THE PERSISTENCE OF FISCAL SHOCKS ON STATE EXPENDITURES: EFFECTS OF BUDGET REQUIREMENTS, RAINY DAY FUNDS, AND WITHDRAWAL REQUIREMENTS

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Abstract

Recent literature has explored in the influence balanced budget requirements (BBR) may have on state budgets. However, while previous work has explored the influence fiscal shocks have on mid-year rescissions my analysis focuses on what, if any, persistent effect these shocks may have on the budget in the year following the shock. In this paper I analyze the influence shocks have on proposed and actual expenditures and revenues, subject to a state's institutionary rules and stabilization funds (Rainy Day Funds). Exploring the influence a shock can have in the period following the shock it will allow states to better understand not only rescissions that are may be made following deficit shocks but what, if any, expansions are done following a surplus shock. Further, incorporating rainy day funds can provide an understanding of a state's propensity to save, beyond their general fund. My results show that absent BBR's surplus shocks are pro-cyclical and generate higher levels of proposed and actual expenditures following a shock; however deficit shocks do not have a significant persistence absent BBR's or on strict rule states. Further, the results show weak rule states propose higher spending in the year following a deficit shock.

I. Introduction & Relevance

The goal of this paper is to build upon previous literature on state budget requirements (BBR) by identifying weaknesses in the existing literature, specifically the failure to incorporate budget stabilization funds (rainy day funds, RDF) into past analysis as a way of reducing the severity of midyear rescissions and what, if any, persistence shocks may have on future budgets. Previous literatures have focused on midyear rescissions following deficit shocks, showing strict BBR states will make more significant cuts to expenditures in the year of the shock, but have not explored potential windfall financing following surplus shocks.[1] Governors have the ability to reduce expenditures in the year a deficit shock occurs but cannot increase expenditures following a surplus shock, this windfall must be incorporated into the following years budget if it will be spent. The design of this paper will allow for a greater understanding of expenditures in the period following a fiscal shock, working to understand any persistent effect shocks will have either through increased reductions in expenditures following deficit shocks or any increases, potentially financed through windfall financing.

Understanding the influence BBRs may have on expenditures, not only in the period of a shock but the following periods, is a growing area of interest in recent years. Towards the end of 2007 the United States entered a recession that became quite severe lasting through mid 2009.[2] This significant downturn caused the federal government to step in and pursue an expansionary fiscal policy to try and lift the US out of this recession or at least significantly slow or reduce the potential duration or severity. This led to a significant surge in government spending. However,

[1] Poterba (1994) and Clemens & Miran (2012), primary literature in this field built upon within this paper
[2] Recession dates sourced from NBER "US Business Cycle Expansions and Contractions"

even with the goal of lifting the US out of a recession this high level of government spending was fought against with 2009 deficits levels nearing $1.5 trillion and having national debt projected to approach ten time deficit levels, approximately $15 trillion by 2018.[3] The most notable response by the federal government was the American Recovery and Reinvestment Act of 2009 (ARRA). While many regarded this spending bill as a necessary step to counteract the continuing recession, increased expenditures to promote economic growth[4], many others pushed against this level of unprecedented and unrestrained government spending. This huge growth in government spending has generated resurgence in potential ideas to limit runaway government spending. One resurrected idea has been to reinstate the concept of PAYGO, where all new levels of spending must be offset by equal spending cuts. The issue with PAYGO is that it only works to limit the expansion of deficits but does little to control for existing deficits. This approach is identified as a weak balanced budget requirement, limiting new deficits, but doing little to correct them once they occur. This discussion also gave way to the continued, or restarted, discussion for a federal balanced amending, limiting the government's ability to run deficits, ideally restricting debt growth. Previous literature has shown that strict BBR will lead to increased rescissions of expenditures in the period the shock occurs however there has been no discussion on what effect the shock will have on future budgets.

While PAYGO has been discussed recently it has not been the first attempt to limit federal spending; another notable push has been the Gramm-Rudman-Hollings Act (GRH). GRH worked by trying to set deficit targets to alter the timing of the federal budget. If these targets were not met then automatic spending cuts would have been enacted on entitlement and discretionary

[3] CBO Reports, "Historical Budget Data" and "Budget Data and Projections" quarterly report.
[4] Basic Keynesian economic theory

spending. The flaw of GRH was the ability to suspend these targets if the economy was in a recession, if the country was at war, or if three-fifths of Congress voted to suspend these rules. The ability to deviate from these rules ultimately caused GRH to be ineffective.[5]

In 1997, well before deficits were close to their current size, a balanced budget amendment fell one vote short in the Senate. Many economists would argue against balanced budget amendments because it could potentially exacerbate the peaks and, potentially more importantly, the troughs of a business cycle. Recently, Clemens and Miran (2012) found that strict BBR states would lead to substantially pro-cyclical spending. States would enact strict rescissions during periods of deficit shocks in order to narrow emerging deficits. This result was built upon Poterba's (1994) original research that showed similar effects. Their analysis, however, did not explore potential long term influence that fiscal shocks could have. Further, governor's only have the ability to enact reductions to expenditures, allowing previous literature that focused on midyear rescissions, only to capture the influence of deficit shocks on state finances, not potential windfall financing following surplus shocks, also exacerbating the peaks and troughs of a state's business cycle.

There is no question that the high level of government spending and deficits present during the recession and years following it cannot be maintained however there are significant disagreements on how to resolve the situation. In 2011 a super committee formed by Congress was created to identify over $1.5 trillion of potential cuts from US spending, however they failed to reach an agreement even with threats of cuts to Social Security, Medicare, Medicaid,

[5] David Primo's "Rules and Restraint" explore the theory behind salutatory laws and why they may ultimately be ineffective. This will be expanded upon through the discussion of the difference of weak and strict BBR states.

and National Defense. The failure of the super committee occurred because these cuts were not thought of being credible and/or the potential cuts were not seen as severe enough.

The goal of this paper will be to first analyze previous literature on state balanced budget requirements and rainy day funds, identifying potential weaknesses or unexplored areas within the existing literature. Specifically, incorporating rainy day funds into the analysis to see how these funds may weaken the severity of midyear rescissions and reduce any persistence of fiscal shocks.

The paper will be divided into several sections. Section II will introduce the existing literature on balanced budget requirements and rainy day funds. Section III will then introduce the available data; discussing fiscal variables as well as state balanced budget requirements, rainy day funds, and the stringency of their use. Section IV will then introduce a basic model to provide the understanding and framework for our own analysis, using economic theory to structure the model. Section V will then begin to identify the potential hypotheses that will be explored. Section VI will then design model, allowing for testing of the hypotheses previously addressed. Section VII will then discuss the results found through the model and finally Section VIII will be the conclusion and discuss any policy implications that can be inferred.

II. Literature Review on the influence of Balanced Budget Requirements and Rainy Day Funds

Poterba (1994), one of the founding papers on the influence of BBR, has examined a state's response to fiscal crises through the use of spending and tax changes. Poterba identified how

unanticipated deficit shocks may influence changes in spending and taxes in the year the shock occurs. Poterba identifies deficit shocks as actual expenditures less proposed expenditures less midyear adjustments to spending. He then does the same with revenues and takes the difference between the two to identify fiscal shocks. Positive values are identified as deficit shocks while negative values are surplus shocks. His initial work examined the influence these fiscal shocks had on changes to midyear rescissions. By incorporating the difference in state's BBR he could see how strict and weak rule states differed in terms of rescissions. To identify the difference between strict and weak BBR states Poterba uses a 1987 Advisory Council on Intergovernmental Relations (ACIR) report that scores state's BBR on a 1 to 10 scale with 1 being the weakest. Poterba uses a cut-off of 5 to distinguish between strict and weak rule states, incorporating a dummy variable interacted with the shock to distinguish between the two. His model is a simple OLS design: $Y_{it} = \alpha_0 + \alpha_1 \cdot Deficit\ Shock_{it} + \alpha_2 \cdot Deficit\ Shock_{it} \cdot Weak\ BBR_i + \epsilon_{it}$. Where "*Y*" is defined as changes in spending and taxes in the year of the shock. One drawback of his model examined by Clemens and Miran (2012) is the symmetry Poterba imposes on positive and negative deficit shocks. Through his analysis he finds that strict BBR states have some difficulty in responding to shocks and will alter expenditures by $44 for every $100 in shock that occurs. Poterba's work also does not look at how states may offset shocks with rainy day funds, state savings that may reduce the severity of the shock.

Poterba expands on his 1994 research with his 1996 paper determining BBRs do limit deficits and that fiscal institutionary rules, such as balanced budget requirements, do influence budget decisions. However, his work, building upon his earlier work, finds no clear agreement on identifying an effective model to predict the influence of fiscal institutions. He also identifies

that budget rules only become a topic of discussion when institutions approach their debt ceiling. His 1996 work finds that strict budget rules, coupled with limits on borrowing, do cause smaller deficits and rapid adjustments on state expenditures. These results may provide some inference for the national level. Although, Poterba identifies some short comings in the current research that prevent state analysis from being applicable on the federal level, however that should not detract from the existing, and growing, body of research. Federal governments can raise money by simply printing more, an option unavailable to states. Though, this may cause rapid inflation, an undesirable option, it is still one available at the federal level. This is just one monetary policy option available that cannot be examined at the state level. His research provides a detailed and critical analysis of past work, suggesting only inference and not solutions can be gathered on balanced budget requirements.

Clemens and Miran (2012) extended Poterba's work by separating deficit shocks into positive and negative values and through a two stage OLS regression. The separation of positive and negative shocks is an important improvement because BBRs are only binding during periods of deficit shocks. Further, governors can only reduce expenditures when a deficit occurs, they cannot increase expenditures in the same period a surplus shock occurs. Once the model identifies the fitted values for midyear changes in spending Clemens and Miran use a similar model as identified by Poterba[6]. Clemens and Miran then extend the work to understand what influence these rescissions may have on the government multiplier, using the fitted values as an instrumental variable for changes in government spending. The second stage of their model is:

[6] Clemens and Miran (2012) model use the same model, however they incorporate a dummy variable to identify the difference in positive and negative shocks and they also include state and time fixed effects that were not incorporated by Poterba's earlier model.

$Y_{s,t} = \beta_1 \cdot \hat{G}_{it} + \beta_2 \cdot Deficit\ Shock_{it} + \delta_s + \delta_t + \epsilon_{it}$. Where "$\hat{G}$" are the fitted values of changes in government spending modeled from the earlier regression. Another change they made is moving the cut-off from 5 to 7 when using the ACIR scoring. To account for Poterba's analysis they extend the analysis to strict, medium, and weak rule states.[7] Their "*Y*" variable is measured as personal income, focusing on the influence changes on government spending will have personal income.

Another improvement Clemens and Miran make over Poterba's initial work is removing state's that may skew the results because they are not similar to the states within the sample. Clemens and Miran focus purely on states with annual budgets, removing biennial states, so states must resolve the budget within one year rather than a second year available to biennial states. Additional, Alaska and Massachusetts are removed from the sample; Alaska because of their oil revenue that makes their revenue source very different than other states and Massachusetts because of their questionable accounting practices. The primary threat to their analysis is how shocks may emerge in states with differences in balanced budget requirements. Also, through the use of fixed state effects, they are not concerned with the potential correlation of budgetary rules and their dependent variables. Their results show that smoothing state spending through business cycle peaks and troughs can reduce business cycle amplitudes, but states with strict balance budget requirements are forced to make large rescissions to their budget during an economic downturn potentially exacerbate business cycles. The primary weakness of their paper that I am exploring is that their paper focuses on cuts to spending in

[7] States' with a score of 7 or above are identified as strict while states with a score of 5 or 6 are medium rule states. Remaining states are identified as weak rule states. This change forces states with only a no deficit carry over rule to be labeled as strict rule states.

the year of the shock but do not explore how states may increase spending because of a fiscal surplus. Further, state's savings, RDF, may allow them to reduce the severity of these mid-year cuts, an area not yet explored.

Alt and Lowery (1994) explore how state's political composition of their government can affect changes in expenditures and tax revenue. The model they explore looks at a unified republican legislation, a unified democratic legislation, split branch with a republican governor and democratic legislation, and split legislation with a republican governor. These four scenarios are how they define "unified and divided government". Their model accounts for state's personal income, personal contribution, and surplus shocks. Alt and Lowery find clear evidence that divided governments are unable to adjust revenues and expenditures as quickly to offset fiscal shocks as unified governments. They also find noticeable differences in how democrats and republican structure state budgets, it is these differences that cause divided governments inability to reconcile shocks as quickly. The results found here align to the expanded model used by Poterba (1994). This raises a question on if political differences and the composition of the state's legislation should be incorporated when exploring how state's respond to fiscal shocks. This is an important question; however, it is not explored within the framework of this paper. It should be addressed in further research.

Knight and Levinson (1999) examine the influence of "Rainy Day Funds and State Government Savings." The paper here focuses on a key variable that past literature has previously overlooked "Rainy Day Funds" (RDF), or budget stabilization funds. This will be explored through the model introduced later in the paper. Knight and Levinson find that RDFs cause higher levels of savings, expanding beyond just a state's general fund. The authors do identify

some characteristics that can restrict RDFs through mandated savings, caps on size, and/or rules on their withdrawals/deposits. For these reasons they find that RDFs are not fungible to a state's general fund savings. Since the author's find that RDFs lead to increased savings, the authors propose that they may work to smooth business cycle fluctuations, a question explored within the research of this paper. Past BBR literature has not incorporated RDFs in to their analysis of BBRs. RDFs measure state savings and therefore can measure a state's propensity to save, potentially influential when exploring the influence surplus shocks or reducing the severity of deficit shocks subject to the stringency of their balanced budget requirements. This may reduce the severity of mid-year rescissions examined by Clemens and Miran. Levinson (1998) also find that states with RDFs are able to smooth volatile economic shocks. This raises a potential endogeneity issue that states that are better able to smooth shocks are more likely to adopt stabilization funds; however this question is not addressed within this research. Instead, the focus is on how the existence and size of RDFs may weaken the need for severe cuts under BBR stringency rules and if it weakens the influence of the shock on future budgets. Wagner (2003) explore the earlier research done by Knight and Levinson on if RDFs are substitutable with general funds. Wagner finds that if RDFs were "just another" savings account it would act no differently than the state's general fund so the difference between the funds must lay within the withdrawal/deposit rules of RDFs that drive the differences in their behaviors. The process of business cycle smoothing through the use of RDFs is one explored further with the research done by Rodriguez-Tejedo (2012). Simply put the existences of RDF provide states with increased assets that can be used during a financial crisis. Her analysis looks at the state's ability to respond to shocks up to the point of their adoption of RDFs. She finds that these funds have

become quite popular in their use by states to weather the effects of recessions. Further her analysis shows that state that are able to access these funds may reduce the severity and persistence of fiscal shocks. However, her work does not actually run the regressions to explore their influence.

Many papers have also tried to identify lessons that can be learned from the states and be applied on a federal level. The most notable papers are Inman (1996), that looked at state experiences and lessons that could be used for the European Monetary Union, and Alexina and Bayoumi (1996) that looked at the cost and benefit of state fiscal rules. Inman's work highlights some key reasons why states BBRs are good measures to draw inference. One such reason is because a state's rules are often set with no variable since the state was established, so there is no concern with mid-time period changes. Inman also questions the features of BBRs and how specifications, enforcements, and possible override provisions may affect outcomes. This further questions the necessity of a control for the strictness of BBRs and their enforcement as well. Alesina and Bayoumi (1996) examine that strict BBR do not affect output variability, allowing for comparison among weak and strict BBR states, and an interesting observation because previous studies have found that strict BBRs can create pro-cyclical spending, and exacerbating business cycles. However, if strict BBRs do not affect output variability there should not be any influence on the severity of persistence of business cycle shocks. This result raises the need for further studies on the influence BBRs can have on state budgets.

Bohn and Inman (1996) further analyze evidence from the states on how budget rules influence deficits. The authors identify that the type of BBR has a measurable impact on the size of deficits accrued by states. BBRs can differ in a variety of ways by being set through

constitutional or statutory rules and have a number of structure differences on if a governor has to submit a balanced budget, if the legislation has pass a balanced budget, and if state's can or cannot carry over deficits.[8] The authors examine the influence BBRs have on government borrowing and what rules regarding governor's decisions may affect spending levels. Similar to Poterba (1994) and Clemens and Miran (2012) Bohn and Inman use ACIR scoring data to measure stringency of BBR. They find that strict BBRs reduce a state's propensity to run deficits. This result is because states are quick to respond to fiscal shocks in the period they occur or they are more prudent in their spending habits. This result aligns to the results other authors have shown.

"Budget Rules and State Business Cycles," published by Krol and Svorny (2007), calls into the question of the validity of ACIR scoring of state BBRs. The ACIR relied upon self reporting from the states and may have some inaccuracies associated with self reported information. The authors provide an in-depth comparison of past literature and also identify that a GAO report from 1993 reversed the findings of Levinson's 1998 paper that used the ACIR scoring system. Their analysis raises the question on the identification of strict and weak BBR states used in the past. However, at this time the ACIR scoring is still actively used to understand state BBR.

Previous authors have provided a significant framework that this research builds upon. How do BBRs influence state budgets, both in the period of the shock and the budget in the following period? Does the enforcement or stringency of BBRs alter a state's ability to respond to fiscal shocks or structure future budgets? Additionally, do RDFs allow states to offset fiscal shocks

[8] These differences provide the metrics for a 1-10 scoring provided by the Advisory Council on Intergovernmental Relations (ACIR) discussed within the data section of the paper.

without significant budget cuts, potentially rendering BBRs moot? To explore these questions the model will explore fiscal shocks interacted with weak BBR rules, control for the size of a state's RDF, and finally explore the stringency of withdrawal/deposit rules of these RDF. The data used here will rely upon previous work and try to explore these questions addressed here.

III. Data Sources

The research conducted here uses a variety of data sources to explore the persistence of fiscal shocks subject to a state's fiscal institutions. The model identifies the size of unanticipated fiscal shocks and each state's budget. The primary sources of this data are the National Association of State Budget Offices (NASBO) and the Bureau of Economic Analysis (BEA). These sources provide the key components necessary to compute fiscal shocks and the components of a state's budget necessary for analysis. NASBO also provides information on the size of each state's budget stabilization fund, rainy day fund, used as a control within the model. This economic data will be used in addition to the data gathered from the Advisory Council on Intergovernmental Relations (ACIR) 1987 report that scores each state's balanced budget requirements on a 1-10 scale with 10 being the strictest possible state. Vermont is not scored because it is the only state without any form of a balanced budget requirement. Finally the stringency of each state's rainy day fund withdrawal/deposit requirements are taken from Wagner (2003). These sources provide us with all data necessary to estimate the model.

As discussed the quantitative data comes primarily from the NASBO, specifically a report labeled the "Fiscal Survey of the States" a semi-annual report that collects the estimates and

forecasts of state's expected spending and tax levels, in addition to a wide range of budgetary data, including rainy day funds. This data allows for the calculation of state unanticipated fiscal shocks, found through the difference the state expectations and actual values in expenditures and revenues. By working through these reports a comprehensive dataset can be built allowing for analysis of state shocks over time, in addition to expenditures and revenues. This information was taken through the Clemens and Miran's (2012) dataset. Alaska must be removed from the dataset because of their unique oil revenue; that distinguishes themselves from other states preventing an equal comparison between the two. To accurately compare each state, they must have similar attributes. **Table B** in the appendix will show the summary statistics for the entire data set and broken out by strict and weak states.[9] The difference between fiscal shocks for strict and weak states is something that will be explored through the analysis in how state's respond to shocks.

Insert Table B

Qualitative data is gathered from the ACIR report as well as Wagner (2003) and Rodriguez-Tejedo (2012). The ACIR report that scores state balanced budget requirements on a 1-10 scale does so by examining each state's rules. The numbers are generated by examining if the state's rules are grounded in their constitution or statutory laws. Further, the report examines various budget rules, such as; if governors must submit a balanced budget, if state legislations must pass a balanced budget, annual or biennial budgets, and if states are required to resolve deficits in the period following the shock. States with a score of 7 or greater are measured as strict

[9] There are some differences between personal income between strict and weak states that may be controlled for in future drafts.

while states with a score of 5 or 6 are labeled as medium[10], and all other states are categorized as weak rule BBR states. In addition to BBRs the influence of RDF will be examined and gathered from three sources. Though NASBO provides the actual size of each state's funds, the stringency and creation of the state's funds will be gathered from Wagner (2003) and Rodriguez-Tejedo (2012). Wagner (2003) examines each state's stringency of deposit/withdrawal rules. When looking at deposit requirements the states can are scored on a 1-4 scale; (1) no requirement, (2) fraction of the general fund must be deposited, (3) annual requirement, and (4) set economic conditions must be met in order for deposits to occur. Withdrawal rules are measured on the same 1-4 scale; (1) at the discretion of the legislation, (2) when the state experiences a revenue short fall, (3) supermajority of legislation votes to use the funds, and (4) when certain economic criteria are met. Rodriguez-Tejedo (2012) examines when each state adopted their rainy day fund. Rainy day funds, similar to BBR, are not time specific, however Idaho updated their RDF rules in 1999. **Table A** breaks out the states analyzed and looks at their BBR, RDF stringency, and adoption year.

Insert Table A

To analyze the persistence of fiscal shocks it is important to examine how this will be measured. Persistence will be measured be examining the influence a shock has on proposed and actual expenditures and revenues in the year following the shock. This will provide for the analysis to see how states respond to fiscal shocks in their structured (proposed) budget and if actual

[10] When the analysis is condensed to strict and weak rule states only, medium rule states are classified as weak rule states.

values, final yearly budget numbers, are influenced. These quantitative metrics are again gathered through the NASBO report, "Fiscal Survey of the States".

IV. Model

First, there is the question on why states encounter fiscal shocks and second if these shocks exist why would there be any expectation of persistence. Beyond the analysis of state fiscal shocks there are a number of papers that explore the influence, both theoretical and empirical, of shocks on consumption.[11] After these questions are addressed there is the final question on why BBR or RDF would have any influence on these shocks. These questions are addressed through the basic model addressed here.

Since no state has perfect foresight on their budgets fiscal shocks will always occur, either through increased or decreased revenues compared to expectations or differences in costs compared to earlier expectations. If state's had perfect knowledge, then there would be no shocks and no need to explore their influence. This question and response needs little reason to be addressed, the summary values in **Table B** clearly show that fiscal shocks do exist, and therefore should be examined.

The persistence of shocks can be seen in a variety of literature. Real business cycle models show that when shocks occur there will be a significant change in consumption in the period of the shock and this change will be persistent over time until consumption returns to its pre-

[11] Lifecycle and business cycle papers have addressed this question, no individual paper is cited but there is wide body of literature that explores this influence.

shock levels. Real business cycles have explored the influence of a change in government purchases or exogenous shock may have on labor, capital, consumption, and output. Howeer, this type of behavior is seen in interest rates, money supply, real prices, and a number of other economic variables throughout various forms of literature. Throughout a wide variety of literature there is an analysis of how over time variables return to their pre shock levels. For this reason there is the expectation of the persistence of shocks on state budgets.

The final question that must be address is if states do experience fiscal shocks and they will influence future budgets why should balanced budget requirements, rainy day funds, and withdrawal/deposit requirements be examined in the analysis? Life cycle models show that when an individual experiences a shock in certain period they will either borrow to reduce the loss of consumption that will occur in the period of the shock or take from preexisting savings. This is important because of how state fiscal institutions are structured. The strictest of balanced budget requirements limit savings preventing states from smoothing consumption (expenditures). Rainy day funds allow states to save funds to, potentially, offset shocks through additional savings. Rainy day funds, however, have stringency of use rules imposed that restrict withdrawals and deposit of these funds. For that reason it is simply not enough to look at incorporating state savings (RDF) but also the stringency of use rules as well.

The reasons explained above set up the theory on why balanced budget requirements, rainy day funds, and stringency of RDF use is influential on the persistence of state shocks. This theory will be the framework of the hypotheses below that will develop the model.

V. Hypothesis / Expectations

The above theory identified why balanced budget requirements, rainy day funds, and stringency of use will play an important role on smoothing the persistence of state fiscal shocks. This section will set up the expectations for the model design to understand what, if any, persistence fiscal shocks may have on a state's budget in the year following their occurrence, and how state fiscal institutionary rules, including rainy day funds, may strengthen or limit their continuation.

In order to examine changes in spending and revenue in the presence of fiscal shocks first an understanding of how states may respond must be examined. State governors will first propose a budget that is then voted upon by the state legislation. Previous papers, again, have looked at mid-year governor's rescissions in spending but this analysis will incorporate legislative response on how a budget is structured following a shock. Also, past papers have shown response absent BBRs prior to incorporating them. For this reason the model will examine how states structure their budget absent RDFs, then with RDFs, and finally with RDF stringency controls. Further, when examining potential hypotheses there is a question on how states will respond to deficit versus surplus shocks, how RDF will weaken or exacerbate those shocks, and how the stringency of RDF use will influence RDF usage and the persistence of shocks.

Before the incorporation of RDF, it is important to understand how states may respond during deficit and surplus shocks. During a recessionary shock states would likely increase safety net spending and reduce non-safety net spending. The resulting increase or decrease to total spending would depend upon the severity of spending reductions to increases in safety net

spending. States with strict BBRs will likely reduce non-safety net spending significantly more than safety net spending leading, reducing overall spending in the period following a shock. This also would align to expectations that strict BBR states would reduce spending following a shock due to the need to resolve deficits in the period they occur. This change in spending should show that deficit shocks lead to lower spending in the period following a shock for strict rule states. Since strict rule BBR states reduce expenditures there is little need for them to alter revenues, taxes, when they experience deficit shocks. Weak BBR states, however, will not be confined to reduce spending to resolve deficits. This change would allow them to increase safety net spending without a significant reduction in non-safety net spending. For this reason it is possible to see an increase in spending in the period following a deficit shock, influencing future budgets but in the opposite direction than strict rule BBR states. This may also cause weak rule states to increase their debt through increased borrowing or raise taxes in future periods to finance the additional expenditures. So absent the incorporation of RDFs the expectations are that strict BBR states will have lower expenditures following a deficit shock with no changes to revenues but weak BBR states may increase expenditures following a deficit shock and offset higher spending through increased revenues. During periods of surplus shocks BBRs are not binding therefore there is little expectation that states would different based purely on strict versus weak BBR in the period following a surplus shock. However, it is possible that states will experience windfall financing in the period following surplus shocks.

The above hypothesis examines state response absent RDF and their stringency. Once these variables are incorporated state response may change because of the increase in savings. A simple assumption is that the existence of RDF should reduce the severity of deficit shocks,

providing states with savings to access in times of deficit shocks, and weaken surplus shocks by allowing states to funnel the excess into savings. This expectation should occur absent controls for a state's BBR. Now expectations will have to look at how states respond given both deficit controls and RDFs. Again, strict BBR states should have a persistence effect with lower spending following deficit shocks, however this effect should be weakened when RDF analysis is incorporated. Weak BBR states may increase spending following a deficit shock and pay for this increase through higher taxes, revenues, in the following year. Rainy day funds may prevent weak BBR states from increasing revenues in the period following the shock, using RDF instead of pushing for higher revenues. Both strict and weak BBR states should be able reduce the persistence of surplus shocks through deposits in to their RDF, showing a reduction in the magnitude of windfall financing.

The above analysis provides the foundation for expectations without and with RDF examining each state's BBR. The final component to be considered is the stringency of withdrawal and deposits on RDFs. State's with strict deposit requirements would be more likely to experience windfall financing because the funds will be spent rather than deposited. Therefore, state's with weak deposit requirements should show lower levels of windfall financing because state's can easily deposit into the RDF, however, since states are not forced to deposit surpluses except under the strictest of requirements[12], states will have to choose to save when they have weak RDF deposit requirements. If states do not choose to deposit when surpluses exist then states with strict requirements, forcing savings, will increase savings more so than states without strict requirements. Withdrawal requirements are broken out into a similar strict and

[12] The strictest of state deposit requirements require states to deposit into their rainy day funds when certain economic conditions are met or have an annual requirement.

weak requirements allowing for a similar comparison. States with weak withdrawal requirements, at discretion or revenue shortfalls, should be able to use the funds to offset deficit shocks once they occur. Therefore, when states experience deficit shocks, regardless of their BBR rules, weak withdrawal requirements should allow them to reduce the severity of mid-year rescissions and weaken any persistence deficit shocks will have on future periods.

The hypotheses and expectations addressed here are anticipated results that may be proven through the regression analysis. The sign (positive or negative) influence of the coefficients are addressed, however the magnitude and significance of the coefficients will be much harder to predict given various state responses. An easy assumption is that shocks will cause cyclical changes in spending and revenues, however, as budgets are structured there needs to be an understanding of proposed, expected, revenues and expenditures and year end, actual, revenues and expenditures. Understanding the difference in proposed and year end values allows the analysis to explore the budgets state try to develop versus where they ended up. The comparison of the results will help to provide a greater understanding of state budgets in response to fiscal shocks.

VI. Model

A. Model Selection

Do state fiscal shocks influence budgets in the year following the shock? Do balanced budget requirements limit the persistence of shocks or exacerbate their influence? Can rainy day funds weaken the continuation of deficit or surplus shocks, in the presence of state BBRs? These are

the questions that will be addressed by the model. To accurately answer these questions the model will be expanded upon incrementally in order to understand how state response may change. When state face fiscal shocks their options for response are to alter expenditures, alter revenues through tax policy changes, promote budget gimmicks[13], use rainy day funds through withdrawals or deposits, and/or potentially finance deficits through debt. To understand state response and answer these questions the model will examine state expected, proposed, expenditure and revenues and year end totals in expenditures and revenues in the period following the shock.[14]

To answer the above questions the regression model will use a panel of data, allowing for cross sectional analysis of each state, over a 25 plus year period, ranging from 1987 through 2004. The dates chosen were selected because of available data and also because in 2009 the American Reinvestment and Recovery Act (ARRA) passed that altered state expectations on financial assistance. Information gathered beyond these years would not allow for accurate inference on a federal level. The panel also allows for an understanding, using each state as part of the collective whole to understand the influence shocks may have and how fiscal institutionary rules will influence state responses.

B. Identification Strategy

To compare states and state responses based on the stringency of their BBR and RDF first states must be grouped into weak versus strong. Using the ACIR (1987) report that ranks states on a 1-

[13] Budget gimmicks are addressed by Clemens and Miran (2012) in how states may use accounting practices to change expectations or levels, transferring burden of costs to other periods or budgetary components.
[14] Going forward state expected expenditures and revenues will be referred to as "proposed" and year end totals will be called "actual" expenditures and revenues.

10 scale; states will be sorted and grouped. Based upon Poterba (1994) establishing a cutoff of 5 for weak versus strict states and then expanded upon my Clemens and Miran (2012) by using a cutoff of 7, but allowed for states with a score of 5 or 6 to be classified as medium BBR states.[15] Their analysis of weak, medium, and strict expands upon Poterba's original work. The analysis done here will also use this weak, medium, and strict BBR breakout.

Further, this analysis does not include only a comparison of the severity of states balanced budget requirements but the stringency in use of their rainy day funds. For that reason a scale must also be incorporated for each state's RDF allowing for grouping of states to understand their differences. Using data gathered by Wagner (2003) states rules are broken out into a 1-4 scale, analyzing withdrawal and deposit rules. A score of 4 denotes the strictest or rules, with 1 denoting the weakest or rules. Weak stringency of use for RDF is denoted as states that have a score of 1 or 2, with strict rule states having a score of 3 or 4. Withdrawal and deposit rules are combined into a single variable dependent upon if the state experiences a surplus or deficit and are interacted with the size of each state's rainy day fund.

C. Controls to the Dataset

To provide for an accurate comparison of the influence shocks may have on state budgets a few controls must be incorporated to avoid skewing the results. As previously mentioned, ensuring each state has an accurate and comparable tax base is important, and for that reason Alaska is removed from the sample because of their heavy reliance on oil revenue, a factor that distinguishes them from other states. Vermont, also must be removed from the analysis

[15] When Clemens and Miran (2012) simply the analysis into strict versus weak only comparison medium rule states are classified as weak rule states.

because of their lack of balanced budget rules, allowing its governments to run deficits as they choose without restrictions. Vermont's budget depends more upon the desire to maintain balanced budgets than actual enforcement, this mindset was identified by the GAO. Clemens & Miran (2012) also addressed the issue regarding biennial budget cycles. They remove these states because the timing of their estimates and response are unclear and can, potentially, allow additional time to resolve shocks regardless of their behavior. The authors also choose to remove Massachusetts from their data set because of "budgetary shenanigans"[16].

D. Controls and Error Terms

The fiscal shock is an exogenous shock that is being explored outside the control terms for stringency of balanced budget requirements, rainy day funds, and the stringency of use rules. The dependent variable explores state response to these exogenous shocks. The stabilization fund, incorporated as a control, is measured at the same time the state occurs the shock, rather than the forward period that examines the state's response. This is done because states may use or alter their RDF size once they recognize potential shocks and the goal is to understand how the existence of these funds and their use will alter the persistence of the shock. Since a shock can be altered when state respond, the size of the fund must be examined before it can be incorporated in to the state response. State and time fixed effects are also incorporated into the model to pick up unobserved effects.

E. Fiscal Shocks

[16] Add C&M footnote on Massachusetts budgetary gimmicks

The model addressed here unanticipated fiscal shocks are measured using the same method originally established by Poterba (1994) and Clemens and Miran (2012). The fiscal shock is calculated using actual expenditures and revenues less expectations and mid-year rescissions[17]. Clemens and Miran (2012) define constant law expenditures and revenues as yearend values, actuals, less mid-year rescissions.[18] Mid-year rescissions are incorporated because the goal is to explore unanticipated fiscal shocks; mid-year rescissions allow states to adjust for some expectation of fiscal shocks. However, if their adjustment is not sufficient, larger unanticipated shocks may exist requiring response in the period following the shock. As established by Poterba (1994) and Clemens and Miran (2012) revenue and spending shocks are defined as:

$R_{s,t}$ = Revenue in state "s" at time "t", $R^a_{s,t}$ = Revenue Adustment in state "s" at time "t"

$S_{s,t}$ = Expenditures in state "s" at time "t", $S^a_{s,t}$ = Expenditure Adustment in state "s" at time "t"

$E_{s,t-1}[*]$ = is the expectation of state "s" in time "t-1"

$$\Delta R_{s,t} = R_{s,t} - E_{s,t-1}\left[R_{s,t}\right] - R^a_{s,t}$$

$$\Delta S_{s,t} = S_{s,t} - E_{s,t-1}\left[S_{s,t}\right] - S^a_{s,t}$$

This will provide an analysis for revenue shocks and expenditure shocks. These two values will be combined and simplified into a single fiscal shock value (FS) defined as:

$$FS_{s,t} = \Delta S_{s,t} - \Delta R_{s,t}$$

[17] Mid-year rescissions are mid-year changes in expenditures and revenues, often reductions in expenditures. State governors can often reduce the budget in the presence of deficits but cannot increase expenditure without legislative input.

[18] This is the level of expenditures and revenues that would exist without adjustment, defined as constant law expenditures and revenues.

Deficit shocks are then defined as positive values and surplus shocks are defined as negative values. This is important to remember when interacting coefficients when exploring potential windfall financing.

F. Model of Subsequent Revenue and Expenditure

Balanced Budget Requirement Rules Only

Clemens and Miran (2012) find that strict BBR have an impact on mid-year adjustments to expenditures and revenues. A first step is to determine if this is confirmed in the model of future revenue and expenditures. The model presented here recreates the first state of Clemens and Miran (2012) model:

$$\mathrm{Y_{s,t+1}} = \beta_0 + \beta_1 \cdot \mathrm{FShock_{s,t,>0}} + \beta_2 \cdot \mathrm{I_w} \cdot \mathrm{FShock_{s,t,>0}} + \beta_3 \cdot \mathrm{FShock_{s,t,\leq 0}} + \beta_4 \cdot \mathrm{I_w} \cdot \mathrm{FShock_{s,t,\leq 0}} + \delta_\mathrm{s} + \delta_\mathrm{t} + \epsilon_\mathrm{s,t}$$

The dependent variable, $\mathrm{Y_{s,t}}$, will reexamine Clemens and Miran (2012) dependent variables of mid-year rescissions in expenditures and revenues but will also explore proposed and actual expenditures and revenues in the "t+1" period. To examine the difference between strict and weak BBR states an identifier will be incorporated to separate out weak BBR states, I_w. Further, to explore the influence of BBR on fiscal shocks, shocks are broken out in to deficit and surplus shocks because BBR are only binding during times of deficit shocks. $\mathrm{FS_{s,t,>0}}$ will measure when fiscal shocks are greater than zero, denoting a deficit shock, while $\mathrm{FS_{s,t,\leq 0}}$ will denote surplus shocks or negative deficit shocks. State and time fixed effects are also incorporated denoted as, δ_s/δ_t, respectfully. Finally the error term, $\epsilon_{\mathrm{s,t}}$, will also be identified for each state and time period.

As addressed above through hypotheses the expectation is that strict rule states will have a persistence of deficit shocks showing lower spending in the period following the shock with little influence on revenues. Although, weak rule states may increase expenditures in the period following a fiscal shock by increasing safety-net expenditures with little reduction to non-safety-net expenditures. Also, weak BBR state may try to offset increase expenditures through increases in tax revenue.

Balanced Budget Requirements and Stabilization Fund (RDF) Levels

$$\mathrm{Y}_{s,t+1} = \beta_0 + \beta_1 \cdot \mathrm{FShock}_{s,t,\geq 0} + \beta_2 \cdot \mathrm{I_w} \cdot \mathrm{FShock}_{s,t,\geq 0} + \beta_3 \cdot \mathrm{FShock}_{s,t,<0} + \beta_4 \cdot \mathrm{I_w} \cdot \mathrm{FShock}_{s,t,<0} + \beta_5 \cdot \mathrm{RDF}_{s,t} + \delta_s + \delta_t + \epsilon_{s,t}$$

In this version of the model rainy day funds, $\mathrm{RDF}_{s,t}$, are incorporated as a control variable, measuring a state's propensity to save. The expectation, again addressed above, says that the existence of RDF should reduce the severity of mid-year rescissions. When examining forward expenditures it should allow states to increase expenditures, because they have RDF as a cushion against shocks, and reduce the need for tax revenue since savings can be used in it's place when shocks occur.

BBR, RDF, and Stringency of RDF use

$$\mathrm{Y}_{s,t+1} = \beta_0 + \beta_1 \cdot \mathrm{FShock}_{s,t,\geq 0} + \beta_2 \cdot \mathrm{I_w} \cdot \mathrm{FShock}_{s,t,\geq 0} + \beta_3 \cdot \mathrm{FShock}_{s,t,<0} + \beta_4 \cdot \mathrm{I_w} \cdot \mathrm{FShock}_{s,t,<0} + \beta_5 \cdot \mathrm{RDF}_{s,t} + \beta_6 \cdot \mathrm{R_w} \cdot \mathrm{RDF}_{s,t} + \delta_s + \delta_t + \epsilon_{s,t}$$

The final variable incorporated is the RDF stringency of use rule, R_w, that denotes weak RDF stringency. Since this variable must be added to the RDF variable. The expectation is that when weak RDF rules are incorporated the coefficient of RDF without the interaction term will also

change. Strict RDF states should experience a smaller increase in expenditures and reduction in revenues although weak RDF should see a larger increase in expenditures and a zero or negative influence on revenues because states can access these savings in place of altering revenues. If RDF grows through weak deposit rules, states may be able to reduce the need for tax revenues.

BBR, RDF, Stringency of RDF and Interaction

$$Y_{s,t+1} = \beta_0 + \beta_1 \cdot FShock_{s,t,\geq 0} + \beta_2 \cdot I_w \cdot FShock_{s,t,\geq 0} + \beta_3 \cdot FShock_{s,t,<0} + \beta_4 \cdot I_w \cdot FShock_{s,t,<0} + \beta_5 \cdot RDF_{s,t} + \beta_6 \cdot R_w \cdot RDF_{s,t} + \beta_7 \cdot R_w \cdot FShock_{s,t,\geq 0} + \beta_8 \cdot R_w \cdot FShock_{s,t,<0} + \beta_9 \cdot I_w \cdot R_w \cdot FShock_{s,t,\geq 0} + \beta_{10} \cdot I_w \cdot R_w \cdot FShock_{s,t,<0} + +\beta_{11} \cdot I_w \cdot RDF_{s,t} + \beta_{12} \cdot I_w \cdot R_w \cdot RDF_{s,t} + \delta_s + \delta_t + \epsilon_{s,t}$$

In order to better understand the model and potential results the interaction of variables must also be explored. Here understanding the sign and magnitude of each variable will become tougher to predict, however the overall result should be the same as described above. The existence of weak RDF rules should weaken the persistence of fiscal shocks. Strict BBR states should experience a reduction in spending with little change shown in revenues and weak BBR states may increase spending, offset with higher revenues. Weak withdrawal rules may prevent weak BBR states from increasing revenues.

G. Robustness Checks

Various robustness checks are also ran in order to better understand the influence fiscal shocks may have on state budgets given their BBR, RDF, and the stringency of use. Clemens and Miran broke out individual time periods; primarily because their focus was on mid-year cuts allowing

them to focus on recessionary time periods. The analysis performed here explores both reductions and increases in spending following the shock so all time periods are examined together. Future iterations may breakout out recessionary and growth time periods.

With state level panel data a concern is cross state leakages or differences with expenditures and revenues. For that reason differences of "t+1" and "t" are calculated, allowing fixed effects to assume cross state leakages are constant over time. Also, the model is run with a trend variable incorporated to allow for potential growth outside of the variables explored. The results calculated with the first difference model support the results calculated using the model above. Additionally, there will be some analysis to explore changes in rainy day funds, beyond just existing levels, when exploring the changes in spending and revenues.

H. Model Adaptations and Limitations

This research will also expand upon the model addressed above. The first goal will to explore non-linear effects shocks can have on future budgets. Small unanticipated fiscal shocks may be resolved with ease but larger shocks may require a more drastic response. The current model designed here does not address that issue, a drawback of the linear regression done here. To overcome this issue the following areas have/are being explored: log-linear model and a piecewise regression analysis.

A log-linear model would be an ideal model to allow for a similar linear regression while reducing the influence outlying data may have. This will also allow for the exploration of percent changes rather than level changes examined by the current model. The issue with this approach is that the breakout of positive and negative spending generates zeroes for the

positive shock value when a negative shock occurs and the same issue occurs for negative shock values when positive shocks occur. This removes the similarity initially examined by Poterba (1994) and provides a better understanding of the differences of deficit or surplus shocks may have. This improvement was incorporated by Clemens and Miran (2012) model, however this difference makes it impossible to take log values without forcing the data to incorporate a non-zero value. This has been done with previous literature and will need to be explored further before it can be incorporated into this analysis.

A piecewise linear regression will allow for a break point to be incorporated into the model so that the coefficient (response) can change depending upon the size of the shock. The advantage of this model is that it allows for larger shocks to be treated differently than their smaller counterparts. This adaptation can provide for a greater understanding of how state's respond and potentially provide for more significant coefficients by allowing for the response to change at higher shock values. This model may be explored in further drafts of this paper.

A potential criticism that will also have to be explored is how fiscal shocks may influence long term spending and revenue changes. Based upon the assumption that all states have a similar composition of their tax base it is possible that strict BBR states may substitute away from income taxes because of their potential economic variability. While the difference in each state's tax base cannot be purely captured this is accounted for through state fixed effects and potentially the incorporation of state fixed time trend effects in additional robustness checks. Fiscal shocks may also be broken out into spending shocks and revenue shocks to explore the potential differences in how states may respond.

VII. Results

Exploring the influence fiscal shocks may have on future budgets clearly shows that surplus shocks lead to windfall spending at a significant level. This can be seen through proposed and actual expenditures in the year following the shock. There is no significant change to proposed values for revenues but there is an increase in actual revenues collected by states. This result could be driven by economic conditions that created a surplus shock in the first place, potentially driving higher revenues. If economic conditions are favorable employment may increase driving higher revenues, creating surplus shocks, and may increase revenues outside expectations. These results are show within **Table C**. When rainy day funds are incorporated as a control within each state there is almost no change see in the magnitude of proposed / actual spending and revenues. Simply controlling for rainy day funds has a little influence on the response states may have. Showing, that perhaps RDFs do little to offset positive fiscal shocks and that states do not necessarily increase savings. The results show that the influence RDF have absent stringency rules, have no significant influence on expenditure and revenue levels. The significant results found in **Table C** are supported with the additional propensity to save, RDF control, is added shown in **Table D**. When stringency of use rules are incorporated there is some significant influence that weak RDF usage leads to higher proposed spending and revenues in future periods, perhaps a sign that weak RDF usage rules may allow states to access these reserves when necessary, potentially representing a lack of fiscal restraints states may have when savings can be easily used. Further, when stringency of use is incorporated there is no longer a significant influence on proposed expenditures but actual expenditures still show

significant windfall spending at magnitudes of 6 cents smaller per $1 of surplus shock seen than when stringency controls are incorporated. Perhaps now the results do show some measure of additional savings taking place where windfall expenditures fall allowing for some RDF savings. Actual revenues also fall in comparison to the absence of stringency of use rules, again with a 6 cents reduction in magnitude per $1 of fiscal shock. Further, weak RDF rules, following a deficit or surplus shock, lead to higher proposed expenditures and revenues in the period following a shock. Weak stringency of RDF may cause states to propose higher expenditures and revenues, knowing they have savings they can fall back upon if necessary. These results, shown in **Table E** also support the significant results found in earlier tables absent BBR rules. The results also raise questions on if weak RDF prevent states from having the discipline to limit spending from this fund.

When the model is initially expanded to incorporate for the difference between weak and strict BBR states, ignoring medium BBR states, there are no significant results generated, except for some significant windfall financing occurring following surplus shocks when RDF is incorporated absent stringency requirements, shown in **Table D**. Other changes in expenditures and revenues are not seen to be significant at the 10% level. The only significant result is that weak RDF stringency shows higher levels of proposed revenues whenever BBR is incorporated, shown in **Table E**. Again, weak RDF stringency may represent a lack of fiscal discipline knowing that state's can access savings to offset potential revenue shortfalls.

When states are broken out into weak, medium, and strict BBR states there is some significant results shown for weak rule states. Weak rule states increase expenditures following deficit shocks; this result is seen across all tables when RDF and their stringency of use controls are

added. This supports the hypothesis that weak rule states will increase spending following deficit shocks because of the increase in safety-net expenditures and not being required to reduce other expenditures or pay down deficits when they occur. This higher level of expenditure in proposed expenditures is seen in **Tables C, D, and E**. The result shown actually increases proposed expenditures by more than the size of the shock. Windfall financing shown previously is no longer significant here for strict and medium rule states. Further, strict rule states show a non-significant reduction in spending following deficit shocks. Medium rule states show a non-significant smaller increase in spending than weak rule states. When examining revenues weak rule states also show a large increase in proposed revenues, again supporting the hypothesis that weak BBR states will increase revenues to pay for higher expenditures following deficit shocks. Strict and medium BBR states do not show a significant influence on future revenues following fiscal shocks. These results are significant for proposed revenues but actual revenues show no significant result. Additionally, states with weak RDF stringency rules do also forecast higher revenues, again possibly showing poor forecasts or undisciplined use of savings and a push to plan for higher revenues.

When the interactions of all the variables are incorporated, examining expenditures, in **Table F1** there is significant influence of windfall expenditures regardless of strength of each state's BBR. Here strict BBR states also show lower levels of proposed expenditures in the period following a deficit shock, however this result is not significant for actual expenditures. Weak BBR rule states also still show significant higher expenditures following deficit shocks. An interesting result is that medium BBR states show significant windfall financing. The primary difference between medium and strict BBR states is the ability to carryover deficits rather than resolving

them. Strict BBR states may be pushed towards fiscal discipline that medium BBR states are not, allowing for surplus spending. When incorporating other interaction terms this effect is reduced but still shows windfall financing. The information gained within this table will be expanded in further iterations of this paper. The interaction and examination on revenues is depicted in **Table F2**. Here we see some significant results occurring with weak BBR states proposing higher revenues in the period following a deficit shock, again aligning to hypotheses. This holds true when interacted with RDF and stringency requirements. However, here there is no significant influence seen of RDF stringency interacted with the shock or RDF. When interacted with BBR there is some significant influence when interacted with weak BBR rules.

The results gained through these tables are supported through robustness checks ran on examining differences in expenditures and revenues. Further, the various models are also ran on mid-year rescissions following the work done by Poterba (1992) and Clemens and Miran (2012). The results gained align to the results of the previous authors.

From the regression results of the various models there are significant and interesting results that appear throughout the tables. First, deficit shocks do generate mid-year recessions but there is also influence on the budget in the period following the shock. Deficit shocks do influence budgets and revenues in the period following the shock, aligning to expectations. There is a significant influence that surplus shocks have on windfall financing absent BBR or when states have very strict BBRs. The reasoning for this may be that states with strict BBR know to use funds when available because programs may have to be hit with rescissions later when their fortunes are not as lucky. Further, states with weak RDF stringency of use may forecast higher revenues than states with strict stringency, because those states can access

savings much easier. RDF may measure a state's propensity to save and states with weak withdrawal rules can access these savings much easier, potentially using it as a bumper to forecast higher revenues and increased expenditures. The results do show that fiscal shocks do significantly influence the proposed budget and actual, year end, values.

VIII. Conclusions

Throughout this paper there have been additional questions asked and answered on the influence of fiscal institutionary rules, however there are still a lot of additional research and analysis that needs to be done. The goal of this paper is to address how states are able to respond to fiscal shocks in the period following the shock. By examining the following period rather than the period of the shock, states may be better able to structure their budgets and incorporate the influence of their fiscal institutionary rules. The results show that rainy day funds, budget stabilization funds, do not significantly reduce mid-year rescissions (less than 25% of the rescission) and do not have any strong influence on future budgets. This raises questions on what influence rainy day funds may have on state budgets. Some recent literature has examined that RDF may be used to provide for higher level of bond ratings so states can borrow cheaper, however RDF should prevent states from having the need to borrow. This research also shows that surplus shocks do show higher levels of windfall spending and that weak BBR states will increase expenditures, likely the result of higher safety-net spending with no reduction in other forms of spending, while strict BBR states do not show significant persistence when RDFs are incorporated as controls.

Further, the lessons learned may be applied at the national level is that periods of economic downturn, causing a reduction in expenditure in the period of the shock, may not significantly influence future budgets negatively. There is definitely a greater potential for windfall financing over the long term. Additionally, savings may be used for options outside of just budget shocks. Further analysis and models may have to be done to provide greater understanding of how RDF may influence budgets.

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X. Tables

Table A: Balanced Budget Requirements and RDF Stringency of Use

State	BBR Stringency	Deposit Req.	Withdrawal Req.	Adoption Year
Alabama	Strict	.	.	.
Arizona	Strict	4	4	1990
California	Medium	2	2	1985
Colorado	Strict	.	.	.
Connecticut	Weak	2	3	1979
Delaware	Strict	2	3	1977
Georgia	Strict	2	1	1976
Idaho	Strict	1	3	1984
Illinois	Weak	2	1	2000
Iowa	Strict	1	1	1992
Kansas	Strict	3	1	1993
Louisiana	Weak	2	1	1990
Maryland	Medium	3	1	1986
Michigan	Medium	4	4	1977
Mississippi	Strict	1	1	1982
Missouri	Strict	1	1	1992
New Jersey	Strict	2	2	1990
New Mexico	Strict	2	1	1978
New York	Weak	4	2	1945
Oklahoma	Strict	2	3	1985
Pennsylvania	Medium	2	3	1985
Rhode Island	Strict	1	2	1985
South Carolina	Strict	3	2	1978
South Dakota	Strict	2	2	1991
Tennessee	Strict	3	2	1972
Utah	Strict	2	2	1986
West Virginia	Strict	2	2	1994

Notes: Contains the classification for 27 states that are included in final sample. States BBR rankings are gathered from ACIR (1987) table. An ACIR score less than 5 are classified as weak, score of 5 and 6 are classified as medium, and score of 7 or above are strict. Deposit and Withdrawal requirements are gathered from Wagner (2004).
Deposit Requirements: (1) No Requirement (2) Fraction of General Fund (3) Annual Requirement (4) Set Economic Conditions.
Withdrawal Requirements: (1) At Discretion, (2) Revenue Shortfall, (3) Supermajority, and (4) Set Economic Conditions

Table B: Summary Statistics

	All States		Strict States		Weak States	
State Budgets	**Mean**	**Std**	**Mean**	**Std**	**Mean**	**Std**
Expenditures	1,704.15	564.47	1,612.47	498.02	1,926.01	650.07
Revenues	1,709.47	569.08	1,620.39	503.53	1,925.04	656.55
Proposed Expenditures	1,680.12	550.10	1,592.99	487.08	1,890.98	632.85
Proposed Revenues	1,671.27	545.02	1,581.03	477.09	1,889.62	632.60
Budget Stabilization Funds (RDF)	38.94	53.95	38.21	51.11	40.72	60.45
Taxes as a percent of Revenue	0.52	0.05	0.51	0.05	0.55	0.06
Personal Income Taxes as a percent of revenue	0.20	0.07	0.19	0.07	0.24	0.05
Fiscal Shock	0.07	91.68	(5.43)	88.53	13.38	97.94
Deficit Shock (Shock >0)	31.46	62.33	28.01	59.23	39.80	68.79
Surplus Shock (Shock <0)	(31.39)	50.40	(33.44)	49.50	(26.42)	52.36
Change in Revenues	9.05	56.99	9.41	50.55	8.19	70.40
Change in Expenditures	(13.74)	30.98	(13.84)	31.37	(13.48)	30.15
Economic						
Personal Income	28,349.02	5,296.91	26,698.97	4,414.08	32,341.90	5,138.81
Employment Shocks (Bartik 1991)	0.02	0.01	0.02	0.01	0.02	0.01
Demographic						
State Population (1,000s)	5,837.30	6,519.51	3,264.72	2,070.43	12,100.00	8,974.34
Drop Out Fraction	0.17	0.04	0.18	0.04	0.17	0.03
High School Graduation Fraction	0.27	0.03	0.27	0.03	0.27	0.04
Some College Fraction	0.18	0.03	0.18	0.04	0.17	0.03
College Plus Fraction	0.15	0.04	0.15	0.03	0.17	0.04
Medicaid Fraction	0.10	0.04	0.10	0.04	0.11	0.03
Senior Fraction	0.12	0.02	0.12	0.02	0.12	0.02
Child Fraction	0.28	0.03	0.28	0.03	0.27	0.02
Observations	448		317		131	

Table C: Balanced Budget Rules Only – Expenditures & Revenues

	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)
Deficit Shock	0.0727	-0.0365	-0.23	-0.134	-0.225	-0.134
	(0.229)	(0.182)	(0.199)	(0.209)	(0.198)	(0.209)
Surplus Shock	-0.299*	-0.496***	-0.167	-0.334	-0.175	-0.338
	(0.152)	(0.177)	(0.195)	(0.21)	(0.193)	(0.21)
Weak Rules x Deficit Shock			0.771	0.265	1.277***	0.633
			(0.49)	(0.44)	(0.249)	(0.413)
Weak Rules x Surplus Shock			-0.255	-0.421	-0.295	-0.445
			(0.394)	(0.449)	(0.438)	(0.527)
Medium Rules x Deficit Shock					0.418	0.0168
					(0.742)	(0.583)
Medium Rules x Surplus Shck					-0.196	-0.399
					(0.605)	(0.645)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.947	0.951	0.948	0.951	0.949	0.951

	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)
Deficit Shock	0.214	-0.0215	-0.045	-0.0953	-0.0364	-0.0906
	(0.229)	(0.189)	(0.223)	(0.223)	(0.221)	(0.222)
Surplus Shock	-0.166	-0.444**	0.00325	-0.287	-0.00224	-0.288
	(0.148)	(0.2)	(0.193)	(0.268)	(0.191)	(0.267)
Weak Rules x Deficit Shock			0.655	0.198	1.188***	0.515
			(0.475)	(0.457)	(0.241)	(0.48)
Weak Rules x Surplus Shock			-0.376	-0.412	-0.586	-0.657
			(0.317)	(0.445)	(0.392)	(0.607)
Medium Rules x Deficit Shock					0.199	-0.128
					(0.693)	(0.579)
Medium Rules x Surplus Shck					0.225	0.323
					(0.634)	(0.518)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.947	0.944	0.948	0.943	0.948	0.944

Table D: Balanced Budget Rules and Rainy Day Funds – Expenditures & Revenues

	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)
Deficit Shock	0.0794	-0.0106	-0.224	-0.119	-0.22	-0.118
	(0.226)	(0.182)	(0.2)	(0.213)	(0.198)	(0.212)
Surplus Shock	-0.298*	-0.492***	-0.177	-0.354*	-0.182	-0.357*
	(0.151)	(0.162)	(0.207)	(0.207)	(0.205)	(0.206)
Weak Rules x Deficit Shock			0.787	0.298	1.284***	0.648
			(0.486)	(0.438)	(0.247)	(0.415)
Weak Rules x Surplus Shock			-0.222	-0.35	-0.284	-0.418
			(0.417)	(0.441)	(0.446)	(0.52)
Medium Rules x Deficit Shock					0.428	0.0382
					(0.733)	(0.564)
Medium Rules x Surplus Shck					-0.112	-0.195
					(0.685)	(0.655)
Rainy Day Funds (t)	0.0698	0.267	0.124	0.265	0.107	0.258
	(0.206)	(0.266)	(0.217)	(0.277)	(0.227)	(0.287)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.947	0.951	0.948	0.951	0.948	0.951

	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)
Deficit Shock	0.223	-0.00555	-0.0386	-0.0866	-0.0285	-0.0789
	(0.225)	(0.19)	(0.224)	(0.226)	(0.222)	(0.225)
Surplus Shock	-0.165	-0.442**	-0.00674	-0.299	-0.0132	-0.302
	(0.145)	(0.192)	(0.201)	(0.259)	(0.199)	(0.257)
Weak Rules x Deficit Shock			0.673	0.217	1.198***	0.526
			(0.469)	(0.456)	(0.236)	(0.479)
Weak Rules x Surplus Shock			-0.341	-0.372	-0.571	-0.637
			(0.341)	(0.449)	(0.397)	(0.599)
Medium Rules x Deficit Shock					0.213	-0.111
					(0.679)	(0.565)
Medium Rules x Surplus Shck					0.345	0.477
					(0.667)	(0.556)
Rainy Day Funds (t)	0.0986	0.164	0.133	0.153	0.152	0.194
	(0.232)	(0.277)	(0.236)	(0.284)	(0.235)	(0.277)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.947	0.944	0.948	0.943	0.948	0.944

Table E: BBR, RDF, and RDF Stringency – Expenditures & Revenues

	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)
Deficit Shock	0.1	0.0116	-0.185	-0.0771	-0.176	-0.0734
	(0.218)	(0.18)	(0.192)	(0.212)	(0.19)	(0.212)
Surplus Shock	-0.243	-0.439**	-0.137	-0.311	-0.138	-0.311
	(0.145)	(0.163)	(0.198)	(0.214)	(0.195)	(0.213)
Weak Rules x Deficit Shock			0.732	0.239	1.270***	0.635
			(0.501)	(0.452)	(0.221)	(0.395)
Weak Rules x Surplus Shock			-0.208	-0.336	-0.272	-0.406
			(0.396)	(0.405)	(0.393)	(0.458)
Medium Rules x Deficit Shock					0.333	-0.0596
					(0.767)	(0.602)
Medium Rules x Surplus Shck					-0.0935	-0.176
					(0.763)	(0.671)
Rainy Day Funds (t)	-0.275	-0.0695	-0.178	-0.0615	-0.23	-0.0938
	(0.178)	(0.266)	(0.179)	(0.274)	(0.204)	(0.3)
Weak RDF x RDF	0.585*	0.57	0.505	0.546	0.559	0.585
	(0.309)	(0.348)	(0.32)	(0.346)	(0.332)	(0.367)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.948	0.952	0.949	0.952	0.949	0.952

	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)
Deficit Shock	0.246	0.0201	0.00609	-0.0373	0.0207	-0.0272
	(0.217)	(0.191)	(0.215)	(0.227)	(0.212)	(0.226)
Surplus Shock	-0.104	-0.380*	0.0391	-0.248	0.0363	-0.249
	(0.149)	(0.196)	(0.201)	(0.278)	(0.198)	(0.275)
Weak Rules x Deficit Shock			0.61	0.147	1.183***	0.511
			(0.488)	(0.472)	(0.205)	(0.452)
Weak Rules x Surplus Shock			-0.325	-0.355	-0.558	-0.623
			(0.315)	(0.415)	(0.341)	(0.528)
Medium Rules x Deficit Shock					0.106	-0.225
					(0.711)	(0.607)
Medium Rules x Surplus Shck					0.365	0.498
					(0.614)	(0.644)
Rainy Day Funds (t)	-0.28	-0.225	-0.213	-0.233	-0.228	-0.214
	(0.226)	(0.392)	(0.218)	(0.397)	(0.234)	(0.399)
Weak RDF x RDF	0.642**	0.659	0.577*	0.646	0.632*	0.678
	(0.302)	(0.402)	(0.306)	(0.397)	(0.311)	(0.413)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.948	0.944	0.948	0.944	0.949	0.945

Table F1: BBR, RDF, RDF Stringency, & Interactions – Expenditures

	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)	Proposed Expenditures (t+1)	Actual Expenditures (t+1)
Deficit Shock	-0.255	-0.265	-0.371*	-0.283	-0.367*	-0.279
	(0.266)	(0.237)	(0.188)	(0.182)	(0.189)	(0.182)
Surplus Shock	-0.373**	-0.571***	-0.220	-0.442**	-0.222	-0.443**
	(0.139)	(0.130)	(0.132)	(0.187)	(0.134)	(0.190)
Weak Rules x Deficit Shock			0.118	-0.137	1.100**	0.572
			(0.813)	(0.745)	(0.428)	(0.669)
Weak Rules x Surplus Shock			-0.337	-0.299	-0.177	-0.189
			(0.407)	(0.375)	(0.285)	(0.307)
Medium Rules x Deficit Shock					-0.842	-0.755
					(0.566)	(0.732)
Medium Rules x Surplus Shck					-1.889***	-1.153***
					(0.438)	(0.351)
Rainy Day Funds (t)	-0.269	-0.0830	-0.0487	0.212	-0.0328	0.223
	(0.208)	(0.279)	(0.237)	(0.261)	(0.243)	(0.267)
Weak RDF x RDF (t)	0.562*	0.585	0.457	0.268	0.435	0.259
	(0.326)	(0.385)	(0.542)	(0.619)	(0.556)	(0.632)
Weak RDF x Deficit Shock	0.642*	0.459	0.322	0.323	0.319	0.321
	(0.330)	(0.303)	(0.269)	(0.334)	(0.275)	(0.339)
Weak RDF x Surplus Shock	0.260	0.280	0.136	0.193	0.118	0.180
	(0.211)	(0.237)	(0.204)	(0.254)	(0.201)	(0.258)
Wk BBR & RDF x Deficit Shock			0.933	0.532	0.385	0.253
			(0.843)	(0.756)	(0.446)	(0.648)
Wk BBR & RDF x Surplus Shck			0.253	-0.136	0.269	-0.0298
			(0.526)	(0.518)	(0.429)	(0.528)
Med BBR & RDF x Deficit Shock					1.786**	1.003
					(0.777)	(0.785)
Med BBR & RDF x Surplus Shock					1.533***	0.385
					(0.500)	(0.657)
Weak BBR x RDF			-0.404	-0.767*	-0.848	-1.295**
			(0.397)	(0.397)	(0.513)	(0.537)
Med BBR x RDF					-0.869	-0.931
					(0.540)	(0.564)
Wk BBR & RDF Rules x RDF			0.0580	0.552	0.971	1.585*
			(0.741)	(0.876)	(0.664)	(0.810)
Med BBR & RDF Rules x RDF					0.350	0.411
					(0.662)	(0.752)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.949	0.952	0.950	0.952	0.952	0.953

Table F2: BBR, RDF, RDF Stringency, & Interactions – Revenues

	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)	Proposed Revenues (t+1)	Actual Revenues (t+1)
Deficit Shock	-0.0745	-0.266	-0.154	-0.251	-0.149	-0.239
	(0.275)	(0.242)	(0.213)	(0.190)	(0.213)	(0.186)
Surplus Shock	-0.225**	-0.538***	-0.0136	-0.304	-0.0108	-0.310
	(0.108)	(0.126)	(0.167)	(0.197)	(0.163)	(0.196)
Weak Rules x Deficit Shock			-0.00752	-0.350	0.988**	0.435
			(0.799)	(0.752)	(0.429)	(0.634)
Weak Rules x Surplus Shock			-0.461*	-0.509	-0.494*	-0.431
			(0.269)	(0.356)	(0.266)	(0.287)
Medium Rules x Deficit Shock					-0.947	-0.821
					(0.631)	(0.870)
Medium Rules x Surplus Shck					-0.447	-0.805**
					(0.451)	(0.357)
Rainy Day Funds (t)	-0.276	-0.247	0.0148	0.222	0.0222	0.232
	(0.239)	(0.403)	(0.254)	(0.301)	(0.260)	(0.304)
Weak RDF x RDF (t)	0.624*	0.688	0.508	0.170	0.485	0.182
	(0.326)	(0.440)	(0.553)	(0.542)	(0.564)	(0.554)
Weak RDF x Deficit Shock	0.578*	0.474	0.289	0.329	0.288	0.328
	(0.312)	(0.312)	(0.255)	(0.352)	(0.262)	(0.356)
Weak RDF x Surplus Shock	0.243	0.335	0.0805	0.0516	0.0623	0.0441
	(0.238)	(0.279)	(0.265)	(0.307)	(0.257)	(0.310)
Wk BBR & RDF x Deficit Shock			0.883	0.638	0.439	0.318
			(0.851)	(0.802)	(0.466)	(0.643)
Wk BBR & RDF x Surplus Shck			-0.0441	0.507	0.0656	0.396
			(0.586)	(0.510)	(0.472)	(0.523)
Med BBR & RDF x Deficit Shock					1.496*	0.873
					(0.864)	(0.901)
Med BBR & RDF x Surplus Shock					-0.623	0.818
					(0.577)	(0.754)
Weak BBR x RDF			-0.676*	-1.246**	-0.847	-1.971***
			(0.334)	(0.462)	(0.504)	(0.499)
Med BBR x RDF					-0.929*	-1.053*
					(0.493)	(0.541)
Wk BBR & RDF Rules x RDF			-0.0310	1.129	0.723	2.713***
			(0.725)	(1.010)	(0.709)	(0.717)
Med BBR & RDF Rules x RDF					-0.248	0.480
					(0.641)	(0.699)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.949	0.945	0.950	0.946	0.951	0.947

XI. Appendix Tables

Table G: Balanced Budget Rules Only – Expenditures & Revenues Differences

	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)
Deficit Shock	0.049	-0.0326	-0.176	0.0751	-0.182	0.0714
	(0.162)	(0.136)	(0.12)	(0.18)	(0.119)	(0.182)
Surplus Shock	-0.349**	-0.527***	-0.274	-0.646***	-0.272	-0.649***
	(0.134)	(0.158)	(0.191)	(0.14)	(0.194)	(0.142)
Weak Rules x Deficit Shock			0.575***	-0.299	0.299*	-0.306
			(0.186)	(0.231)	(0.149)	(0.313)
Weak Rules x Surplus Shock			-0.125	0.297	0.0462	0.488**
			(0.297)	(0.271)	(0.226)	(0.19)
Medium Rules x Deficit Shock					0.843***	-0.199
					(0.27)	(0.216)
Medium Rules x Surplus Shck					-0.637	-0.314
					(0.468)	(0.25)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.208	0.242	0.231	0.249	0.238	0.256

	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)
Deficit Shock	-0.167	0.281*	-0.273**	0.399**	-0.274**	0.399**
	(0.117)	(0.146)	(0.132)	(0.179)	(0.132)	(0.179)
Surplus Shock	-0.373***	0.329**	-0.350**	0.143	-0.347**	0.144
	(0.096)	(0.154)	(0.146)	(0.13)	(0.148)	(0.13)
Weak Rules x Deficit Shock			0.271	-0.321	0.0968	-0.352
			(0.205)	(0.282)	(0.316)	(0.402)
Weak Rules x Surplus Shock			-0.0267	0.479**	-0.0255	0.462
			(0.176)	(0.23)	(0.163)	(0.276)
Medium Rules x Deficit Shock					0.387	-0.31
					(0.255)	(0.296)
Medium Rules x Surplus Shck					-0.00671	0.538*
					(0.311)	(0.289)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.258	0.186	0.261	0.195	0.261	0.191

Table H: Balanced Budget Rules & Rainy Day Funds – Expenditures & Revenues Differences

	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)
Deficit Shock	0.0633	-0.0339	-0.166	0.0742	-0.172	0.0678
	(0.164)	(0.136)	(0.118)	(0.18)	(0.117)	(0.18)
Surplus Shock	-0.347**	-0.527***	-0.289	-0.645***	-0.285	-0.645***
	(0.145)	(0.158)	(0.21)	(0.137)	(0.211)	(0.135)
Weak Rules x Deficit Shock			0.601***	-0.301	0.311*	-0.31
			(0.189)	(0.23)	(0.162)	(0.307)
Weak Rules x Surplus Shock			-0.0733	0.293	0.065	0.482**
			(0.286)	(0.272)	(0.241)	(0.187)
Medium Rules x Deficit Shock					0.860***	-0.204
					(0.259)	(0.215)
Medium Rules x Surplus Shck					-0.492	-0.361
					(0.503)	(0.252)
Rainy Day Funds (t)	0.148	-0.0131	0.197	-0.0167	0.184	-0.0598
	(0.14)	(0.108)	(0.144)	(0.106)	(0.141)	(0.0904)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.21	0.24	0.236	0.247	0.241	0.255

	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)
Deficit Shock	-0.156	0.269*	-0.266*	0.392**	-0.266*	0.392**
	(0.117)	(0.145)	(0.133)	(0.177)	(0.133)	(0.178)
Surplus Shock	-0.372***	0.327**	-0.361**	0.153	-0.359**	0.153
	(0.105)	(0.15)	(0.159)	(0.125)	(0.162)	(0.125)
Weak Rules x Deficit Shock			0.291	-0.336	0.108	-0.359
			(0.211)	(0.276)	(0.333)	(0.387)
Weak Rules x Surplus Shock			0.0125	0.447*	-0.00853	0.449
			(0.182)	(0.24)	(0.177)	(0.282)
Medium Rules x Deficit Shock					0.402	-0.32
					(0.247)	(0.296)
Medium Rules x Surplus Shck					0.124	0.443
					(0.254)	(0.26)
Rainy Day Funds (t)	0.121	-0.128	0.149	-0.121	0.166*	-0.121
	(0.0846)	(0.0898)	(0.0882)	(0.0796)	(0.0946)	(0.0823)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.259	0.187	0.264	0.195	0.265	0.191

Table I: BBR, RDF, and RDF Stringency – Expenditures & Revenues Differences

	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)
Deficit Shock	0.0655	-0.0328	-0.167	0.0789	-0.175	0.0727
	(0.165)	(0.137)	(0.126)	(0.184)	(0.125)	(0.184)
Surplus Shock	-0.341**	-0.525***	-0.289	-0.640***	-0.287	-0.640***
	(0.14)	(0.157)	(0.206)	(0.13)	(0.208)	(0.128)
Weak Rules x Deficit Shock			0.601***	-0.308	0.312*	-0.311
			(0.194)	(0.236)	(0.163)	(0.31)
Weak Rules x Surplus Shock			-0.0733	0.294	0.0645	0.483**
			(0.288)	(0.271)	(0.243)	(0.182)
Medium Rules x Deficit Shock					0.865***	-0.215
					(0.269)	(0.225)
Medium Rules x Surplus Shck					-0.493	-0.359
					(0.498)	(0.267)
Rainy Day Funds (t)	0.11	-0.0305	0.199	-0.0537	0.202	-0.0989
	(0.168)	(0.169)	(0.183)	(0.155)	(0.184)	(0.141)
Weak RDF x RDF	0.0643	0.0295	-0.00213	0.0619	-0.0293	0.0649
	(0.187)	(0.193)	(0.199)	(0.194)	(0.189)	(0.159)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.208	0.238	0.234	0.246	0.239	0.253

	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)
Deficit Shock	-0.153	0.272*	-0.262*	0.400**	-0.263*	0.400**
	(0.117)	(0.149)	(0.136)	(0.179)	(0.136)	(0.18)
Surplus Shock	-0.364***	0.334**	-0.357**	0.161	-0.357**	0.161
	(0.103)	(0.151)	(0.157)	(0.131)	(0.16)	(0.132)
Weak Rules x Deficit Shock			0.285	-0.347	0.107	-0.361
			(0.214)	(0.272)	(0.337)	(0.389)
Weak Rules x Surplus Shock			0.0138	0.449*	-0.00795	0.451
			(0.182)	(0.232)	(0.177)	(0.269)
Medium Rules x Deficit Shock					0.397	-0.337
					(0.246)	(0.296)
Medium Rules x Surplus Shck					0.125	0.446
					(0.249)	(0.29)
Rainy Day Funds (t)	0.0741	-0.17	0.121	-0.185	0.148	-0.184
	(0.0975)	(0.17)	(0.104)	(0.164)	(0.105)	(0.172)
Weak RDF x RDF	0.0794	0.0717	0.0472	0.107	0.0286	0.105
	(0.128)	(0.207)	(0.121)	(0.202)	(0.124)	(0.213)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.258	0.185	0.262	0.194	0.263	0.19

Table J1: BBR, RDF, RDF Stringency, & Interactions – Expenditures Differences

	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)	Proposed Expenditures (t+1) - (t)	Actual Expenditures (t+1) - (t)
Deficit Shock	-0.145	-0.0628	-0.369***	-0.0957	-0.376***	-0.0989
	(0.158)	(0.142)	(0.124)	(0.160)	(0.117)	(0.161)
Surplus Shock	-0.391***	-0.439**	-0.273*	-0.602***	-0.277*	-0.605***
	(0.107)	(0.195)	(0.139)	(0.169)	(0.143)	(0.172)
Weak Rules x Deficit Shock			0.626***	0.276	0.475**	0.243
			(0.150)	(0.184)	(0.216)	(0.191)
Weak Rules x Surplus Shock			-0.193	0.389	-0.0158	0.522**
			(0.268)	(0.244)	(0.180)	(0.199)
Medium Rules x Deficit Shock					0.695***	0.306
					(0.144)	(0.245)
Medium Rules x Surplus Shck					-1.638***	-0.476*
					(0.325)	(0.265)
Rainy Day Funds (t)	0.123	0.00549	0.0899	-0.123	0.0941	-0.119
	(0.147)	(0.158)	(0.187)	(0.143)	(0.189)	(0.146)
Weak RDF x RDF (t)	0.0336	-0.0339	0.0195	0.133	0.0252	0.138
	(0.211)	(0.178)	(0.208)	(0.178)	(0.213)	(0.183)
Weak RDF x Deficit Shock	0.383*	0.0580	0.369**	0.329	0.368**	0.331
	(0.189)	(0.212)	(0.162)	(0.219)	(0.159)	(0.220)
Weak RDF x Surplus Shock	0.0975	-0.182	-0.0110	-0.0353	-0.00328	-0.0342
	(0.241)	(0.191)	(0.293)	(0.190)	(0.303)	(0.192)
Wk BBR & RDF x Deficit Shock			-0.0159	-0.940***	-0.413*	-1.097***
			(0.249)	(0.263)	(0.236)	(0.310)
Wk BBR & RDF x Surplus Shck			0.695	-0.417	0.440	-0.388
			(0.491)	(0.303)	(0.391)	(0.409)
Med BBR & RDF x Deficit Shock					0.343*	-0.774**
					(0.182)	(0.301)
Med BBR & RDF x Surplus Shock					2.747**	0.517
					(1.143)	(0.615)
Weak BBR x RDF			0.365	0.293	0.287	-0.00724
			(0.300)	(0.223)	(0.194)	(0.230)
Med BBR x RDF					0.198	0.277
					(0.320)	(0.241)
Wk BBR & RDF Rules x RDF			0.0702	-0.344	-0.238	-0.0864
			(0.517)	(0.329)	(0.250)	(0.306)
Med BBR & RDF Rules x RDF					0.824	-0.192
					(0.846)	(0.455)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.219	0.237	0.245	0.267	0.261	0.264

Table J2: BBR, RDF, RDF Stringency, & Interactions – Revenues Differences

	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)	Proposed Revenues (t+1) - (t)	Actual Revenues (t+1) - (t)
Deficit Shock	-0.288**	0.274*	-0.446***	0.238	-0.451***	0.242
	(0.129)	(0.154)	(0.104)	(0.155)	(0.0989)	(0.156)
Surplus Shock	-0.376***	0.429*	-0.359**	0.222	-0.363**	0.210
	(0.0843)	(0.212)	(0.156)	(0.184)	(0.160)	(0.181)
Weak Rules x Deficit Shock			0.504***	0.209	0.499**	0.369*
			(0.176)	(0.271)	(0.235)	(0.192)
Weak Rules x Surplus Shock			0.00957	0.479*	0.00182	0.620***
			(0.181)	(0.257)	(0.178)	(0.196)
Medium Rules x Deficit Shock					0.426***	0.254
					(0.149)	(0.360)
Medium Rules x Surplus Shck					-0.223	-0.286
					(0.423)	(0.369)
Rainy Day Funds (t)	0.0904	-0.134	0.0908	-0.0696	0.0893	-0.0641
	(0.0794)	(0.175)	(0.0950)	(0.0863)	(0.0975)	(0.0846)
Weak RDF x RDF (t)	0.0464	0.0104	0.0704	-0.0465	0.0708	-0.0182
	(0.140)	(0.219)	(0.159)	(0.182)	(0.166)	(0.178)
Weak RDF x Deficit Shock	0.248	0.00422	0.368**	0.300	0.367**	0.302
	(0.165)	(0.239)	(0.153)	(0.223)	(0.150)	(0.222)
Weak RDF x Surplus Shock	0.0195	-0.202	0.0125	-0.0989	0.0218	-0.0877
	(0.199)	(0.273)	(0.230)	(0.249)	(0.237)	(0.244)
Wk BBR & RDF x Deficit Shock			-0.395	-0.977**	-0.865**	-1.420***
			(0.330)	(0.385)	(0.413)	(0.253)
Wk BBR & RDF x Surplus Shck			0.0534	-0.112	-0.523	-0.786**
			(0.540)	(0.567)	(0.322)	(0.322)
Med BBR & RDF x Deficit Shock					-0.0733	-0.818*
					(0.326)	(0.416)
Med BBR & RDF x Surplus Shock					1.347*	2.030***
					(0.725)	(0.450)
Weak BBR x RDF			0.143	-0.202	0.380***	-0.866***
			(0.181)	(0.365)	(0.103)	(0.238)
Med BBR x RDF					0.102	0.176
					(0.150)	(0.186)
Wk BBR & RDF Rules x RDF			-0.110	0.261	-0.881***	0.908***
			(0.396)	(0.372)	(0.245)	(0.257)
Med BBR & RDF Rules x RDF					0.652	0.418
					(0.401)	(0.282)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	419	422	419	422	419	422
Adjusted R sq	0.261	0.183	0.262	0.203	0.282	0.224

XIV. Appendix Tables

Table K: Balanced Budget Rules Only – Mid Year Adjustments

	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments
Deficit Shock	-0.292***	-0.383***	-0.383***	0.0641***	0.0716**	0.0717**
	(0.0552)	(0.0462)	(0.0462)	(0.0223)	(0.0305)	(0.0306)
Surplus Shock	0.00220	0.0248	0.0246	0.0273**	0.0220	0.0220
	(0.0142)	(0.0156)	(0.0157)	(0.0107)	(0.0165)	(0.0166)
Weak Rules x Deficit Shock		0.243***	0.188***		-0.0198	-0.0130
		(0.0506)	(0.0400)		(0.0316)	(0.0334)
Weak Rules x Surplus Shock		-0.0408	-0.0317		0.0127	0.0145
		(0.0276)	(0.0363)		(0.0209)	(0.0265)
Medium Rules x Deficit Shock			0.277***			-0.0233
			(0.0615)			(0.0354)
Medium Rules x Surplus Shck			-0.0528*			0.00850
			(0.0290)			(0.0206)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	448	448	448	448	448	448
Adjusted R sq	0.506	0.555	0.555	0.172	0.170	0.166

Table L: Balanced Budget Rules & Rainy Day Funds – Mid Year Adjustments

	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments
Deficit Shock	-0.287***	-0.379***	-0.379***	0.0642***	0.0716**	0.0716**
	(0.0546)	(0.0445)	(0.0446)	(0.0226)	(0.0307)	(0.0308)
Surplus Shock	0.00224	0.0208	0.0205	0.0273**	0.0220	0.0220
	(0.0150)	(0.0185)	(0.0188)	(0.0107)	(0.0166)	(0.0166)
Weak Rules x Deficit Shock		0.251***	0.192***		-0.0198	-0.0130
		(0.0502)	(0.0385)		(0.0312)	(0.0330)
Weak Rules x Surplus Shock		-0.0292	-0.0267		0.0126	0.0144
		(0.0288)	(0.0367)		(0.0214)	(0.0267)
Medium Rules x Deficit Shock			0.286***			-0.0234
			(0.0583)			(0.0352)
Medium Rules x Surplus Shck			-0.0264			0.00818
			(0.0394)			(0.0201)
Rainy Day Funds (t)	0.0378	0.0581**	0.0608**	0.000675	-0.000207	-0.000748
	(0.0231)	(0.0234)	(0.0237)	(0.0125)	(0.0122)	(0.0123)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	448	448	448	448	448	448
Adjusted R sq	0.508	0.560	0.561	0.170	0.168	0.164

Table M: BBR, RDF, and RDF Stringency – Mid Year Adjustments

	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments
Deficit Shock	-0.288***	-0.383***	-0.384***	0.0636***	0.0705**	0.0705**
	(0.0548)	(0.0437)	(0.0438)	(0.0224)	(0.0307)	(0.0308)
Surplus Shock	0.000493	0.0165	0.0158	0.0258**	0.0208	0.0208
	(0.0153)	(0.0204)	(0.0209)	(0.0111)	(0.0172)	(0.0172)
Weak Rules x Deficit Shock		0.256***	0.194***		-0.0181	-0.0126
		(0.0514)	(0.0392)		(0.0306)	(0.0325)
Weak Rules x Surplus Shock		-0.0295	-0.0277		0.0125	0.0141
		(0.0310)	(0.0435)		(0.0212)	(0.0259)
Medium Rules x Deficit Shock			0.295***			-0.0211
			(0.0562)			(0.0349)
Medium Rules x Surplus Shck			-0.0246			0.00863
			(0.0294)			(0.0208)
Rainy Day Funds (t)	0.0504	0.0912*	0.0983*	0.0114	0.00944	0.00857
	(0.0432)	(0.0513)	(0.0494)	(0.0194)	(0.0185)	(0.0193)
Weak RDF x RDF	-0.0202	-0.0522	-0.0585	-0.0172	-0.0152	-0.0146
	(0.0466)	(0.0539)	(0.0498)	(0.0176)	(0.0167)	(0.0172)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	448	448	448	448	448	448
Adjusted R sq	0.507	0.562	0.563	0.170	0.167	0.163

Table N: BBR, RDF, RDF Stringency, & Interactions – Mid Year Adjustments

	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Expenditure Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments	Mid Year Revenue Adjustments
Deficit Shock	-0.276***	-0.347***	-0.349***	0.0667**	0.0628*	0.0628
	(0.0460)	(0.0511)	(0.0511)	(0.0295)	(0.0367)	(0.0370)
Surplus Shock	0.00747	0.0191	0.0178	0.0289	0.0291	0.0288
	(0.0159)	(0.0170)	(0.0175)	(0.0170)	(0.0284)	(0.0283)
Weak Rules x Deficit Shock		0.162***	0.145***		0.0195	0.0172
		(0.0532)	(0.0464)		(0.0418)	(0.0328)
Weak Rules x Surplus Shock		-0.0337	0.00189		0.00493	0.00690
		(0.0357)	(0.0189)		(0.0345)	(0.0355)
Medium Rules x Deficit Shock			0.219***			0.0317
			(0.0505)			(0.0658)
Medium Rules x Surplus Shck			-0.101*			0.0335
			(0.0552)			(0.0674)
Rainy Day Funds (t)	0.0514	0.112***	0.111***	0.0122	0.0107	0.0104
	(0.0462)	(0.0236)	(0.0241)	(0.0202)	(0.0229)	(0.0229)
Weak RDF x RDF (t)	-0.0220	-0.0850**	-0.0792*	-0.0185	-0.00392	-0.00264
	(0.0534)	(0.0407)	(0.0408)	(0.0183)	(0.0224)	(0.0225)
Weak RDF x Deficit Shock	-0.0194	-0.0683	-0.0667	-0.00485	0.0183	0.0186
	(0.0789)	(0.0673)	(0.0680)	(0.0333)	(0.0425)	(0.0429)
Weak RDF x Surplus Shock	-0.0150	-0.0130	-0.0115	-0.00662	-0.0121	-0.0117
	(0.0366)	(0.0470)	(0.0490)	(0.0243)	(0.0367)	(0.0366)
Wk BBR & RDF x Deficit Shock		0.153*	0.0698		-0.0693	-0.0704
		(0.0849)	(0.0687)		(0.0518)	(0.0470)
Wk BBR & RDF x Surplus Shck		0.0197	-0.0379		-0.00342	0.0232
		(0.0688)	(0.0678)		(0.0461)	(0.0520)
Med BBR & RDF x Deficit Shock			0.159**			-0.0817
			(0.0772)			(0.0745)
Med BBR & RDF x Surplus Shock			0.140			-0.0482
			(0.114)			(0.0727)
Weak BBR x RDF		-0.0616	-0.300***		-0.000693	-0.0276
		(0.113)	(0.0489)		(0.0389)	(0.0608)
Med BBR x RDF			0.0794			0.0231
			(0.0591)			(0.0358)
Wk BBR & RDF Rules x RDF		0.0825	0.279***		-0.0391	0.0151
		(0.0984)	(0.0391)		(0.0407)	(0.0515)
Med BBR & RDF Rules x RDF			-0.0200			-0.0841**
			(0.0961)			(0.0313)
State and Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	448	448	448	448	448	448
Adjusted R sq	0.505	0.562	0.574	0.166	0.167	0.157