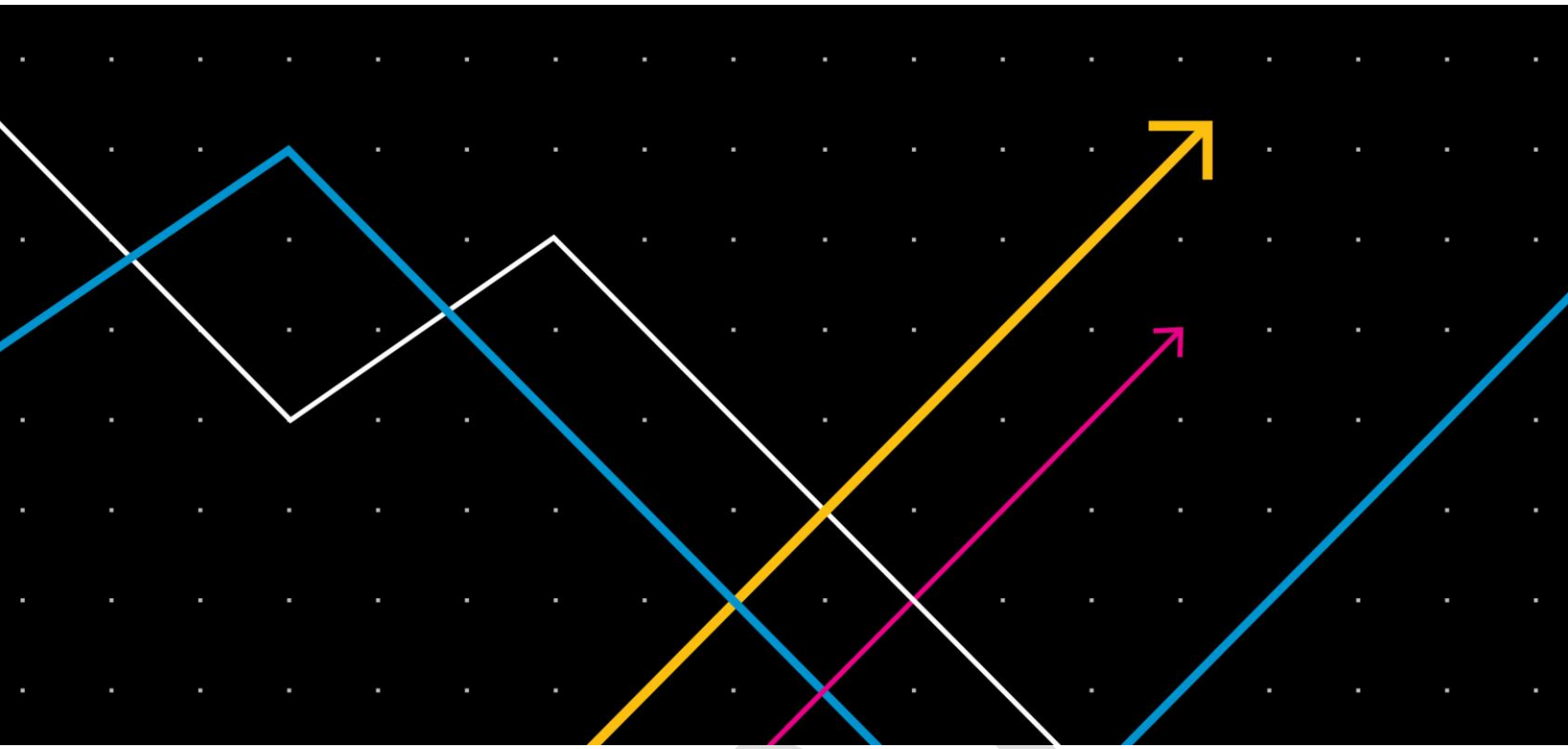

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Budget Processes and the Great Recession

How State Fiscal Institutions Shape Tax and Spending Decisions

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Budget Processes and the Great Recession

Introduction

As states enter the 2019 fiscal year, most have passed budgets on time and are finally logging tax revenues at pre-Great Recession levels,[1] arguably exhibiting the highest degree of fiscal health since the recession's 2009 trough. While many states have seen notable annual revenue growth over the last five years,[2] in as recently as 2017 ten states struggled to pass a budget on time.[3] In October, 2017, for example, Connecticut Gov. Dan Malloy approved the state's two-year $40.2 billion budget more than 100 days after the fiscal year began.[4] Representing a strong bipartisan effort, the package included spending cuts, new taxes and fees, and new fiscal controls meant to stabilize the state's financial future. These controls included strengthening revenue and spending limits and specifying how money should be deposited into a rainy day fund – the assumption being that additional fiscal controls would help the state move toward a more sustainable fiscal path.

What evidence, however, shows that fiscal institutions, such as those adopted by CT, help states respond to unexpected fiscal or economic pressures? Following up on previous literature, new data and the magnitude of states' fiscal challenges during the Great Recession make this an important time to re-

[1] The Pew Charitable Trusts reported in May, 2018 that tax revenues exceeded their pre-recession levels in 34 states at the end of 2017, "Fiscal 50: State Trends and Analysis," May 2, 2018, http://www.pewtrusts.org/en/research-and-analysis/data-visualizations/2014/fiscal-50#ind0.

[2] Tax revenues recovered, nationally, from states' recession-driven losses in 2013. See the Pew Charitable Trusts, "Fiscal 50: State Trends and Analysis," May 2, 2018, http://www.pewtrusts.org/en/research-and-analysis/data-visualizations/2014/fiscal-50#ind0. For trends in annual state revenue growth from 1979-2018, see NASBO, *The Fiscal Survey of States*, Spring 2018, https://www.nasbo.org/reports-data/fiscal-survey-of-states.

[3] Ten states passed FY18 budgets late, according to the National Conference of State Legislatures, "FY 2018 Budget Status," National Conference of State Legislatures, October 31, 2017, http://www.ncsl.org/research/fiscal-policy/fy-2018-budget-status.aspx.

[4] See Rick Rojas, "Connecticut Adopts a Budget After Months of Debate and Delays," *New York Times*, October 31, 2017, https://www.nytimes.com/2017/10/31/nyregion/connecticut-budget.html.

examine the role of budget rules in determining state fiscal health and helping states weather fiscal uncertainty.

Literature

A wide body of previous literature has examined the effect of fiscal institutions on state spending, debt, and other fiscal outcomes. However, conflicting findings are common in state and local public finance research due to differing research methodologies and state idiosyncrasies, and research is sparse on the interactions between institutions.

Since the 1980s, balanced budget requirements (BBRs) and their stringency have been the subject of much study. BBRs require states to balance projected revenues with expenditures, although states have varying flexibility when interpreting and implementing these provisions. In general, research has concluded that stricter BBRs, which prohibit states from carrying deficits into the following fiscal year, are associated with tighter fiscal outcomes, such as reduced spending, smaller deficits, larger surpluses, and more rapid spending adjustments during recessions (ACIR 1987; Alesina and Bayoumi 1996; Alt and Lowry 1994; Bohn and Inman 1996; Campbell and Sances 2013; Crain 2003; Crain and Miller 1990; Lowry and Alt 2001; Poterba 1994; Poterba and Rueben 2001; Primo 2007; Von Hagen 1991).

For example, Von Hagen (1991) found that states with stricter BBRs had less general obligation debt, while the federal Advisory Commission on Intergovernmental Relations (ACIR 1987), Alt and Lowry (1994), and Campbell and Sances (2013) all found reductions in deficit spending in states with strict BBRs. The ACIR (1987), Crain (2003), Crain and Miller (1990), and Primo (2007) found that BBRs were associated with less spending,[5] while Alesina and Bayoumi (1996) and Bohn and Inman (1996) found higher surpluses.

In his 2003 book, Crain controlled for several demographic and institutional variables and found that states with strict BBRs spent on average $88 per capita less than other states. Alesina and Bayoumi (1996) was an early study on BBRs and, although widely cited across the literature, did not address

[5] Many early studies on state budget institutions were not as methodologically rigorous as later studies. For example, Gordon (2012a) explained that Crain and Miller (1990), while cross-cited in many early literature reviews (Poterba 1995, 1996b), did not control for endogeneity. Gordon (2012a) also explained that the ACIR study suffered from challenges with endogeneity and featured only cross-sectional data. Knight and Levinson (2000) used the ACIR's BBR index and commented that, while the study only included cross-sectional data, its results have been borne out by later studies.

reverse causality or omitted variables, and it neglected to include interactions with other fiscal institutions or factors that might cause fluctuations in the business cycle (Gordon 2012a; Knight and Levinson 2000). Lowry and Alt (2001) and Poterba and Rueben (2001) found that strict BBRs reduced states' borrowing costs.

Some studies have also concluded that strict BBRs increase fiscal and economic volatility, since they force spending cuts or revenue increases when a state's economy is already contracting (Bayoumi and Eichengreen 1995; Levinson 1998, 2007).[6] Approaches to classifying BBR stringency have been subject to debate (Krol and Svorny 2007; Hou and Smith 2006), however, and findings about how BBRs affect fiscal and economic volatility have varied depending on researchers' classification choices.

Poterba (1994) arguably undertook the most holistic examination of how state fiscal institutions and political circumstances interact to affect tax and spending dynamics in response to fiscal crises. Findings included that states with strict BBRs, which prohibited them from running deficits, were better able to adjust to deficit shocks, especially if one political party controlled both the governorship and the state house of representatives (Poterba 1994). He found, for example, that states with weak antideficit provisions reduced spending by $17 for every $100 deficit overrun, compared with $44 in strong antideficit states.

Tax and expenditure limits (TELs) have been another common subject of study. State TELs restrict the growth of government revenues or spending by capping them at a fixed-dollar amount, or by limiting their growth to match increases in population, inflation, personal income, or some combination of those factors.[7] Evidence on whether TELs limit state and local spending is mixed. While some earlier studies suggested that TELs have no effect (e.g., Bails 1990),[8] a larger and more methodologically robust

[6] Bayoumi and Eichengreen (1995) was an early study and did not distinguish between income and employment effects as effectively as Bohn and Inman's study from the same period (1996). See Gordon (2012a) in the *Oxford Handbook of State and Local Government Finance* for a more in-depth critique of early budget process studies.

[7] "What Are Tax and Expenditure Limits?" Urban-Brookings Tax Policy Center, 2016, http://www.taxpolicycenter.org/briefing-book/what-are-tax-and-expenditure-limits.

[8] In her literature review on state fiscal institutions, Gordon (2012a) discussed Bails (1990) as an example of early TEL research. While widely cited, more recent studies (e.g., McGuire and Rueben 2006; Poterba and Rueben 2001) that employ more methodologically robust methods have reached different conclusions. Gordon (2012a) also cited Kenyon and Benker (1984) as an early study on TELs and the size of government but did not comment on its quality. Shadbegian (1996) is cited in Gordon (2012a) and Poterba (1996a) as an early study that found TELs are not binding in states with income growth.

body of literature suggests that TELs result in lower taxes, revenues, and spending (McGuire and Rueben 2006; Poterba 1994; Rogers and Rogers 2000; Rueben 1996).

Rueben (1996) found that TELs requiring a legislative supermajority or popular vote to modify spending led to a 2 percent reduction in state general fund expenditures. However, these savings were often offset in part by higher local spending. Rogers and Rogers (2000) reported that statutory revenue limits reduced the size of government in terms of both revenues and expenditures, while expenditure limits only reduced revenues and to a lesser degree than revenue limitations. Rogers and Rogers actually found a positive relationship between expenditure limits and overall expenditures but pointed out that high-spending states may be more likely to adopt expenditure limits to rein in spending. McGuire and Rueben (2006) reviewed recent literature and concluded that some of the strictest TELs were successful in lowering taxes and spending.

Lower spending and revenues, however, may not produce desirable fiscal or economic outcomes. TELs have been tied to structural deficits and higher borrowing costs, while some studies have found no discernable effect on economic growth (Bae, Moon, and Jung 2012; Campbell and Sances 2013; McGuire and Rueben 2006; Poterba and Rueben 2001). McGuire and Rueben (2006), for example, found that Colorado's TABOR did not boost the state's economic growth, despite its effect on revenues and spending.[9] Moreover, they found that the literature was inconclusive as to whether lower taxes produced higher economic growth. In a more recent study, Gale, Krupkin, and Rueben (2015) found that tax cuts did not necessarily lead to economic growth. Bae, Moon, and Jung (2012), in a quantitative evaluation of TELs, found that they actually have a negative effect on employment and no effect on personal income.[10]

Poterba (1994) also examined the effect of TELs, concluding that states with tax limits raised taxes less during fiscal crises than those without, but that states with TELs did not necessarily cut spending more than those without.

Over the following years, many influential papers have cited Poterba's (1994) research while studying these and other facets of public finance (e.g., Alesina and Bayoumi 1996; Alt and Lowry 1994; Battaglini and Coate 2008; Bayoumi and Eichengreen 1995; Besley and Case 1995; Besley and Case

[9] For a qualitative case study review of TABOR in Colorado, see James and Wallis (2004).

[10] Bae, Moon, and Jung (2012) performed a regression analysis using time-series cross-sectional five-year interval data from 1985 to 2005.

2003; Bohn and Inman 1996; and Henisz 2004). Poterba's 1994 paper has over 1,200 citations in Google Scholar and is a cornerstone of the literature on fiscal institutions.[11]

Some of the literature that followed Poterba (1994) explored policies that would produce optimal fiscal or economic outcomes. Battaglini and Coate (2008), for example, explored a theoretical model showcasing when public welfare is best advanced by financing deficit shocks through raising additional revenues or taxes. And Chodorow-Reich et al. (2012) evaluated the effect of fiscal transfers on state employment.

Other research has focused on how political dynamics influenced policy choices. Henisz (2004) examined the relationship between veto points, checks and balances, and policy volatility. While Groseclose and McNarty (2001) examined political bargaining and its effect on policy change. Baqir (2002) studied the effects of political districting on municipal spending.

Still others have focused on how fiscal institutions interact with political makeup and the political cycle. Besley and Case (1995) found that when Democratic governors were under binding term limits, government spending and taxes increased during the lame duck term. Later, Besley and Case (2003) studied the effects of a variety of budgetary institutions, including the line item veto, TELs, supermajority budget requirements, and divided government on state taxes and spending. They found that states with binding revenue limitations were more likely to have higher taxes, illustrating the endogeneity challenge.

The strength of Poterba's (1994) approach was its precise measure of fiscal shock (discussed in more detail in the Data and Approach section of this study),[12] inclusion of political variables, and its use of panel data [as opposed to cross-sectional data used in earlier approaches by the ACIR (1987), for example].[13] As Poterba (1994) explained, this careful measure of deficit shock mitigated endogeneity by focusing on tax and spending change rather than levels, as previous research had done. States with strict fiscal institutions may also have an electorate that favors less spending or taxes. Focusing simply

[11] Cross-citations as of July, 2018. Other frequently-cited papers that reference Poterba (1994) included Afonso and Furceri (2010); Coleman (1999); Dosi et al. (2015); Fatás and Mihov (2006); Milesi-Ferretti (2004); Tsebelis (2002); and Wildasin (1999).

[12] Gordon 2012 praises Poterba (1994) for its precise fiscal shock measure but points out that it only covers a limited number of fiscal years.

[13] Bohn and Inman (1996) discussed Poterba's (1994) strengths as compared to ACIR (1987), Von Hagen (1991) and Alt and Lowry (1994).

on levels obscures this endogeneity.[14] Thus we model our approach on Poterba's (1994) research. One of Poterba's primary limitations is its limited sample size from annual budgeting states from a four-year time period between 1988 – 1992. Our research seeks to replicate Poterba's strengths, especially in measuring deficit shocks, with a larger and updated sample.

In addition, we want to examine whether the relationships found in earlier research still hold, especially in the aftermath of the Great Recession and recent changes in the annual growth rate of spending and revenues. In 2017, Randall and Rueben reviewed over 30 years of existing research on a wide range of fiscal institutions, including budget cycles, BBRs, supermajority voting requirements, debt limits, TELs, and tax expenditure accounting, among others. Their recommendations included: considering state fiscal institutions as toolkits, rather than as stand-alone practices; tailoring institutional reforms to each state depending on its level of revenue volatility and political constraints; and taking into account social and economic distributional outcomes, in addition to traditional measures of fiscal stability (Randall and Rueben 2017).

In this study, we take a quantitative, econometric approach in an effort to supplement Randall and Rueben's (2017) findings from the literature and provide a timely update on Poterba's (1994) research. Our objective is to expand collective understanding of how budget processes, including permutations of institutional and political factors, influence states' fiscal outcomes, especially in times of unexpected fiscal pressure.

Data and Approach

In this study, we explore: 1) how fiscal institutions influenced states' decisions to either cut spending or raise taxes in response to unexpected deficits; and 2) how this dynamic played out during states' recovery from the Great Recession.

In answering these questions, we follow Poterba's (1994) approach, measuring unanticipated fiscal shocks and estimating a series of linear regression models that account for the interactions between fiscal institutions, deficit shocks, and political party control. This approach disentangles anticipated

[14] For more information on endogeneity in state policy evaluation, see Besley and Case (2000), which also cites Poterba (1994).

spending and tax changes from economic and political activity. In this study, we go beyond prior research by:

- **Expanding the study period** to 26 years, giving us a larger number of observations to draw inferences from, as well as insights into contemporary state fiscal dynamics;
- **Examining results over different time periods** to understand whether the relationship between institutions and outcomes has been stable over time, or if there have been shifts since the Great Recession or as fiscal institutions have matured;
- **Including both biennial and annual budgeting states** in our analysis (as opposed to just annual states), giving us a larger number of observations and increasing our results' relevance for a wider pool of states; and
- **Updating and refining definitions and data** on BBRs and TELs, examining how these institutions have changed over time and if they truly are binding on states.

Data

We constructed a panel dataset featuring fiscal, political, and institutional variables on forty-nine states from 1990 to 2015. We excluded Alaska from our analysis, consistent with prior literature, due to its fiscal volatility and unique reliance on oil severance taxes. While several states in our data are dependent on natural resources as a source of revenues, none quite-so-much as Alaska. For analyses of unified government across legislative houses, we also excluded Nebraska because it has a unicameral legislature.

We obtained data from a variety of sources, with our main variables coming National Association of State Budget Officers (NASBO) *Fiscal Survey of States* (for fiscal data) and *Budget Processes in the States* (for fiscal institution data). NASBO surveys state budget officers twice a year, asking about prior, current and the upcoming fiscal year. It asks questions about both: 1) the amount or size of revenues, expenditures, and rainy day fund balances; and 2) any action state legislatures or the executive branch has taken to increase or lower taxes or cut budgets during the current fiscal year.

We augmented NASBO survey data with information on state fiscal institutions [as summarized in Randall and Rueben (2017)] and information on state legislative and gubernatorial control from Carl

Klarner, "State Partisan Balance Data, 1936 – 2016" (accessible through the Harvard Dataverse).[15] We converted all fiscal variables from nominal, millions of dollars to 2015 inflation-adjusted dollars per capita using the Consumer Price Index (CPI) from the Bureau of Labor Statistics and population estimates from the US Census Bureau.[16] All fiscal data reflect states' own fiscal year, which typically runs from July 1 to June 30, with some exceptions.[17]

Dependent Variables

Our dependent variables represent different fiscal choices that states have made when faced with an unexpected surplus or revenue shock. Most states are required to balance their budgets each year, with varying levels of stringency. But when faced with insufficient revenues to meet spending needs mid-year, how do states react? States can choose to either cut budgets or raise taxes during the year. They may also choose to raise taxes for the following year, either to retroactively plug gaps in revenue (if permitted) or ensure greater revenue streams for future years.

Budget cut (budcut) is a continuous variable that reflects the amount by which a state cuts its spending mid-year. States may decide to cut spending, when they experience an unexpected deficit, and may be more or less likely to do so if there are stringent fiscal institutions in place. Positive values for budcut indicate a spending cut, while a value of zero for this variable suggests no changes to spending,

[15] See Harvard Dataverse at https://hdl.handle.net/1902.1/20403.

[16] See Consumer Price Index for All Urban Consumers: All Items (CPIAUCSL) from the Bureau of Labor Statistics, accessed via the St. Louis Federal Reserve Board, https://fred.stlouisfed.org/series/CPIAUCSL; and Annual Estimates of the Population for the U.S. and States, and for Puerto Rico from the US Census Bureau, accessed via the St. Louis Federal Reserve Board, https://fred.stlouisfed.org/series/CAPOP.

[17] Alabama, Minnesota, New York, and Texas operate on a different fiscal year than most states. We adjusted population and income numbers to reflect each states' fiscal year, rather than the calendar year. We converted calendar year variables to fiscal years per states' respective fiscal year calendars: 1) A fifty-percent split between current and prior calendar year data for the 45 states in our panel with fiscal years beginning July 1; 2) thirty-three to sixty-seven percent split for Texas, whose fiscal year begins September 1; 3) a seventy-five to twenty-five percent split for New York, whose fiscal year begins April 1; and 4) a twenty-five to seventy-five percent split for Alabama and Minnesota, whose fiscal years begin October 1. For government finance variables, no conversion was necessary, since the US Census Bureau adjusts its fiscal variables to reflect each state's fiscal year.

as compared to projected spending. Budcut does not relay information on any increases in mid-year spending above projected levels (i.e., budcut has no negative values).[18]

Tax change (taxch), reflects the amount by which a state has raised or lowered its tax revenues mid-year, due to changing its tax rates. States may decide to raise tax rates to address an unexpected deficit and may be more, or less, likely to do so if stringent fiscal institutions are in place. Positive values indicate a tax raise with an associated increase in tax revenue, negative values indicate a tax cut with reduced revenue, while zero indicates no change.[19]

Tax next (taxnxt), reflects the amount by which a state raises or lowers its tax revenues for the following fiscal year, due to changing its following-year tax rates. States may decide to raise their taxes in the following year to retroactively plug holes from an unexpected deficit shock, or to ensure better revenue availability next year. In fact, states may be more likely to incorporate a tax increase that goes into effect at the beginning of the calendar year, or at a future date that is in the next budget year.

These measures reflect policy actions that states take either to cut specific spending on state programs mid-year or raise tax rates. They do not reflect changes in revenues or spending caused by economic conditions independent of legislative or executive action. For example, if an increase in economic activity drives revenue up under current tax rates, that would not be included in our measures of tax changes. NASBO's biannual *Fiscal Survey of the States* provides information about mid-year budget cuts and state tax changes that occurred during the current and following year. Figure 1 illustrates the share of states that have acted to either cut budgets or raise taxes during a given fiscal year, and table 1 provides summary statistics on these variables.

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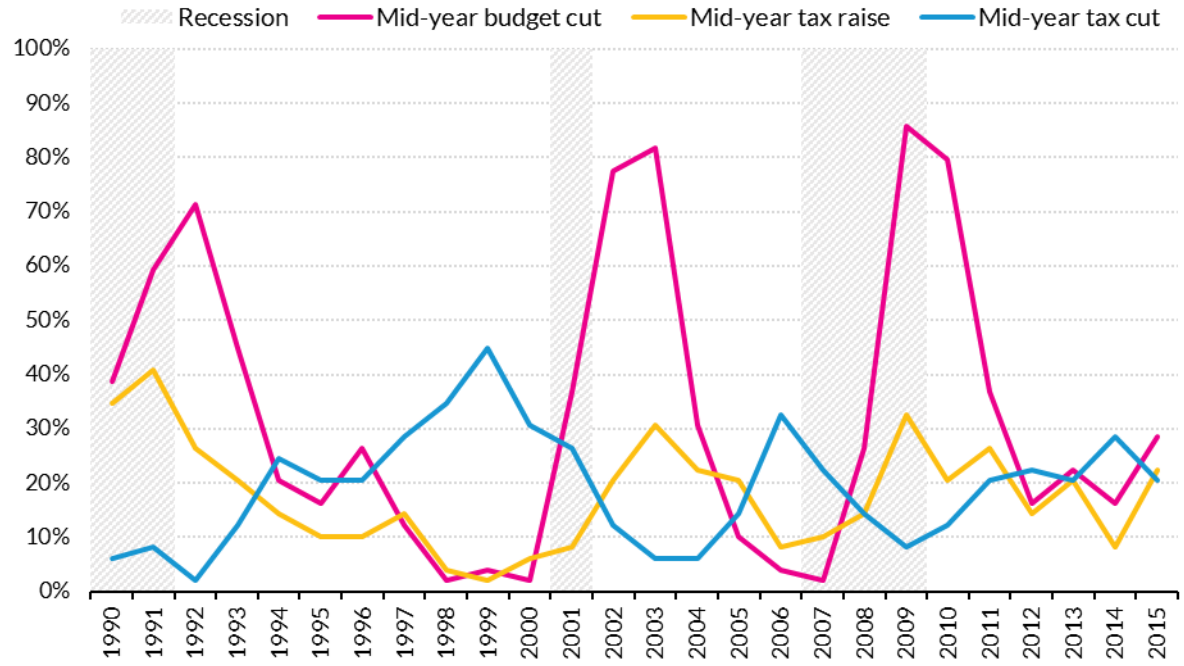
[18] NASBO reports mid-year budget cuts for FY[xx] in its fall *Fiscal Survey of the States* published that year (i.e. FY[xx] budget cut data reported in fall FY[xx] survey). See "Net Mid-Year Budget Cuts," Table 1 (1990 – 2009) or Table 7 (2010 – 2015).

[19] NASBO reports mid-year tax changes for FY[xx] in its spring *Fiscal Survey of the States* published that year (i.e. FY[xx] tax change data reported in spring FY[xx] survey).[19] We included the full value of tax changes from the spring survey in our FY[xx] taxch calculation, unless they overlapped with amounts reported in the fall survey later that year. NASBO reports tax changes for the following fiscal year (FY[xx+1]) in the fall survey for FY[xx], and some of those changes also apply to FY[xx]. We calculated the portion of FY[xx+1] tax changes that applied to FY[xx] by prorating their value based on the date of enactment. We added spring and fall FY[xx] tax changes together to arrive at a final mid-year taxch value.

FIGURE 1

State Mid-year Budget and Tax Changes

Percentage of states that enacted mid-year budget cuts, tax raises, or tax cuts each year (1990 – 2015)



Sources: Authors' calculations using data from the National Association of Budget Officers (NASBO), *Fiscal Survey of the States*, 1990 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive; and National Bureau of Economic Research, "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles.html.
Notes: Excludes Alaska.

TABLE 1

Dependent Fiscal Variables

Summary statistics, per capita 2015 dollars (1990 – 2015)

Variable	1990	1995	2000	2005	2010	2015
Budget cut						
Mean	21	6	1	2	84	6
Standard Deviation	46	18	5	9	81	13
Minimum	0	0	0	0	0	0
Maximum	247	84	34	60	299	55
# of states	19	8	1	5	39	14
Tax change						
Mean	10	-1	-1	1	2	-3
Standard Deviation	28	7	17	5	12	14
Minimum	-54	-36	-49	-7	-37	-69
Maximum	110	16	97	26	70	30
# of states negative (i.e. tax cut)	3	10	15	7	6	10
Tax next						
Mean	56	-16	-17	14	28	17
Standard Deviation	107	51	53	45	50	64
Minimum	-105	-241	-214	-152	-104	-105
Maximum	515	112	138	120	159	252
# of states negative (i.e. tax cut)	7	29	27	14	7	17

Source: Authors' calculations using data from the National Association of Budget Officers (NASBO), *Fiscal Survey of the States*, 1990 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive.
Note: Excludes Alaska.

Measuring State Fiscal Shock

In 2015, 37 states required the governor to submit a balanced budget to the legislature, and 37 required the legislature to pass a balanced budget.[20] Unexpected surpluses and deficits can still arise, however, when during the fiscal year either revenues or spending differ from initial projections. When spending is greater than anticipated, or when revenues are less than anticipated, states may be faced with a surprise mid-year deficit. Similarly, if spending is less than, or revenues exceed, what was originally projected, states will have a surprise mid-year surplus. These unexpected mid-year differences are called "fiscal shocks."

In theory, due to BBRs, states that experience an unexpected deficit would need to respond by cutting spending, raising taxes, or spending down existing general or rainy day fund balances. If surpluses arise they can build up their balances, increase spending, or cut taxes. Some states with

[20] Authors' analysis, based on multiple sources. For more information, see forthcoming technical compendium [Rueben, Randall, and Boddupalli (2018 forthcoming)].

revenue limits (e.g. Colorado under TABOR) may require remittance of tax revenue back to voters if there is an unexpected surplus. In some cases, states may choose not to act, choosing to push a deficit or maintain a surplus into the following fiscal year. This study asks whether stricter BBRs and TELs influence how and whether states respond to fiscal shocks, how their responses have changed over time, and if they vary by party control.

A state's overall fiscal shock is a product of its annual revenue and expenditure shocks, which we measured using data from NASBO's biannual *Fiscal Survey of the States.* Per Poterba's 1994 definition, a revenue shock consists of a state's actual revenue collected in a fiscal year (actrev), minus the value of mid-year tax increases (taxch), minus the value of originally projected revenues (prorev) (equation 1):

$$revshock = actrev^{21} - taxch^{22} - prorev^{23}$$

A positive revenue shock occurs when the state collects more revenue than originally projected (after adjusting for any mid-year revenue changes enacted in reaction to the unexpected revenue dip). A negative revenue shock happens when the state collects less revenue than anticipated. As Poterba (1994) noted, it is important to subtract mid-year tax changes from actual revenues to arrive at the amount of revenue that would have been collected *but for* the tax changes. Without subtracting mid-year tax changes, actual and projected revenues would misleadingly sum to zero if policymakers responded to unexpected deficits by enacting mid-year tax changes. Adjusting for mid-year tax changes reveals the extent of the revenue shock to which policymakers are responding.

An expenditure shock, similarly, consists of actual expenditures in a fiscal year (actexp), minus the value of mid-year budget cuts (budcut), minus originally projected expenditures (proexp) (equation 2):

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[21] NASBO reports final, actual revenues for FY[xx] in the fall *Fiscal Survey of the States* published the following fiscal year (i.e. the fall FY[xx+1] survey). See "General Fund, Actual," Table A-1 (1991 – 2009) and Table 3 (2010 – 2016).

[22] NASBO reports mid-year tax changes for FY[xx] in its spring *Fiscal Survey of the States* published the same year (i.e. the spring FY[xx] survey). See "Enacted Mid-Year Revenue Changes by Type of Revenue," Table A-1, and "Enacted Revenue Measures," Table A-2. We included the full value of tax changes from the spring survey in our FY[xx] taxch calculation, unless they overlap with amounts reported in the fall survey later that year. NASBO reports tax changes that apply to the following fiscal year (FY[xx+1]) in the fall survey for FY[xx], but some of those changes were adopted mid-year and thus also apply to FY[xx]. We calculated the portion of FY[xx+1] tax changes that applied to FY[xx] by prorating their value based on the date of enactment. We added spring and fall FY[xx] tax changes together to arrive at a final mid-year taxch value for FY[xx].

[23] NASBO reports final, projected revenues for FY[xx] in its fall *Fiscal Survey of the States* published the previous fiscal year (i.e. the fall FY[xx-1] survey), "General Fund Appropriated," Table A-3 (1991 – 2009) and Table 5 (2010 – 2016).

$$expshock = actexp^{24} - budcut^{25} - proexp^{26}$$

A positive expenditure shock indicates that actual spending exceeded projected expenditures, while a negative value indicates that actual spending was less than anticipated. As with mid-year tax changes, it is important to adjust for mid-year budget cuts that states have enacted as a response to expenditures exceeding projections.

The overall fiscal shock, then, is the value of the revenue shock minus the expenditure shock (i.e. the amount by which unanticipated revenues exceeded unanticipated expenditures) (equation 3):

$$fiscshock = revshock - expshock$$

An unexpected surplus is represented by a positive fiscal shock value, while an unexpected deficit is represented by a negative fiscal shock value. There is more pressure on states to act during periods of unexpected deficit, as all states can carry over surpluses and make changes in the following fiscal year (except for those states that are required to remit surplus revenues to voters). Thus, in this study we have highlighted and focused on how many states experienced an unexpected deficit in the given year. Table 2 summarizes fiscal shock, revenue shock, and expenditure shock for a sample of years in our study period.

[24] NASBO reports final, actual expenditures for FY[xx] in its fall *Fiscal Survey of the States* published the following fiscal year (i.e. final FY[xx] revenue data reported in fall FY[xx+1] survey). See "General Fund, Actual," Table A-1 (1991 – 2009) and Table 3 (2010 – 2016).

[25] NASBO reports mid-year budget cuts for FY[xx] in its fall *Fiscal Survey of the States* published that year (i.e. FY[xx] budget cut data reported in fall FY[xx] survey). See "Net Mid-Year Budget Cuts," Table 1 (1990 – 2009) or Table 7 (2010 – 2015).

[26] NASBO reports final, projected spending for FY[xx] in its fall *Fiscal Survey of the States* published the previous fiscal year (i.e. FY[xx] projected spending reported in fall FY[xx-1] survey). See "General Fund Appropriated," Table A-3 (1991 – 2009) and Table 5 (2010 – 2016).

TABLE 2

Fiscal Shock in the States

Summary statistics, per capita 2015 dollars (1990 – 2015)

Variable	1990	1995	2000	2005	2010	2015
Fiscal shock						
Mean	-8	24	80	86	-104	20
Standard Deviation	151	104	108	77	127	172
Minimum	-712	-348	-129	-64	-349	-1,012
Maximum	596	461	461	270	248	389
# of states negative (i.e. deficit)	23	19	5	8	40	18
Expenditure shock						
Mean	21	53	-30	49	23	13
Standard Deviation	208	159	298	111	124	99
Minimum	-367	-164	-2013	-108	-194	-272
Maximum	1224	701	350	655	440	575
# of states positive	27	33	29	34	26	29
Revenue shock						
Mean	12	77	51	135	-81	32
Standard Deviation	135	154	290	103	87	100
Minimum	-359	-198	-1820	-39	-261	-438
Maximum	512	744	429	603	149	264
# of states negative	19	14	8	2	42	16

Sources: Authors' calculations using data from the National Association of Budget Officers (NASBO), *Fiscal Survey of the States*, 1989 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive.

Notes: Excludes Alaska. Fiscal shock is revenue minus expenditure shock. A positive expenditure shock occurs when actual spending is more than projected, while a negative revenue shock occurs when actual revenues are less than projected.

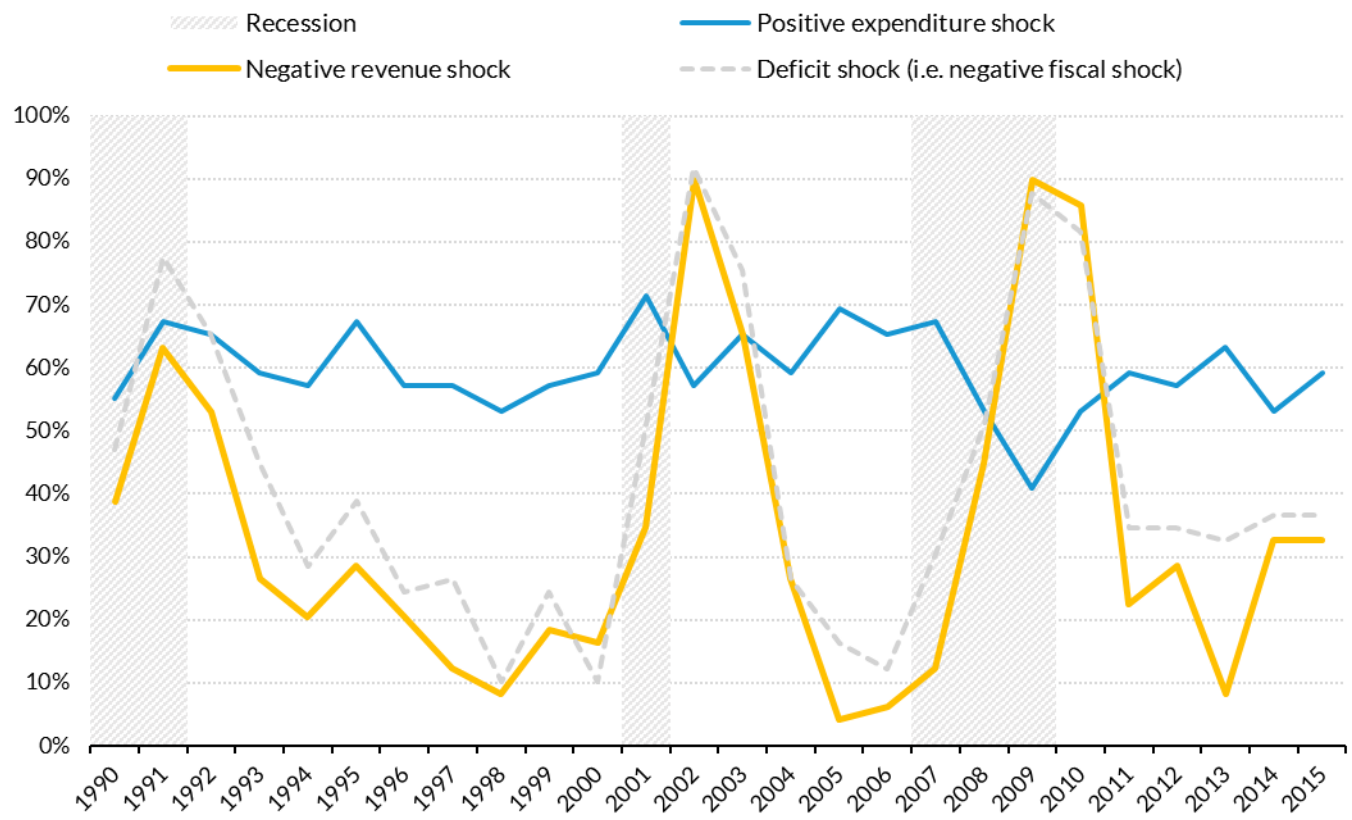
From 1990 – 2015, the percentage of states with a deficit shock and the percentage with a negative revenue shock tracked one another closely, while consistently over half of states experienced a positive expenditure shock in any given year during that time frame (figure 2). On average, between 1990 and 2015, sixty percent of states spent more than anticipated (before mid-year budget cuts) in a given year in our study period, while only thirty-four percent had negative revenue shocks (i.e. collected less revenue than projected). Forty-two percent, on average, experienced a deficit shock, overall.

This suggests that states regularly grapple with expenditure shocks, regardless of what is happening with revenues and the economy, while negative revenue shocks happen primarily during economic downturns and are the driving force in state deficit shocks. Expenditure shocks can arise due to unanticipated caseload growth for state programs, such as Medicaid or education, increasing cost per program recipient (as can often happen in healthcare), or other unexpected usage of state programs.

FIGURE 2

State Expenditure, Revenue, and Deficit Shock

Percentage of states with a negative revenue shock, positive expenditure shock, and deficit shock (1990 – 2015)



Sources: Authors' calculations using data from the National Association of Budget Officers (NASBO), *Fiscal Survey of the States*, 1989 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive; and National Bureau of Economic Research, "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles.html.
Notes: Excludes Alaska. A positive expenditure shock occurs when actual spending is more than projected, while a negative revenue shock occurs when actual revenues are less than projected. A deficit shock occurs when fiscal shock (revenue minus expenditure shock) is negative.

This study focuses especially on how negative fiscal shocks, what we call "deficit shocks," influenced states' likelihood of cutting spending or raising taxes, and how fiscal institutions affected this likelihood.

Independent Variables

INDEPENDENT FISCAL VARIABLES

Our independent fiscal variables illustrate how an unexpected surplus or deficit (i.e. positive or negative fiscal shock) affects states' likelihood of enacting budget cuts or tax increases. We generated surplus and deficit shock variables using states' revenue, expenditure, and overall fiscal shocks, as described in the "Measuring State Fiscal Shock" section of this report, above.

Unexpected surplus (surplus), or "surplus shock," reflects the amount by which revenues unexpectedly exceeded expenditures in a fiscal year (i.e. a positive fiscal shock value). A value of zero, for this variable, denotes either a balanced budget or a deficit for that year.

Unexpected deficit (deficit), or "deficit shock," reflects the amount by which expenditures unexpectedly exceeded revenues in a fiscal year (i.e. a negative fiscal shock value). A value of zero, for this variable, denotes either a balanced budget or a surplus for that year.

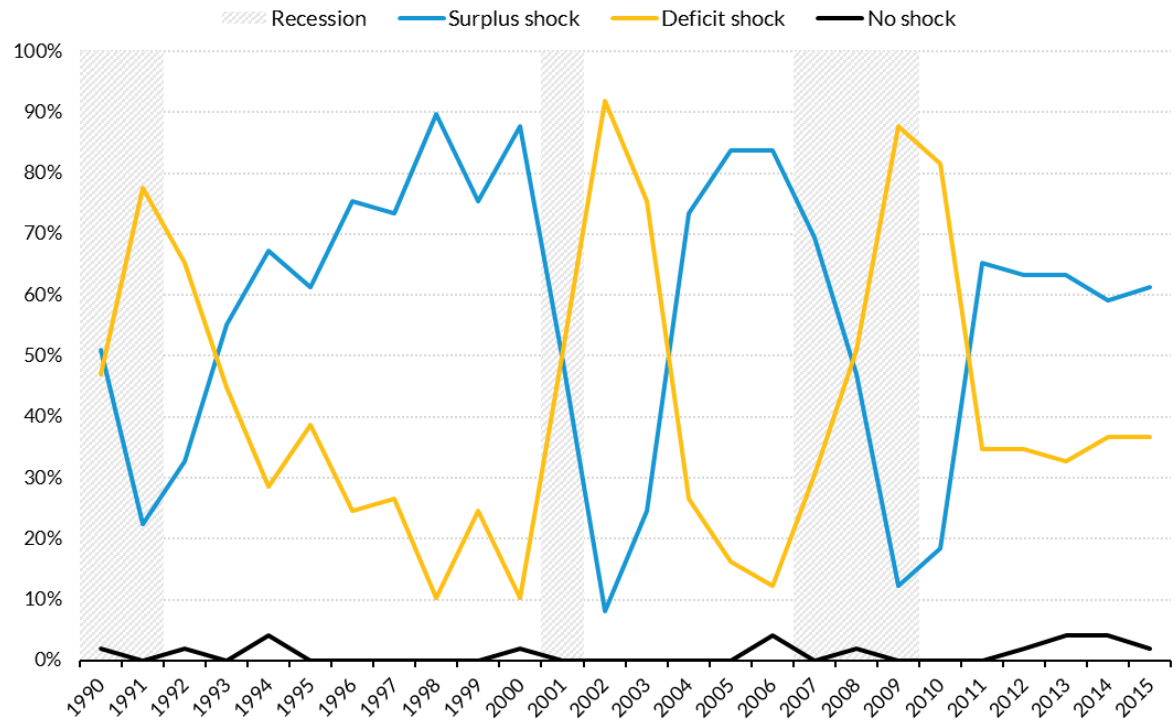
On average, during the 26 years in our study period (1990 – 2015), less than half of states experienced a deficit shock in any given year. On average, 42 percent of states saw deficit shocks each year, while 57 percent saw surplus shocks. Budgets are rarely perfectly balanced, after accounting for mid-year tax or budget changes, with only one percent of states experiencing no shock at all in a given year.

However, averages across our study period obscure the influence of the business cycle and variation in fiscal shock over time. In 1998, for example, only ten percent of states experienced a deficit shock. In 2002, by comparison, 92 percent of states saw a deficit shock, reflecting the economic contraction and dot-com bust of the early 2000's (figure 3).

FIGURE 3

State Surplus and Deficit Shocks

Percentage of states with a surplus or deficit shock (1990 – 2015)



Sources: Authors' calculations using data from the National Association of Budget Officers (NASBO), *Fiscal Survey of the States*, 1990 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive; and National Bureau of Economic Research "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles.html.
Notes: Excludes Alaska. Surplus shocks occur when unexpected revenues exceed expenditures, while deficit shocks occur when unexpected expenditures exceed revenues. "No shock" indicates a balanced budget.

Table 3 gives additional summary information on state surplus and deficit shocks from a sample of years in our full study period.

TABLE 3

Independent Fiscal Variables

Summary statistics, per capita 2015 dollars (1990 – 2015)

Variable	1990	1995	2000	2005	2010	2015
Surplus shock						
Mean	35	45	87	90	12	52
Standard deviation	90	78	100	71	39	77
Minimum	0	0	0	0	0	0
Maximum	596	461	461	270	248	389
# of states	25	30	43	41	9	30
Deficit shock						
Mean	-43	-20	-7	-4	-116	-32
Standard Deviation	108	53	24	12	109	143
Minimum	-712	-348	-129	-64	-349	-1012
Maximum	0	0	0	0	0	0
# of states	23	19	5	8	40	18

Source: Authors' calculations using data from the National Association of Budget Officers (NASBO) Fiscal Survey of the States, 1990 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive;
Notes: Excludes Alaska. Surplus shock occurs when unexpected revenues exceed expenditures, while deficit shock occurs when unexpected expenditures exceed revenues.

INDEPENDENT INSTITUTIONAL VARIABLES

We compiled data on fiscal institutions from a variety of sources, including NASBO *Budget Processes in the States*, materials published by the National Conference of State Legislatures (NCSL), peer-reviewed literature or other authoritative sources on fiscal institutions, and our own statutory and bill analysis, where necessary. We focused on BBRs and TELs, as they directly govern states' response to fiscal shocks, and have the most cross-state variation, compared to other institutional features such as the presence of a line item veto or budget stabilization fund which we found were fairly consistent across states.

The efficacy of fiscal institutions in achieving their goals (e.g., a balanced budget), and their effects on state spending and taxation during times of deficit, are of primary interest in our study. We wanted to determine whether more stringent fiscal institutions, designed to constrain taxes or spending, have the anticipated effect on state budgeting. Previous definitions of both BBR and TEL stringency informed our analysis (e.g., ACIR 1987). To accurately examine institutions' influence over time, however, we augmented and amended previous definitions and classifications by examining state laws and constitutions, confirming and further parsing the details of provisions in each state. We focused our study on fiscal limits that, based upon previous literature and our own examination of laws, we felt could have material effects on state actions. We differentiated, for example, between states with tax or spending limits that could be overridden with a simple majority and those that required either voter approval or a supermajority vote of the legislature to override.

Weak BBR (wbbr) is a dummy variable with a value of 1 when the state has either a weak, or no, BBR. A value of zero, for this variable, denotes a strong BBR, according to the definition described in further detail below.

In many previous studies (including Poterba 1994), researchers relied on an index of BBR stringency constructed by the Advisory Council on Intergovernmental Relations (ACIR 1987) to classify a state's BBR as strong or weak. The ACIR index relied heavily on whether the legislature or governor was required to pass or sign a balanced budget, respectively, whether the state was prohibited from carrying over a deficit into the following fiscal year, and whether such requirements were constitutional.

The ACIR index was constructed at the discretion of ACIR staff, as very few prior empirical findings on BBR efficacy were available to inform the staff's classification framework. Recent literature has proposed a more nuanced framework for understanding BBR stringency, incorporating not only the role of political actors, such as the legislature and governor, but technical provisions that direct the state to implement a balanced budget. These technical provisions include, but are not limited to, the "no carryover" provisions identified by the ACIR (Hou and Smith 2006; Smith and Hou 2013).

For this study, we adopted Hou and Smith's (2006) framework, which examined BBRs as a complex system made up of nine possible political and technical provisions. We then focused on the combinations most likely to exert a material influence on whether states balance their budget each year. These provisions come into play during different stages of states' budget process, with later-stage provisions acting as stricter controls on states' budgeting actions. Provisions prohibiting a deficit carryover into the following fiscal year, for example, impose a late-stage technical requirement for the state to implement a balanced budget. However, a combination of other mid- and late-stage requirements can also create a stricter system of balanced budget adherence.

For this study, based on findings from Hou and Smith (2006) and Smith and Hou (2013), as well as prior literature on this topic, we defined states with strict BBRs as meeting one of the following requirements:

1. **The legislature must pass a balanced budget** (i.e. a mid-stage political requirement), **accompanied by** at least one of two late-stage technical requirements:
    - Either controls are in place on supplementary appropriations; or
    - Within fiscal-year controls are in place to avoid deficit.

2. **The governor must sign a balanced budget**;[27] or
3. **The state is prohibited from carrying over a deficit** into the following fiscal year or biennium.

We classified any state with at least one of the above as having a strong BBR, and the remaining as "weak BBR" states. "Weak BBR" states may have early-stage political requirements for the governor to pass a balanced budget, or weak early-stage technical requirements that allow the state to finance deficits through debt, but these do not rise to the standard of a binding requirement for the purposes of this study. Included in our "weak BBR" classification, are also the few states that lack a BBR entirely.

Compared to fiscal and political variables, BBRs vary little over time. In 1990, thirty-three percent of states had a weak BBR, compared to 24 percent in 2015 (table 4). Most states, therefore, had a strong BBR according to our classification system.[28]

TABLE 4

Independent Institutional Variables

Number and percentage of states with fiscal institutions (1990 – 2015)

Institution	1990	1995	2000	2005	2010	2015
Weak BBR						
# of states	16	14	13	13	13	12
% of states	33%	29%	27%	27%	27%	24%
Binding TEL						
# of states	15	18	22	22	22	23
% of states	31%	37%	45%	45%	45%	47%
Strong Expenditure Limit						
# of states	7	11	11	11	11	11
% of states	14%	22%	22%	22%	22%	22%
Strong Revenue Limit						
# of states	9	12	16	16	16	17
% of states	18%	24%	33%	33%	33%	35%

Sources: Authors' calculation based on various sources and independent data collection. See Rueben, Randall, and Boddupalli (2018 forthcoming).
Notes: Excludes Alaska.

[27] Only one state has this requirement, that we can confirm: California. And the state would otherwise meet the requirements for a strict BBR classification due to criteria #1.

[28] Please note, our classification system defined strong BBRs more narrowly than Poterba (1994) and other prior studies, primarily due to a more sophisticated and narrower definition of the "no carryover" provision. Therefore, fewer states in our study met the standard for strong classification criteria, and we classified more states as weak compared to prior classification frameworks.

There is more cross-state than cross-time variation in BBR stringency, although several states have adopted stronger requirements during our study period. Four states moved from a weak to a strong BBR classification during our study period, either because they adopted a legislative requirement to pass a balanced budget or within-year, late-stage fiscal controls.[29] Only one state, North Carolina, changed its "no carryover" provision by repealing it in 2006. However, the state retained its strong BBR classification due to its existing requirements for the legislature to pass a balanced budget and within-year, late-stage fiscal controls.

Strict tax or expenditure limit (stel) is a dummy variable with a value of 1 when the state has a binding tax or expenditure limit in place. We define binding (or strict) as requiring a vote of the people or supermajority vote of the legislature to override the requirement. This includes requiring a supermajority to raise new taxes or revenues. As with our BBR data, we constructed our TEL dataset by examining state statutes and constitutions and cross-referencing a variety of data sources, including: 1) NASBO *Budget Processes in the States;* 2) Bert Waisanen's "State Tax and Expenditure Limits – 2010" (2010); 3) state-specific or other authoritative sources, including Skidmore (1999), Rueben (1995) and Mitchell (2010); 4) direct outreach to state budget staff;[30] and 6) our own review of state statutes and bills, where necessary. In 2015, 33 states had either a tax or expenditure limit. However, not all TEL data sources included year-of-adoption data on TEL stringency.[31] In 2015, only 23 states had a *strict* tax or expenditure limit in place.

Strict revenue limit (strict revlim) is a dummy variable with a value of 1 when the state has a binding revenue limit. We define binding as requiring a vote of the people or supermajority vote of the legislature to override the requirement or if they require a supermajority to raise new taxes or revenues. In 2015, 17 states had a strict revenue limit.

Strict expenditure limit (strict explim) is a dummy variable with a value of 1 when the state has a binding expenditure limit. We define binding as requiring a vote of the people or supermajority vote of the legislature to override the requirement. In 2015, 11 states had a strict expenditure limit.

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[29] Three states adopted a legislative requirement to pass a balanced budget during our study period: Connecticut, New Hampshire, and Washington. While one state (Ohio) passed late-stage within-year fiscal controls.

[30] Where data on BBRs and their year of adoption where conflicting or unavailable, we reached out directly to state budget offices for more clarification.

[31] See Matthew D. Mitchell, "TEL It Like It Is: Do State Tax and Expenditure Limits Actually Limit Spending," 2010, Mercatus Center, for a helpful compendium of states' TEL stringency.

State TELs have more variation across time and across states than BBRs. Thirteen states had a change in the stringency of either an expenditure limit or revenue limit during the study period.[32] States adopted stricter TELs during our study period. In 1990, 31 percent of states had a binding TEL in 1990, compared to 47 percent in 2015 (table 4).

INDEPENDENT POLITICAL VARIABLES

We constructed political variables from a dataset produced by political scientist and consultant Dr. Carl Klarner.[33] We included political variables on unified government in our analysis to account for spending and tax decisions driven primarily by partisan dynamics, rather than the institutional factors of core interest in our study. We also investigated whether responses to fiscal shock became more partisan in the recent period as compared to prior periods. Indeed, in recent years, states have often responded differently. Some (often Democratically controlled) states have passed new taxes, including progressive income taxes, while Republican-controlled states have often responded to economic recovery through cutting these taxes.

Unified Republican control (rep), is a dummy variable with a value of "1" when the state house, senate, and governorship are all under Republican control during the legislative year in question. A value of zero, for this variable, denotes either Democratic or mixed control.

Unified Democratic control (dem) is a dummy variable with a value of "1" when the state house, senate, and governorship are all under Democratic control during the legislative year in question. A value of zero, for this variable, denotes either Republican or mixed control.

On average, just over half of states (excluding Alaska and Nebraska) had a divided government in any given year of our study period (1990 – 2015), while approximately a quarter were Republican-controlled and another quarter were Democratically controlled. However, these averages obscure changes in party control over time. In 1990, only eight percent of states were Republican-controlled, 33 percent were Democratically controlled, and 58 percent were divided (table 5). By 2015, however,

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[32] The following states adopted a binding revenue limit during our study period: Arizona, Colorado, Kentucky, Nevada, Oklahoma, Oregon, South Dakota, and Wisconsin. The following states adopted binding expenditure limits: Colorado, Connecticut, Louisiana, and Ohio. Montana repealed a binding expenditure limit during the study period, while Washington adopted and then repealed one (following a court order).

[33] Klarner provides datasets in his Harvard-hosted Dataverse, https://dataverse.harvard.edu/dataverse/cklarner, but we reached out to Klarner separately for his most recent updates. His data is also available through the Michigan State University Institute for Public Policy and Social Research "Correlates of State Policy Project," http://ippsr.msu.edu/public-policy/correlates-state-policy.

forty-eight percent of states had a unified Republican government, while only 15 percent had a unified Republican government, and 38 percent were divided. Figure 4 provides an illustration of cross-state and time variation in unified government and party control for our full study period.

TABLE 5

Independent Political Variables

Number and percentage of states with unified political control, 1990 – 2015, five-year intervals

Institution	1990	1995	2000	2005	2010	2015
Unified Republican Control						
# of states	4	15	15	11	9	23
% of states	8%	31%	31%	23%	19%	48%
Unified Democratic Control						
# of states	16	8	9	8	16	7
% of states	33%	17%	19%	17%	33%	15%

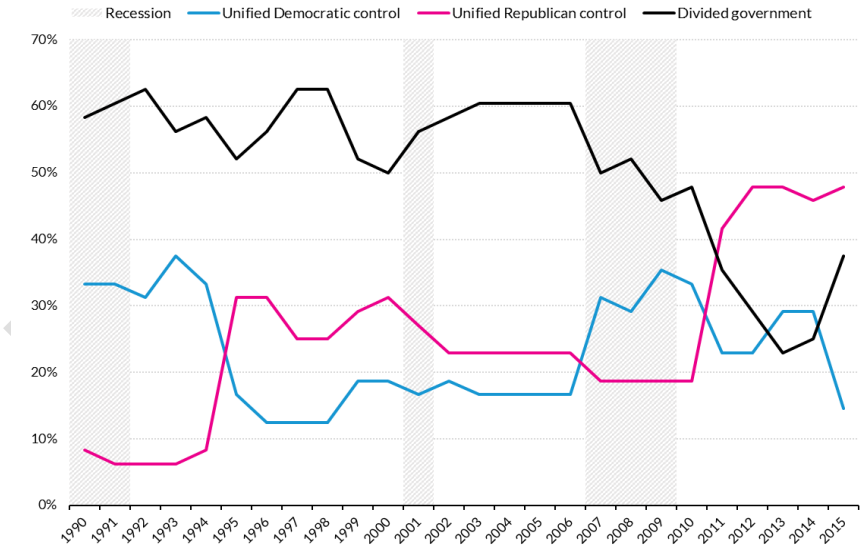
Source: Authors' calculations using data from Carl Klarner, 2018, "State Partisan Balance Data, 1936 – 2016," Harvard Dataverse, Cambridge, MA: Harvard University, https://hdl.handle.net/1902.1/20403.

Notes: Excludes Alaska and Nebraska. Unified government indicates where the house, senate, and governorship are all controlled by the same political party.

FIGURE 4

State Unified Democratic and Republican Control

Percentage of states with house, legislature, and governorship controlled by a single party (1990 – 2015)



Sources: Authors' analysis using Carl Klarner, 2018, "State Partisan Balance Data, 1936 – 2016," Harvard Dataverse, Cambridge, MA: Harvard University, https://hdl.handle.net/1902.1/20403; and National Bureau of Economic Research "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles.html.

Notes: Analysis excludes Alaska and Nebraska. Unified government indicates where the house, senate, and governorship are all controlled by the same political party. Divided government indicates the absence of unified control by any one party.

INTERACTION TERMS

While the presence of individual fiscal institutions or political institutions can affect changes in taxes or spending, we are most interested in how these factors influence a state's actions when they are experiencing unexpected deficits. Thus, our critical variables are interaction terms that include the effect of institutional indicator variables and the size of unexpected deficits and surpluses.

Two-way fiscal and institutional interactions (fiscal*institutional) demonstrate how institutions influenced states' behavior during times of either unexpected surplus or deficit.

Two-way fiscal and political interactions (fiscal*political) demonstrate how party control (either Democratic or Republican) influenced states' behavior during time of either unexpected surplus or deficit.

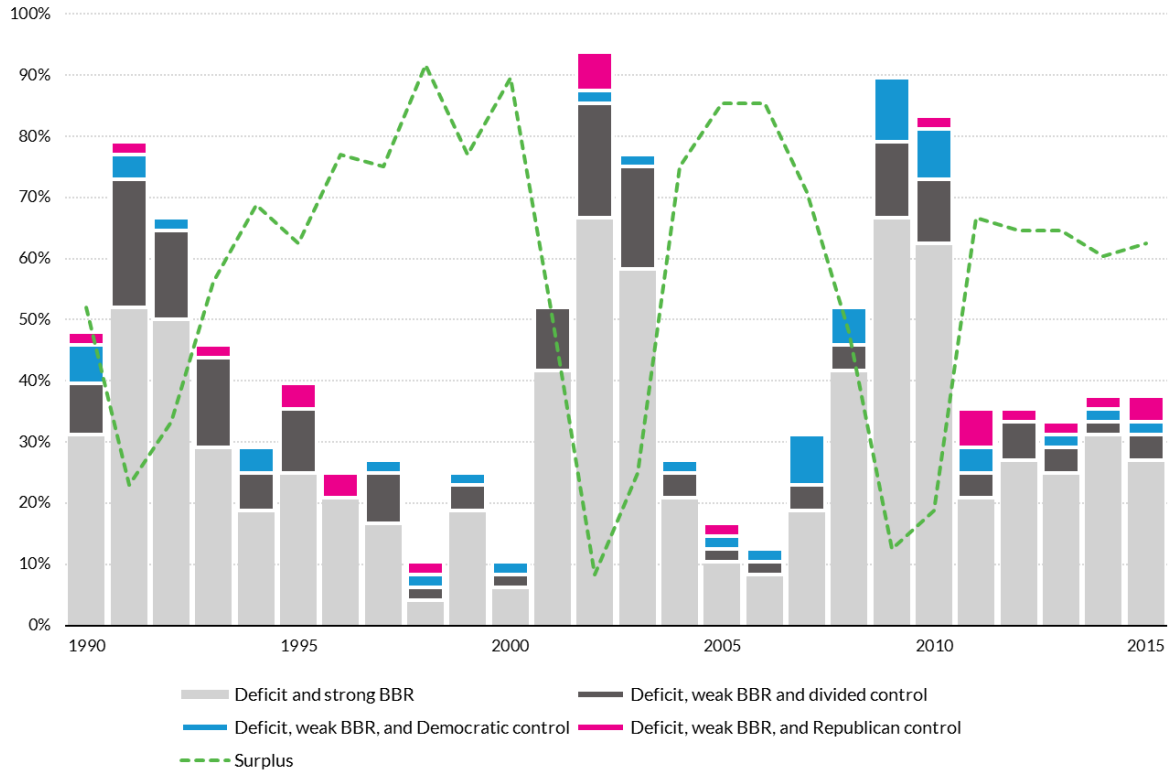
Three-way institutional, political, and fiscal interactions (institutional combined with political and fiscal) demonstrate how party control (either Democratic or Republican) affected states' behavior, in the presence or absence of specific fiscal institutions, during times or either surplus or deficit.

Thus, we examined how governments responded in terms of tax increases or budget cuts during periods of unanticipated fiscal change, and under different political parties. Each set of interaction terms applied to an increasingly smaller number of observations. Of the states that had a deficit (of primary interest to us), for example, a minority of them also had a weak BBR in place. And, of those with a weak BBR, an even smaller subset was either Democratically or Republican-controlled. Figure 5 illustrates the share of states that had a deficit shock as well as a weak BBR, and either unified or divided government. Figure 6 illustrates the share that had a deficit shock, as well as a binding TEL, and either unified or divided government. While shares fluctuated over time, the percentage of states that met three-way interaction-term requirements was small compared to the sample as a whole.

FIGURE 5

State Deficits, Balanced Budget Requirements, and Party Control

Percentage of states that have a deficit, weak BBR, and unified or divided government (1990 – 2015)



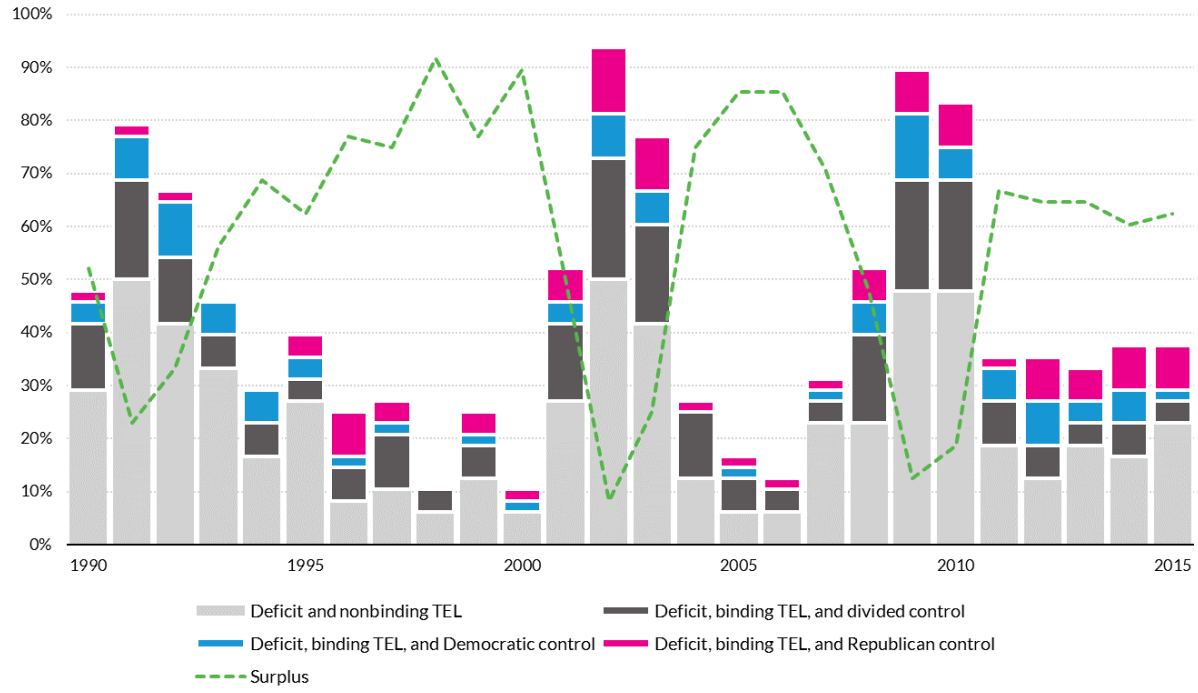
Source: Authors' calculations using data from the National Association of Budget Officers (NASBO) Fiscal Survey of the States, 1990 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive; Carl Klarner, 2018, "State Partisan Balance Data, 1936 – 2016," Harvard Dataverse, Cambridge, MA: Harvard University, https://hdl.handle.net/1902.1/20403; and National Bureau of Economic Research "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles.html.

Notes: Excludes Alaska and Nebraska. Surplus shock occurs when unexpected revenues exceed expenditures, while deficit shock occurs when unexpected expenditures exceed revenues. Unified government counts indicate where the house, senate, and governorship are all controlled by the same political party. Divided government indicates the absence of unified control by any one party.

FIGURE 6

State Deficits, Tax and Expenditure Limits, and Party Control

Percentage of states that have a deficit, binding TEL, and either unified or divided government (1990 – 2015)



Source: Authors' calculations using data from the National Association of Budget Officers (NASBO) Fiscal Survey of the States, 1990 – 2016, https://www.nasbo.org/mainsite/reports-data/fiscal-survey-of-states/fiscal-survey-archive; Carl Klarner, 2018, "State Partisan Balance Data, 1936 – 2016," Harvard Dataverse, Cambridge, MA: Harvard University, https://hdl.handle.net/1902.1/20403; and National Bureau of Economic Research "US Business Cycle Expansions and Contractions," http://www.nber.org/cycles.html.

Notes: Excludes Alaska and Nebraska. Surplus shock occurs when unexpected revenues exceed expenditures, while deficit shock occurs when unexpected expenditures exceed revenues. Unified government counts indicate where the house, senate, and governorship are all controlled by the same political party. Divided government indicates the absence of unified control by any one party.

Results

We estimated a series of linear regression models with either state fixed or random effects.[34] Including a state fixed effect means our estimation was only based on variation in the presence or an absence of an institution in a single state over time. We included year fixed effects in all models.

State Adjustment to Fiscal Shock

First, we evaluated state fiscal dynamics without accounting for either institutions or political party control. We wanted to understand whether states were more likely to cut budgets or raise taxes during an unexpected deficit. Replicating Poterba (1994), we estimated regression equations of the form (equation 4a):

$$\left.\begin{matrix}\textbf{budcut}\\ \textbf{taxch}\\ \textbf{taxnxt}\end{matrix}\right| = b + a_1{*}\text{surplus} + a_2{*}\text{deficit} + \text{error}$$

Where budcut, taxch, and taxnxt are dependent variables in three separate equations, *b* represents the constant, a_1 represents the coefficient on surplus shock (i.e. the amount by which states cut their budget, raised their taxes mid-year, or raised their taxes next year, respectively, for each per capita dollar of unexpected surplus), and a_2 represents the coefficient on deficit shock (i.e. the amount by which states cut their budget, raised their taxes mid-year, or raised their taxes next year, respectively, for each per capita dollar of unexpected deficit), plus an error term. These equations allowed us to assess, as a kind of baseline, the effect of either a surplus or deficit shock on states' decision to cut its spending (budcut), raise its taxes mid-year (taxch), or raise taxes the following year (taxnxt). Table 6 reports results from this first set of regressions (equation 4a),

[34] We estimated generalized least squares regression models including year indicator variables, with and without state fixed effects. In regressions without state fixed effects we adjusted the standard errors to account for correlation in observations within states. We do not display the state fixed effects results in this paper.

TABLE 6

State Adjustment to Fiscal Shock

State random effects with year fixed effects

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	-0.016	-0.041***	-0.118***	-0.004	-0.018*	-0.131***	-0.018	-0.075***	-0.069	-0.023	-0.088***	-0.076+
	(0.013)	(0.008)	(0.026)	(0.014)	(0.009)	(0.033)	(0.026)	(0.013)	(0.043)	(0.024)	(0.014)	(0.042)
deficit	-0.259***	-0.078***	-0.220***	-0.290***	-0.106***	-0.294***	-0.225***	-0.046***	-0.147***	-0.150***	-0.032*	-0.097*
	(0.013)	(0.008)	(0.025)	(0.015)	(0.01)	(0.033)	(0.024)	(0.012)	(0.037)	(0.028)	(0.016)	(0.046)
_cons	10.647*	8.204**	50.278***	8.887*	6.187*	47.530***	56.937***	2.814	3.893	67.004***	-0.538	4.818
	(4.915)	(2.921)	(9.647)	(4.224)	(2.821)	(9.562)	(7.61)	(3.152)	(10.151)	(6.392)	(3.813)	(9.556)
r2_a	0.477	0.157	0.196	0.459	0.184	0.23	0.481	0.151	0.128	0.397	0.147	0.051
N	1274	1274	1274	882	882	882	392	392	392	294	294	294

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates p < 0.10, * p < 0.05, ** p < 0.01, and *** p < 0.001. Deficit values are negative, surplus values are positive, budcut values are positive (representing the absolute value of mid-year budget cuts), positive values for taxch and taxnxt reflect tax increases, and negative values reflect tax cuts. Analysis excludes Alaska.

MID-YEAR BUDGET CUTS

Mid-year budget cuts exceeded tax hikes during periods when states experienced deficit shocks. Although states cut budgets *and* raised taxes during unexpected deficits during our study period, they cut budgets more aggressively than they raised taxes. This is consistent with findings from prior literature.

From 1990 – 2015, states cut their budgets mid-year by 26 cents per capita for each dollar of unexpected deficit. They also raised taxes mid-year, but by a lesser magnitude: eight cents per capita for each dollar of unexpected deficit. Raising taxes during a fiscal year can be difficult, and legislators and governors often wait for the beginning of the calendar year to raise taxes in order to be less disruptive. States raised next-year taxes by 22 cents per capita, closer to the magnitude of mid-year budget cuts. The net adjustment to a deficit is computed by adding the current fiscal year spending change to next year's tax increase, or 26 + 22 = 48 cents per capita per dollar of unexpected deficit.

Both types of adjustments decreased in magnitude later in our study period. From 2008 – 2015, states cut budgets by 23 cents per capita, raised mid-year taxes by five cents, and raised next-year's taxes by only 15 cents for each dollar of deficit shock [for a net 38 cent-per capita adjustment]. Thus, even though the Great Recession was more severe and long lasting than prior downturns, state reactions were less immediate. This is, in part, due to robust rainy day fund balances prior to the start of the recession and federal action that increased federal funds to the states.

MID-YEAR TAX CUTS

States cut taxes when experiencing surpluses, but by less than they raised them during downturns. During periods with unexpected surpluses, states cut taxes during the year, but not by the same magnitude that they had raised them during periods with unexpected deficits. From 1990 – 2015, states cut taxes mid-year by four cents per capita for each dollar of unexpected surplus (compared to raising them by eight cents during a deficit). They cut the following year's taxes by 12 cents, compared to the 22-cent increase when experiencing a negative shock. However, this relationship isn't consistent over the entire period. In the post-Great Recession period from 2008 – 2015 and 2010-2015, states cut mid-year taxes when experiencing unexpected surpluses by more than they had raised them during downturns.

Budget Processes and Fiscal Shock

Next, we introduced budget processes into our equations, interacting fiscal institutions with both the surplus and deficit shock variables to understand how state fiscal institutions influenced states' responses to fiscal shocks. Poterba (1994) found that states with fiscal institutions responded

differently to fiscal shocks than those without, or with only weak, institutions in place. We estimated regression equations of the following forms.

BALANCED BUDGET REQUIREMENTS AND FISCAL SHOCK

To examine the effect of weak BBRs on state adjustment to fiscal shock, we estimated (equation 4b):

$$\begin{vmatrix}\textbf{budcut}\\ \textbf{Taxch}\\ \textbf{Taxnxt}\end{vmatrix} = b + a_1{*}surplus + a_2{*}deficit + a_3{*}wbbr + a_4{*}wbbr{*}surplus + a_5{*}wbbr{*}deficit + error$$

This time, we included a level variable (wbbr) illustrating how states responded if they had weak BBRs (coefficient a_3), typically only requiring a governor to propose a balanced budget. However, our main interest were the interaction terms, which measure how states with weak rules responded to unexpected deficits or surpluses compared to strong-BBR states (illustrated by coefficients a_4 and a_5). Table 7 reports results from this second set of regressions.

Weak-BBR states cut their budgets by less than strong BBR-states when experiencing unexpected deficits, with stronger effects in the most recent period. From 1990 – 2015, states with a weak BBR (or none) cut their budgets by 24 cents less per capita than states with a strong BBR, for each dollar of unexpected deficit.

However, results from the full study period were influenced by dynamics in the latter half of the period (2008 – 2015), when states with weak BBRs cut their budgets even less aggressively than in the previous period, compared to states with strong BBRs. From 2008 – 2015, states with a weak BBR (or none) cut their budget by 31 cents less per capita than states with strong BBRs, per dollar of unexpected deficit (compared to only 18 cents less in the period from 1990 – 2007). Thus, stronger budget rules were associated with stronger state actions to balance their budgets, especially in the most recent period.

TABLE 7

Balanced Budget Requirements and Fiscal Shock

State random effects with year fixed effects

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	-0.005	-0.036***	-0.170***	0.001	-0.033***	-0.166***	-0.01	-0.040*	-0.144*	0.004	-0.057*	-0.167*
	(0.016)	(0.009)	(0.032)	(0.015)	(0.01)	(0.037)	(0.039)	(0.02)	(0.066)	(0.04)	(0.025)	(0.072)
deficit	-0.337***	-0.068***	-0.204***	-0.343***	-0.065***	-0.244***	-0.338***	-0.073***	-0.168***	-0.362***	-0.084**	-0.160*
	(0.014)	(0.009)	(0.029)	(0.017)	(0.011)	(0.038)	(0.028)	(0.015)	(0.047)	(0.04)	(0.026)	(0.073)
weak bbr	2.573	-1.138	-12.021	0.851	-7.350***	-15.843+	6.171	2.057	-12.701	10.804+	-0.017	-12.77
	(3.303)	(1.735)	(7.763)	(3.267)	(1.956)	(8.635)	(6.64)	(3.135)	(12.423)	(6.313)	(3.858)	(12.183)
weak bbr + surplus	-0.02	-0.016	0.134**	-0.028	0.070***	0.141+	-0.005	-0.055*	0.14	-0.025	-0.039	0.154+
	(0.025)	(0.015)	(0.052)	(0.032)	(0.021)	(0.074)	(0.05)	(0.026)	(0.087)	(0.049)	(0.03)	(0.089)
weak bbr + deficit	0.242***	-0.031*	-0.041	0.183***	-0.147***	-0.181**	0.306***	0.067**	0.078	0.347***	0.079*	0.112
	(0.024)	(0.015)	(0.048)	(0.029)	(0.019)	(0.066)	(0.043)	(0.023)	(0.071)	(0.051)	(0.032)	(0.091)
_cons	9.702*	8.481**	55.022***	9.044*	8.176**	52.304***	43.455***	-2.504	45.746***	50.196***	2.109	18.395
	(4.833)	(2.979)	(10.004)	(4.244)	(2.801)	(9.938)	(7.836)	(4.089)	(13.362)	(6.771)	(3.671)	(12.253)
r2_a	0.524	0.16	0.196	0.488	0.234	0.233	0.547	0.175	0.132	0.482	0.166	0.062
N	1274	1274	1274	882	882	882	392	392	392	294	294	294

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates p < 0.10, * p < 0.05, ** p < 0.01, and ***p < 0.001. Deficit values are negative, surplus values are positive, budcut values are positive (representing the absolute value of mid-year budget cuts), and positive values for taxch and taxnxt reflect tax increases, while negative values reflect tax cuts. Analysis excludes Alaska.

States with weak BBRs raised mid-year taxes more than states with strong BBRs, but only in the pre-Recession period. Over the full study period, states with a weak BBR (or none) raised mid-year taxes by 3 cents more per capita than states with a strong BBR, for each dollar of unexpected deficit. These results are unexpected, as one would expect states with weak budget rules to raise taxes less during times of fiscal stress than states strictly required to balance their budget.

These results are driven by actions during the earlier period, however. From 2008 – 2015, weak-BBR states raised taxes by seven cents *less* per capita than strong-BBR states, for every dollar of unexpected deficit. From 1990 – 2007, however, they raised taxes by 15 cents more than strong BBR states mid-year. These results suggest that stringent BBRs, relative to weak BBRs, produced even tighter fiscal outcomes in the 2008 – 2015 period compared to the preceding period (1990 – 2007).

States with weak BBRs relied more evenly on mid-year tax hikes and budget cuts than did states with strong BBRs. From 1990 – 2015, states with weak BBRs cut mid-year budgets *and* raised mid-year taxes by approximately 10 cents per capita, for each dollar of unexpected deficit.[35] Results were not statistically significant for the following year's taxes. Strong BBR states, by comparison, cut budgets more than they raised taxes mid-year. Strong BBR states cut spending by 34 cents per capita and raised taxes by only 7 cents per capita over the full study period.

From 2008 – 2015 period, weak BBR states relied more heavily on budget cuts to overcome a deficit, but adjustments to bridge the fiscal gap were small: weak BBR states cut budgets by three cents and raised taxes by one cent per capita, for each dollar of unexpected deficits. Results for next year's taxes were not statistically significant. Results for strong BBR states held throughout each time period, with strong BBR states continuing to rely heavily on budget cuts, rather than mid-year tax raises (from 1990 – 2007 and 2008 – 2015). Their adjustments were also consistently larger. Most of the time-period variation occurred in weak BBR states. We found little difference across states with strong and weak budget rules during periods of surpluses. This is not surprising given that budcut only measures spending cuts (not increases) and that BBRs are asymmetric, requiring spending to be less than revenues raised but making no claims on how states should spend or save excess funds.

TAX AND EXPENDITURE LIMITS AND FISCAL SHOCK

To examine the effects of strict tax and expenditure limits (equation 4c):

[35] Totals arrived at by adding the coefficients for deficit and wbbr*def together. Interaction and base terms are additive.

$$\left.\begin{matrix}\textbf{budcut}\\ \textbf{taxch}\\ \textbf{taxnxt}\end{matrix}\right| = b + a_1*surplus + a_2*deficit + a_3*stel + a_4*stel*surplus + a_5*stel*deficit + error$$

We looked at whether states with strict TELs reacted differently when facing unexpected deficits or surpluses. Expenditure limits dictate that spending cannot grow by more than a certain amount each fiscal year, based either on changes in personal income or inflation and demographic growth. Revenue limits, on the other hand, restrict increases in general fund revenues or require a supermajority vote of the legislature (or public voter approval) to increase state tax rates. We examined how TELs affected a state's likelihood of cutting spending or raising taxes. Additionally, spending and tax limits can have different effects, we examine these effects separately.

Table 8 reports results from our third set of regressions (equation 4c), exploring how states responded to surplus and deficit shocks in the presence of binding TELs, and Table 9 explores differential effects between expenditure limits and revenue limits.

States cut budgets when unexpected deficits occurred, but only in the later period did this vary with the presence of binding TELs. From 1990 – 2007, states experiencing deficits cut spending by 29 cents, and this did not vary based on if there was a TEL in place (i.e., no statistically significant effect, and coefficient close to zero).

However, during the 2008-2015 period, while states with binding TELs maintained this level of budget trimming [adding the coefficient on deficit (16 cents) and the interaction term (15 cents) for a total of 31 cents per capita for each dollar of unexpected deficit], those without binding TELs only cut budgets by 16 cents per dollar of unexpected deficit per capita.

States with binding TELs raised mid- and next-year's taxes by more than other states. Binding-TEL states raised taxes by eight cents more per capita than other states (and 13 cents more per capita in the following year).

Results differed slightly in the earlier and later years. From 2008 – 2015, binding-TEL states raised taxes by nine cents more per capita from 2008 – 2015 (compared to only seven cents more from 1990 – 2007). Even more pronounced, they raised next year's taxes by 17 cents more than other states from 2008 – 2015, compared to only 11 cents more per capita from 1990 – 2007.

As with BBRs, these results seem to suggest that, compared to nonbinding TELs, bindings TELS were *more* binding on state budget actions in later than earlier years.

TABLE 8

Tax and Expenditure Limits and Fiscal Shocks

State random effects with year fixed effects

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**Taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	-0.023	-0.056***	-0.115***	-0.007	-0.024+	-0.151***	-0.026	-0.085***	-0.055	-0.024	-0.094***	-0.048
	(0.016)	(0.009)	(0.032)	(0.02)	(0.013)	(0.045)	(0.029)	(0.014)	(0.048)	(0.027)	(0.016)	(0.048)
deficit	-0.227***	-0.041***	-0.160***	-0.294***	-0.073***	-0.244***	-0.160***	-0.01	-0.072	-0.086**	-0.015	-0.048
	(0.016)	(0.01)	(0.032)	(0.02)	(0.013)	(0.045)	(0.029)	(0.015)	(0.046)	(0.03)	(0.019)	(0.052)
strong tel	-1.194	-3.708*	-3.432	1.372	-2.3	-5.958	-5.791	-3.53	0.52	-7.201	-1.332	4.863
	(3.126)	(1.538)	(6.591)	(3.026)	(1.838)	(7.672)	(6.324)	(2.885)	(11.026)	(6.098)	(3.617)	(11.224)
strong tel + surplus	0.019	0.034*	-0.01	0.008	0.008	0.034	0.031	0.049	-0.071	0.026	0.04	-0.11
	(0.026)	(0.014)	(0.051)	(0.027)	(0.017)	(0.062)	(0.065)	(0.031)	(0.105)	(0.061)	(0.037)	(0.107)
strong tel + deficit	-0.069**	-0.082***	-0.133**	0.009	-0.069***	-0.101+	-0.153***	-0.085***	-0.170**	-0.246***	-0.073*	-0.169+
	(0.022)	(0.013)	(0.044)	(0.027)	(0.018)	(0.06)	(0.041)	(0.021)	(0.066)	(0.057)	(0.035)	(0.097)
_cons	11.617*	10.020***	52.808***	8.335+	7.726**	50.600***	6.653	1.149	5.375	63.270***	-2.379	4.566
	(4.996)	(2.922)	(9.82)	(4.368)	(2.883)	(9.94)	(6.787)	(3.843)	(11.085)	(6.589)	(4.008)	(10.561)
r2_a	0.481	0.181	0.203	0.458	0.196	0.231	0.498	0.187	0.146	0.432	0.156	0.062
N	1274	1274	1274	882	882	882	392	392	392	294	294	294

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates p < 0.10, * p < 0.05, ** p < 0.01, and ***p < 0.001. Deficit values are negative, surplus values are positive, budcut values are positive (representing the absolute value of mid-year budget cuts), and positive values for taxch and taxnxt reflect tax increases, while negative values reflect tax cuts. Analysis excludes Alaska.

TABLE 9

Separate Revenue and Expenditure Limits and Fiscal Shocks

State random effects with year fixed effects

	1990 – 2015			1990 – 2007			2008 - 2015			2010 - 2015		
	budcut	**Taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	-0.026	-0.053***	-0.114***	-0.014	-0.022+	-0.146***	-0.026	-0.083***	-0.05	-0.026	-0.092***	-0.04
	(0.016)	(0.009)	(0.031)	(0.019)	(0.012)	(0.043)	(0.029)	(0.014)	(0.048)	(0.027)	(0.016)	(0.048)
deficit	-0.237***	-0.047***	-0.172***	-0.295***	-0.083***	-0.266***	-0.180***	-0.013	-0.080+	-0.108***	-0.015	-0.059
	(0.016)	(0.009)	(0.03)	(0.019)	(0.012)	(0.042)	(0.028)	(0.014)	(0.044)	(0.031)	(0.018)	(0.051)
strong revlim	-6.803+	0.099	0.206	-5.873+	2.721	0.533	-8.351	-2.161	-7.255	-5.333	-2.348	-3.408
	(3.504)	(1.605)	(7.045)	(3.323)	(1.85)	(8.088)	(7.009)	(3.116)	(11.965)	(6.591)	(3.914)	(12.39)
strong revlim + surplus	0.046	0.053***	0.022	0.044	0.030+	0.057	0.018	0.044	0.053	-0.012	0.047	0.014
	(0.03)	(0.016)	(0.058)	(0.029)	(0.017)	(0.066)	(0.085)	(0.041)	(0.137)	(0.082)	(0.049)	(0.142)
strong revlim + deficit	-0.111***	0.044**	0.085+	-0.078*	0.104***	0.262***	-0.127*	-0.022	-0.137+	-0.125+	-0.045	0.026
	(0.026)	(0.015)	(0.05)	(0.031)	(0.019)	(0.068)	(0.05)	(0.024)	(0.078)	(0.073)	(0.044)	(0.121)
strong explim	3.829	-3.279+	-1.886	6.456+	-3.666+	-4.693	-0.803	-0.521	12.185	-3.331	2.965	20.771
	(3.996)	(1.875)	(8.022)	(3.745)	(2.099)	(9.151)	(8.333)	(3.775)	(14.089)	(8.102)	(4.819)	(14.877)
strong explim + surplus	-0.006	-0.023	-0.065	-0.024	-0.048*	-0.026	0.027	0.019	-0.245+	0.028	0.003	-0.311*
	(0.032)	(0.018)	(0.063)	(0.032)	(0.02)	(0.071)	(0.085)	(0.041)	(0.134)	(0.081)	(0.048)	(0.138)
Strong explim + deficit	0.016	-0.124***	-0.210***	0.081**	-0.145***	-0.272***	-0.048	-0.082***	-0.084	-0.118+	-0.054	-0.147
	(0.024)	(0.014)	(0.047)	(0.029)	(0.018)	(0.063)	(0.046)	(0.023)	(0.072)	(0.071)	(0.042)	(0.116)
_cons	12.189*	9.736***	52.178***	9.451*	7.221**	49.049***	57.703***	1.264	6.468	65.107***	3.005	14.729
	(4.979)	(2.83)	(9.687)	(4.32)	(2.694)	(9.656)	(7.851)	(3.821)	(11.018)	(6.648)	(3.652)	(11.333)
r2_a	0.483	0.228	0.215	0.465	0.291	0.265	0.488	0.188	0.145	0.406	0.153	0.065
N	1274	1274	1274	882	882	882	392	392	392	294	294	294

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates p < 0.10, * p < 0.05, ** p < 0.01, and ***p < 0.001. Deficit values are negative, budcut values are positive (representing the absolute value of mid-year budget cuts), and positive values for taxch and taxnxt reflect tax increases, while negative values reflect tax cuts.

R EVENUE AND EXPENDITURE LIMITS AND FISCAL SHOCK

Although TELs, as a general category, include *both* revenue and spending limits, we might expect different types of limits to have different effects on budget cuts and tax changes. Are states that limit revenues increase more, or less, likely to implement tax changes as compared to cutting spending? Similarly, in periods of unexpected surplus, are states that limit future tax increases more, or less, likely to cut next year's tax rates? Thus, we examine how states with strict revenue or expenditure limits react for every additional dollar of unexpected surplus or deficit, *compared to states with no, or a nonbinding, limit.*

To examine the effects of strict revenue and expenditure limits separately, we estimated (equation 4d):

$$\left.\begin{matrix}\textbf{budcut}\\ \textbf{Taxch}\\ \textbf{Taxnxt}\end{matrix}\right| = b + a_1{*}surplus + a_2{*}deficit + a_3{*}srevlim + a_4{*}sexplim + a_5{*}srevlim{*}surplus + a_6{*}srevlim{*}deficit + a_7{*}sexplim{*}surplus + a_8{*}sexplim{*}deficit + error$$

Table 9 shows results for revenues and expenditures, separately.

States with binding revenue limits cut budgets more aggressively than states without (including states with just expenditure limits), especially during the Great Recession. From 1990-2007, states without a binding TEL cut spending by 30 cents for each unexpected dollar of deficit per capita. States with binding revenue limits cut spending by an additional 8 cents, while those with spending limits cut budgets by 8 cents less. From 2008-2015, we found that states without a binding revenue limit cut spending by about half as much (18 cents) as in the period before that. But states with binding revenue limits raised taxes by an additional 12 cents per dollar of unexpected deficit during that period (compared to only eight cents in the previous period). States with strong expenditure limits also cut budgets, but only by an additional four cents from 2008-2015.

During the early period (from 1990 – 2007), states with binding expenditure limits raised taxes more in response to unexpected deficits, as compared to states without (including states with just revenue limits). From 1990-2007 states with unexpected deficits, and no binding TEL, raised taxes by 8 cents mid-year and 27 cents in the next year. States with binding tax limits did not undertake these increases. In contrast, states with binding expenditure limits responded to unexpected deficits by raising taxes 15 cents per capita more.

During the 2008-2015 period, only states with binding expenditure limits raised taxes in response to unexpected deficits mid-year, but states with binding revenue limits did raise taxes for the following year.

States with binding spending limits raised taxes by 8 cents per capita, per dollar of unexpected deficit, during the current budget year. States without binding TELs responded by raising taxes by 8 cents the following year, while those with strict revenue limits raised next year's taxes by an additional 14 cents.

Overall, strict-revenue limited states relied more on budget cuts than tax increases during deficits, while those with expenditure limits relied more on tax cuts. The above findings illustrate how limiting one fiscal option for bridging deficit gaps may encourage use of alternatives. States with binding revenue limits are more likely to bridge gaps by cutting spending, while states with expenditure limits are more likely to rely on tax raises.

Party Control and Fiscal Shock

Lastly, we wanted to understand the influence of divided government and party control on states' responses to surplus and deficit shocks, in the presence or absence of different institutions. We wanted to test whether any observable patterns in states' response to unexpected deficits are attributable to the fiscal institutions of interest, rather than party dynamics.

UNIFIED GOVERNMENT AND FISCAL SHOCK

To examine the effect of unified party control, alone, we estimated (equation 4e):

$$\left.\begin{matrix}\textbf{budcut}\\ \textbf{taxch}\\ \textbf{taxnxt}\end{matrix}\right| = b + a_1*surplus + a_2*deficit + a_3*dem + a_4*rep + a_5*dem*surplus + a_6*dem*deficit + a_7*rep*surplus + a_8*rep*deficit$$

Where a_3 is the coefficient on Democratic unified control (i.e. how much a state cut spending (budcut), raised its taxes mid-year (taxch), or raised taxes the following year (taxnxt) per capita for every additional dollar of surplus or deficit spending), and a_4 is the coefficient on unified Republican control.

Interaction term coefficients represent how much more states will cut budgets or raise taxes, per every dollar of deficit or surplus spending, when they have either Democratic or Republic control, *compared to states with divided government.* This equation evaluates the effect of unified government, alone, on fiscal responses.

Table 10 presents results on how Republican and Democratic party control affected states' decisions to cut budgets or raise taxes (equation 4e). Unlike fiscal institutions, the fundamental relationships between party control and responses to deficits are more stable. Results for

Democratically unified governments were not statistically significant except for the 2010 – 2015 period.

From 2010 – 2015, both Republican- and Democratic unified state governments cut budgets less than divided state governments when experiencing an unexpected deficit. And Republican-unified governments cut budgets even less than Democratic unified state governments. States controlled by the Democratic party cut budgets by 31 cents less per capita than states with divided governments, per every dollar of unexpected deficit. While Republican-controlled governments cut their budgets by 36 cents less.

From 2010 – 2015, Democratic unified state governments raised taxes more than divided governments. Democratic unified governments raised taxes 16 cents *more* per capita, for each dollar of deficit, than divided governments. Results for unified Republican governments were not statistically significant.

Across the full study period (1990 – 2015), Republican-controlled governments raised taxes less than divided governments when experiencing unexpected deficits. From 1990 – 2015, Republican-controlled governments raised mid-year taxes by 10 cents less per capita for each dollar of unexpected deficit than divided governments. They raised next-year's taxes by 27 cents less per capita per deficit dollar.

Both Republican and Democratic controlled governments cut taxes when experiencing unexpected surpluses, though this is only true for unified Democratic governments before 2008. From 1990 – 2007, Republican-controlled governments cut mid-year taxes by 6 cents less per capita for each dollar of unexpected surplus while Democrats cut taxes by 5 cents more. After 2008, Democrats were no more likely to cut taxes, but Republican controlled states cuts taxes by 9 cents for every dollar of surplus, though this is only marginally statistically significant.

TABLE 10

Party Control and State Adjustments to Fiscal Shock

State random effects with year fixed effects

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	-0.003	0.003	-0.114**	0.005	0.002	-0.125**	-0.004	-0.008	-0.017	0.008	-0.049	-0.096
	(0.02)	(0.011)	(0.039)	(0.018)	(0.011)	(0.042)	(0.079)	(0.039)	(0.124)	(0.079)	(0.049)	(0.139)
deficit	-0.298***	-0.108***	-0.288***	-0.292***	-0.120***	-0.316***	-0.313***	-0.088***	-0.277***	-0.412***	-0.023	-0.085
	(0.017)	(0.01)	(0.033)	(0.018)	(0.012)	(0.04)	(0.039)	(0.019)	(0.061)	(0.051)	(0.031)	(0.089)
dem	2.481	2.806	10.265	6.259+	1.171	5.374	-4.292	7.081+	17.255	7.34	1.336	7.185
	(3.356)	(1.966)	(6.524)	(3.501)	(2.293)	(7.921)	(8.01)	(3.887)	(12.558)	(8.238)	(5.069)	(14.686)
dem + surplus	-0.026	-0.041*	-0.007	-0.034	-0.047*	-0.008	-0.019	-0.025	-0.099	-0.064	0.023	0.026
	(0.033)	(0.019)	(0.064)	(0.035)	(0.023)	(0.079)	(0.096)	(0.047)	(0.15)	(0.095)	(0.059)	(0.168)
dem + deficit	0.004	0.006	-0.019	-0.001	0.027	0.044	0.005	-0.013	-0.082	0.313***	-0.163**	-0.369**
	(0.028)	(0.017)	(0.055)	(0.032)	(0.022)	(0.072)	(0.057)	(0.029)	(0.089)	(0.081)	(0.05)	(0.141)
rep	3.761	4.963**	-2.519	2.366	2.396	-9.161	2.59	7.379*	3.105	3.565	3.902	-4.534
	(3.285)	(1.863)	(6.457)	(3.931)	(2.513)	(9.096)	(7.118)	(3.405)	(11.262)	(6.787)	(4.176)	(12.28)
rep + surplus	-0.014	-0.090***	0.012	-0.012	-0.063**	-0.02	-0.01	-0.091*	-0.034	-0.025	-0.055	0.043
	(0.028)	(0.016)	(0.054)	(0.034)	(0.022)	(0.078)	(0.085)	(0.042)	(0.134)	(0.083)	(0.051)	(0.147)
rep + deficit	0.158***	0.100***	0.266***	0.121*	0.090*	0.162	0.179***	0.085***	0.283***	0.362***	0.019	0.07
	(0.027)	(0.016)	(0.053)	(0.053)	(0.035)	(0.117)	(0.048)	(0.024)	(0.075)	(0.06)	(0.037)	(0.104)
_cons	8.518+	4.516	40.664***	7.283+	5.406+	43.615***	51.178***	-7.851+	-2.761	1.605	-0.251	10.609
	(5.046)	(2.969)	(9.855)	(4.411)	(2.923)	(9.998)	(8.749)	(4.297)	(12.455)	(7.354)	(4.525)	(14.296)
r2_a	0.492	0.197	0.223	0.456	0.196	0.229	0.504	0.209	0.204	0.474	0.211	0.103
N	1248	1248	1248	864	864	864	384	384	384	288	288	288

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates p < 0.10, * p < 0.05, ** p < 0.01, and ***p < 0.001. Deficit values are negative, surplus values are positive, budcut values are positive (representing the absolute value of mid-year budget cuts), and positive values for taxch and taxnxt reflect tax increases, while negative values reflect tax cuts. Analysis excludes Alaska and Nebraska.

FISCAL INSTITUTIONS AND UNIFIED GOVERNMENT

To examine the effect of fiscal institutions (weak BBRs or strict TELs) combined with unified government (equation 4f):

$$\begin{matrix}\textbf{budcut}\\ \textbf{Taxch}\\ \textbf{Taxnxt}\end{matrix} = b + a_1*surplus + a_2*deficit + a_3*inst + a_4*dem + a_5*rep + a_6*inst*surplus + a_7*inst*deficit + a_8*dem*surplus + a_9*dem*deficit + a_{10}*rep*surplus + a_{11}*rep*deficit + a_{12}(dem\ and\ inst)*surplus + a_{13}*(dem * inst)*deficit + a_{14}*(rep *inst)*surplus + a_{15}*(rep*inst)*deficit + error$$

In the above equation, we incorporated three-way interaction terms between either weak BBR or tax and expenditure limits, party control, and fiscal shock. This will help us parse if the presence or absence of balanced budget rules or a strict tax or expenditure limit has a different effect if Republicans or Democrats control the executive and legislative branch. As noted above, as we interacted more variables, the number of state-year pairs that fit into each grouping becomes smaller.

While Tables 11 and 12 present the results for weak balanced budget rules and tax and expenditure limits respectively, the results largely reflect our earlier findings. That is, we found that prior results for fiscal institutions and party control were similar and we didn't have enough power to generally find additional effects. The main exception to this finding was that we do find that in the interactions of same party control and TELs, that in the 2008-2015 period while Republican controlled governments cut spending less in later periods if faced with an unexpected deficit, this is somewhat offset if they have a strict TEL in place. Similarly, Republican controlled states with a TEL in the 1990-2007 period also are less likely than others to raise taxes when faced with an unexpected deficit, but this is mitigated if they have a strong TEL in place.

TABLE 11

Balanced Budget Requirements and State Party Control

State random effects with year fixed effects

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	0.002	-0.014	-0.180***	0.017	-0.018	-0.203***	-0.039	-0.012	-0.001	-0.005	-0.075	-0.151
	(0.021)	(0.012)	(0.043)	(0.019)	(0.012)	(0.046)	(0.094)	(0.048)	(0.155)	(0.096)	(0.064)	(0.187)
deficit	-0.356***	-0.067***	-0.203***	-0.347***	-0.049***	-0.188***	-0.364***	-0.100***	-0.273***	-0.545***	-0.026	-0.088
	(0.019)	(0.011)	(0.037)	(0.02)	(0.013)	(0.045)	(0.041)	(0.021)	(0.066)	(0.053)	(0.035)	(0.101)
weak bbr	2.811	-8.640***	-26.029**	7.053+	-11.989***	-33.777**	-4.613	6.466	-4.272	0.928	3.593	-5.694
	(4.556)	(2.435)	(9.879)	(4.043)	(2.454)	(11.171)	(11.436)	(5.705)	(19.356)	(11.106)	(7.385)	(22.536)
weak bbr + surplus	-0.037	0.087**	0.279**	-0.064	0.104***	0.324**	0.011	-0.001	-0.067	-0.017	0.057	0.083
	(0.051)	(0.03)	(0.101)	(0.049)	(0.031)	(0.111)	(0.162)	(0.084)	(0.264)	(0.15)	(0.099)	(0.286)
weak bbr + deficit	0.206***	-0.171***	-0.341***	0.178***	-0.239***	-0.428***	0.290**	0.084+	-0.024	0.462***	0.032	-0.036
	(0.035)	(0.021)	(0.068)	(0.035)	(0.022)	(0.078)	(0.097)	(0.05)	(0.157)	(0.101)	(0.067)	(0.191)
dem	4.703	0.553	3.911	11.330**	-2.9	-4.412	-10.175	9.523*	17.117	4.97	1.707	5.145
	(3.712)	(2.2)	(7.393)	(3.846)	(2.447)	(8.89)	(8.826)	(4.482)	(14.588)	(8.815)	(5.862)	(17.254)
dem + surplus	-0.031	-0.026	0.06	-0.048	-0.027	0.076	0.02	-0.025	-0.122	-0.054	0.051	0.079
	(0.034)	(0.02)	(0.067)	(0.036)	(0.023)	(0.082)	(0.108)	(0.055)	(0.177)	(0.109)	(0.072)	(0.211)
dem + deficit	0.019	-0.047**	-0.152*	0.005	-0.058*	-0.183*	0.013	-0.008	-0.09	0.500***	-0.220***	-0.398*
	(0.03)	(0.018)	(0.06)	(0.035)	(0.023)	(0.078)	(0.059)	(0.031)	(0.096)	(0.088)	(0.058)	(0.168)
dem + weak bbr	-3.736	11.188*	38.647*	-12.719	17.079**	53.311**	13.837	-9.176	2.045	3.018	-6.594	7.386
	(8.083)	(4.846)	(16.011)	(8.433)	(5.406)	(19.175)	(19.501)	(9.993)	(31.988)	(19.583)	(13.022)	(38.434)
dem + weak bbr + surplus	-0.035	-0.082	-0.476*	-0.03	-0.1	-0.565*	0.213	0.002	0.093	0.594	-0.013	-0.189
	(0.118)	(0.071)	(0.232)	(0.114)	(0.074)	(0.254)	(0.402)	(0.209)	(0.654)	(0.513)	(0.341)	(0.954)
dem + weak bbr + deficit	0.003	0.244***	0.700***	0.11	0.318***	1.036***	-0.153	-0.03	0.061	-0.719***	0.153	0.139
	(0.072)	(0.043)	(0.143)	(0.08)	(0.051)	(0.179)	(0.161)	(0.083)	(0.262)	(0.172)	(0.115)	(0.33)
rep	0.8	3.997+	0.673	5.293	1.384	-21.103*	-10.427	9.657*	21.568	-7.24	5.707	8.155
	(4.014)	(2.319)	(8.096)	(4.474)	(2.798)	(10.751)	(8.538)	(4.273)	(14.294)	(8.088)	(5.378)	(16.1)
rep + surplus	0.003	-0.092***	-0.071	-0.033	-0.088***	0.013	0.087	-0.078	-0.319	0.042	-0.024	-0.174
	(0.039)	(0.023)	(0.079)	(0.041)	(0.026)	(0.094)	(0.12)	(0.06)	(0.199)	(0.116)	(0.077)	(0.227)
rep + deficit	0.067+	0.059**	0.207**	0.084	0.049	0.042	0.056	0.094**	0.331***	0.197*	-0.001	0.021

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
	(0.035)	(0.021)	(0.07)	(0.061)	(0.039)	(0.138)	(0.058)	(0.03)	(0.094)	(0.087)	(0.058)	(0.162)
rep + weak bbr	-0.82	6.095	10.711	-10.193	6.874	44.597*	13.555	-13.494+	-41.153	10.694	-12.505	-30.9
	(7.057)	(4.114)	(14.171)	(8.277)	(5.216)	(19.555)	(15.516)	(7.898)	(25.619)	(14.448)	(9.607)	(29.024)
rep + weak bbr + surplus	0.021	-0.059	-0.055	0.085	0.006	-0.23	-0.07	-0.001	0.426	-0.038	-0.051	0.273
	(0.065)	(0.039)	(0.13)	(0.075)	(0.048)	(0.17)	(0.181)	(0.093)	(0.298)	(0.165)	(0.11)	(0.318)
rep + weak bbr+ deficit	0.084	0.176***	0.330**	0.092	0.192**	0.479+	0.023	-0.082	-0.035	-0.102	-0.011	0.104
	(0.056)	(0.034)	(0.111)	(0.109)	(0.07)	(0.245)	(0.116)	(0.06)	(0.188)	(0.13)	(0.086)	(0.244)
_cons	8.473+	6.572*	47.300***	5.672	8.639**	53.435***	46.652***	-6.647	12.97	4.505	-2.654	8.604
	(5.089)	(3.002)	(10.294)	(4.455)	(2.853)	(10.511)	(9.251)	(4.128)	(13.377)	(7.339)	(4.88)	(15.032)
r2_a	0.531	0.238	0.242	0.495	0.297	0.26	0.55	0.208	0.201	0.557	0.223	0.102
N	1248	1248	1248	864	864	864	384	384	384	288	288	288

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates p < 0.10, * p < 0.05, ** p < 0.01, and ***p < 0.001. Deficit values are negative, surplus values are positive, budcut values are positive (representing the absolute value of mid-year budget cuts), and positive values for taxch and taxnxt reflect tax increases, while negative values reflect tax cuts. Analysis excludes Alaska and Nebraska.

TABLE 12

Tax and Expenditure Limits and State Party Control

State random effects with year fixed effects

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
surplus	-0.006	-0.041*	-0.178**	0	-0.038*	-0.197**	-0.017	-0.042	-0.11	-0.016	-0.051	-0.123
	(0.028)	(0.016)	(0.055)	(0.027)	(0.017)	(0.061)	(0.09)	(0.044)	(0.14)	(0.089)	(0.056)	(0.157)
deficit	-0.303***	-0.037*	-0.205***	-0.303***	-0.043*	-0.224***	-0.309***	-0.022	-0.189+	-0.299***	-0.012	-0.071
	(0.027)	(0.015)	(0.051)	(0.027)	(0.017)	(0.06)	(0.067)	(0.032)	(0.103)	(0.071)	(0.045)	(0.126)
strong tel	3.66	-4.814*	-11.641	1.591	-3.902+	-11.05	5.516	-7.031	-17.196	0.253	-0.818	-10.699
	(4.151)	(2.178)	(8.453)	(3.928)	(2.356)	(9.703)	(10.98)	(5.2)	(17.597)	(11.221)	(7.023)	(20.742)
strong tel + surplus	0.006	0.070**	0.108	0.01	0.064**	0.124	0.122	0.095	0.367	0.165	0.001	-0.031
	(0.039)	(0.022)	(0.076)	(0.036)	(0.022)	(0.083)	(0.208)	(0.102)	(0.324)	(0.209)	(0.131)	(0.368)
strong tel + deficit	0.006	-0.111***	-0.133*	0.019	-0.122***	-0.146*	-0.015	-0.100**	-0.148	-0.220*	-0.027	-0.039
	(0.032)	(0.019)	(0.062)	(0.033)	(0.021)	(0.074)	(0.078)	(0.038)	(0.121)	(0.093)	(0.058)	(0.163)
dem	4.373	0.256	1.642	6.853	-2.29	-8.145	1.94	5.542	17.08	6.827	3.615	3.921
	(4.53)	(2.589)	(8.828)	(4.743)	(2.971)	(10.809)	(10.728)	(5.238)	(16.662)	(10.996)	(6.881)	(19.938)
dem + surplus	-0.033	0.005	0.05	-0.042	0.021	0.116	-0.029	-0.016	-0.082	-0.035	-0.017	-0.048
	(0.047)	(0.027)	(0.091)	(0.05)	(0.032)	(0.111)	(0.119)	(0.058)	(0.184)	(0.123)	(0.077)	(0.217)
dem + deficit	0.021	-0.060**	-0.053	0.014	-0.075**	-0.053	0.04	-0.031	-0.044	0.13	-0.132+	-0.21
	(0.039)	(0.023)	(0.075)	(0.041)	(0.026)	(0.091)	(0.09)	(0.044)	(0.14)	(0.11)	(0.069)	(0.197)
dem + strong tel	-4.428	2.515	16.017	-0.724	5.801	25.187	-11.841	2.192	2.039	4.21	-5.221	5.64
	(6.803)	(3.901)	(13.241)	(7.202)	(4.542)	(16.274)	(16.416)	(7.886)	(25.866)	(16.542)	(10.352)	(30.049)
dem + strong tel + surplus	0.015	-0.077*	-0.088	0.021	-0.133**	-0.218	-0.074	-0.046	-0.22	-0.185	0.072	0.194
	(0.066)	(0.038)	(0.128)	(0.071)	(0.045)	(0.159)	(0.235)	(0.115)	(0.366)	(0.236)	(0.148)	(0.416)
dem + strong tel + deficit	-0.046	0.096**	-0.004	-0.034	0.244***	0.137	-0.072	0.01	-0.091	0.366*	-0.07	-0.326
	(0.058)	(0.034)	(0.112)	(0.077)	(0.049)	(0.171)	(0.118)	(0.058)	(0.182)	(0.159)	(0.099)	(0.278)
rep	7.449+	0.73	-10.346	3.198	-3.104	-13.744	10.903	0.924	-14.438	9.025	0.426	-17.2
	(4.395)	(2.501)	(8.575)	(5.391)	(3.384)	(12.25)	(9.881)	(4.727)	(15.645)	(9.219)	(5.77)	(17.099)
rep + surplus	-0.015	-0.028	0.125+	-0.006	0.043	0.102	-0.006	-0.048	0.116	-0.008	-0.043	0.123
	(0.036)	(0.02)	(0.07)	(0.047)	(0.03)	(0.105)	(0.096)	(0.047)	(0.15)	(0.093)	(0.058)	(0.165)
rep + deficit	0.212***	0.035	0.188**	0.194*	-0.003	-0.013	0.225**	0.021	0.195+	0.274***	0.013	0.073
	(0.037)	(0.022)	(0.071)	(0.077)	(0.049)	(0.169)	(0.074)	(0.036)	(0.116)	(0.079)	(0.049)	(0.139)

	1990 - 2015			1990 - 2007			2008 - 2015			2010 - 2015		
	budcut	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**	**budcut**	**taxch**	**taxnxt**
rep + strong tel	-11.169+	8.860*	22.135+	-1.666	10.261*	7.87	-21.298	13.780+	52.473*	-14.847	7.423	38.226
	(6.581)	(3.709)	(12.885)	(7.717)	(4.827)	(17.625)	(14.915)	(7.126)	(23.602)	(14.45)	(9.043)	(26.557)
rep + strong tel + surplus	0.025	-0.155***	-0.337**	-0.014	-0.215***	-0.243	-0.05	-0.166	-0.857*	-0.102	-0.065	-0.428
	(0.062)	(0.035)	(0.121)	(0.069)	(0.043)	(0.154)	(0.239)	(0.116)	(0.373)	(0.232)	(0.145)	(0.412)
rep + strong tel + deficit	-0.182**	0.104**	0.155	-0.134	0.172*	0.317	-0.191+	0.093+	0.197	-0.001	-0.041	-0.063
	(0.059)	(0.035)	(0.115)	(0.105)	(0.067)	(0.233)	(0.108)	(0.053)	(0.167)	(0.144)	(0.09)	(0.25)
_cons	7.247	7.409*	46.973***	6.558	8.005**	49.805***	45.527***	0.905	28.081+	47.105***	-5.658	13.363
	(5.312)	(3.059)	(10.411)	(4.714)	(2.99)	(10.754)	(10.253)	(4.645)	(16.047)	(9.533)	(5.966)	(16.235)
r2_a	0.495	0.225	0.229	0.453	0.252	0.23	0.508	0.222	0.217	0.488	0.204	0.118
N	1248	1248	1248	864	864	864	384	384	384	288	288	288

Notes: Standard errors reported in parentheses. For tests of statistical significance, + indicates $p < 0.10$, * $p < 0.05$, ** $p < 0.01$, and ***$p < 0.001$. Deficit values are negative, surplus values are positive, budcut values are positive (representing the absolute value of mid-year budget cuts), and positive values for taxch and taxnxt reflect tax increases, while negative values reflect tax cuts. Analysis excludes Alaska and Nebraska.

Conclusion

The results in this report suggest that fiscal institutions and political factors still matter for short-run deficit dynamics. We found similar results to those found by prior authors beginning with Poterba (1994), however we found that relationships have changed in the period beginning in and following the Great Recession. States with relatively weak BBRs cut their budgets less than states with stricter rules and this relationship was stronger in more recent years. In part, this increased reliance on budget cuts reflects the recent reluctance of states with weak budget rules to raise taxes when faced with unexpected shortfalls, allowing them to offset their gaps by cutting spending instead.

Similarly, the presence of binding TELs affected actions more in the recent past than during earlier downturns. States with binding TELS both cut spending and increased taxes more than states without limits, or limits that could be exceeded with a simple majority vote. Interestingly, states with binding spending limits were more likely to raise revenues, while those with binding revenue caps were more likely to implement mid-year budget cuts or have larger cuts. This might represent more slack in the side of the budget that is not limited. For example, if you have a strict revenue or tax limit, this implies the need for voter approval or a supermajority vote of the legislature to raise taxes, which can be a higher hurdle to reach than cutting spending (which requires a simple majority vote). Similarly, states with expenditure limits might already have less slack in their budgets due to prior limits on growth.

We found that, since 2010, states with unified governments were less likely to cut spending to close budget gaps. Divided government states cut 30 cents for every dollar of unexpected deficit while unified governments did not. Republican governments were less likely to raise taxes during downturns, and more recently were more likely to cut taxes when unexpected surpluses arose. This is not totally surprising given political rhetoric. It may be easier to act if some of the responsibility can be shared. While we tried examining the interaction between fiscal institutions and political control, we were unable to find meaningful interactions, but this might reflect trying to tease out too many interactions.

Overall the fact that states seem to be closing less of the deficits that occurred and that these actions or inactions are related to fiscal controls could reflect either federal support that moved some spending needs from general fund accounts but more likely in part reflects states pushing decision-making into the future. In part, the fact that states continued to experience unexpected deficits even while the economy improved could reflect too optimistic forecasts or budgeting. We hope to further examine the interaction between political control and fiscal institutions but also investigate whether budget forecasting has also changed over the recent past.

References

Advisory Commission on Intergovernmental Relations. 1987. "Fiscal Discipline in The Federal System: National Reform and the Experience of the States." A-107. Washington, D.C.: Advisory Commission on Intergovernmental Relations.

Afonso, A. and Furceri, D., 2010. "Government Size, Composition, Volatility and Economic Growth." *European Journal of Political Economy*, *26*(4):.517-532.

Alesina, Alberto, and Tamim Bayoumi. 1996. "The Costs and Benefits of Fiscal Rules: Evidence from US States." Working Paper. Cambridge, MA: National Bureau of Economic Research. http://www.nber.org/papers/w5614.pdf.

Alt, James E., and Robert C. Lowry. 1994. "Divided Government, Fiscal Institutions, and Budget Deficits: Evidence from the States." *American Political Science Review* 88 (4): 811. doi:10.2307/2082709.

Bails, Dale G. 1990. "The Effectiveness of Tax-Expenditure Limitations: A Re-Evaluation: In 19 States They Resulted in Virtually No Success in Limiting Growth in Their Budgets." *The American Journal of Economics and Sociology* 49 (2): 223–38.

Baqir, Reza. 2002. "Districting and Government Overspending." *Journal of Political Economy* 110 (6): 1318–54.

Battaglini, M. and Coate, S., 2008. "A Dynamic Theory of Public Spending, Taxation, and Debt." *American Economic Review*, *98*(1): 201-36.

Bayoumi, Tamim, and Barry Eichengreen. 1995. "Restraining Yourself: The Implications of Fiscal Rules for Economic Stabilization." *Staff Papers - International Monetary Fund* 42 (1): 32. https://doi.org/10.2307/3867339.

Besley, Timothy, and Anne Case. 1995. "Does Electoral Accountability Affect Economic Policy Choices? Evidence from Gubernatorial Term Limits." *The Quarterly Journal of Economics* 110 (3): 769–98. https://doi.org/10.2307/2946699.

———. 2000. "Unnatural Experiments? Estimating the Incidence of Endogeneous Policies*." *The Economic Journal* 110 (November): F672–94.

———. 2003. "Political Institutions and Policy Choices." *Journal of Economic Literature* 41 (March): 7–73.

Bohn, Henning, and Robert P. Inman. 1996. "Balanced Budget Rules and Deficits: Evidence from the U.S. States." 5533. Cambridge, MA: National Bureau of Economic Research.

Campbell, A. L., and M. W. Sances. 2013. "State Fiscal Policy during the Great Recession: Budgetary Impacts and Policy Responses." *Annals of the American Academy of Political and Social Science* 650 (1): 252–273. doi:10.1177/0002716213500459.

Chodorow-Reich, Gabriel, Laura Feiveson, Zachary Liscow, and William Gui Woolston. 2012. "Does State Fiscal Relief During Recessions Increase Employment? Evidence from the American Recovery and Reinvestment Act." *American Economic Journal: Economic Policy* 4 (3): 118–45. https://doi.org/10.1257/pol.4.3.118.

Coleman, J.J., 1999. "Unified Government, Divided Government, and Party Responsiveness." *American Political Science Review*, *93*(4): 821-835.

Crain, W. Mark. 2003. *Volatile States: Institutions, Policy, and the Performance of American State Economies*. University of Michigan Press. https://www.press.umich.edu/16580/volatile_states.

Crain, W. Mark, and James C. Miller. 1990. "Budget Process and Spending Growth." *Wm. & Mary L. Rev.* 31 (4): 1021–46.

Dosi, Giovanni, et al. 2015 "Fiscal and monetary policies in complex evolving economies." *Journal of Economic Dynamics and Control* 52: 166-189.

Gordon, Tracy. 2012. "State and Local Fiscal Institutions in Recession and Recovery." In *The Oxford Handbook of State and Local Government Finance*. New York, New York: Oxford University Press.

Groseclose, Tim, and Nolan McCarty. 2001. "The Politics of Blame: Bargaining before an Audience." *American Journal of Political Science* 45 (1): 100. https://doi.org/10.2307/2669362.

Henisz, Witold Jerzy. 2004. "Political Institutions and Policy Volatility." *Economics and Politics* 16 (1): 1–27. https://doi.org/10.1111/j.1468-0343.2004.00129.x.

Hou, Yilin, and Daniel L. Smith. 2006. "A Framework for Understanding State Balanced Budget Requirement Systems: Reexamining Distinctive Features and an Operational Definition." *Public Budgeting & Finance* 26 (3): 22–45.

Krol, R., and S. Svorny. 2007. "Budget Rules and State Business Cycles." *Public Finance Review* 35 (4): 530–44. https://doi.org/10.1177/1091142106295761.

Levinson, Arik. 1998. "Balanced Budgets and Business Cycles: Evidence from the States." *National Tax Journal*, 715–732.

———. 2007. "Budget Rules and State Business Cycles: A Comment." *Public Finance Review* 35 (4): 545–49. https://doi.org/10.1177/1091142107301758.

Lowry, Robert C., and James E. Alt. 2001. "A Visible Hand? Bond Markets, Political Parties, Balanced Budget Laws, and State Government Debt." *Economics and Politics* 13 (1): 50–72.

McGuire, Therese J., and Kim S. Rueben. 2006. "The Colorado Revenue Limit: The Economic Effects of TABOR." *State Tax Notes* 40 (6): 459–473.

Mitchell, Matthew D. 2010. "TEL It Like It Is: Do State Tax and Expenditure Limits Actually Limit Spending?" Working Paper No. 10-71. Mercatus Center. https://www.mercatus.org/system/files/TEL%20It%20Like%20It%20Is.Mitchell.12.6.10.pdf.

Poterba, James M. 1994. "State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Policies." *Journal of Political Economy* 102 (4): 799–821.

Poterba, James M., and Kim Rueben. 2001. "Fiscal News, State Budget Rules, and Tax-Exempt Bond Yields." *Journal of Urban Economics* 50: 537–62.

Primo, David. 2007. *Rules and Restraint: Government Spending and the Design of Institutions*. The University of Chicago Press. http://press.uchicago.edu/ucp/books/book/chicago/R/bo5509178.html.

Randall, Megan, and Kim Rueben. 2017. "Sustainable Budgeting in the States: Evidence on State Budget Institutions and Practices." Washington, D.C.: Urban Institute. https://www.urban.org/sites/default/files/publication/93461/sustainable-budgeting-in-the-states_2.pdf.

Rogers, Diane Lim, and John H. Rogers. 2000. "Political Competition and State Government Size: Do Tighter Elections Produce Looser Budgets?" *Public Choice* 105 (1–2): 1–21.

Rueben, Kim. 1996. "Tax Limitations and Government Growth: The Effect of State Tax and Expenditure Limits on State and Local Government." San Francisco, California: Public Policy Institute of California.

Skidmore, Mark. 1999. "Tax and Expenditure Limitations and the Fiscal Relationships between State and Local Governments." *Public Choice* 99 (1): 77–102.

Smith, Daniel L., and Yilin Hou. 2013. "Balanced Budget Requirements and State Spending: A Long–Panel Study." *Public Budgeting & Finance* 33 (2): 1–18.

Snell, Ronald K. 2010. "Appendix to State Balanced Budget Requirements: Provisions and Practice." National Conference. http://www.ncsl.org/research/fiscal-policy/state-constitutional-and-statutory-requirements-fo.aspx#al.

Tsebelis, G., 2002. *Veto players: How Political Institutions Work*. Princeton University Press.

Von Hagen, Jurgen. 1991. "A Note on the Empirical Effectiveness of Formal Fiscal Restraints." *Journal of Public Economics* 44 (2): 1999–1210.

Waisanen, Bert. 2007. "State Tax and Expenditure Limits -- 2007." National Conference of State Legislatures. http://www.scstatehouse.gov/Archives/CitizensInterestPage/SpendingCapsStudyComm/NCSLStateTaxandExpenLimits.pdf.