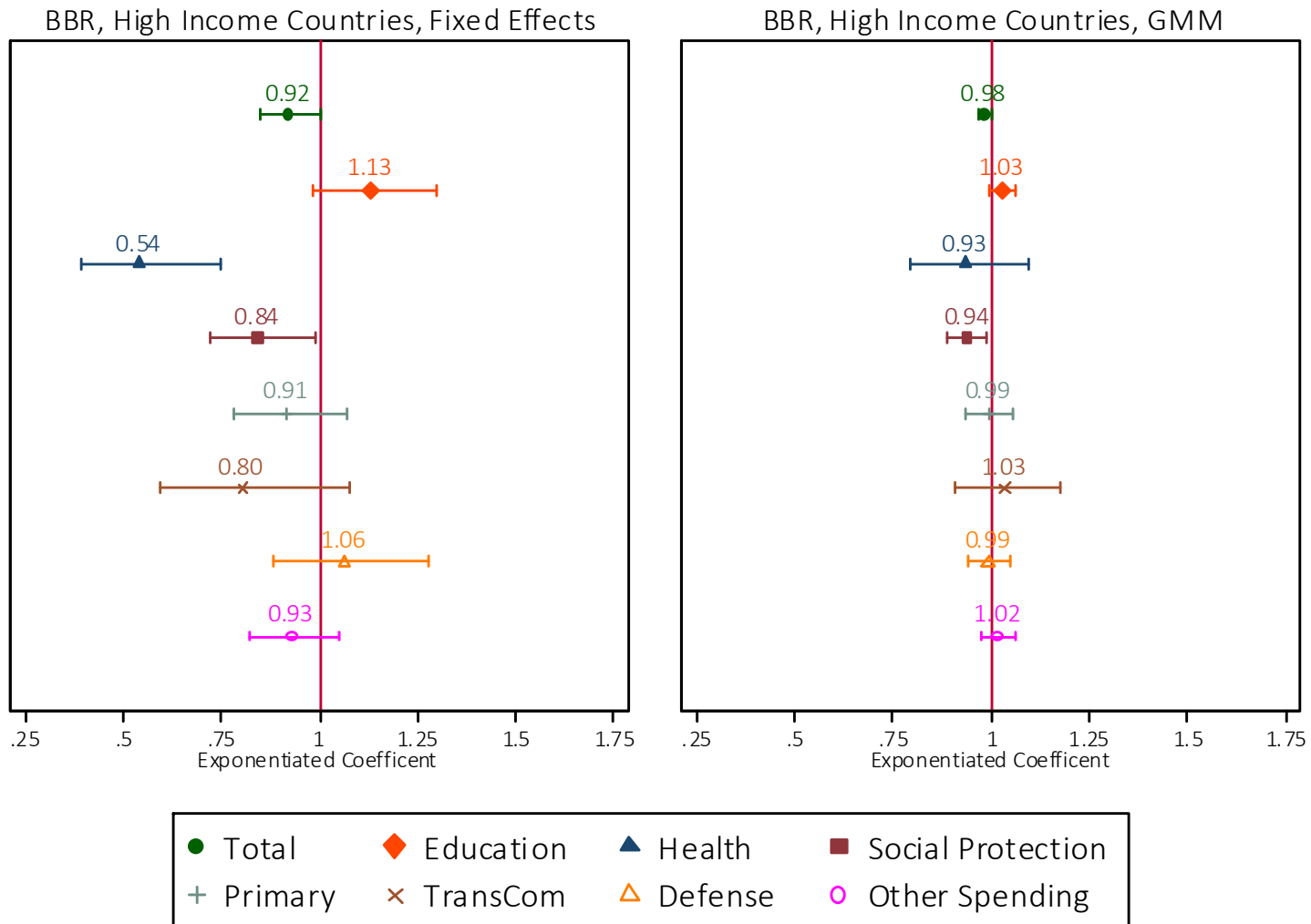


Figure 2.2: Balanced Budget Rules and Sector Wise Spending in High-Income Economies  
 (Dependent Variable: Logged Sector Wise Spending, Exponentiated Coefficients)

Next, I examine whether the effect of these rules varies under different political systems. As noted earlier, one of the primary reasons to adopt fiscal rules is to contain overspending due to collective problems in the parliamentary legislatures and electoral cycles in democracies. Table 2.5 summarizes the differential impacts of balanced budget rules on social spending in democratic and parliamentary systems. Fixed effects estimates in Column 1 suggest that democracies without a fiscal rule spend significantly more on the social sector than democracies with the rule. Furthermore, the effect of balanced budget rule on reduction in social spending is significantly more in countries that have institutional democracy vis-à-vis non-democratic countries. Though the GMM estimate in column 2 also has the same sign on coefficients, it is not statistically significant. Similarly, fixed effects estimates in column 3 suggest that parliamentary systems spend more on the social sector than countries with non-parliamentary systems. The negative coefficient on the interaction term is not significant in the fixed effects estimates. Furthermore, the GMM estimates also yield insignificant results. Overall, the fiscal rules appear to be more effective in democracies and parliamentary systems, but the results are not conclusive, since they vary across the two estimation approaches.

Table 2.5: Balanced Budget Rules and Social Sector Spending across Political Systems

[Fixed Effects, Full Sample]

(Dependent Variable: Logged Social Spending, Exponentiated Coefficients)

	(1)	(2)	(3)	(4)
	Fixed Effects	System GMM	Fixed Effects	System GMM
Balanced Budget Rule (BBR)	1.447** (0.235)	0.996 (0.095)	1.071 (0.130)	0.969 (0.042)
BBR*Democracy	0.661*** (0.102)	0.951 (0.093)		
Democracy	1.276*** (0.112)	1.009 (0.053)		
BBR*Parliament			0.887 (0.134)	0.974 (0.056)
Parliament			1.265* (0.161)	1.082 (0.074)
Population (Logged)	2.180** (0.682)	1.107*** (0.040)	2.492*** (0.783)	1.119*** (0.044)
% Children	0.980 (0.013)	0.997 (0.003)	0.984 (0.012)	0.996 (0.004)
% Seniors	1.073* (0.040)	1.010 (0.007)	1.073* (0.040)	1.004 (0.008)
GDP (Logged)	4.183*** (0.975)	1.086 (0.064)	4.387*** (0.983)	1.102 (0.068)
Unemployment Rate	1.019** (0.009)	0.997 (0.006)	1.021** (0.009)	1.000 (0.006)
Economic Growth	0.996 (0.003)	1.005 (0.004)	0.996 (0.003)	1.005 (0.004)
Election Year	1.003 (0.010)	1.008 (0.011)	1.002 (0.010)	1.010 (0.010)
Left Ideology	1.010 (0.037)	1.011 (0.020)	1.011 (0.040)	1.012 (0.019)
Lagged Spending		2.461*** (0.066)		2.453*** (0.068)
Observations	1,675	1,657	1,719	1,701
Number of Countries	92	92	95	95
AR1 (p-value)		0.000		0.000
AR2 (p-value)		0.916		0.911
Hansen (p-value)		1.000		1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

## 2.6 SUMMARY AND CONCLUSION

Numerical limits on deficits and balanced budget rules change the institutional environment in which the policymakers operate – leading to a short-term focus on meeting targets. Furthermore, the pursuit of deficit targets may often translate to disproportionate expenditure cuts, particularly cuts in social spending. Using a large panel data on developed and developing economies, this study finds evidence that balanced budget rules reduce public spending more than they raise revenues. The distortionary impacts of fiscal rules on social spending are more prominent in developing economies than in developed countries – perhaps owing to more ad hoc budget making in the former and better budgetary processes in the latter. In the developing economies, health and social protection witness reductions in allocation. In the developed economies, education and health budgets are not affected, but cuts in social security expenditures do occur. Fiscal rules appear to be more effective in democracies and parliamentary systems, but the evidence is not conclusive.

Some limitations of this analysis need to be highlighted. First, the empirical design captures the existence of balanced budget rules using a dummy variable, which does not account for the substantial cross-country variation in the level of stringency of these rules. Second, fiscal rules are often adopted along with other reforms, which may introduce bias in the estimates, particularly in the fixed effects models. Third, the issue of underlying political and social preferences informing deficit and spending behavior has been a persistent theme in the political economy literature. Though the controls for economic ideology of government and country fixed effects help in addressing this issue, they may still be inadequate in capturing

underlying preferences. Lastly, cross-country panel studies often suffer from reporting errors and measurement issues that might also affect this study.

In the end, it is likely that more countries will continue to adopt fiscal rules in the immediate future. However, when policymakers design these rules, they should consider mitigating the potential negative impact of these rules on social investment. For example, countries may consider excluding certain social investments and long-term public investments from the deficit targets. Developing economies may also consider meeting the fiscal targets over medium-term rather than annual fiscal targets. In countries that already have these rules, identifying revenue and expenditure policies that can assist in controlling deficits without compromising of long-term investments in human and physical capital will be integral in sustaining economic growth.

CHAPTER 3  
TIED TO THE MAST:  
Do Subnational Fiscal Rules Reduce Public Investment?

### 3.1 INTRODUCTION

The last two decades have witnessed an increase in fiscal decentralization in many developing economies. Subnational governments are responsible for providing more public services and increasingly issue and manage debt and administer new taxes. However, the devolution of fiscal authority may also have led to an increase in the incidence of high subnational deficits in several countries. For example, the 1988 constitutional reforms in Brazil gave significant fiscal authority to states, and two major subnational debt crises occurred during the 1990s. A similar pattern exists in other developing economies (Liu & Webb, 2011). In response, several countries have adopted subnational fiscal rules or fiscal responsibility laws (FRLs) with an aim to promote fiscal discipline at the state and local level. Latin American countries adopted some of the notable FRLs towards the turn of the millennium (Brazil in 2000; Argentina in 1999; Peru in 2000). Subsequently, other developing countries have followed suit (India in 2003; Pakistan in 2005; Sri Lanka in 2003; Mexico in 2006).

The increasing popularity of FRLs has motivated substantial research focusing on their impact on budget balances and fiscal discipline. However, limited research has examined how subnational governments meet the numerical fiscal targets, and especially how the composition of public spending changes in response to these rules. Using the Indian case, this essay focuses on the effect of subnational FRLs on the composition of public spending. I argue that the short-term deficit targets change the institutional environment in which policymakers operate. In response, policymakers pursue austerity measures and expenditure cuts that disproportionately affect development spending and long-term investments in capital projects. The empirical results broadly support this thesis, and I find that the Indian states undertook significant cuts in

development spending after the adoption of the fiscal rules. Furthermore, it appears that the states have reduced their capital outlay and social spending after the adoption of FRBM laws.

The rest of this essay proceeds as follows. In the next section, I provide a brief overview of previous research on subnational fiscal rules highlighting the rationale for their adoption and the impact on spending outcomes. Section 3.3 lays out the key hypotheses of the study. Section 3.4 provides the details of data, variables, and empirical strategy. Section 3.5 summarizes the results. The last section discusses the limitations of the study and provides conclusions.

## 3.2 PREVIOUS RESEARCH

Traditional decentralization theory suggests that subnational governments are capable of efficient public spending decisions since they have better information on the preferences and needs of local jurisdictions (Oates, 1972, 2005). The implicit assumption is that the subnational fiscal institutions and the political process can alter the composition of public expenditures and achieve allocative efficiency (Granado, Martinez-Vazquez, & McNab, 2016; Grisorio & Prota, 2015). However, fiscal decentralization may lead to coordination failures and moral hazard problems. The delegation of fiscal powers often leads to principal-agent problems, because subnational governments have more information on their financial condition and service requirements than central government (De Mello, 2000; Prud'homme, 1995). On the expenditure side, central governments cannot effectively monitor the efficiency of public spending, and local representatives may have an incentive to incur spending on populist policies that can maximize the probability of their reelection. On the revenue side, the subnational governments may underutilize the local tax base, leading to inefficiencies in revenue mobilization. If the decentralized system has significant vertical imbalances and relies heavily on



revenue-sharing mechanisms, the subnational governments have an incentive to free ride and underutilize their own-source revenues. This leads to typical common pool problems when the governments do not completely internalize the cost of their actions. Furthermore, after incurring expenditures or debt, the subnational governments tend to expect a bailout by the central government in the form of higher intergovernmental transfers and special fiscal packages. This is particularly prevalent in developing economies. The central governments cannot remain immune to consistent fiscal problems at the subnational level, since the problems in one jurisdiction may produce adverse externalities for other jurisdictions (Ter-Minassian, 2007, 2015; Wildasin, 1997). Also, the central government cannot ignore consistent underprovision of essential public services in a particular part of the country because of socio-political consequences. The bailout of subnational units by central government may ultimately lead to moral hazard problems, i.e., subnational governments wilfully engaging in a fiscally imprudent behavior because of soft budget constraints (Kornai, Maskin, & Roland, 2003; Qian & Roland, 1998; Rodden, Eskeland, & Litvack, 2003). In the long run, such subnational behavior affects overall economic performance and macroeconomic stability.

Such problems become particularly acute when the fiscal system has an inherent dependency on central transfers – a characteristic of public finance systems in most developing countries (Bahl, 1999; Oates, 2005; Rodden et al., 2003). In addition, the subnational governments also confront overspending problems due to political budget cycles and collective action problems in the legislatures. In such a scenario, theoretically, the existence of formal institutional arrangements or subnational fiscal rules can mitigate the suboptimal behavior of the state and local governments. Substantial research has focused on the relationship between subnational fiscal rules and fiscal discipline – broadly suggesting that, under a set of political and

economic conditions, subnational fiscal rules may lead to fiscal discipline and improve fiscal balances (Foremny, 2014; Grembi, Nannicini, & Troiana, 2015; Kotia & Lledo, 2016; Krogstrup & Wälti, 2008; Liu & Webb, 2011; Ter-Minassian, 2007).

The relationship between fiscal rules and the composition of public spending has received less attention. National-level studies that have examined fiscal consolidation policies in OECD and Latin American countries find that numerical fiscal targets have adverse impacts on the composition of public spending (Calderón & Servén, 2012; Cordes et al. 2015; Dahan & Strawczynski, 2013; Easterly, Irwin, & Servén, 2008). Research on subnational fiscal rules and public spending in developing countries has been rather limited.<sup>1</sup> Among the industrialized economies, several studies have examined the relationship between Tax and Expenditure Limitations (TEs) and public spending in the United States. These studies also provide mixed evidence on the relationship between TEs and various components of spending (Amiel et al. 2014; Ballal & Rubenstein, 2009; Eliason & Lutz, 2015; Kousser et al., 2008; Shadbegian, 1998). Kousser et al. (2008) find that TEs are largely ineffective in controlling spending since the state officials find ways to circumvent the limits. Eliason & Lutz (2015) also find an insignificant impact while studying the impact of Taxpayers Bill of Rights in Colorado. Amiel et al. (2014) and Ballal & Rubenstein (2009) highlight that TEs may have an impact on spending outcomes but the results are sensitive to measurement and methodological issues.

In the Indian context, previous studies suggest that the political economy of state finances provides ample opportunities for states to overspend, as they face soft budget

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<sup>1</sup> A few studies on Latin America that have studied the effect of subnational rules on infrastructure and related investments (De Mello, 2006) and other research has examined effect of subnational institutions on outcomes related to subnational borrowing (Martell, 2008; Martinez-Vazquez & Vulovic, 2016).

constraints (Bahl et al. 2005; Karmakar, 2016; McCarten, 2003). During the 1990s, Indian states went through a period of high fiscal stress, characterized by increasing expenditures and stagnant tax collections (Rangarajan & Prasad, 2013). Large deficits during the 1990s prompted the development of a rule-based institutional framework to manage fiscal policy. The central government adopted the Fiscal Responsibility and Budget Management (FRBM) law at the national level in 2003. Subsequently, in 2005, the Twelfth Finance Commission mandated that states could avail the financial benefits of a debt-restructuring program only if they enacted fiscal responsibility laws.<sup>2</sup> This led to the adoption of fiscal responsibility laws by all Indian states during the 2000s.

Previous research on the Indian experience suggests that the adoption of FRLs by the states contributed to improvements in fiscal balances (Chakraborty & Dash, 2013; Reserve Bank of India, 2016; Roy & Kotia, 2017; Simone & Topalova, 2009). Chakraborty & Dash (2013) find a reduction in state fiscal deficits after the adoption of FRBM. Simone & Topalova (2009) highlight that central government transfers played a significant role in improving state finances after FRBM adoption. Chakraborty (2017) finds that the states have also achieved higher own-tax revenue mobilization during this period, particularly due to the introduction of the value added tax (VAT). Roy & Kotia (2017) argue that high economic growth and expenditure control initiatives by the states, like modifying retirement ages and promoting voluntary retirement schemes, led to improvements in fiscal balances. A few working papers and reports also examine the spending impacts, but most of these rely on simple comparisons of trends. Chakraborty & Dash (2013) suggest that the states reduced their development spending after

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<sup>2</sup> Finance Commission is a constitutional body that is constituted every five years to determine the distribution of tax proceeds between the Union and the states. In the Indian federal structure, the states have major expenditure responsibilities but limited tax authority creating a significant vertical balance, which the Finance Commission seeks to address.

the adoption of FRBM. Chakraborty (2017) finds a reduction in capital outlays after the fiscal rule adoption. On the contrary, the Reserve Bank of India (2016) suggests that the composition of public spending changed after the adoption of FRBM, particularly with higher development spending and capital spending.

In summary, several studies highlight the reasons for overspending by subnational governments. They argue that intergovernmental coordination problems, moral hazard due to soft budget constraints, political budget cycles, and common pool problems in legislatures, introduce deficit bias in fiscal policy, and fiscal rules may partially address this problem. Previous studies support the view that such institutional arrangements introduce fiscal discipline and improve budget balances. Fewer studies focus on the impact of the rules on spending composition, particularly in the context of developing economies. This study contributes to this literature and uses the Indian case to examine the impact of subnational fiscal rules on the composition of public spending. In the next section, I outline my key hypotheses about the impact of subnational fiscal rules on spending composition.

### 3.3 RESEARCH HYPOTHESES

Several political economy factors influence how governments respond to fiscal targets. If policymaking was a completely rational exercise, to meet the deficit goals, the policymakers would enact new taxes that minimize the excess burden of taxation or cut expenditures with lowest marginal social welfare. However, given the realities of everyday policymaking, such revenue and expenditure analysis is rare, much less its implementation. Particularly in the Indian context, several factors hinder a rational revenue and expenditure analysis to meet the goals laid out by the FRBM laws.

First, state governments in India are not fiscal sovereigns, i.e., they rely on the central government for a significant proportion of their revenue needs. Also, low tax compliance and weak tax administration severely constrain the ability of states to raise revenues. Thus, spending cuts are the most feasible way for the states to meet fiscal targets in the short run. Therefore, if they are complying with the fiscal targets, it is likely that policymakers are using spending cuts to meet their goals.

Second, spending categories, such as public sector wage bills and pensions are difficult to change, since public-sector jobs are unionized and employees are guaranteed lifetime employment and pensions. Similarly, manipulating spending on several subsidies (for example, agriculture, fertilizer, fuel) and debt service is difficult. Therefore, within the expenditure cuts, a reduction in budgetary allocation for development spending is perhaps one of the most feasible options to meet fiscal targets.<sup>3</sup>

Third, demarcation of responsibilities between the central and state governments in India is fuzzy for some public goods, because (the seventh schedule of) the constitution keeps several governance functions in 'the concurrent list' – i.e., both parliament and state assemblies can legislate on these subjects.<sup>4</sup> Arguably, state policymakers face weaker electoral accountability for public goods in the concurrent list. This may particularly manifest in expenditure cuts in education, health, and physical infrastructure.

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<sup>3</sup> In the Indian public finance system, total expenditure of the government is classified into three broad categories – non-development expenditure, development expenditure, and other expenditure. Many items related to general government such as wages are classified as 'non-development expenditure' and spending on items such as health, education, and infrastructure is classified as 'development expenditure'. Third classification of 'other expenditures' includes items that are not included in these two classifications.

<sup>4</sup> Article 246 of the seventh schedule classifies legislative power into three lists: union list (central government authority), state list (state government authority), concurrent list (both center and states have authority).

Lastly, budget-making institutions at the state level lack the administrative and technical capacity to examine the effects of different policy choices. Therefore, accounting for the long-term impact of budget cuts and positive externalities of investment in social and physical capital is usually not feasible. This may further increase the likelihood of reduction in social investment and capital projects under the fiscal rules regime.

All these processes often work in conjunction with the factors discussed in section 2.3, which may lead to a disproportionate reduction in development spending (particularly the subcategories of social expenditures and capital spending) in the aftermath of the adoption of fiscal responsibility laws. Based on these considerations, I formulate two key hypotheses for this study.

Hypothesis 1: The adoption of FRBM laws by the Indian states resulted in a reduction in development spending.

Hypothesis 2: The introduction of FRBM laws by the states resulted in a reduction in key development spending subcategories – social expenditure and capital outlay.

### 3.4 DATA AND METHODS

India is a federal union of 29 states and seven union territories. Eleven states with special category status receive a preferential fiscal treatment in the form of higher central transfers and aid because of the development deficits they face.<sup>5</sup> Typically, comparative analyses of state finances do not include these states because of their unique fiscal status. Therefore, I

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<sup>5</sup> The concept of special category status was introduced by the fifth finance commission in 1969 to extend certain preferential treatment and tax breaks to a few states. The features of these states include hilly and difficult terrain, high tribal population, historical backwardness or strategic location near the national border. Currently, special category states are Arunachal Pradesh, Assam, Himachal Pradesh, Jammu and Kashmir, Meghalaya, Manipur, Mizoram, Nagaland, Sikkim, Tripura, Uttarakhand.

restrict my sample to 17 Non-Special Category (NSC) States during 2001 and 2014.<sup>6</sup> The state finance data for this study comes primarily from India's central bank, the Reserve Bank of India, which annually publishes *State Finances: A Study of Budgets*. The state finance reports tabulate comprehensive information on budgetary components and a variety of fiscal indicators for Indian states. The reports combine information from state budgets with supplementary data from the Bank's internal records and other agencies such as the Planning Commission and Ministry of Finance's Indian Public Finance Statistics. In addition to the RBI, I obtain some information on fiscal indicators from the Ministry of Finance, IndiaStat, and EPW Research Foundation's India Time Series. Furthermore, I obtain information on other economic and political variables from the Central Statistics Office (CSO), Census of India, Election Commission of India, and Hankla (2016).

Across the models, the key dependent variables are different fiscal outcomes related to deficits, revenues, and expenditures. I begin with an analysis of the impact of fiscal rules on aggregate fiscal outcomes. I use four key dependent variables – fiscal deficits, total expenditures, tax revenues, and non-tax revenues to examine the overall impact of fiscal responsibility laws. To allow for comparison across these indicators, I operationalize these variables as a percent of the gross domestic product. Next, I examine the first hypothesis – that the states reduced their development spending after the adoption of fiscal responsibility laws. I report the results for all three categories of spending – development, non-development, and other spending, using two measures – natural logarithm of spending and spending as a percent of GDP.<sup>7</sup> The logarithmic

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<sup>6</sup> State of Telangana was carved out of Andhra Pradesh in 2014. For the period of this study, Telangana is part of Andhra Pradesh (11 special category states, 17 NSC states, and Telangana total to 29 states).

<sup>7</sup> Reserve Bank of India classifies the entire government expenditure into three functional categories – development, non-development, and other spending. This includes the expenditures in the revenue and capital account as well as loan and advances from the central government. Furthermore, since India practiced centralized

measure enables me to capture actual budget cuts within the expenditure classification (adjusted for inflation), and the expenditure-GDP ratio captures whether spending has kept pace with the state's economic growth. To examine the second hypothesis, I examine the impact of fiscal responsibility laws on two subcategories of development spending – social expenditures and capital outlay.

The primary dependent variable is a dummy for the existence of Fiscal Responsibility Law over state-years. Table 3.1 provides the timeline of FRBM adoption in the Indian states. I code the dummy variable as one from the fiscal years in which the rule was adopted.<sup>8</sup>

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planning until recently these expenditures were disaggregated into the plan and non-plan components until 2014. I use total expenditures (both plan and non-plan) in my estimations.

<sup>8</sup> The Indian fiscal year runs from April 1 to March 31.



Table 3.1: Adoption of Subnational Fiscal Responsibility Laws by the Indian States

State	FRBM Law Adoption
Karnataka	September 2002
Tamil Nadu	May 2003
Kerala	August 2003
Punjab	October 2003
Uttar Pradesh	February 2004
Gujarat	March 2005
Himachal Pradesh	April 2005
Maharashtra	April 2005
Madhya Pradesh	May 2005
Rajasthan	May 2005
Andhra Pradesh	June 2005
Odisha	June 2005
Tripura	June 2005
Haryana	July 2005
Manipur	August 2005
Assam	September 2005
Chhattisgarh	September 2005
Uttarakhand	October 2005
Arunachal Pradesh	March 2006
Meghalaya	March 2006
Bihar	April 2006
Goa	May 2006
Jammu and Kashmir	August 2006
Mizoram	October 2006
Jharkhand	May 2007
Nagaland	January 2010
West Bengal	July 2010
Sikkim	September 2010

Source: Reserve Bank of India

I control for a variety of factors that may influence the results. First, the log of total state population and real gross domestic product account for demand for services and size of the economy. Second, economic growth in the previous fiscal year accounts for changes in resource availability. Total internal debt and central government grants account for other fiscal resources that are available to the states.<sup>9</sup> In the absence of social development estimates that change annually across the states, I use surface road density, i.e., length of the surfaced roads per square kilometer of state area as a proxy for the overall social development level of the states.<sup>10</sup> Furthermore, I include a set of political variables – a dummy indicating years in which state or general elections are held to capture political budget cycles and a set of dummies indicating economic ideology of the political party in power. Election information comes from the Election Commission of India, and economic ideology is obtained from Hankla (2016). Finally, I include year dummies in all the specifications to account for business cycle effects. All the independent variables except elections and ideology are lagged by one year.<sup>11</sup> Table 3.2 provides the summary statistics for all the variables.

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<sup>9</sup> Intergovernmental transfers are a key component of state resources and have undergone a dramatic change during the last decade with an increased support for centrally sponsored schemes like Mahatma Gandhi National Rural Employment Guarantee Scheme. The central grants measure includes funds transferred for central and state plan schemes, centrally sponsored schemes, and non-plan grants. Omitting the central grants may introduce omitted variable bias in the deficit regressions. However, in the spending regressions it will rather lead to an underestimating the effect because more resources should ideally increase development and capital spending.

<sup>10</sup> In the Indian context, surface road density is usually a good proxy for social development level of a jurisdiction since the regions with better physical infrastructure also perform well on social indicators. For instance, Appendix Figure B1 shows high correlation of surface road density with poverty rate. The social development measures introduce significant measurement error since they are not available annually and can only be used with the assumption that estimates do not change during the intercensal period (Census of India provides only decennial demographic estimates and National Sample Survey Organization provides quinquennial poverty estimates). On the other hand, surface road density data varies across years and captures the annual changes in development levels.

<sup>11</sup> If we expect political budget cycles to exist then we should see the effect of elections on that year's budget. However, the timing of elections is relevant – if the election is held early in the fiscal year, we should ideally lead the election variables. I ran alternative specifications with leaded election variable but the results do not change significantly.

Table 3.2: Summary Statistics (Non-Special Category States, 2001-2014)

Variable	Mean	SD	Min	Max
Fiscal Deficit (Percent of GDP)	3.26	1.78	-1.02	8.08
Total Expenditure (Percent of GDP)	18.75	3.70	6.75	29.94
Own Tax Revenue (Percent of GDP)	6.76	1.39	2.64	10.28
Own Non-Tax Revenue (Percent of GDP)	1.98	1.69	0.25	14.51
Development Expenditure (Percent of GDP)	11.26	2.72	4.53	18.98
Non-Development Expenditure (Percent of GDP)	5.99	1.82	1.78	13.88
Other Expenditure (Percent of GDP)	1.50	0.86	0.35	4.83
Social Expenditure (Percent of GDP)	6.75	1.87	3.28	12.26
Capital Outlay (Percent of GDP)	2.27	1.09	0.40	5.37
Development Expenditure (Billion Constant Rupees)	206.20	143.94	14.38	709.33
Non-Development Expenditure (Billion Constant Rupees)	107.03	69.81	6.12	352.39
Other Expenditure (Billion Constant Rupees)	28.22	23.07	0.55	118.39
Social Expenditure (Billion Constant Rupees)	124.47	88.65	6.67	464.38
Capital Outlay (Billion Constant Rupees)	42.40	37.18	2.30	176.92
FRBM Rule (1=Yes, 0=No)	0.66	0.48	0.00	1.00
State Population (000s)	62168.82	43038.71	1357	213273
GDP (Billion Constant Rupees)	1945.65	1491.05	95.91	8967.68
Economic Growth	7.17	4.83	-9.90	28.67
Total Internal Debt (Percent of GDP)	17.51	6.44	5.61	36.37
Central Grants (Percent of GDP)	1.85	1.05	0.46	5.60
Surface Road Density (Surfaced roads per square kilometer)	0.87	0.67	0.04	3.53
Election Year (State or General Election)	0.37	0.48	0.00	1.00
Left Ideology (1=Yes, 0=No)	0.12	0.32	0.00	1.00
Centrist Ideology (1=Yes, 0=No)	0.45	0.50	0.00	1.00

For all the specifications, I report the fixed effects and system GMM estimates. The primary specification of the fixed effects model assumes the form of equation 3.1.

$$y_{it} = \gamma D_{it} + \beta x_{it} + \alpha_i + \mu_t + \varepsilon_{it} \quad (3.1)$$

$y_{it}$  is the fiscal outcome of interest,  $D_{it}$  is a dummy for fiscal responsibility law. The parameter  $\gamma$  measures the impact of FRL on the fiscal outcome. All other covariates are included in the

vector  $x_{it}$  and  $\beta$  is the vector of coefficients associated with the covariates. In addition,  $\alpha_i$  denotes a full set of country dummies,  $\mu_t$  captures the time effects and  $\varepsilon_{it}$  is the error term with  $E(\varepsilon_{it}) = 0$  for all  $i$  and  $t$ .

Though the fixed effects estimator removes all the time-invariant country characteristics from the estimates, it arguably produces inefficient estimates, since potential endogeneity is not completely ruled out. Furthermore, the regressions may particularly suffer from serial correlation problem given the nature of the data. I follow Wooldridge (2003) and Drukker (2003) to examine the existence of serial correlation and reject the null hypothesis of no serial correlation. To partially address this concern, we can modify the specification and introduce the lagged value of the dependent variable on the left-hand side of equation 3.1. However, such an approach leads to dynamic panel bias – correlation between the lagged values of dependent variable ( $y_{it-1}$ ) and fixed effects in the error term ( $\mu_t$ ) (Nickell, 1981). System GMM estimator introduced by Arellano & Bond (1991), Arellano and Bover (1995), and Blundell & Bond (1998) helps in addressing this issue. GMM estimator purges the fixed effects by differencing the data and uses lagged levels and lagged differences of independent variables as internal instruments; therefore, addressing the endogeneity problem while avoiding dynamic panel bias (Roodman, 2009a, 2009b).

Though the system GMM estimators are one of the more reliable estimators in this study area – they rely on strong assumptions about instrument validity. Therefore, for all the GMM specifications, I report the p-values for first-order (AR1) and second-order (AR2) autocorrelation and the Hansen J statistic. A well-specified model should reject the null for AR1 and fail to reject the null for AR2 and the Hansen test. Fixed effects and GMM estimators rely

on different assumptions and have their unique advantages. The fixed effects estimator is more transparent about its assumptions, but suffers from potential endogeneity and serial correlation problem. The GMM estimator, on the other hand, assists in addressing these problems, but since it uses lagged levels and differences to create an instrument matrix, it is less transparent. For most of the specifications, I report both the estimates but when the fixed effects and GMM estimate yield inconsistent estimates, the latter estimate is methodologically superior if the instrument validity assumption is met.

### 3.5 RESULTS AND DISCUSSION

One of the primary rationales for the adoption of FRBM was to introduce fiscal discipline and reduce deficits of the states. The general consensus among Indian policymakers has been that FRBM was effective, since the average deficits of the states dropped sharply after the adoption of fiscal limits as shown in Figure 3.1.<sup>12</sup> However, there was substantial variation in how FRBM affected deficits across the states as shown in Figure 3.2. The effect of FRBM on state deficits is much more prominent in some states such as Kerala, Punjab, and Uttar Pradesh that adopted FRBM on their own rather than waiting for the directions from the 12<sup>th</sup> finance commission. On the other hand, states like West Bengal, Chattisgarh, and Rajasthan reduced their deficits even before the adoption of the FRBM. Therefore, a simple trend analysis does not provide sufficient insight into the workings of FRBM, and it is important to examine the effect across different fiscal outcomes while controlling for observable state characteristics.

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<sup>12</sup> Deficit reduction at the national and subnational level after the adoption of Fiscal Responsibility Laws is a recurring theme of the recently released report of a committee that reviewed the FRBM framework in India (FRBM Review Committee, 2017).

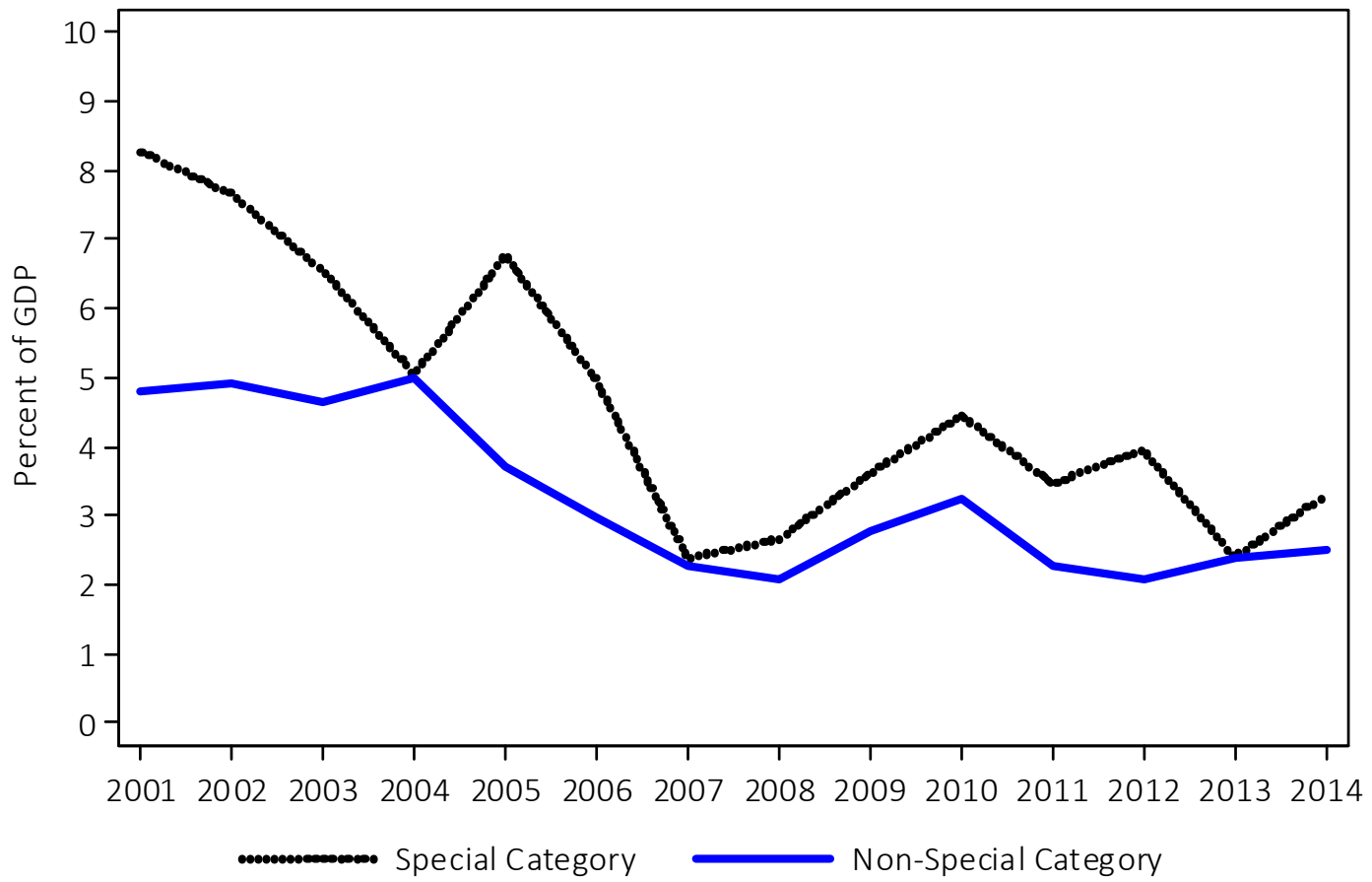
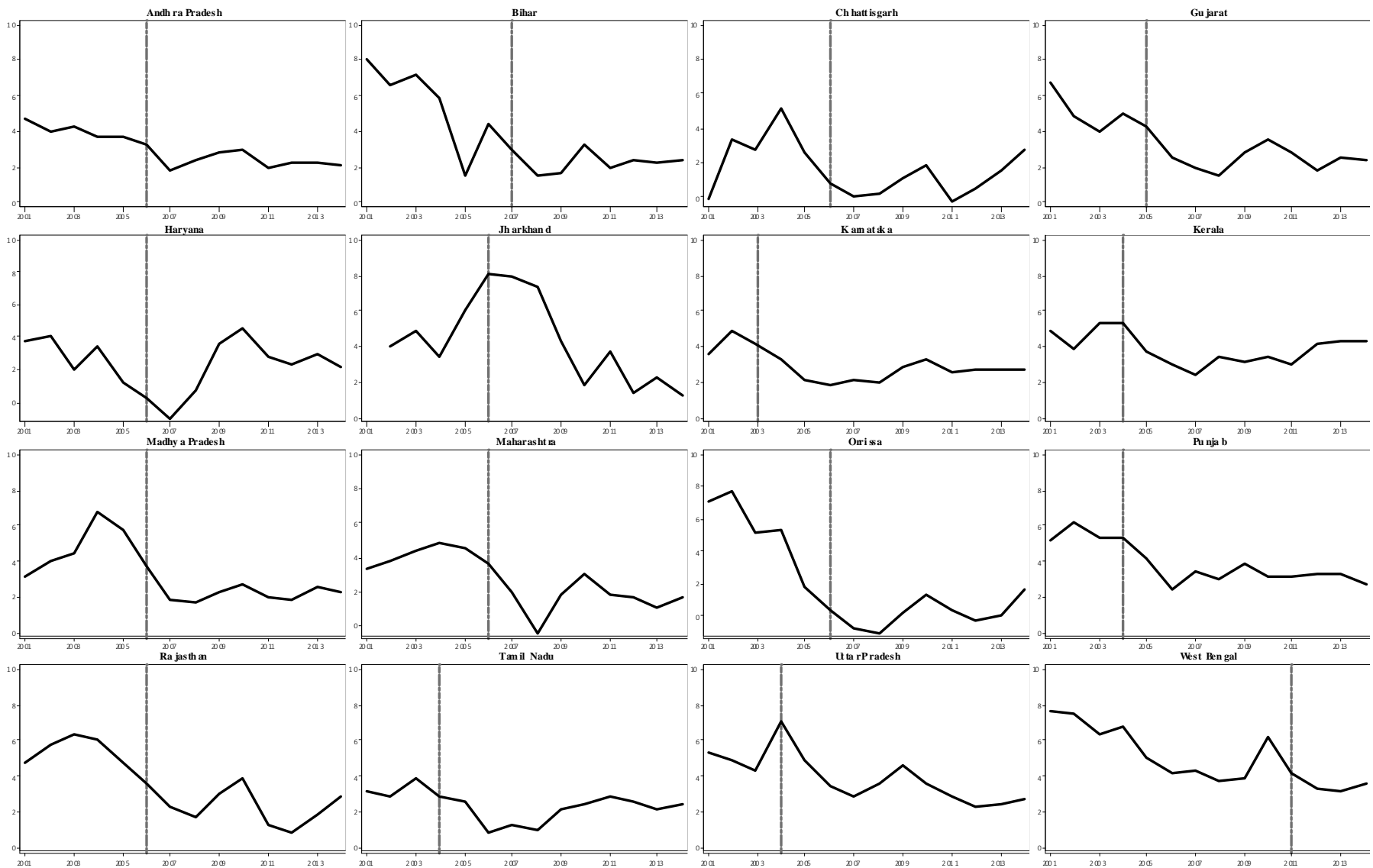


Figure 3.1: Subnational Fiscal Deficits in India, 2001-2014  
(Special and Non-Special Category States)



Note: (1) Vertical line shows the year of FRBM adoption. (2) State of Goa not shown in the chart due to space constraints. Goa witnessed marginal deficit decreases after the FRBM adoption (May 2006) and before the Great Recession.

Figure 3.2: FRBM Adoption and Subnational Fiscal Deficits of NSC States, 2001-2014

To examine the impact of FRBM on the full set of fiscal variables, I summarize the results of empirical analysis in three parts. First, I begin by exploring the relationship between the adoption of FRBM and major fiscal outcomes – deficits, spending, tax revenues, and non-tax revenues. In the second part, I examine the first hypothesis – that adoption of FRBM by the Indian states led to a reduction in development spending. In the third part, I examine whether the fiscal responsibility laws affected specific subcategories of development expenditure – social expenditures and capital outlay.

Table 3.3 reports the results from four sets of fixed effects (FE) and GMM regressions examining the impact of FRBM laws on the fiscal deficit (Column 1-2), total expenditures (Column 3-4), tax revenue (Column 5-6), and non-tax revenue (Column 7-8). The FRBM law has significant negative impact on state fiscal deficits of the states across both the estimates, which suggests the constraints imposed by the FRBM laws were effective in reducing deficits. In the fixed-effects models, on average, the states cut their fiscal deficits by about 1.13 percentage points after the adoption of FRBM. In the GMM specifications, the effect is also significant but somewhat smaller at 0.81 percentage points. The impact of FRBM on total expenditure and revenue also has the expected signs, i.e., the states reduced their total spending and tried to improve revenue collections after the passage of FRBM. However, none of the coefficients on aggregate indicators are significant.



Table 3.3: FRBM Adoption and Key Fiscal Outcomes (Percent of GDP) in Indian States

	Deficit		Total Expenditure		Tax Revenue		Non-Tax Revenue	
	(1) FE	(2) GMM	(3) FE	(4) GMM	(5) FE	(6) GMM	(7) FE	(8) GMM
FRBM	-1.127** (0.452)	-0.813** (0.325)	-0.795 (0.543)	-0.486 (0.332)	0.069 (0.164)	0.133 (0.119)	0.458 (0.442)	0.174 (0.119)
Population (Logged)	1.341 (4.658)	1.064*** (0.231)	-17.185* (9.290)	2.137*** (0.636)	-3.959* (2.252)	0.069 (0.099)	-17.755** (6.439)	-0.044 (0.150)
Real GDP	2.296 (1.863)	-1.164*** (0.298)	-4.726 (4.526)	-2.493*** (0.716)	-1.737 (1.426)	0.037 (0.150)	-2.856 (2.764)	-0.218 (0.162)
Economic Growth	-0.013 (0.018)	0.005 (0.016)	0.022 (0.031)	0.043* (0.022)	0.017 (0.014)	0.018** (0.008)	0.002 (0.014)	0.001 (0.009)
Debt	0.024 (0.062)	0.002 (0.017)	0.013 (0.072)	-0.026 (0.017)	-0.010 (0.017)	-0.013** (0.005)	-0.067* (0.035)	-0.005 (0.005)
Grant	-0.740*** (0.248)	-0.537*** (0.116)	1.138** (0.404)	0.062 (0.240)	0.248** (0.112)	-0.030 (0.039)	0.256 (0.166)	-0.067 (0.067)
Road Density	0.851* (0.428)	0.240*** (0.078)	-0.246 (0.972)	0.573** (0.244)	-0.010 (0.161)	0.162*** (0.047)	-0.828 (0.624)	-0.175*** (0.067)
Election Year	-0.113 (0.201)	0.124 (0.153)	-0.015 (0.297)	-0.223 (0.305)	-0.094 (0.060)	-0.192** (0.077)	-0.004 (0.111)	-0.293** (0.138)
Left Ideology	-0.976 (0.568)	-0.179 (0.149)	-0.670 (0.660)	-0.572* (0.321)	0.006 (0.141)	-0.220** (0.094)	-0.102 (0.353)	0.029 (0.062)
Centrist Ideology	-0.597 (0.404)	-0.184** (0.074)	-0.517 (0.691)	-0.284 (0.295)	0.057 (0.121)	-0.168* (0.087)	0.017 (0.412)	0.177* (0.107)
Lagged Y		0.597*** (0.050)		0.628*** (0.047)		0.877*** (0.030)		0.733*** (0.039)
Observations	220	220	220	220	220	220	220	220
Number of numeric	17	17	17	17	17	17	17	17
ARI (p-value)		0.003		0.002		0.004		0.144
AR2 (p-value)		0.729		0.147		0.632		0.696
Hansen (p-value)		1.000		1.000		1.000		1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust Standard Errors in Parentheses

The next set of regressions examine whether the spending impact of FRBM varies across different subcategories of spending – development spending, non-development spending, and other spending. In Table 3.4, Column 1-6 use the natural logarithm of constant rupee spending as the dependent variables. This measure allows us to understand the inflation-adjusted patterns in budgetary allocations and cuts. I exponentiate the regression coefficients (using the `exp` stata command) to convert them into expected percentage change – therefore, negative coefficients assume values less than one and positive coefficients assume values more than one. For example, Column 6 shows that, on average, the development spending after the FRBM adoption was 95.2 percent as high as (or 4.8 percent lower than) the pre-FRBM period. Concurrently, the non-development spending increased by 4.3 percent in the post-FRBM period (Column 5), and other spending showed positive but insignificant growth. Fixed effects models yield consistent estimates, but results are significant only for development spending.

To understand the changes in spending composition in response to changing economic condition of the states, Table 3.5 reproduces the same specifications, but measures the expenditures as a percent of state GDP. The results in Table 3.5 are moreover consistent with Table 3.4. Development spending in the states has not kept pace with the economic growth of the states after the adoption of FRBM. As per the GMM estimates, the share of development spending in state GDP decreased by 0.81 percentage points after the adoption of FRBM (Column 4). At the same time, non-development and other spending witnessed a positive, but insignificant increase during the period. Overall, the results in Table 3.4 and 3.5 suggest that states have reduced development spending under the fiscal rules regime and it has not kept pace with the economic growth in the states.

Table 3.4 – FRBM Laws and Category-Wise Spending (Log of Constant Spending)

(Dependent Variable: Log of Constant Spending, Exponentiated Coefficients)

	(1)	(2)	(3)	(4)	(5)	(6)
	Development Spending	Non-Development Spending	Other Spending	Development Spending	Non-Development Spending	Other Spending
	Fixed Effects Estimates			System GMM Estimates		
FRBM	0.938** (0.028)	1.058 (0.041)	0.998 (0.108)	0.952*** (0.015)	1.043** (0.020)	1.116 (0.085)
Population (Logged)	0.791 (0.312)	0.582 (0.288)	0.212* (0.179)	1.097** (0.044)	1.096*** (0.029)	1.085 (0.079)
Real GDP	1.296 (0.288)	1.382 (0.389)	1.441 (1.073)	1.125** (0.057)	1.215*** (0.082)	1.471** (0.258)
Economic Growth	0.997* (0.001)	1.000 (0.002)	1.010 (0.006)	0.998** (0.001)	0.998* (0.001)	1.004 (0.007)
Debt	0.985*** (0.004)	1.015*** (0.005)	1.035** (0.013)	0.994*** (0.001)	1.006*** (0.002)	1.003 (0.003)
Grant	1.052** (0.019)	1.026 (0.023)	1.090 (0.058)	0.993 (0.013)	1.001 (0.012)	1.051 (0.048)
Road Density	0.949 (0.044)	0.994 (0.070)	1.034 (0.206)	1.011 (0.018)	1.045*** (0.017)	1.090** (0.046)
Election Year	0.975 (0.021)	1.009 (0.013)	1.153** (0.065)	0.981 (0.018)	0.988 (0.016)	1.128** (0.063)
Left Ideology	0.907* (0.044)	1.051 (0.044)	1.281* (0.180)	0.948** (0.024)	1.006 (0.015)	1.106* (0.063)
Centrist Ideology	0.976 (0.038)	0.990 (0.036)	1.001 (0.094)	0.974* (0.015)	1.004 (0.013)	0.937* (0.035)
Lagged Spending				2.147*** (0.130)	2.002*** (0.157)	1.810*** (0.185)
Observations	220	220	220	220	220	220
Number of States	17	17	17	17	17	17
ARI (p-value)				0.004	0.017	0.011
AR2 (p-value)				0.134	0.204	0.109
Hansen (p-value)				1.000	1.000	1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust Standard Errors in Parentheses

Table 3.5 – FRBM Laws and Category-Wise Spending (Percent of GDP)

	(1) Development Spending	(2) Non-Development Spending	(3) Other Spending	(4) Development Spending	(5) Non-Development Spending	(6) Other Spending
	Fixed Effects Estimates			System GMM Estimates		
FRBM	-1.121** (0.391)	0.296 (0.266)	0.031 (0.146)	-0.818*** (0.195)	0.175 (0.132)	0.218 (0.149)
Population (Logged)	-6.780 (4.046)	-8.551 (5.535)	-1.855 (1.303)	1.280** (0.553)	0.674*** (0.209)	0.183 (0.182)
Real GDP	-5.026** (2.197)	0.252 (2.153)	0.048 (1.023)	-1.566*** (0.606)	-0.738*** (0.252)	-0.069 (0.228)
Economic Growth	0.003 (0.022)	0.002 (0.016)	0.017 (0.012)	0.021 (0.016)	0.010 (0.007)	0.009 (0.016)
Debt	-0.177*** (0.044)	0.124*** (0.036)	0.066*** (0.019)	-0.070*** (0.016)	0.036*** (0.013)	0.011 (0.007)
Grant	0.813*** (0.232)	0.221 (0.192)	0.105 (0.075)	0.007 (0.186)	-0.039 (0.095)	0.065 (0.091)
Road Density	-0.241 (0.557)	-0.088 (0.464)	0.083 (0.304)	0.229 (0.240)	0.242** (0.119)	0.145* (0.082)
Election Year	-0.325 (0.211)	0.088 (0.132)	0.222* (0.112)	-0.228 (0.210)	-0.172 (0.152)	0.171 (0.118)
Left Ideology	-1.304** (0.610)	0.264 (0.285)	0.370** (0.153)	-0.660** (0.274)	0.021 (0.084)	0.210* (0.126)
Centrist Ideology	-0.447 (0.467)	-0.050 (0.320)	-0.021 (0.095)	-0.271 (0.209)	0.116 (0.082)	-0.119 (0.081)
Lagged Spending				0.703*** (0.065)	0.698*** (0.102)	0.320* (0.181)
Observations	220	220	220	220	220	220
Number of States	17	17	17	17	17	17
ARI (p-value)				0.005	0.179	0.006
AR2 (p-value)				0.084	0.168	0.041
Hansen (p-value)				1.000	1.000	1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust Standard Errors in Parentheses

To identify the sectoral patterns within development spending, I run two additional sets of regressions using the sub-categories of social sector expenditure, and capital outlays as the dependent variable. Table 3.6 summarizes these results and reports both measures of the dependent variables: natural log of actual spending and expenditure-to-GDP ratio. Columns 1-4 use natural logarithm of spending in these categories as the dependent variable and report exponentiated coefficients. Column 5-8 use the ratio of spending to state GDP as the dependent variable. The coefficients on social expenditures and capital outlay have the expected signs, but the results are significant for social spending at only 10 percent level of significance. However, when we use the expenditure-to-GDP ratios as the spending measures – it suggests that the social spending and capital outlay have not kept pace with the economic growth in the states.

Overall, the results suggest that the adoption of fiscal responsibility and budget management laws by the Indian states had a significant impact on state finances characterized by improved fiscal balances. In addition, FRBM adoption did not seem to improve revenue collection but did alter the composition of subnational public spending. To comply with the FRBM targets, states reduced their development spending while non-development components of the spending continued to grow. Furthermore, it appears that social spending and capital outlays have not kept pace with economic growth in the states in the post-FRBM period. These results are consistent with the previous studies that have found a negative impact of fiscal rules on social spending and capital investment in India and Latin America (Chakraborty, 2014, 2017; Servén, 2007).

Table 3.6 – Fiscal Rules, Social Spending, and Capital Outlays in the Indian States

	Log of Constant Spending				Percent of GDP			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Social Spending	Capital Spending	Social Spending	Capital Spending	Social Spending	Capital Spending	Social Spending	Capital Spending
	Fixed Effects		System GMM		Fixed Effects		System GMM	
FRBM	0.964 (0.027)	0.916 (0.063)	0.961* (0.021)	0.951 (0.048)	-0.470** (0.220)	-0.378** (0.157)	-0.410** (0.178)	-0.306** (0.140)
Population (Logged)	1.054 (0.552)	0.286 (0.285)	1.066** (0.029)	1.125 (0.085)	-1.573 (3.594)	-1.162 (1.671)	0.692*** (0.207)	0.356* (0.206)
Real GDP	1.500* (0.294)	1.932 (1.034)	1.124** (0.057)	1.049 (0.087)	-1.873 (1.490)	-0.907 (1.497)	-0.790*** (0.237)	-0.358* (0.210)
Economic Growth	0.997* (0.002)	1.000 (0.004)	0.998 (0.002)	1.001 (0.003)	0.003 (0.016)	0.007 (0.008)	0.022* (0.013)	0.010* (0.006)
Debt	0.990* (0.005)	0.986 (0.010)	0.996*** (0.001)	0.993** (0.003)	-0.071* (0.037)	-0.049** (0.023)	-0.033*** (0.011)	-0.016** (0.007)
Grant	1.075*** (0.020)	1.077* (0.041)	1.015 (0.010)	0.998 (0.027)	0.705*** (0.157)	0.268** (0.113)	0.194** (0.092)	-0.005 (0.081)
Road Density	1.003 (0.052)	0.970 (0.121)	1.019* (0.012)	1.020 (0.041)	0.206 (0.392)	0.084 (0.195)	0.195* (0.102)	0.119 (0.112)
Election Year	0.976 (0.020)	0.966 (0.064)	0.978 (0.016)	1.018 (0.048)	-0.202 (0.131)	-0.187 (0.142)	-0.152 (0.099)	-0.030 (0.087)
Left Ideology	0.886* (0.053)	0.794** (0.079)	0.971 (0.020)	0.886* (0.058)	-0.920* (0.478)	-0.792*** (0.185)	-0.231 (0.158)	-0.322** (0.126)
Centrist Ideology	0.971 (0.040)	0.971 (0.044)	0.981 (0.013)	0.978 (0.028)	-0.231 (0.333)	-0.120 (0.142)	-0.100 (0.122)	-0.078 (0.067)
Lagged Spending			2.248*** (0.151)	2.289*** (0.100)			0.705*** (0.068)	0.790*** (0.050)
Observations	220	220	220	220	220	220	220	220
Number of numeric	17	17	17	17	17	17	17	17
AR1 (p-value)			0.001	0.001			0.003	0.006
AR2 (p-value)			0.521	0.489			0.142	0.628
Hansen (p-value)			1.000	1.000			1.000	1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust Standard Errors in Parentheses

### 3.6 SUMMARY AND CONCLUSION

In this essay, I examine whether the adoption of fiscal rules by subnational governments in developing economies impact the composition of public expenditures. I focus on the Indian experience and specifically examine the impact of fiscal responsibility laws adopted by the Indian states on development spending and the subcategories of social and capital spending. Using a combination of fixed effects and GMM estimation approaches, this study finds that the adoption of fiscal responsibility laws by Indian states influenced the composition of public spending. Among the major states of India, fiscal responsibility laws led to a small shift in spending from developmental to non-developmental purposes. Furthermore, social spending and capital outlay have not kept pace with the economic growth in the states after the adoption of fiscal responsibility laws. These results are robust to several alternative specifications and checks and are consistent with the previous studies in this area.

However, studying the impact of the subnational fiscal rules on public spending in the Indian setting has its limitations. Indian states adopted the FRLs in the context of very high deficits and debt at the national and subnational level. The grim public finance situation led to the adoption of several other reforms in the mid-2000s. Some of the prominent concurrent events included the adoption of VAT by all the states, an increase in the devolution of central taxes by the twelfth finance commission, and debt relief and restructuring extended to the states. In addition, the period also witnessed robust economic growth in India and a liberal interest rate regime that could have a simultaneous effect on deficits, revenues, and expenditures. Arguably, all of these factors should have led to higher resources at the disposal of state governments, and therefore development spending should have increased, which is not

the case in the results. However, the omission of these factors may bias the impact on fiscal deficits, but isolating the effects of these factors is an empirical challenge.

In India, a central government-appointed committee has recently completed a review of fiscal responsibility framework that recognizes the possibility of subnational fiscal targets distorting the composition of public spending – without any proposal for remedial steps (FRBM Review Committee, 2017). In the review committee’s consultations with the states, several states have highlighted the need for exempting certain public investment items from the FRBM limits – a plausible short-run policy option to counteract the adverse impacts in jurisdictions that already have such rules. Several developing economies are currently considering the adoption of similar fiscal responsibility laws. In these countries, the Indian experience should provide some impetus for careful examination of the impact of fiscal limits on the composition of public spending.



## CHAPTER 4

### THE TYRANNY OF SUPERMAJORITY?

Debt Market Impact of Supermajority Voting Rules in the U.S. State Legislatures

## 4.1 INTRODUCTION

In the United States, regional variations in institutional arrangements provide a fertile ground for practitioners and researchers to study the intended and unintended effects of different fiscal institutions. Previous research has focused on numerical fiscal rules, such as tax and expenditure limits, deficits rules, and balanced budget requirements.<sup>1</sup> Procedural fiscal rules, such as supermajority voting requirements and voter approvals for tax increases have also received substantial attention, but largely in the context of their intended effects on taxes and spending (Gradstein 1999; Knight 2000; Kioko and Martell 2012; Bradbury and Johnson 2006; Lee 2014; Seljan 2015). This article focuses on the unintended effects of supermajority requirements on the borrowing costs of state governments, an issue that has received little attention in previous studies.

Sixteen states require a supermajority vote for any tax increase, i.e., more than a simple majority for passing any measure that would lead to an increase in tax (Table 1).<sup>2</sup> Seven of them, constitutionally require a supermajority vote in each house to enact any bill that would lead to a tax increase. With the changing political and ideological composition of state legislatures, several states continue to discuss the merits and demerits of adopting such rules. The Wisconsin legislature passed a statutory supermajority rule in 2011 and subsequently adopted a legislatively-referred constitutional amendment which awaits voter approval

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<sup>1</sup> See Poterba 1994; Alesina and Perotti 1996; Poterba 1996; Besley and Case 2003 for some early discussions on state fiscal institutions. The Symposium on Tax and Expenditure Limitations (2004), *Public Budgeting and Finance*, 24(4) provides an overview of early research on state and local TELs. See Hou and Smith (2010); Smith and Hou (2013) for some recent discussions on balanced budget rules.

<sup>2</sup> The tax revolt of 1970s and other developments like passing of Voting Rights Act of 1965 led to some states adopting the supermajority requirements, but only six states had supermajority requirements before 1990. Among these, Arkansas adopted a supermajority requirement after the Great Depression in November, 1934. Most of the other states with the supermajority rule adopted it in the nineties.

(Wisconsin State Legislature 2011; 2013). In recent years, at least ten other states (Idaho, Maine, Michigan, Minnesota, New Hampshire, New York, Nebraska, New Jersey, Hawaii, and West Virginia) have considered similar requirements (Henchman, 2012; Leachman, Johnson, & Grundman, 2012; Minnesota Budget Project, 2012; New Hampshire Fiscal Policy Institute, 2015; State of Hawaii, 2015).

Table 4.1: Supermajority Rules for Tax Increases in the United States

State	Year of adoption	Size of the requirement	Application of the rule	Legal status
Arkansas	1934	3/4	Majority of Taxes	Statutory
Louisiana	1966	2/3	Majority of Taxes	Constitutional
Mississippi	1970	3/5	Majority of Taxes	Constitutional
Florida	1971	3/5	Corporate Income Tax	Statutory
California	1979	2/3	Majority of Taxes	Constitutional
Delaware	1980	3/5	All Taxes	Constitutional
Arizona	1992	2/3	All taxes	Constitutional
Colorado	1992	2/3	All Taxes	Statutory
Oklahoma	1992	3/4	All Taxes	Statutory
Washington	1993	2/3	All Taxes	Statutory
Missouri	1996	2/3	Selected Taxes	Statutory
Nevada	1996	2/3	All Taxes	Statutory
Oregon	1996	3/5	All Taxes	Constitutional
South Dakota	1996	2/3	All Taxes	Statutory
Montana	1998	3/4	Selected Taxes	Statutory
Wisconsin	2011	2/3	Selected Taxes	Statutory

Source: National Conference of State Legislatures

In the public finance context, one of the early discussions of supermajority requirements for tax increases is found in *The Calculus of Consent*. Buchanan & Tullock (1962) argue that two-thirds majority “can be more representative and reduce the tyranny of the majority,” since it

can reduce the taxes and expenditures that are not agreeable to all social groups.<sup>3</sup> The proponents of supermajority requirements argue that making it more difficult for legislators to enact tax increases ensures that taxes are raised only with broad bipartisan support. Critics, however, argue that such rules make even the day-to-day tax reform a cumbersome process, and can even lead to a minority coalition dominating the legislative process by obstructing the majority consensus. Furthermore, the supermajority requirements signal to the market that the jurisdiction has to overcome additional political hurdles to pass a tax increase, which may affect the cost of borrowing from the bond market.

Several studies have examined the political aspects and effects of supermajority requirements on outcomes such as overall tax burden (Bradbury & Johnson, 2006; Knight, 2000; Lee, 2015; Lee, 2014; Seljan, 2015). This article focuses on the effect of supermajority rules on subnational borrowing costs, an issue that has received little attention. Previous research suggests that fiscal rules that impose constraints on the budgetary process may change the risk associated with debt issued by the governments and thereby may influence the credit rating and borrowing costs (Capeci 1994; Johnson and Kriz 2005; Poterba and Rueben 1999a; Lowry and Alt 2001; Moldogaziev, Kioko, and Hildreth 2016; Feld et al. 2013). In this essay, I examine whether the procedural rules such as supermajority rules also have a similar effect.

The rest of the essay proceeds as follows. Section 4.2 provides a background of existing research on supermajority voting requirements and fiscal outcomes. Section 4.3 discusses the role of fiscal institutions in municipal bond market and lays out the analytical framework of the

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<sup>3</sup>The constitutional debate on supermajority requirements goes back to the *Federalist Papers*. See Ackerman et al. (1995) and McGinnis and Rappaport (1995) for an overview of constitutional arguments for and against the supermajority rules written in the context of proposal in the House of Representatives to amend the constitution to adopt supermajority rules. The bill was defeated in 1996.

study. Section 4.4 provides an overview of the data sources and variables, and Section 4.5 discusses the details of estimation and results. The last section summarizes the findings and concludes.

## 4.2 SUPERMAJORITY RULES AND FISCAL OUTCOMES

Previous studies on supermajority rules have mostly focused on the impact of these requirements on taxes and expenditures. The central thesis of this literature is that the choice of voting rules and distribution of voting powers across different social groups influences the distribution of the tax burden and budgetary allocations (Buchanan and Tullock 1962; Lee 2014; Lee, Borcharding, and Kang 2014; Dixit, Grossman, and Gul 2000). A set of interest groups (e.g., business coalitions) hope to limit the government's ability to increase taxes, while other groups (e.g., progressive social movements) want higher expenditure commitments from the government, which would lead to future tax increases. Gradstein (1999) suggests that, in the 19<sup>th</sup> century, disenfranchisement restrained the latter group, by limiting political participation and containing the demand for redistribution. However, the expansion of universal franchise led to strengthening of the welfare state, an increase in taxes, and a parallel increase in demand for mechanisms to lower taxes by the former groups. Gradstein suggests that supermajority requirements for tax increases gained prominence in this context, and he outlines a theoretical model that argues that supermajority requirements can make tax increases difficult.

Knight (2000) empirically tests the tax reduction hypothesis and examines the effect of state-level supermajority requirements on tax rates using fixed effects and instrumental variable estimation. He finds that the supermajority requirements are effective in reducing taxes, and the results are stronger in his instrumental variable models. Some other studies have also found

similar results for tax burden, using other approaches and case studies of individual states (Lee 2014; Besley and Case 2003; Jordan and Hoffman 2009; Kioko and Martell 2012; Rafool 1996). For example, Kioko and Martell (2012) find that supermajority and voter approval requirements impose additional political constraints on governments and limit their ability to increase or impose taxes. Further, Lee (2014) uses the synthetic control method to demonstrate that California's supermajority requirements reduced the non-property tax burden by an average of \$1.44 per \$100 of personal income. However, some studies find mixed results or no effect of supermajority rules. For example, Bradbury and Johnson (2006) use state-level data from 1960-1997 and find no significant effect of supermajority rules on government revenues.

The research on the effect of supermajority rules on spending is less clear. Some of the early studies on the subject find lower spending growth in the states with supermajority rules, but the recent literature shows mixed results (Crain and Miller 1990; Gabel and Hager 2000; Lee, Borcherding, and Kang 2014). Supermajority requirements may affect spending through two key mechanisms. First, by imposing constraints on increasing taxes, they should reduce overall spending (Buchanan & Tullock, 1962). On the other hand, to get minority legislators to vote on tax legislations, they have to give them more funds (pork barrel) that eventually inflates the budgets (Gabel and Hager 2000; Lee et al. 2014; Lee 2015). Lee et al. (2014) find empirical evidence that the second effect dominates and that states with supermajority requirements experience an increase in spending.

These studies have focused on the effect of supermajority rules on taxes and spending, but the role of supermajority requirements in the municipal bond market has received little empirical attention. Recent studies that have examined the relationship between fiscal

institutions, credit ratings, and subnational borrowing have paid little or no attention to supermajority rules (Johnson & Kriz, 2005; Lowry & Alt, 2001; Poterba & Von Hagen, 1999; Stallmann, Deller, Amiel, & Maher, 2012). In the next section, I discuss the literature on fiscal institutions and borrowing costs in the municipal bond market and outline the analytical framework of this article.

#### 4.3 FISCAL INSTITUTIONS AND THE COST OF SUBNATIONAL BORROWING

Fiscal institutions and economic characteristics of the bond issuer may have a significant effect on yields and borrowing costs (Capeci 1994; Poterba and Rueben 1999; Poterba and Rueben 1999; Johnson and Kriz 2005; Lowry and Alt 2001; Feld et al. 2013; Wagner 2004; Stallmann et al. 2012). In the 1980s, some studies focused on the correlation between the economic characteristics of bond issuers and cross-sectional variation in the yields (Wallace 1981; Benson et al., 1984; 1986 Wilson and Howard 1984). However, as the debate around fiscal institutions like the Taxpayer's Bill of Rights (TABOR) in the U.S. and the Maastricht Treaty in Europe gained prominence, institutional arrangements and their market effects received attention in the 1990s (Bayoumi, Morris, & Woglom, 1995; Capeci, 1994; Eichengreen & Bayoumi, 1994; Lowry & Alt, 2001; Poterba & Rueben, 1999).

Capeci (1994) examined data from New Jersey municipalities and found that local borrowing costs were positively related to the debt burden and size of the current-year bond issues. Studies that examined interstate variations in the yields used the Chubb Relative Value Survey (CRVS) and found that institutions such as balanced budget rules, tax and expenditure limits, and budget stabilization funds influenced the yields on municipal bonds (Bayoumi, Morris, and Woglom 1995; Eichengreen and Bayoumi 1994; Poterba and Rueben 1999; Lowry and Alt

2001; Wagner 2004). Using the CRVS, Poterba & Rueben (1999a) find that bonds issued by states with limits on taxes pay a higher borrowing cost. Similarly, Lowry & Alt (2001) found that fiscal rules like balanced budget requirements serve as a signaling mechanism in the bond market and affect the market response. However, the lack of data on actual issues constrained these studies, since the CRVS data had a significant limitation – it was just a measure of the trader’s opinions on bond yields and not actual trades. Johnson and Kriz (2005) were the first to examine the impact of state fiscal institutions on credit ratings and borrowing costs in the primary market using official statement data. They found that debt limits and revenue limits increase borrowing costs, and spending limits and balanced budget rules reduce borrowing costs. They also found similar effects of these institutions on credit ratings, a finding that has been supported by subsequent studies that have used long-term datasets on state institutions and credit ratings (Grizzle, 2010; Moldogaziev & Guzman, 2015; Stallmann et al., 2012).

*Hypotheses.* In summary, institutions that increase the perceived default risk, such as tax limits, lower the credit ratings and lead to higher borrowing costs (Johnson and Kriz 2005; Moldogaziev, Kioko, and Hildreth 2016). On the other hand, the institutions that decrease the perceived default risk, such as budget stabilization funds and balanced budget requirements, may have a positive effect on the credit ratings and lead to lower borrowing costs (Grizzle, 2010; Johnson & Kriz, 2005; Wagner, 2004). Supermajority rules make tax increases difficult. Thus, they should increase the perceived default risk for investors and credit rating agencies.

Using CRVS, Poterba and Rueben (1999a) find an unclear relationship between fiscal institutions and borrowing costs. However, market observers, including the rating agencies such as Moody’s have noted the association of supermajority requirements with borrowing costs



(Leachman et al., 2012; Moody's Investor Service, 2011). Credit ratings are one of the key factors that affect borrowing cost; therefore, they serve as an important intervening mechanism. However, lower credit ratings may impact the state governments beyond borrowing costs in the primary market. Thus, it is also useful to examine the impact of supermajority requirements on credit ratings and borrowing costs, separately and simultaneously. The first hypothesis of this study examines the impact of supermajority requirements on credit ratings of general obligation bonds issued by state governments. In the second hypothesis, I examine the impact of supermajority requirements on the cost of borrowing for state governments.

Hypothesis 1: Supermajority requirements lower the credit ratings of state general obligation bonds.

Hypothesis 2: Supermajority requirements increase the borrowing cost of the general obligation debt of state governments.

#### 4.4 DATA AND METHODS

The previous section highlighted the limitations of the Chubb Relative Value Survey that informs most of the literature in this area. In recent years, the availability of data on actual debt market transactions has improved, as the Municipal Securities Rulemaking Board and other private sector organizations have started to compile data in research-friendly format. This study uses two such municipal securities databases from Mergent, Inc. and Ipreo, Inc. These sources have same information, but each has some unique variables. For example, only the Ipreo database includes information on interest cost. Each maturity of a municipal issue has a unique identifier called a CUSIP (Committees on Uniform Securities Identification Procedures), which

could be used to match securities across datasets. These databases contain a range of information on the characteristics of issues and maturities, and identifying information of the issuer. State governments issue two key types of bonds – general obligations bonds, backed by full faith and credit of the state, and revenue bonds, backed by revenues from a specific project. Since the general obligation bonds (GOs) are funded through tax revenues, the supermajority requirements may limit a state’s ability to repay them – therefore, impacting their ratings and borrowing costs. On the other hand, user fee is the primary funding method for revenue bonds which is often outside the purview of legislative policymaking, and thus, they should not to be influenced by supermajority requirements.<sup>4</sup> Therefore, I restrict the sample to only the GOs issued by state governments between 2001 and 2014 and combine bond issues with information on state characteristics from the Census Bureau and legislative variables from the National Conference of State Legislatures.

One of the key challenges in the study of fiscal rules is the possibility of bias in estimates, since underlying political and citizen preferences affect the adoption of rules and observed outcomes (Poterba & Von Hagen, 1999; Rose, 2010). In the absence of opportunities to use quasi-experimental approaches, one way to partially reduce bias in the estimates is to control for observable political conditions and voter preferences (Krogstrup & Wälti, 2008; Poterba & Von Hagen, 1999). Furthermore, a growing body of literature highlights the impact of political institutions on municipal financing costs (Abakah & Kedia, 2016; Aneja, Moszoro, & Spiller, 2015; Gao & Qi, 2013). Therefore, I include a set of political variables in the regressions. First, I control for political ideology of the state governments, since it influences the fiscal behavior and

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<sup>4</sup> In the sample, very small number of revenue bonds are issued by state government directly since governments rely on conduit agencies or special authorities to issue these bonds. Therefore, it is not possible to examine whether supermajority requirements have a direct impact of state-issued revenue bonds.

the institutions they adopt. Berry and Ringquist (1998) and Berry et al. (2010) provide an index of liberalism of the American states' citizens and legislators, which I use as a measure of ideological variation in the political and voter preferences. Second, a plausible political motivation behind the supermajority requirements is to limit the fiscal maneuvering space for opposition parties, particularly in the states that are electorally volatile (or swing states). Therefore, I include a dummy variable for political competition that is coded one if the percentage of Democrats in the house is between 45 and 55 percent.<sup>5</sup> Third, I include a dummy for party affiliation of the Governor to account for gubernatorial preferences. I obtain the information on these political variables from the National Conference of State Legislatures (NCSL). The information on supermajority rules also come from the NCSL, but I verify it with other recent studies on the subject (Lee 2014; Lee 2015; Heckelman and Dougherty 2010).

I include unlimited tax GOs, limited tax GOs, and double-barreled bonds in the sample. Unlimited-tax bonds are backed by unlimited tax authority of the state. Limited Tax GOs are subject to state-specific legal limits on raising taxes. Double-barreled bonds are GO bonds that are first secured by designated source of revenue as well as the full-faith and credit pledge of issuer. All these bonds qualify as the general obligation debt of the state governments. The final sample comprises of 931 state GO bonds. Figure 4.1 and 4.2 summarize the distribution of the sample across states and years.

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<sup>5</sup> Political Science literature uses more robust measures of electoral volatility and stability, but long-term volatility data on U.S. states is not readily available. Arguably, classifying the states with 45 to 55 percent representation of one political party as relatively more volatile is a valid assumption in the context of U.S. state politics.

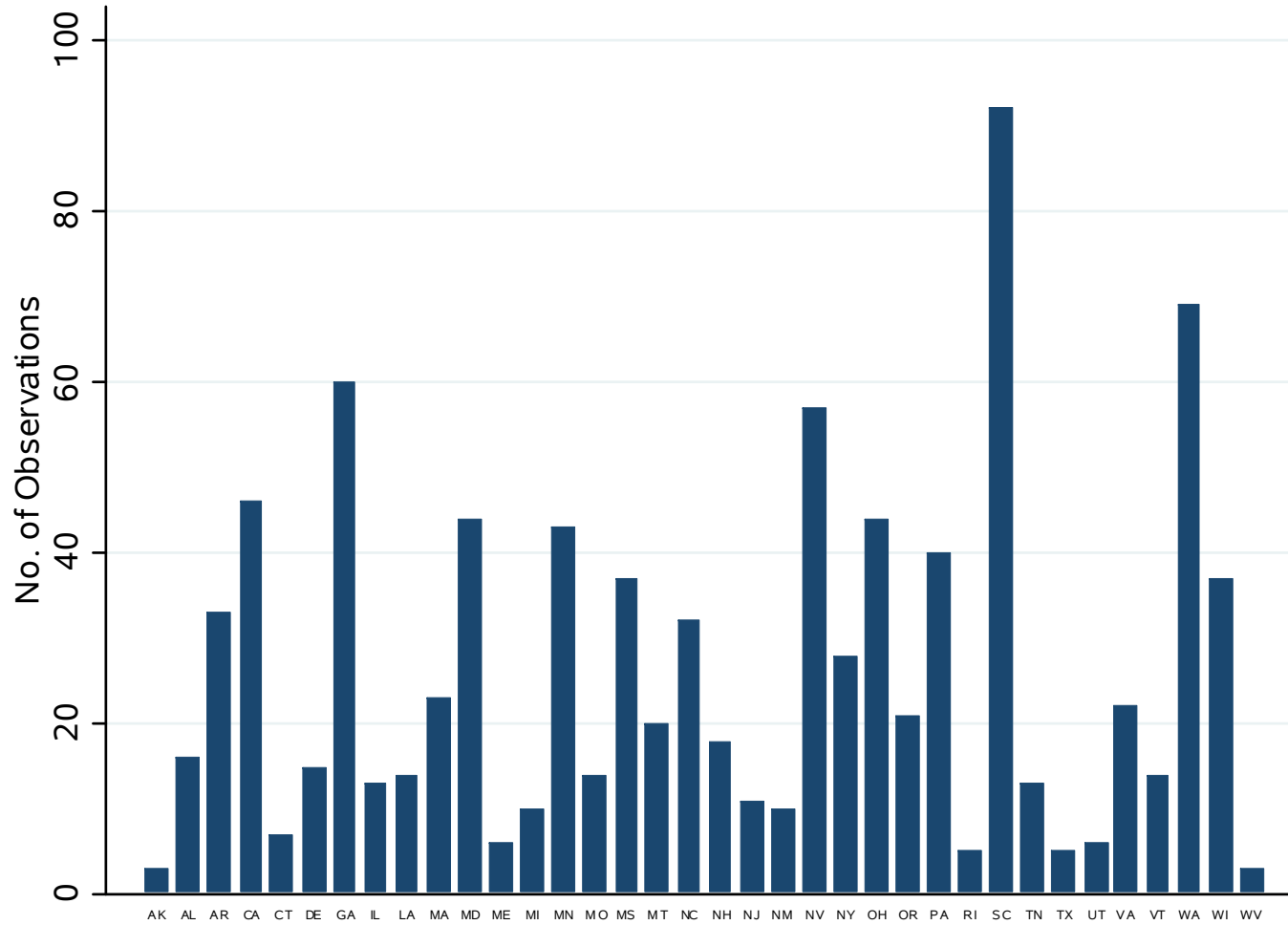


Figure 4.1 - Distribution of the General-Obligation Issues across States (N=931)

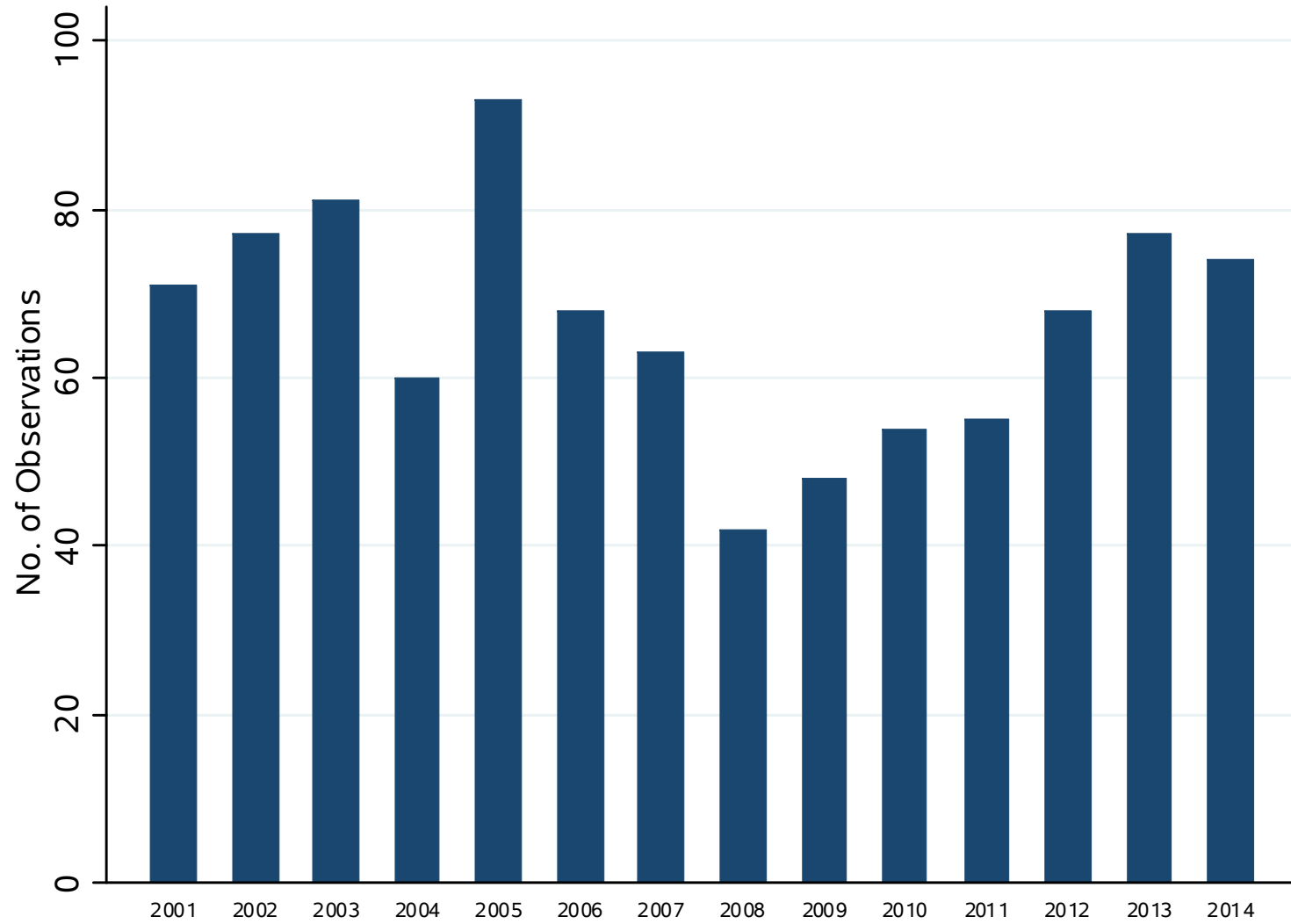


Figure 4.2: Distribution of the General-Obligation Issues across Years (N=931)

The key independent variable is a dummy for supermajority requirement and I have two sets of dependent variables. First, I use credit ratings to examine whether the bond issued by states with supermajority requirements receive lower ratings. The sample consists of state governments' general obligation bonds, which typically receive high credit ratings. Therefore, I reorganize the ratings on an eight-point scale as shown in Table 4.2, where all the bonds receiving less than A3/A- are coded one and the ones with AAA are coded eight. I further recode these eight categories into three ratings of low, medium, and high which are used as the dependent variable in the ordered logit regressions.<sup>6</sup> Second, I use the True Interest Cost (TIC) of the bond as my dependent variable to estimate the effect of supermajority requirements on borrowing cost. TIC is a widely-used measure of the total cost of capital for a bond issuer and estimates the present value of all the interest that the issuer will pay over the life of the bond.<sup>7</sup>

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<sup>6</sup> The three-point scale enables as easy interpretation of the results and also provides enough observations across the rating thresholds.

<sup>7</sup> Securities Rulemaking Board defines TIC as “the rate necessary to discount the amounts payable on the respective principal and interest payment due to the purchase price received for the new issue of bonds”. Another method of calculating interest expense is Net Interest Cost (NIC) which is slightly different from TIC since it does not consider the time value of money.

Table 4.2: Credit Rating Classification of the State G.O.s in the Sample

Credit Rating	Eight-Point Scale	Three-Point Scale	Observations
Aaa/AAA	8	High	362
Aa1/AA+	7	Medium	260
Aa2/AA	6	Medium	175
Aa3/AA-	5	Low	84
A1/A+	4	Low	17
A2/A	3	Low	15
A3/A-	2	Low	7
Baa1/BBB+ or lower	1	Low	11
			Total=931

Note: The eight-point scale is constructed after taking an average of ratings across the three agencies: Moody's, S&P, and Fitch. If any two rating agencies assign different ratings to an issue, then average rating is rounded off to the nearest whole number. For example, if Moody's assigns Aa1 to a bond, and S&P and Fitch assign AA, the bond will have an average rating of  $(7+6+6)/3=6.33$ , which will assume the value six on the eight-point scale, and 'medium' on the three-point scale.

I control for a range of variables related to bond issues, issuers, and the political climate. The first set controls for characteristics of the bonds that are known to affect the credit rating and borrowing costs (Johnson & Kriz, 2005; Marlowe, 2013; Moldogaziev et al., 2016). Logged par value of the bond controls for the size of the bond. Since tax-exempt status of the bond is known to affect the demand of bond by the market, I include two dummies for whether interest on the bond is exempted from federal and state income taxes. Underwriter selection process may also impact the borrowing costs. A large literature shows that the method of sale, i.e. whether the underwriter is chosen through competitive bidding or negotiated agreement may influence the borrowing costs (Kriz, 2003; Peng & Brucato, 2004; Simonsen & Robbins, 1996). Thus, I control for method of sale using a dummy for competitive sales. Third party

insurance provides additional protection to bonds and may affect borrowing costs and; therefore, I include a dummy for bond insurance.<sup>8</sup> Long-term debt typically has higher borrowing costs; therefore, I control for bonds that have maturities of more than ten years. Finally, since issuers can redeem some bonds before the stated maturity period (i.e., call back the bond and refinance it) – such bonds typically have higher borrowing costs. Therefore, I include a dummy for bonds that have the call option.

Second, I control for a set of issuer characteristics that are lagged one year. States' population; per capita GDP and the unemployment rate to account for production and economic conditions; and per capita debt outstanding and per capita own-source general revenues to account for the fiscal position of the state governments. Third, I include Bondbuyer's 20 General Obligation Bond Index that provides average estimated yield for general obligation bonds in the market on the date of issuance. The bond index controls for economic fluctuations in the market conditions over time. Fourth, I include a set of political variables as described earlier: state government ideology, a measure of political competitiveness, and the party affiliation of the governor.

In order to examine the mechanism effect that works through credit ratings, I also include eight dummies for credit ratings that are constructed as per the description in Table 4.2. Also, a dummy for split credit ratings controls for bonds whose credit ratings differ across rating agencies. I include the region dummies to account for regional effects, since there seem to be regional patterns in the adoption of supermajority requirements. Lastly, I include year

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<sup>8</sup> However, this relationship does not hold across the entire study period since the Great Recession significantly affected the role of bond insurance in the municipal securities market (See Cohen (2013); Ely (2012); Nanda & Singh, (2004)). All the models include year dummies that partially addresses the changing dynamics of the market.



dummies to account for the annual fluctuations and business cycle events like the Great Recession that affected the municipal market significantly. Table 4.3 provides the summary statistics of the all the variables.

I use generalized ordered logit in the credit rating models and linear regression in the borrowing cost models. The empirical specification for the borrowing cost models assumes the form of equation (1) where  $y_i$  is the dependent variable i.e., the true interest cost (*TIC*) to the issuer of the bond.

$$y_i = \gamma \mathbf{D}_{it} + \boldsymbol{\beta} \mathbf{x}_{it} + \mu_t + \varepsilon \quad (1)$$

The main variable of interest is a measure of the supermajority requirement ( $\mathbf{D}$ ). The parameter  $\gamma$  measures the effect of the supermajority requirement on true interest cost. All other covariates are included in the vector  $\mathbf{x}_{it}$  and  $\boldsymbol{\beta}$  is the vector of coefficients associated with the covariates. In addition,  $\mu_t$  captures year effects and  $\varepsilon_{it}$  is the error term.  $\mathbf{x}_{it}$  vector includes all the control variables that are discussed earlier. All the standard errors are clustered at the state level to allow for correlation between bonds issued by the same state thereby relaxing the i.i.d. assumption.

Table 4.3: Summary Statistics

[N=931]

Variables	Mean	S.D.	Min	Max	Data Source
True Interest Cost	3.60	1.08	0.22	6.97	Ipreo
Long credit rating	6.79	1.39	1.00	8.00	Ipreo/Mergent
Short credit rating ( <i>LOW, MED, HIGH</i> )	2.24	0.69	1.00	3.00	Ipreo/Mergent
Bond received split rating (1,0)	0.27	0.45	0.00	1.00	Ipreo/Mergent
PAR value of the issue (million\$)	179.12	197.12	0.50	1132.18	Ipreo/Mergent
Bond exempted from federal income tax	0.86	0.35	0.00	1.00	Mergent
Bond exempted from state income tax	0.89	0.31	0.00	1.00	Mergent
Callable Bond	0.74	0.44	0.00	1.00	Mergent
Bond with insured maturities	0.18	0.39	0.00	1.00	Mergent
Sold in competitive bid	0.78	0.42	0.00	1.00	Mergent
Bonds with more than 10-year maturity	0.82	0.38	0.00	1.00	Ipreo/Mergent
Bondbuyer's 20-Bond GO Index	4.51	0.43	3.27	5.58	Bondbuyer
State population (million)	7.74	7.64	0.61	38.43	Census Bureau
Per Capita GDP (\$)	42903	9337	23231	79622	BEA
Unemployment rate	6.27	1.98	2.30	12.42	BLS
Per capita total debt (\$)	3002.42	1888.80	589.00	12084.00	Census Bureau
Per capita general OSR (\$)	3135.62	968.65	1778.00	20353.00	Census Bureau
State government ideology	51.24	26.44	0.00	92.45	Berry et al., 2010
Swing state	0.24	0.43	0.00	1.00	NCSL
Democratic Governor	0.51	0.50	0.00	1.00	NCSL

Finally, I also undertake a set of robustness checks using alternative measures of supermajority rules to improve the confidence in the estimates. First, I use the size of the supermajority requirement (i.e. whether the state requires a three-fifths, two-thirds, or a three-fourths supermajority to adopt the tax legislations). My hypothesis is that the states that have larger majority thresholds pay a higher premium on their bonds vis-à-vis the states that have a relatively lower majority threshold or no requirement. Second, I examine if there is a difference in the effect of constitutional supermajority requirement versus the statutory requirement. The underlying assumption is that the constitutional supermajority requirements are stronger limits than the statutory requirements since it is relatively hard to violate constitutional provisions.

I run an additional check using an instrumental variable regression. I follow the approach of previous studies in the area and employ the provision of citizens initiatives for constitutional amendments as an instrument for supermajority rules (Kioko & Martell, 2012; Knight, 2000). The underlying logic of the constitutional initiative provision as an instrument for supermajority requirements stems from the assumption that the states that allow citizen initiatives to amend constitutions are more likely to adopt supermajority requirements. This is a credible assumption given that in almost a half of the states with supermajority requirements, voters initiated the amendments (Knight, 2000). Furthermore, several of these provisions were adopted as part of the original state constitutions or were added in the early 19<sup>th</sup> century during the populist movement. Therefore, the previous studies have argued that it is safe to assume that citizen initiatives for constitutional amendments are exogenous to the current fiscal outcomes (Kioko & Martell, 2012; Knight, 2000; Poterba, 1996; Poterba & Rueben, 1999b).

## 4.5 ESTIMATION AND RESULTS

Fiscal institutions may affect subnational borrowing through several mechanisms, but credit rating is one of the key factors that influences borrowing costs. Given the ordinal character of the credit ratings, I use generalized ordered logit to examine the effect of the supermajority requirements on credit ratings.<sup>9</sup> Table 4.4 reports the average marginal effects on the probability of receiving low, medium, and high credit ratings. In the credit rating regressions, holding other variables constant at their actual levels, the states with supermajority requirements on average are 33 percentage points less likely to receive AAA credit rating on their bonds, 17 percentage points more likely to get a medium rating, and 16 percentage points more likely to get a low rating i.e. Aa3/AA- or less.

These results are robust to alternative definitions and combinations of the credit rating thresholds. For example, the findings do not change if I classify AAA and AAA+ in the 'high rating' category. Furthermore, the linear regression models with a measure of average rating across three rating agencies S&P, Moody's, and Fitch also yield similar results, which show that the states with supermajority requirements for tax increases, on average, receive a lower credit rating than other states.

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<sup>9</sup> Ordered logit specification violates parallel regression assumption based on the likelihood ratio test. Therefore, only the results of generalized ordered logit are reported here.

Table 4.4: Credit Rating and Supermajority Requirements for Tax Increases

(Average Marginal Effects, Generalized Ordered Logit Regressions, N=931)

	<i>Prob(Low Rating)</i>	<i>Prob (Medium Rating)</i>	<i>Prob (High Rating)</i>
Supermajority Rule (1=Yes, 0=No)	0.157*** (0.053)	0.175*** (0.058)	-0.333*** (0.089)
Par value (logged)	-0.004 (0.008)	-0.005 (0.009)	0.009 (0.017)
Federal Exemption	-0.005 (0.022)	-0.006 (0.024)	0.011 (0.046)
State Exemption	-0.119*** (0.039)	-0.133** (0.058)	0.252*** (0.084)
Call Feature	0.019 (0.030)	0.022 (0.033)	-0.041 (0.062)
Insured Bond	0.013 (0.043)	0.014 (0.048)	-0.027 (0.091)
Competitive Sale	0.034 (0.029)	0.038 (0.030)	-0.072 (0.057)
Long-Term Bond	0.010 (0.025)	0.011 (0.028)	-0.022 (0.052)
20 Bond GO Index	-0.025 (0.025)	-0.027 (0.029)	0.052 (0.053)
Population (Logged)	0.111*** (0.034)	0.124*** (0.047)	-0.235*** (0.066)
Per Capita GDP	-0.000* (0.000)	-0.000* (0.000)	0.000* (0.000)
Unemployment Rate	-0.009 (0.008)	-0.011 (0.009)	0.020 (0.016)
Per Capita Debt	0.000* (0.000)	0.000** (0.000)	-0.000** (0.000)
Own-Source Revenues	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)
State Government Ideology	0.003** (0.001)	0.003* (0.002)	-0.006** (0.003)
Political Volatility	0.061 (0.051)	0.068* (0.041)	-0.129 (0.089)
Democratic Governor	-0.186*** (0.051)	-0.207** (0.084)	0.393*** (0.113)

Standard errors clustered at the state level in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

In the next set of specifications, I examine the effect of supermajority requirements on true interest cost. Table 4.5 reports the results from linear regression with three sets of specifications. The first two specifications (columns 1 and 2) show naïve bivariate relationships (with and without year and region dummies). The results suggest that the bonds issued by supermajority requirements, on average, pay a higher interest cost. Column 3 controls for the issue and issuer characteristics, and column 4 controls for a set of political variables and is the full model that measures the total effect. In this specification, on average, the states with a supermajority voting requirement for a tax increase pay a 21 basis point premium on their true interest costs compared to the states that do not have a supermajority requirement. Finally, in column 6, I control for credit ratings as an intervening variable, and it reduces the effect by around four basis points (the mechanism effect).

Table 4.5: Supermajority Requirements and True Interest Costs

	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) OLS
Supermajority Rule (1=Yes, 0=No)	0.534*** (0.142)	0.314* (0.166)	0.251** (0.094)	0.213** (0.091)	0.180** (0.087)
Baa1/BBB+ or lower					0.903*** (0.203)
A3/A-					-0.061 (0.133)
A2/A					0.104 (0.109)
A1/A+					0.002 (0.107)
Aa3/AA-					0.146 (0.091)
Aa2/AA					0.153*** (0.055)
Aa1/AA+					0.047 (0.065)
Par value (logged)			0.018 (0.018)	0.015 (0.020)	0.016 (0.020)
Federal Exemption			-0.639*** (0.110)	-0.621*** (0.108)	-0.615*** (0.109)
State Exemption			-0.206** (0.093)	-0.219** (0.084)	-0.114* (0.062)
Call Feature			0.630*** (0.071)	0.623*** (0.067)	0.598*** (0.062)
Insured Bond			0.041 (0.039)	0.033 (0.033)	0.028 (0.036)
Competitive Sale			0.072 (0.051)	0.084 (0.053)	0.050 (0.054)
Long-Term Bond			0.577*** (0.111)	0.589*** (0.110)	0.593*** (0.110)
20 Bond GO Index			0.788*** (0.067)	0.790*** (0.062)	0.783*** (0.062)
Population (Logged)			0.125*** (0.038)	0.116*** (0.037)	0.110** (0.043)
Per Capita GDP			-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Unemployment Rate			0.038 (0.028)	0.043 (0.027)	0.030 (0.024)
Per Capita Debt			0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)

**(continued)**

*(Table 4.5 continued)*

Own-Source Revenues			0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)
State Government Ideology				0.004** (0.002)	0.003* (0.001)
Political Volatility				0.077 (0.056)	0.046 (0.045)
Democratic Governor				-0.180** (0.079)	-0.109* (0.058)
Year Dummies	No	Yes	Yes	Yes	Yes
Region Dummies	No	Yes	Yes	Yes	Yes
Observations	931	931	931	931	931

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Standard errors clustered at the state level in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

The effect of the supermajority rule is robust to several alternative specifications, subsamples, and supermajority measures. Table 4.6 summarizes three key tests involving alternative operationalization of supermajority requirement and the impact on borrowing costs. Column I reports the estimates of regressions that use a set of dummies for the size of supermajority requirements. All three coefficients are positive and significant at the 10 percent level, suggesting that states with supermajority requirements pay higher interest on their bond than the states without these requirements. Furthermore, states with a three-fifths supermajority requirement pay about four basis points lower premium than the states with a two-thirds requirement, but roughly the same premium as the states with three-fourth requirement.<sup>10</sup>

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<sup>10</sup>Arkansas and Montana are two states driving the coefficient on three-fourths category. Oklahoma is the only other state with three-fourth supermajority requirement, but it is not a part of the sample. It is plausible that there are certain unobserved factors that I am not accounting for in my estimation leading to lower impact of three-fourth requirement. For example, the supermajority requirement in Arkansas was adopted after the Great



Column 2 reports the estimates of the regression in which I use a set of dummies indicating whether the state has a constitutional or statutory requirement as the dependent variable. Both the coefficients are positive and significant, suggesting that bonds issued in the states with either of these requirements have higher true interest costs relative to the base category – states without a supermajority requirement. However, contrary to my expectation, the states with constitutional requirements pay a marginally lower interest cost premium.

Lastly, column 3 reports the results of the two-stage least squares regression – using the provision for citizen initiatives for constitutional amendments as the instrumental variable for supermajority requirements. This specification also suggests that states with supermajority requirements pay a premium on their bonds in the form of higher borrowing costs, and the two-stage least squares estimate is highly comparable to the estimate of total effect in Table 4.5.

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Depression and it is plausible that market does not account for this long-lasting constraint in the same way as it does in other states.

Table 4.6: Robustness Tests: Supermajority Requirements and True Interest Cost

	(1) OLS	(2) OLS	(3) 2SLS
Three-Fifth Supermajority Requirement	0.197* (0.109)	-	-
Two-Third Supermajority Requirement	0.235* (0.130)	-	-
Three-Fourth Supermajority Requirement	0.191** (0.094)	-	-
Constitutional Supermajority Requirement	-	0.205** (0.094)	-
Statutory Supermajority Requirement	-	0.221** (0.104)	-
Supermajority Requirement (Instrumented) <i>(Provision of Citizen Initiatives to amend Constitution)</i>	-	-	0.229* (0.133)
Par value (logged)	0.014 (0.020)	0.015 (0.021)	0.015 (0.019)
Federal Exemption	-0.624*** (0.108)	-0.621*** (0.109)	-0.620*** (0.102)
State Exemption	-0.218** (0.087)	-0.219** (0.084)	-0.219*** (0.081)
Call Feature	0.625*** (0.067)	0.624*** (0.066)	0.623*** (0.064)
Insured Bond	0.030 (0.038)	0.035 (0.035)	0.032 (0.033)
Competitive Sale	0.082 (0.051)	0.084 (0.053)	0.084 (0.052)
Long-Term Bond	0.590*** (0.111)	0.588*** (0.109)	0.588*** (0.110)
20 Bond GO Index	0.788*** (0.063)	0.789*** (0.062)	0.790*** (0.060)
Population (Logged)	0.114*** (0.036)	0.116*** (0.036)	0.118*** (0.034)
Per Capita GDP	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Unemployment Rate	0.043 (0.028)	0.043 (0.026)	0.042* (0.024)
Per Capita Debt	0.000*** (0.000)	0.000*** (0.000)	0.000*** (0.000)
Own-Source Revenues	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)

*(continued)*

(Table 4.6 continued)

State Government Ideology	0.004** (0.002)	0.004** (0.002)	0.004** (0.002)
Political Volatility	0.076 (0.056)	0.075 (0.057)	0.077 (0.056)
Democratic Governor	-0.179** (0.080)	-0.183** (0.078)	-0.178** (0.075)
Year Dummies	Yes	Yes	Yes
Region Dummies	Yes	Yes	Yes
Observations	931	931	931

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Standard errors clustered at the state level in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## 4.6 SUMMARY AND CONCLUSION

This essay focuses on understanding the effects of supermajority requirements for tax increases on the borrowing costs in the municipal bond market. I find that states with supermajority requirements, on average, receive a lower credit rating on their bonds. As a result, states pay a premium of 18 to 21 basis points on their general obligation debt, which may quantify as a significant cost in debt service in the long term. For example, Appendix Table C1 shows a hypothetical calculation for two identical bond issues with par value of \$200 million and 15 year maturity. Given the maturity structure and coupon rates, the 18 basis points difference in true interest costs translates to around \$5 million in debt service or budgetary expenditure over the life of the bond – a significant cost from a budgetary perspective.

This article has focused only on GO bonds, which are typically securities with the lowest default risk. Future studies may consider the effect of such requirements on other types of securities such as bonds issued by conduit agencies or local issuers. Furthermore, the supermajority requirements may also influence the performance of bonds in the secondary market – buying and selling of bonds after the initial issuance.

The policy debate and political discussions on supermajority requirements have mostly focused on the impact of supermajority requirements on the tax burden and tax rates of states incorporating these requirements while ignoring the unintended consequences of such fiscal rules. As noted earlier, at least ten states are discussing or have discussed the adoption of supermajority requirements in the recent years. It is important that the policymakers in these states account for these unintended consequences and external costs while deciding on the future of these requirements.

## APPENDIX A

Table A1: Balanced Budget Rules and Sector Wise Spending in Developing Economies, FE  
(Dependent Variable: Logged Sector Wise Spending, Exponentiated Coefficients)

	Fixed Effects Estimates of Sector-Wise Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total	Education	Health	Social Protection	Primary Sector	Trans- Com	Defense	Other
Balanced Budget Rule	0.960 (0.081)	0.894 (0.100)	0.607** (0.128)	0.620 (0.177)	0.671* (0.135)	0.824 (0.309)	0.931 (0.089)	1.495*** (0.164)
Population (Logged)	4.120*** (1.215)	9.587* (11.822)	1.946 (2.507)	1.032 (2.345)	2.111 (3.150)	0.160 (0.642)	4.438*** (2.996)	7.806* (9.319)
% Children	0.984* (0.008)	1.027 (0.029)	0.989 (0.055)	1.032 (0.022)	1.026 (0.057)	0.982 (0.043)	1.020 (0.028)	0.986 (0.039)
% Seniors	1.123** (0.058)	1.126 (0.119)	0.789 (0.191)	0.841 (0.201)	0.977 (0.159)	0.768 (0.468)	0.879 (0.074)	1.318** (0.174)
GDP (Logged)	3.106*** (0.281)	7.344*** (3.620)	0.924 (0.873)	2.288 (2.200)	12.149*** (4.707)	4.628 (4.444)	2.363** (0.757)	1.645 (0.503)
Unemployment Rate	1.016** (0.008)	1.001 (0.009)	0.992 (0.020)	0.994 (0.018)	1.044** (0.021)	0.976 (0.033)	0.998 (0.007)	1.008 (0.017)
Economic Growth	0.997 (0.002)	0.991* (0.004)	1.002 (0.006)	0.989 (0.010)	1.011 (0.008)	1.022 (0.014)	1.007*** (0.002)	0.991* (0.005)
Decentralization	1.000 (0.001)	1.001 (0.002)	1.001 (0.002)	1.002 (0.005)	1.006** (0.003)	1.002 (0.004)	0.996 (0.005)	1.000 (0.001)
Left Ideology	0.951 (0.034)	1.051 (0.137)	1.533 (0.513)	1.221 (0.356)	1.020 (0.126)	1.264 (0.347)	1.092 (0.100)	0.818** (0.080)
Election Year	1.006 (0.014)	1.002 (0.022)	1.043 (0.048)	0.980 (0.043)	1.041 (0.044)	1.038 (0.053)	1.029 (0.023)	1.003 (0.025)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	319	282	282	280	297	278	267	297
Number of Countries	35	34	34	34	34	32	33	34

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

Notes: (1) Primary sector includes Agriculture, Fuel, and Mining (2) Trans-Com: Transport and Communications

Table A2: Balanced Budget Rules and Sector Wise Spending in Developing Economies, GMM  
(Dependent Variable: Logged Sector-wise Spending, Exponentiated Coefficients)

	GMM Estimates of Sector-wise Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total	Education	Health	Social Protection	Primary Sector	Trans- Com	Defense	Other
Balanced Budget Rule	0.947 (0.052)	0.975 (0.063)	0.791** (0.083)	0.764** (0.091)	0.883 (0.122)	0.973 (0.088)	0.966 (0.039)	1.056 (0.116)
Population (Logged)	1.491*** (0.093)	1.110** (0.058)	1.301*** (0.114)	1.194*** (0.077)	1.244*** (0.073)	1.216*** (0.054)	1.127*** (0.039)	1.333*** (0.080)
% Children	0.986*** (0.004)	0.986 (0.010)	0.982** (0.009)	0.981 (0.012)	0.986 (0.018)	0.995 (0.012)	1.004 (0.006)	0.995 (0.008)
% Seniors	0.981*** (0.007)	0.968* (0.017)	0.969* (0.017)	0.966* (0.019)	0.972 (0.031)	0.994 (0.022)	1.004 (0.009)	1.000 (0.015)
GDP (Logged)	1.403*** (0.107)	1.050 (0.081)	1.114 (0.113)	1.280* (0.168)	1.140 (0.147)	1.066 (0.091)	1.044 (0.040)	1.312*** (0.117)
Unemployment Rate	1.002 (0.003)	0.990 (0.006)	0.998 (0.011)	0.980 (0.016)	0.993 (0.014)	1.007 (0.013)	1.001 (0.005)	1.012 (0.007)
Economic Growth	1.002 (0.003)	1.005 (0.004)	1.001 (0.005)	1.005 (0.006)	1.021** (0.010)	1.004 (0.006)	1.006** (0.003)	0.992** (0.004)
Decentralization	1.000 (0.001)	1.000 (0.001)	0.999 (0.002)	0.999 (0.001)	0.997 (0.003)	1.000 (0.002)	0.999 (0.001)	1.000 (0.001)
Left Ideology	1.017 (0.027)	0.964 (0.046)	1.134* (0.078)	1.032 (0.077)	1.030 (0.106)	1.069 (0.130)	0.994 (0.039)	1.007 (0.048)
Election Year	1.009 (0.010)	1.025 (0.022)	1.018 (0.026)	1.053 (0.071)	1.070 (0.046)	1.053 (0.058)	1.014 (0.021)	0.998 (0.019)
Lagged Spending	1.782*** (0.110)	2.415*** (0.119)	2.060*** (0.160)	2.260*** (0.129)	2.091*** (0.120)	2.169*** (0.138)	2.493*** (0.062)	1.962*** (0.123)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	314	273	273	270	290	270	258	290
Number of Countries	35	34	34	34	34	32	31	34
ARI (p-value)	0.007	0.013	0.019	0.010	0.001	0.010	0.002	0.005
AR2 (p-value)	0.010	0.606	0.293	0.277	0.900	0.813	0.155	0.355
Hansen (p-value)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

Notes: (1) Primary sector includes Agriculture, Fuel, and Mining (2) Trans-Com: Transport and Communications

Table A3: Balanced Budget Rules and Sector Wise Spending in High-Income Countries, FE  
(Dependent Variable: Logged Sector-wise Spending, Exponentiated Coefficients)

	Fixed Effects Estimates of Sector-Wise Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total	Education	Health	Social Protection	Primary Sector	Trans-Com	Defense	Other
Balanced Budget Rule	0.922*	1.130	0.542***	0.845*	0.914	0.802	1.063	0.930
	(0.044)	(0.093)	(0.104)	(0.078)	(0.085)	(0.139)	(0.115)	(0.065)
Population (Logged)	2.879	2.215	6.498	0.169	1.299	0.004*	6.437	11.377**
	(2.308)	(4.448)	(23.153)	(0.294)	(2.375)	(0.012)	(8.554)	(10.285)
% Children	1.073**	1.151*	1.245	1.190*	1.194**	0.823	1.041	1.067
	(0.028)	(0.090)	(0.215)	(0.102)	(0.086)	(0.102)	(0.065)	(0.058)
% Seniors	1.110**	1.000	1.922***	1.614***	1.105	0.828	0.948	1.031
	(0.048)	(0.100)	(0.422)	(0.190)	(0.197)	(0.119)	(0.096)	(0.115)
GDP (Logged)	3.804***	6.387*	1.747	12.814***	12.270**	10.039	36.577***	2.218
	(0.926)	(6.736)	(2.686)	(8.443)	(11.250)	(16.606)	(21.444)	(1.166)
Unemployment Rate	1.017**	1.037*	1.045	1.026	0.999	0.940	0.994	1.004
	(0.007)	(0.018)	(0.048)	(0.020)	(0.025)	(0.038)	(0.014)	(0.011)
Economic Growth	1.001	0.990	1.022	1.000	0.985	0.971	0.996	1.005
	(0.004)	(0.008)	(0.019)	(0.009)	(0.011)	(0.018)	(0.009)	(0.007)
Decentralization	0.999	0.997	0.987	0.995	0.991**	0.991	1.003	1.004*
	(0.001)	(0.007)	(0.012)	(0.003)	(0.004)	(0.006)	(0.004)	(0.002)
Left Ideology	1.014	0.961	1.072	1.076	1.022	0.942	0.931	1.011
	(0.023)	(0.072)	(0.158)	(0.086)	(0.075)	(0.111)	(0.072)	(0.051)
Election Year	1.007	0.989	1.064	1.030*	1.026	0.964	1.018	1.004
	(0.007)	(0.018)	(0.056)	(0.018)	(0.025)	(0.029)	(0.026)	(0.018)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	243	243	238	238	233	229	240	243
Number of Countries	28	28	28	27	27	27	27	28

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

Notes: (1) Primary sector includes Agriculture, Fuel, and Mining (2) Trans-Com: Transport and Communications

Table A4: Balanced Budget Rules and Sector Wise Spending in High-Income Countries, GMM  
(Dependent Variable: Logged Sector-wise Spending, Exponentiated Coefficients)

	GMM Estimates of Sector-wise Spending							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Total	Education	Health	Social Protection	Primary Sector	Trans- Com	Defense	Other
Balanced Budget Rule	0.983*	1.029	0.934	0.938*	0.991	1.034	0.993	1.019
	(0.009)	(0.021)	(0.090)	(0.031)	(0.037)	(0.081)	(0.031)	(0.026)
Population (Logged)	1.042**	1.029	1.416***	1.329***	1.085***	1.218***	1.172**	1.044
	(0.017)	(0.025)	(0.145)	(0.106)	(0.031)	(0.077)	(0.087)	(0.040)
% Children	1.000	1.008	1.066**	1.006	1.000	1.010	1.010	0.981*
	(0.005)	(0.007)	(0.027)	(0.013)	(0.009)	(0.016)	(0.014)	(0.011)
% Seniors	1.002	1.011	1.121***	1.037	1.005	1.048*	1.004	0.977**
	(0.006)	(0.009)	(0.041)	(0.024)	(0.010)	(0.030)	(0.015)	(0.011)
GDP (Logged)	1.075**	1.109	2.106***	1.811***	1.017	0.869	1.109	1.058
	(0.039)	(0.092)	(0.519)	(0.287)	(0.083)	(0.076)	(0.138)	(0.059)
Unemployment Rate	1.002	0.998	1.047***	1.016**	0.993	0.970***	0.988**	0.999
	(0.003)	(0.005)	(0.017)	(0.008)	(0.008)	(0.010)	(0.006)	(0.005)
Economic Growth	1.005***	1.011**	1.011	1.000	0.996	0.994	1.008	1.003
	(0.002)	(0.004)	(0.011)	(0.006)	(0.008)	(0.008)	(0.007)	(0.003)
Decentralization	0.999**	0.997	0.980***	0.991***	0.999	0.995	1.000	1.000
	(0.001)	(0.002)	(0.007)	(0.003)	(0.001)	(0.003)	(0.001)	(0.001)
Left Ideology	1.016	0.987	1.304***	1.124*	0.953	0.991	1.003	1.017
	(0.011)	(0.022)	(0.134)	(0.070)	(0.034)	(0.056)	(0.015)	(0.016)
Election Year	1.002	1.001	0.994	0.989	0.970	0.949	1.019	1.031*
	(0.011)	(0.020)	(0.053)	(0.024)	(0.028)	(0.031)	(0.023)	(0.019)
Lagged Spending	2.598***	2.648***	2.129***	2.122***	2.490***	2.339***	2.320***	2.547***
	(0.040)	(0.066)	(0.119)	(0.122)	(0.062)	(0.105)	(0.165)	(0.095)
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	241	240	233	235	230	226	238	240
Number of Countries	28	28	28	27	27	27	27	28
ARI (p-value)	0.001	0.013	0.003	0.015	0.001	0.011	0.008	0.002
AR2 (p-value)	0.403	0.215	0.167	0.403	0.045	0.380	0.661	0.210
Hansen (p-value)	1.000	1.000	1.000	1.000	1.000	1.000	1.000	1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

Notes: (1) Primary sector includes Agriculture, Fuel, and Mining (2) Trans-Com: Transport and Communications



Table A5: Balanced Budget Rules and Social Sector Spending by Country Groups, 1990-2012

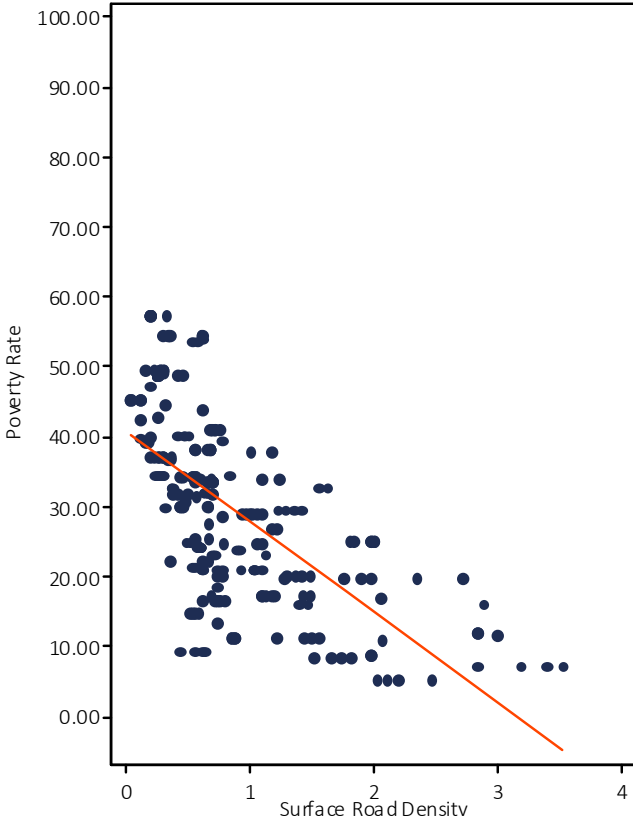
Robustness Test without Fiscal Decentralization Control

(Dependent Variable: Logged Social Spending, Exponentiated Coefficients)

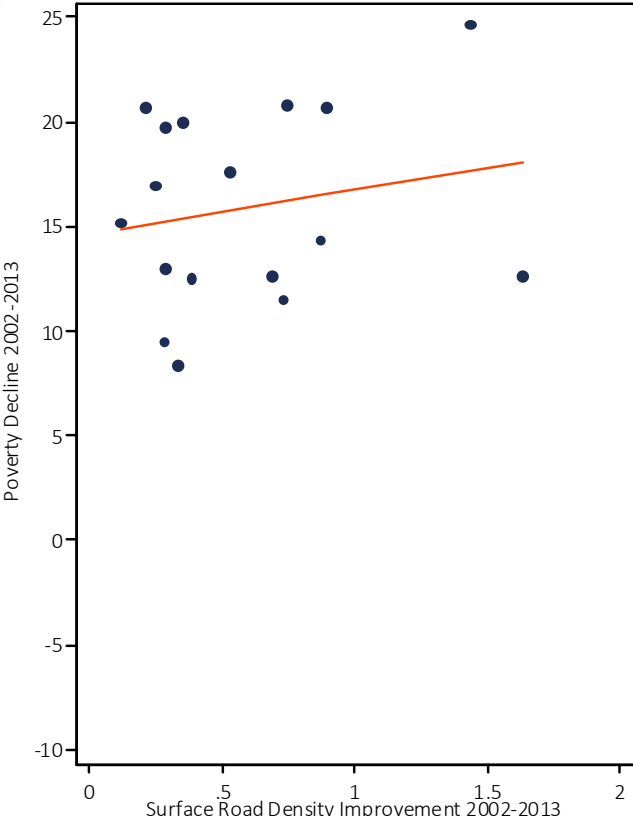
	High-Income Countries		Middle and Low-Income Countries	
	(1)	(2)	(3)	(4)
	Fixed Effects	System GMM	Fixed Effects	System GMM
Balanced Budget Rule	1.107 (0.103)	1.029 (0.047)	0.838** (0.071)	0.869** (0.050)
Population (Logged)	2.429** (0.822)	1.053** (0.024)	1.736 (1.325)	1.165*** (0.057)
% Children	0.968* (0.018)	0.995 (0.005)	1.024 (0.017)	0.997 (0.010)
% Seniors	1.094** (0.038)	1.004 (0.006)	1.093 (0.097)	0.993 (0.019)
GDP (Logged)	5.773*** (2.119)	1.036 (0.049)	3.155*** (0.943)	1.247*** (0.097)
Unemployment Rate	1.022** (0.010)	1.007 (0.005)	1.014 (0.014)	0.994 (0.009)
Economic Growth	0.996 (0.004)	1.008** (0.004)	0.994 (0.004)	1.001 (0.004)
Left Ideology	1.008 (0.044)	1.028 (0.019)	1.046 (0.080)	1.011 (0.036)
Fiscal Decentralization	-	-	-	-
Election Year	0.997 (0.012)	1.009 (0.012)	1.011 (0.016)	1.013 (0.014)
Lag Social Spending		2.535*** (0.053)		2.319*** (0.076)
Year Dummies	Yes	Yes	Yes	Yes
Observations	733	730	986	971
Number of Countries	37	37	58	58
AR1 (p-value)		0.006		0.000
AR2 (p-value)		0.144		0.306
Hansen (p-value)		1.000		1.000

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1 Robust standard errors in parentheses

APPENDIX B



r= -0.652



r=0.197

Figure BI- Correlations between Surface Road Density and Poverty Rate in the NSC states

## APPENDIX C

Table C1: Example of two bids with 18 basis points difference in True Interest Cost\*

(Identical \$200 million bond issues of fifteen year maturity)

Year	State A				State B		
	Principal	Coupon	Interest	Debt Service	Coupon	Interest	Debt Service
2016			\$11,825,000	\$11,825,000		\$12,091,000	\$12,091,000
2017			\$11,825,000	\$11,825,000		\$12,091,000	\$12,091,000
2018			\$11,825,000	\$11,825,000		\$12,091,000	\$12,091,000
2019			\$11,825,000	\$11,825,000		\$12,091,000	\$12,091,000
2020	\$5,000,000	0.055	\$11,825,000	\$16,825,000	0.0419	\$12,091,000	\$17,091,000
2021	\$5,000,000	0.055	\$11,550,000	\$16,550,000	0.0419	\$11,881,500	\$16,881,500
2022	\$5,000,000	0.055	\$11,275,000	\$16,275,000	0.0419	\$11,672,000	\$16,672,000
2023	\$10,000,000	0.055	\$11,000,000	\$21,000,000	0.0575	\$11,462,500	\$21,462,500
2024	\$10,000,000	0.055	\$10,450,000	\$20,450,000	0.0575	\$10,887,500	\$20,887,500
2025	\$10,000,000	0.055	\$9,900,000	\$19,900,000	0.0575	\$10,312,500	\$20,312,500
2026	\$15,000,000	0.055	\$9,350,000	\$24,350,000	0.0575	\$9,737,500	\$24,737,500
2027	\$15,000,000	0.055	\$8,525,000	\$23,525,000	0.0575	\$8,875,000	\$23,875,000
2028	\$15,000,000	0.055	\$7,700,000	\$22,700,000	0.0575	\$8,012,500	\$23,012,500
2029	\$55,000,000	0.0625	\$6,875,000	\$61,875,000	0.0650	\$7,150,000	\$62,150,000
2030	\$55,000,000	0.0625	\$3,437,500	\$58,437,500	0.0650	\$3,575,000	\$58,575,000
<b>Total</b>	<b>\$200,000,000</b>		<b>\$149,187,500</b>	<b>\$349,187,500</b>		<b>\$154,021,000</b>	<b>\$354,021,000</b>

TIC for State A = 5.9614%

TIC for State B = 6.1432%

$TIC_B - TIC_A = 18.17$  basis points

$Interest_B - Interest_A = \$ 4,833,500$

\*Adapted from the question bank of Mikesell, J.L., *Fiscal Administration: Analysis and Application for the Public Sector*, pp. 676. Ninth edition, Cengage Learning, Boston MA

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## VITA

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Rahul's principal research interests lie at the intersection of public finance and social policy. He is particularly interested in the functioning of the subnational governments and institutional reforms to promote an equitable and efficient provision of public goods. He also works on social policy and international development as they relate to public finance. His research has appeared in journals such as *Regional Science and Urban Economics*, *State Tax Notes*, *Review of Public Personnel Administration*, and *State and Local Government Review*.

At the Andrew Young School, he has taught courses related to policy analysis, microeconomics, and research methods to the undergraduate and graduate students. He is an affiliate of the Center for Excellence in Teaching and Learning and received the AYSPS Dean's Award for Excellence in Teaching Public Policy.

In the fall of 2017, Rahul will be joining the faculty of the Baruch College at the City University of New York. His latest contact information is available at <http://rahulpathak.net/>.