# Making Budget Stabilization Funds Work

BY
EUNJOO CHOI
M.A., Georgetown University, 2013
B.A., Sogang University, 2005

THESIS

Submitted as partial fulfillment of the requirements
for the degree of Doctor of Philosophy in Public Administration
in the Graduate College of the
University of Illinois Chicago, 2024

Chicago, Illinois

Defense Committee:

Yonghong Wu, Chair and Advisor
Rebecca Hendrick
David Merriman
Michael D. Siciliano
Kenneth Kriz, University of Illinois, Springfield

This thesis is dedicated to my parents without whom it would never have been accomplished.

## ACKNOWLEDGEMENTS

I am deeply indebted to numerous individuals whose contributions have been instrumental in the completion of this dissertation. First and foremost, I express my heartfelt gratitude to my academic advisor, Dr. Yonghong Wu, whose unwavering support and guidance throughout my Ph.D. journey have been invaluable. Dr. Wu consistently encouraged me to expand the horizons of my research and provided invaluable insights in shaping this dissertation. I also extend my gratitude to my academic mentor, Dr. Rebecca Hendrick, whose meticulousness and intellect have profoundly influenced my academic growth. Her mentorship laid the foundation for this work, and I am truly grateful for her contributions.

I am equally thankful to my committee members, Drs. David Merriman, Michael D. Siciliano, and Kenneth Kriz, for their scholarly guidance and expertise. Dr. Merriman's insights into measurement and analytical frameworks have been instrumental in refining this research. Dr. Siciliano's methodological expertise and support have been invaluable in navigating methodological challenges. Dr. Kriz's knowledge in our field, along with his encouragement to explore diverse literature, has added depth to my dissertation. Special appreciation is due to Dr. Kelly LeRoux for her encouragement and support. Her mentorship and wisdom have been pivotal in advancing my academic journey.

I am indebted to the professors who shaped my academic foundation during my master's and bachelor's degrees. I am thankful to Dr. Kilkon Ko for his steadfast belief in my potential and fortitude, serving as a consistent source of motivation during my Ph.D. journey. Dr. Eusebio Mujal-Leon's insightful guidance has been invaluable, and I am deeply grateful for his mentorship at Georgetown University. Additionally, Dr. Matthew Rudolph's expertise in Asian

political economy has been inspiring, and I am thankful for his contributions to my academic growth. I also express my gratitude to Dr. Josep Colomer for his guidance in game theory at Georgetown University and support during the Ph.D. application process. Additionally, I extend my heartfelt thanks to Dr. Changki Park for his warm encouragement during challenging times.

I am particularly grateful to Dr. Yoonhwan Shin for igniting my research interests in Southeast Asian regions. I am also grateful to Dr. Hocheol Son, who sparked my interest in studying and supported my pursuit of education abroad. Dr. Sekeol Kim's support during difficult times has been deeply appreciated. The memory of Dr. Pattana Kitiarsa's admirable character continues to inspire me; although he is no longer with us, his impact on my academic journey remains profound.

I extend heartfelt appreciation to my friends at the University of Illinois Chicago, especially Victor Hugg and Di Qiao, for their enduring friendship and shared memories. I am also thankful to Jooyoon Hwang, Hyunjung Park, Juyeon Hong, Jihyun Hannah Paik, and Samuel Choi for their encouragement and camaraderie.

Finally, I am profoundly grateful to my family for their unwavering support and sacrifices. To my parents, Kichang Choi and Chasook Kwon, I owe a debt of gratitude for their boundless love and encouragement. I appreciate the constant support of my husband, Dr. Hyowon Park. Even though I joked that if my husband had helped with household chores, I could have finished my Ph.D. three years earlier, without you standing by me during difficult times, I wouldn't have been able to complete my degree. To my beloved children, Ryan Park and Amber Park, your presence fills my life with joy and purpose.

This dissertation is a testament to the collective support and encouragement of these individuals, without whom this journey would not have been possible.

## TABLE OF CONTENTS

## LIST OF TABLES

## LIST OF FIGURES

## LIST OF ABBREVIATIONS

| | |
|---|---|
| ACFR | Annual Comprehensive Financial Reports |
| BBR | Budget Balancing Requirements |
| BSF | Budget Stabilization Fund |
| CBPP | Center on Budget and Policy Priorities |
| CCFC | Countercyclical Fiscal Capacity |
| EEC | Economic Estimates Commission |
| GFB | Unassigned General Fund Ending Balance |
| GSCM | Generalized Synthetic Control Method |
| GSP | Gross State Product |
| IGR | Intergovernmental Revenue |
| NCSL | National Conference of State Legislatures |
| NIE | New Institutional Economics |
| NCEI | National Centers for Environmental Information |
| PBC | Political Budget Cycle |
| RSF | Revenue Stabilization Fund |
| TEL | Tax and Expenditure Limits |

## SUMMARY

The dissertation investigates the influence of Budget Stabilization Fund (BSF) rules' stringency on fiscal slack levels within state governments in the United States. BSFs are utilized by states to stabilize budgets during economic downturns, but the stringency of rules governing BSF deposits and withdrawals varies considerably among states. Drawing upon New Institutional Economics (NIE), the study aims to elucidate how the strictness of these rules affects states' saving and spending patterns.

Using Fixed Effects and Generalized Synthetic Control Method (GSCM) models, significant insights into states' saving and spending behaviors are generated. The findings suggest that stringent deposit rules positively impact BSF levels, emphasizing the importance of clearly defined saving obligations within BSF frameworks. However, the impact of stringent withdrawal rules on BSF levels is not significant, which could be attributed to their inherent relationship with BSF usage and collinearity concerns with certain deposit requirements.

In Fixed Effects models, it is observed that stringent withdrawal rules influence General Fund Balance (GFB) levels, whereas stringent deposit rules do not. States implementing both linking withdrawal to revenue volatility and imposing a withdrawal limit tend to have higher GFB levels, indicating a preference for maintaining funds in the GFB account over utilizing the BSF when faced with multiple stringent regulations.

In sum, the study highlights the significance of stringent deposit rules in enhancing BSF levels for fiscal stabilization. Additionally, it underscores the impact of stringent withdrawal rules on GFB levels, prompting nuanced considerations in devising effective fiscal management strategies for state governments.

# 1. INTRODUCTION

## 1.1 Statement of the Problem

The dissertation investigates how the stringency of Budget Stabilization Fund rules influences the levels of fiscal slack in state governments, focusing on two key sources: budget stabilization funds (BSFs) and unassigned general fund ending balances (GFBs) as defined by National Association of State Budget Officers (NASBO) in the Fiscal Survey of the States (National Association of State Budget Officers, 2018).[1] BSFs, designed to exert countercyclical effects on state budget actions during fiscal stress (Hou, 2004), have been adopted by all U.S. states except Colorado, with a majority established in the 1980s following the 1980-82 recession (see Table 1). Despite widespread adoption, BSFs have evolved differently, resulting in significant variation in institutional rules governing deposit and withdrawal across states. While some states have stringent policies, others do not. For example, Arizona follows a well-defined formula based on "the difference between the annual growth rate and the trend growth rate multiplied by total general fund revenue" (A.R.S. § 35-144), while Alaska and Texas mandate a supermajority vote for fund use (Alaska Stat. § 37.05.540; Tex. Const. Art. III, § 49-g). In contrast, Illinois lacks clear withdrawal conditions or voting requirements (30 ILCS 122).

Recognizing that BSFs primarily serve as emergency funds during tough fiscal times, their availability and use should ideally reduce reliance on other budget-balancing measures, such as tax increases and expenditure reductions. Unassigned general fund balances (GFBs) also

[1] According to the NASBO's Fiscal Survey of the States (2018), general fund ending balances represent fund balances comprising both "reserved and unreserved" amounts. NASBO accommodates variations in states' accounting practices for recording general fund balances and budgetary stabilization funds. Ending balances, as defined by NASBO, are a type of "surplus funds and reserves that states may use to respond to unforeseen circumstances and help smooth revenue volatility" (p. ix).

act as significant emergency funds, reducing the need for additional revenue sources. Therefore, it is crucial to expand the investigation of BSF rule impact to include states' GFBs, exploring the relationship and potential tradeoffs between BSFs and GFBs at the state level for budget balancing from 2002 to 2020 (GASB, 1999). This study addresses key questions: What determines fiscal reserve levels? Does the stringency of BSF rules influence state savings and spending behavior? More specifically, do more stringent deposit and withdrawal rules contribute to increased levels of BSFs (and/or GFBs), or do states circumvent these stringent deposit and withdrawal requirements? Is there a tradeoff between BSF and GFB levels?

To answer these questions, the research has three objectives: conceptualizing BSF rule stringency, examining the impact of structural characteristics of BSF rules on state savings and spending behavior, and understanding the interplay among BSF rules, BSF, and GFB levels. By addressing these objectives, this research enhances our comprehensive understanding of the impact of institutional constraints on the accumulation of fiscal slack, thereby contributing to a deeper comprehension of the relationships between BSF rules, fiscal capacity, and state fiscal behavior.

### 1.2 Significance of the Study

There has been a long-running debate about the determinants of the size of budget stabilization fund. However, prior research has been conceptually, theoretically, and methodologically limited as follows. First, the stringency of BSF rules has yet to be conceptualized in a systematic way when analyzing the effects of the BSF rules on state savings and spending behavior. Although several studies have attempted to examine the impact of stringent BSF rules on fiscal stress (Douglas & Gaddie, 2002; Sobel & Holcombe, 1996) and

have investigated the determinants of BSF rule stringency (Rodríguez-Tejedo, 2012; Wagner, 2004), none of them define BSF rule stringency. Stringency is implicitly assumed to be a synonym for strictness, restrictiveness, or tightness. It is important to know which attributes of BSF rules in particular encourage a state to save more money or curb unnecessary withdrawals from BSF. Therefore, this study conceptualizes the stringency of the BSF by considering attributes, such as precision and degree of obligation, encompassing aspects like saving obligations, withdrawal conditions, and withdrawal restrictions, as detailed in section 2.3.

A set of obligations or commitments compels public officials or legislators to undertake specific actions (obligation) or refrain from particular actions (restriction). Clearly and coherently defined rules prevent public officials or legislators from interpreting and implementing regulations discretionarily (precision). Notably, the conceptualization of BSF rule stringency has not been undertaken in previous research. By delving into the conceptualization of BSF rule stringency, the study aims to identify the specific regulatory features that effectively contribute to bolstering BSF balance levels.

Secondly, there exists limited theoretical and empirical knowledge regarding the impact of BSF rules on unassigned GFB, commonly referred to as unreserved undesignated balances (UUB). While GFB serves as a crucial savings instrument, research at the state level predominantly delves into the relationship between BSF structural features and corresponding balance levels. Given that most BSFs derive funding from general funds, it logically follows that the stringency of BSF rules plays a role in influencing GFB levels. Furthermore, exploring how BSF rules shape a state's reliance on GFB becomes pertinent, as each state exhibits a distinct dependence on either BSF or GFB. Our investigation into the impact of BSF rule stringency on GFB levels contributes to a more comprehensive understanding of the determinants influencing

GFB levels. Moreover, it sheds light on the intricate relationship between BSF and GFB levels, enriching our comprehension of this dynamic interplay.

Finally, numerous prior studies have overlooked crucial structural features of BSFs, including repayment provisions, spending limits, and the interactions among these vital structural features, when empirically assessing their impact on BSF balance levels (refer to Table 2). Neglecting these essential structural features and their interactions can result in a misrepresentation of the relationship between BSF rules and their size. This research incorporates *fourteen* structural dimensions of BSFs and empirically investigates their effects on BSF balance levels. From a methodological standpoint, this study makes a significant contribution by elucidating the causal relationship between the stringency of BSF rules and the size of the BSF. Employing the Generalized Synthetic Control Method (GSCM), the research scrutinizes the causal effects of BSF rule stringency on BSF and GFB. The GSCM is a statistical technique that is used to analyze the causal effects of BSF policy changes on BSF balances for treatment group and comparison group (Xu, 2017a).

This study seeks to deepen our understanding of the factors shaping BSF balances. The empirical findings in this dissertation present valuable policy implications, proposing strategies for states to create fiscal reserves as a precaution against fiscal stress. The study's results allow us to identify the importance of specific BSF rules and offer guidance on their prioritization concerning their impact on BSF balance levels. It is my hope that this paper will yield further insights, thereby contributing to the advancement of theories and policies governing Budget Stabilization Funds.

### 1.3 Plan of the Proposal

This research proposal is structured as follows: Chapter Two delves into the landscape of Budget Stabilization Funds (BSF) in the U.S., addressing i) the timeline of BSF adoption by states, ii) the rationale behind implementing BSF policies, and iii) the variations in BSF structural features across states. Chapter Three provides a literature review on BSFs and their relationship with General Funds. Chapter Four introduces hypotheses outlining the relationships between the stringency of BSF rules and levels of both BSF and General Fund Balances (GFB). Chapter Five details the operationalization of variables and outlines the data sources. Chapter Six presents the quantitative research design, estimation methodology, and findings. Chapter Seven incorporates a qualitative analysis of documents, including legal documents, budget documents, local newspapers, etc., to account for contextual factors. Finally, Chapter Eight provides a comprehensive summary and engages in a discussion of the key findings presented in this dissertation. It explores the contributions and limitations of these findings, offers insights into potential avenues for future research within the realm of financial management scholarship, and reflects on the possible policy implications arising from this study.

# 2. BUDGET STABILIZATION FUNDS

## 2.1 Adoption and Purpose of Budget Stabilization Funds

BSF structural characteristics refer to "the detailed legal language as prescribed in state statutes or constitutions" regarding the operation of state BSFs (Hou, 2004, p. 40). Currently, all 50 states in the U.S., except Colorado, have BSFs or implemented a similar policy. Although Colorado does not maintain an official BSF, it has a "required reserve" that helps stabilize budget (NCSL, 2018). Table 1 State Budget Stabilization Funds provides years that BSF enacted. The oldest BSF is the Tax Stabilization Reserve Fund, adopted by New York in 1946. Florida is the second oldest state, establishing the BSF in 1959. New Mexico's Operating Reserve was built in 1966. In the late 1970s, seven states, including California, Connecticut, Georgia, Michigan, New Mexico (for the second BSF), South Carolina, and Tennessee created their BSFs.

After the recession that occurred in 1980-82, twenty-four states had adopted and implemented their BSFs. Thirteen BSFs were constructed in the 1990s, Illinois and Arkansas adopted the BSFs in 2001 and 2002, respectively. New York built its second BSF, called Rainy Day Reserve Fund, in 2007. Kansas and Montana recently established their BSFs in 2017. From the widespread adoption of BSFs at the state level, a natural question that arises is "why do almost all states in the U.S. adopt and implement BSF policies?"

There are disagreements in the literature regarding the motives for BSF adoption. One of the dominant views is that states have adopted BSFs because policymakers recognize the need for funds to alleviate fiscal stress during economic downturns (Douglas & Gaddie, 2002; Gold, 1991; Hou, 2003; Sobel & Holcombe, 1996). In contrast to the perspective that views BSF adoption as the result of deliberate recognition by policymakers (Hou, 2004), others raise doubts

about the intention of BSF adoption and its effectiveness in fiscal stabilization. Wagner and Sobel (2006) offer an alternative argument that BSFs are established to avoid existing fiscal constraints caused by Tax and Expenditure Limits (TELs), rather than preparing for fiscal shocks during economic downturns (Wagner & Sobel, 2006). They (2006) find i) a positive association between TELs and BSF adoption rate and ii) a negative association between TELs and stringent deposit/withdrawal rules.

The debate about the motives for adopting BSFs led to research on the determinants of BSF characteristics because it is believed that the motives for BSFs affect their characteristics. For example, if the main purpose of BSF adoption is to circumvent political and institutional restrictions, BSF rules are likely to be loosely structured to gain easy access to funds (Wagner & Sobel, 2006). In contrast, if the key motive for creating BSFs is to relieve fiscal stress, BSF rules will be strictly structured to ward off spending pressures and the overuse of general fund balances (Hou, 2003). Rodriguez-Tejedo (2012) finds that the stringency of BSF rules depends on political, institutional, and fiscal factors within the state. Specifically, larger state senates and expenditure volatility are associated with weaker deposit and withdrawal rules, while the volatility of tax revenues is linked to stricter withdrawal rules.(Rodríguez-Tejedo, 2012).

**Table 1. State Budget Stabilization Funds**

| State | Fund Name | Years enacted |
|---|---|---|
| Alabama | Education Trust Fund Rainy Day Account[2] | 2002 |
| | General Fund Rainy Day Account | 2008 |
| Alaska | Constitutional Budget Reserve Fund | 1990 |
| | Budget Reserve Fund | 2013 |
| Arizona | Budget Stabilization Fund | 1990 |
| Arkansas | Long Term Reserve Fund | 2002 |
| | Rainy Day Fund | 2017 |
| California | Special Fund for Economic Uncertainties | 1980 |
| | Budget Stabilization Account | 1980 |
| Colorado | Required Reserve (It is not an official BSF) | 1985 |
| Connecticut | Budget Reserve Fund | 1978 |
| Delaware | Budget Reserve Fund | 1980 |
| Florida | Budget Stabilization Fund | 1959 |
| Georgia | Revenue Shortfall Reserve | 1976 |
| Hawaii | Emergency and budget reserve fund | 1999 |
| Idaho | Budget stabilization fund | 1984 |
| Illinois | Budget Stabilization Fund | 2001 |
| Indiana | Counter-Cyclical Revenue and Economic Stabilization Fund | 1982 |
| Iowa | Cash Reserve Fund | 1992 |
| Kansas | Budget Stabilization Fund | 2017 |
| Kentucky | Budget Reserve Trust Fund | 1983 |
| Louisiana | Budget Stabilization Fund | 1997 |
| | (Revenue Stabilization and Mineral Trust Fund) | (1991) |
| Maine | Budget Stabilization Fund | 1985 |
| Maryland | Revenue Stabilization Account | 1986 |
| Massachusetts | Commonwealth Stabilization Fund | 1986 |
| Michigan | Counter-Cyclical Budget and Economic Stabilization Fund | 1977 |
| Minnesota | Budget Reserve and Cash Flow Accounts | 1983 |
| Mississippi | Working Cash-Stabilization Reserve Fund | 1992 |
| Missouri | Budget Reserve Fund | 1986 |
| Montana | Budget Stabilization Reserve Fund | 2017 |
| Nebraska | Cash Reserve Fund | 1983 |
| Nevada | Account to Stabilize Operation of State Government | 1991 |
| New Hampshire | Revenue Stabilization Reserve Account | 1986 |
| New Jersey | Surplus Revenue Fund | 1990 |
| New Mexico | Operating Reserve | 1978 |
| | Tax Stabilization Reserve | 1978 |
| New York | Tax Stabilization Reserve Fund | 1946 |
| | Rainy Day Reserve Fund | 2007 |
| North Carolina | Savings Reserve | 1991 |
| North Dakota | Budget Stabilization Fund | 1987 |
| Ohio | Budget Stabilization Fund | 1989 |
| Oklahoma | Constitutional Reserve Fund | 1985 |

[2] Prior to the 2008 constitutional amendment, the state of Alabama did not have a Rainy Day Account for General Fund programs and services, but there was the Education Trust Fund Rainy Day Account to cover Education Trust Fund shortfalls. Nevertheless, Alabama's Education Trust Fund Rainy Day Account has been treated as an important Rainy Day Fund in the prior literature.

| State | Fund Name | Years enacted |
|---|---|---|
| Oregon | Rainy Day Fund[3] | 2007 |
| Pennsylvania | Budget Stabilization Reserve Fund | 1985 |
| Rhode Island | State budget reserve and cash stabilization account | 1985 |
| South Carolina | General Reserve Fund | 1977 |
| | Capital Reserve Fund | 1988 |
| | Contingency Reserve Fund | 2007 |
| South Dakota | General Reserve Fund | 1991 |
| Tennessee | Reserve for Revenue Fluctuations | 1972 |
| Texas | Economic Stabilization Fund | 1988 |
| Utah | Budget Reserve Account | 1986 |
| Vermont | General Fund Budget Stabilization Reserve | 1987 |
| | General Fund Surplus Reserve | 1999 |
| Virginia | Revenue Stabilization Fund | 1992 |
| Washington | Emergency Reserve Fund | 1981 |
| West Virginia | Revenue Shortfall Reserve Fund | 1994 |
| Wisconsin | Budget Stabilization Fund | 1985 |
| Wyoming | Budget Reserve Account | 1982 |

Source: Primary sources derived from the constitutions and statutes of individual U.S. states, cross-referenced with the research conducted by Hou (2004)

[3] Before establishing the Oregon Rainy Day Fund (ORDF), the state of Oregon did not have a Rainy Day Account for General Fund programs and services, but there was the Education Stability Fund for public education (Or. Const. art. XV, § 4).

## 2.2 Characterization of BSF Rules in the Literature

In the previous section, I discussed that the motives for BSFs affect BSF structural features. This section aims to provide the details of BSF policies. Specifically, I will define the key characteristics of BSF structural dimensions that affect or represent stringency and other important structural features of BSF. I will then classify states on these different dimensions using documentation of BSF-enabling legislation from associations, interest groups, and state statutes from 2002 to 2020. In my research, these characteristics are a proximate cause of size of BSF and a more remote cause of state fiscal behavior, elaborated in Chapter 5. Thus, the theoretical construct of stringency is important to define and operationalize.

Several studies have attempted to identify the common elements of BSF structure. Wagner (2004) categorizes BSF deposit and withdrawal requirements, ranking them on a scale from 1 to 4: 1) deposit (or withdrawal) by legislative appropriation; 2) deposits by a revenue surplus (or withdrawals in the event of a revenue shortfall); 3) deposits based on rules tied to economic growth (or withdrawal based on formulas tied to economic decline); 4) deposit based on formulas (or withdrawal based on supermajority approval). He finds that BSFs governed by strict deposit and withdrawal rules reduce state borrowing costs (Wagner, 2004).

Hou (2004) introduces four structural features of BSFs that are commonly found from state statutes, such as 1) purpose of use (e.g., revenue shortfall, cash flow, emergencies, and any purpose), 2) source of funds (e.g., by formula, from revenue surplus, by appropriation, from special revenue), 3) maximum allowable balance, and 4) approval procedure for use (e.g., executive discretion, appropriation of legislature, predetermined formula). Hou (2004) finds that higher caps and deposit/withdrawal by formula have positive and significant effects on BSF balance, while withdrawal for any purpose and for revenue shortfalls decrease the BSF balance.

**Table 2. The Measurement of BSF Structural Features**

| Authors | Empirical Analysis | Classification of BSF structural features |
|---|---|---|
| Sobel & Holcombe (1996) | Yes | Deposit requirement, withdrawal requirement (binary), cap |
| Douglas & Gaddie (2002) | Yes | Deposit requirement, withdrawal requirement (binary), cap |
| Gonzalez & Paqueo (2003) | Yes | Deposit requirement, withdrawal requirement (binary), cap |
| Wagner (2003)[4] | Yes | Ranked deposit and withdrawal methods on four scales: 1) by legislative appropriation; 2) by a revenue surplus or revenue shortfall; 3) by economic volatility; 4) by supermajority vote |
| Hou (2004) | Yes | Purposes, funding sources (by formula, from revenue surplus, by appropriation, from special revenue), caps, and procedure for use (executive discretion, appropriation of legislature, predetermined formula) |
| Thatcher (2008) | No | Legal authorization, use of multiple funds, method for deposit, methods for withdrawal, repayment provision, and caps on the size of the funds |
| McNichol (2014) | No | Method for deposit, cap, repayment provision |
| The Pew Charitable Trusts (2014) | No | Method for deposit, including deposit tied to economic or revenue volatility |
| NASBO (2015) | No | Funding source, method for deposit, cap (minimum & maximum size required), procedure for use |
| The Pew Charitable Trusts (2017) | No | Method for withdrawal, including withdrawal tied to economic or revenue volatility |
| NCSL (2018) | No | Deposit rule, withdrawal rule, repayment, and fund size |
| Hendrick, Choi, & Kan (2019) | No | Purpose, funding source, cap, deposit by revenue surplus, repayment provision, deposit tied to volatility (formula), withdrawal by revenue shortfall, voting requirement, withdrawal limit |
| The Volcker Alliance (2021) | No | Purpose, funding source, cap, deposit by revenue surplus, repayment provision, deposit tied to volatility (formula), withdrawal by revenue shortfall, voting requirement, withdrawal limit |
| Buerger et al. (2022) | Yes | Wagner (2003)'s deposit and withdrawal methods, cap, repayment provision |

[4] The rank order of BSF deposit and withdrawal rule categories, developed by Wagner (2003), has been used in several studies, including Wagner and Elder (2005), Wagner and Sober (2006), Rodriguez-Tejedo (2012), Buerger, Reitano, & Sorrentino (2022), Ryu, Cho, and Kim (2020), and Lee and Chen (2022).

The National Conference of State Legislatures (NCSL) (2018) proposes four structural features of BSFs, including deposit rule, withdrawal rule, repayment, and fund size. The report by the Center on Budget and Policy Priorities (CBPP) discusses the determinants of BSF replenishment and recent legislative efforts that require fund replenishment (McNichol, 2014). The Pew Charitable Trusts (2014, 2017) highlights the importance of deposit and withdrawal requirements tied to economic or revenue volatility. However, most empirical research focuses on particular characteristics of BSF, instead of covering all structural features in a comprehensive and systematical manner (See, Table 2).

Hendrick, Choi and Kan (2019) integrate the aforementioned BSF structural features, discussing nine structural dimensions: 1) purpose, 2) cap on BSF balance level, 3) deposit rules, and 4) withdrawal rules, which fall into four categories (e.g., deposit/withdrawal by governor's discretion, legislative appropriation, revenue surplus or revenue shortfall, and formula), 5) repayment provision, 6) deposit tied to volatility and 7) withdrawal tied to volatility, 8) voting requirements for use, and 9) spending limits. The Volcker Alliance recently released a working paper that closely aligns with the study conducted by Hendrick et al. in 2019 (The Volcker Alliance, 2021). This paper investigates the effectiveness of different states' BSF strategies.

Building upon the research conducted by Hendrick et al. (2019), this study introduces fourteen structural dimensions related to state BSFs. However, there are distinctions between the BSF structural features implemented in this study and those in previous research. In contrast to previous studies that relied on rank-ordered categorical variables, our methodology adopts a numerical representation for the variables, a distinction that will be elaborated upon in subsequent sections. For example, we express BSF structural features, such as the cap on BSF deposit and the source of funding, as percentages of general fund expenditures. Additionally, the

deposit by revenue surplus is quantified as a percentage of the general fund surplus, while withdrawal by legislature is expressed as a fraction of the total number of votes. The repayment provision is categorized into four groups based on the number of years required for repayment. Employing numerical variables enables precise measurement and facilitates the identification of which BSF structural features have the most significant impact on improving BSF balance levels. Other variables, such as number, deposit by legislature, deposit tied to revenue volatility, withdrawal based on shortfall, and withdrawal tied to revenue volatility, are treated as binary variables due to the difficulty in expressing them numerically.

The rationale behind this approach is rooted in the absence of interval-level measurement for the ranking of BSF deposit and withdrawal rule categories. For instance, Wagner's rank-order deposit and withdrawal rules employ a scale with four levels, wherein legislative deposit (or withdrawal) is assigned a value of 1, while deposit by formula (or a supermajority vote for withdrawal) is assigned a value of 4. This ranking presupposes the strictness of each rule without offering a precise interval-level measurement, relying instead on the subjective judgment of the researcher. Thus, our numerical and dummy variables for BSF rules reduce subjectivity in data interpretation, while enhancing precision and objectivity compared to Wagner's rank-ordered variables.

### 2.3 Conceptualization and Operationalization of BSF Rule Stringency

A notable void in the literature on BSF is the absence of a clear definition for the stringency of BSF rules. The term "stringency" is inherently ambiguous, allowing for varied interpretations. Some may perceive stringent BSF rules as a means of compelling individuals to save substantial amounts of money. Conversely, others, such as Hou (2004), might view

stringent rules as a mechanism to curtail the discretionary powers of public officials or politicians in managing or utilizing these funds. In essence, each requirement within the framework of BSF may exhibit varying degrees or types of stringency. However, in the current literature, stringency is generally assumed to be synonymous with strictness, restrictiveness, or tightness. The absence of a clear conceptualization of BSF rule stringency has led to discrepancies in determining the least stringent BSF rule. Hou (2004), for instance, identifies deposit/withdrawal by executive discretion as the least stringent, contrasting with Wagner (2004), who considers deposit/withdrawal by legislative appropriation as the least stringent category, thereby contributing to conflicting perspectives in the literature.

Therefore, this study conceptualizes the stringency of BSF rules by examining distinct characteristics, such as *the degree of precision and the degree of obligation*, encompassing aspects like saving obligations, withdrawal conditions, and withdrawal restrictions. The concepts of precision and obligation are proposed by Abbott et al. (2000): "precision" refers to rules that clearly describe the "requirement, authority, or prohibition" of particular actions by government officials; "obligation" means that a set of rules or commitments bind the behavior of public officials, subjecting them to scrutiny under the rules or procedures. These concepts are applied to the context of BSF rules for this study.

Obligation, in the form of binding rules, comprises i) mandatory savings requirements, ii) spending conditions contingent on fiscal conditions, and iii) restrictions on withdrawal. *Savings obligation* refers to a set of commitments requiring a state to deposit a certain amount of unrestricted general funds in BSF. *Spending conditions* represent a set of conditions under which a state can withdraw money from BSF. *Withdrawal restrictions* refer to a set of rules that are designed to regulate or limit the use of BSF. The degree of obligation is quantified in monetary

terms, indicating the amount of money, such as a percentage of the general fund revenue surplus, deposited into the BSF, the permissible amount that can be withdrawn from the BSF, or the designated repayment period.

Precision denotes rules that *precisely* define the savings obligation, withdrawal conditions, or withdrawal restrictions, by using objective indicators (e.g., annual growth rates, employment growth rates, or actual growth in tax revenues) and formula or by linking BSF deposit to a specific tax that can generate a large amount of revenue. It is assumed that the level of stringency is determined collectively by precision and degree of obligation. If deposit requirements are precisely defined with a strong degree of obligation, the stringency of those rules will be high. Withdrawal requirements that impose restrictions on BSF withdrawals can be considered strict rules. In contrast, a low level of stringency is characterized by a lack of precision and a weak degree of obligation. The level of BSF rule stringency will be discussed in more detail in Section of 2.4. Operational Definitions of BSF Rules.

**Table 3. Summary of BSF Structural Features and Hypothetical Stringency**

| Variables | Operational Definitions | Degree of Precision | Degree of Obligation | Level of Stringency |
|---|---|---|---|---|
| DEPOSIT REQUIREMENTS | | | | |
| **Source of funding** | The amount of special revenue that is deposited | 1 | 1 | 2 |
| **Deposit by executive** | Deposit by governor, commissioner, treasurer, or comptrollers | 0 | 0 | 0 |
| **Deposit by legislature** | Deposit by legislative appropriation | 0 | 0.5 | 0.5 |
| **Deposit by surplus** | The percentage of the general fund surplus that needs to be deposited. | 1 | 1 | 2 |
| **Deposit tied to volatility** | Deposit money linked to economic or revenue fluctuation | 1 | 1 | 2 |
| **Deposit funds in other ways** | Deposit money in various ways (e.g., Deposit linked to BSF balance.) | 1 | 0 | 1 |
| **Cap** | The cap on the BSF levels expressed as a share of general fund expenditures | 1 | 1 | 2 |
| WITHDRAWAL REQUIREMENTS | | | | |
| **Withdraw by executive** | Withdrawal by governor, commissioner, or treasurer | 0 | 0 | 0 |
| **Withdraw by legislature** | 1. Withdrawal by a simple majority vote | 0 | 0.5 | 0.5 |
| | 2. Withdrawal by 3/5 votes of the legislature | 0 | 0.6 | 0.6 |
| | 3. Withdrawal by 2/3 votes of the legislature | 0 | 0.67 | 0.67 |
| | 4. Withdrawal by 3/4 votes of the legislature | 0 | 0.75 | 0.75 |
| **Withdraw by budget shortfall** | Withdraw money from their BSFs to cover budget shortfalls | 1 | 1 | 2 |
| **Withdrawal tied to volatility** | Withdraw money from BSFs based on revenue fluctuation | 1 | 1 | 2 |
| RESTRICTIONS ON WITHDRAWAL | | | | |
| **Withdrawal limit** | Limit withdrawal to a certain amount of money | 1 | 1 | 2 |
| **Repayment provision** | 1. Repayment required but no deadline | 0 | 0.25 | 0.25 |
| | 2. Repay money spent within 4-6 years | 1 | 0.5 | 1.5 |
| | 3. Repay money spent within 2-3 years | 1 | 0.75 | 1.75 |
| | 4. Repay money spent within a 1 year | 1 | 1 | 2 |
| NUMBER | | | | |
| **Number of BSFs** | The number of BSFs for general funds | - | - | - |

Note: 0 – 0.5 represents "low," 1 – 1.5 represents "moderate," and 1.75 – 2 represents "high" stringency.
Source: Author's classification of BSF structural features from Hou (2004), Hendrick, Choi, and Kan (2019), NCSL (2018), and The Pew Charitable Trusts (2014, 2017).

## 2.4 Operational Definitions of BSF Rules

In this section, I will define fourteen distinct structural features of BSF functioning and categorize them based on the previously mentioned concepts of stringency, encompassing i) degree of precision and ii) degree of obligation. It is crucial to note that among the fourteen structural features of BSF, some are considered stringent, while others do not meet the criteria for stringency. Chapter 5 will elaborate on a set of hypotheses grounded in the concepts of stringency, making this section primarily dedicated to elucidating the structural features of BSF.

Table 3 provides a summary of the BSF structural features, presenting operational definitions and hypothesized stringency for each variable. Within Table 3, the BSF structural features are organized into four groups: first, deposit requirements pertain to guidelines on how to save funds; second, withdrawal requirements outline stipulations on how to use funds; third, withdrawal restrictions specify requirements designed to limit the imprudent use of BSF; and fourth, the number of BSF indicates whether a state has more than one BSF for general funds.

The deposit and withdrawal requirements are two pivotal dimensions of BSF, profoundly influencing its size and effectiveness as a countercyclical tool (National Conference of State Legislatures, 2018; The Pew Charitable Trusts, 2014; The Pew Charitable Trusts, 2017). These requirements exert control over the "flow of money in and out of the fund" (Rodríguez-Tejedo, 2012). Dimension 1 concerns the source of funding. Dimensions 2 to 6 encompass requirements that delineate who primarily decide the BSF deposit and how funds should be saved. Dimension 7 represents a cap on the balance levels, varying from 2 percent to 100 percent of the total general fund receipts or expenditures.

Dimensions 8 to 11 cover withdrawal requirements, indicating who predominantly decides withdrawal from BSF and how funds should be utilized. Dimensions 12 and 13 denote restrictions pertaining to withdrawal. Dimension 12, withdrawal limits, signifies a state that restricts the amount of withdrawal. Dimension 13, repayment provisions, assesses whether a withdrawal must be repaid. Repayment within a specific period makes it challenging for states to utilize BSF. Dimension 14 represents the number of BSF.

The column of ***Degree of Precision*** indicates requirements that specify the conditions for BSF deposit and withdrawal from BSF, ranging from 0 to 1. 1 represents that the deposit or withdrawal condition of BSF rule is precisely defined, while 0 indicates that the deposit or withdrawal condition of BSF rule is not well defined.

The column of ***Degree of Obligation*** shows the degree or intensity of obligation, ranging from 0 to 1. For example, "deposit by surplus" is a numerical variable, with larger required amounts of revenue surplus to be deposited indicating a higher level of saving obligation. This in turn leads to an escalation in stringency. Similarly, the cap on BSF level is also a numerical variable, where a higher cap indicates a greater level of saving obligation.

The level of obligation for the "repayment provision" is categorized into four distinct levels, each associated with a specific deadline for repayment borrowed from BSF. The degree of obligation for "withdrawal limit" indicates the extent of restrictions or prohibitions on the amount of withdrawals from BSF.

The Level of Stringency is determined by the sum of the degree of precision and the degree of obligation (or restriction), which ranges from 0 to 2. A score of 0 to 0.5 represents "low" stringency, 1 to 1.5 represents "moderate" stringency, and 1.75 to 2 represents "high" stringency.

### *2.4.1 Funding Source*

General funds are primary sources to fund BSF in most states, while some states have adopted special revenue as a main source of BSF (Hou, 2004). For example, Alaska and Wyoming use *severance tax revenue* generated by natural resources to fund their BSFs (Alaska Const. art. IX, § 17; Wyo. Stat. § 39-14-801). In Hawaii, contributions to the Emergency and Budget Reserve (EBR) fund include appropriations approved by the legislature as well as a segment of the tobacco settlement funds, as outlined in Hawaii Revised Statutes, Chapter 328L.[5] Nebraska receives Federal Funds for undesignated general government purposes, federal revenue sharing, or general fiscal relief of the state (R.R.S. Neb. § 84-612).

***Stringency***: Special revenue as a funding source is the more specific condition for a deposit because special revenue should be used only for funding BSF unlike general funds that can be used for other purposes. Thus, it receives one point for the precision. However, the special revenue of each state for funding BSF has different *tax capacity (or revenue-generating capacity)*, denoting the "maximum tax revenue that could be collected" in a state (Castro & Camarillo, 2014, pp. 51-52). For example, severance tax revenue is a main source of revenue in a few states: in 2019, severance tax revenue accounted for 7 percent of Alaska's state and local general revenue and 8 percent of Wyoming's state and local general revenue, respectively.[6] 7 – 8 percent of general fund revenue is much greater than 0.4 percent of general fund revenue, the amount of revenue collected from severance taxes in most U.S. states in 2019.

[5] The State of Hawaii. Department of Budget and Finance, State Fiscal Reserve. Accessed March 15, 2019. http://budget.hawaii.gov/budget/about-budget/state-fiscal-reserves/

[6] Urban Institute. Project: State and Local Backgrounders: Severance Taxes. Accessed October 17, 2022.

Thus, the impact of special revenue on BSF balance levels depends on *tax or revenue capacity of funding source*. If a BSF is funded from a source with higher revenue-generating capacity, it is deemed to have a greater savings obligation compared to a BSF that is linked to a source with lower revenue capacity. Greater amounts of special revenue deposited denote a heightened level of saving obligation, thereby leading to increased stringency. Thus, it receives one point for the obligation. However, windfall is not recurring revenue, and its amount is relatively small compared to tax revenue. Hence, funding source from non-tax revenue is considered to have less savings obligation or lower level of stringency than funding source derived from specific tax revenue.

### *2.4.2 Deposit/Withdrawal by Executive Decision*

Deposit by executive decision denotes that BSF deposit is mainly determined by a governor or financial officer (e.g., Treasurer, Comptroller or Commissioner) who is empowered to manage BSF without a legislative appropriation (Hou, 2004). In the early days of the adoption of BSF, some governments permitted the use of the governor's discretion for depositing and withdrawing money from the BSFs. In Florida, as an example, the Working Capital Fund can hold up to 10% of the net revenue from the General Revenue Fund, with *surplus amounts determined and transferred by the Executive Office of the Governor* each year by September 15th.[7] In 1998, however, a Florida amendment modified the deposit rule, mandating legislative approval when both the governor and the chief financial officer transfer funds to the BSF.[8]

[7] 1991 Fla. ALS 109, 1991 Fla. Laws ch. 109, 1991 Fla. HB 2313 (May 24, 1991).

[8] The following statement is found in 1998 Fla. ALS 73, which is also known as 1998 Fla. Laws ch. 73, and was enacted through 1997 Fla. SB 832 on May 21, 1998: "By September 15 of each year, the governor shall authorize the comptroller to transfer, and the comptroller shall transfer pursuant to appropriations made by law, to the budget stabilization fund the amount of money needed for the balance of that fund to equal the amount

These days, it is rare for budget fund deposits or withdrawals to be solely determined by the governor or the executive branch. Instead, executive deposits are allowed under specific conditions as follows: In situations where deposit-related formulas require calculation by executives (e.g., in Connecticut),[9] or when a predetermined percentage of the general fund, earmarked for deposit into BSF, is in place (e.g., in California), or when a revenue surplus automatically mandates allocation to BSF (e.g., in Minnesota),[10] executives typically possess the authority to allocate funds accordingly.

In the 2014 Legislative Session, for example, Governor Dayton enacted a law that mandated up to 33% of any projected current biennium surplus, as determined by the Budget and Economic Forecast, to be automatically credited to Minnesota's budget reserve account.[11] It's worth noting that in California, the Legislature holds the authority to allocate additional funds to the Budget Stabilization Account (BSA) via statutory measures; however, such transfers to the BSA can be suspended through an executive order issued by the Governor.[12]

Like deposit by executive decision, withdrawal by executive decision represents that a governor or financial officer decides withdrawal from BSF without a legislative approval (Hou, 2004). In Florida, for example, the governor can order a temporary transfer of money from the fund to meet deficiencies in a particular fund (Fla. Stat. § 215.18). In Mississippi, the Working Cash-Stabilization Reserve Fund (WCSRF) serves as a resource that the State Treasurer can utilize to address cash flow deficiencies within the State General Fund when the Executive Director of the Department of Finance and Administration certifies the need for such access (Miss. Code Ann. § 27-103-203). It should be noted that both the Governor and

specified in subparagraph 1., less any amounts expended and not restored. The moneys needed for this transfer may be appropriated by the legislature from any funds."

[9] Conn. Gen. Stat. § 4-30a

[10] Minn. Stat. § 16A.152

[11] State of Minnesota. Annual Comprehensive Financial Report for the Year Ended June 30, 2015.

[12] General Government. 9658 Budget Stabilization Account.

the legislature have independently utilized Mississippi's WCSRF with their approvals, a topic to be elaborated upon in the Qualitative Analysis chapter.[13]

***Stringency***: According to the literature (Hou, 2004), executive deposits or withdrawals were seen as the least stringent rule. Consequently, these requirements are perceived as lenient from this standpoint. However, it should be noted that there have been very few instances of depositing or withdrawing money from the BSF solely based on the governor's discretion in recent times. Over time, BSF policies have evolved to employ precise methods that reduce the discretion of the executive or politicians to encourage greater savings over the past two decades.

To reflect such trends, "deposit by the executive" should be understood not as the executive deciding how much to save directly, but rather as *the execution of specific methods*. These methods include depositing funds into the BSF, following established formulas for BSF deposits, allocating a predetermined percentage of the general fund to the BSF, and transferring mandated savings from revenue surpluses to achieve this goal.

Thus, when the executive makes deposits, it is done with accompanying information specifying the conditions under which the BSF should be funded. Similarly, the discretion of the executive branch, such as the governor's discretion, in matters of withdrawal has become increasingly uncommon except in cases of emergencies. In certain states, like Florida, emergency provisions grant the Governor to utilize the Budget Stabilization Fund in the event of a declared state of emergency.[14]

[13] State of Mississippi. Annual Comprehensive Financial Report. Fiscal Year Ended June 30, 2001.
[14] 2000 Fla. ALS 371, 2000 Fla. Laws ch. 371, 2000 Fla. HB 2377 (June 26, 2000).

### *2.4.3 Deposit/Withdrawal by Legislative Appropriation*

Deposit or withdrawal by legislative appropriation indicates that legislators hold the primary authority in making decisions regarding the allocation or withdrawal of funds from BSFs. In the literature, legislative approval is viewed as the more restrictive procedure for the use of BSF because it limits executive discretion (Hou, 2004). In Illinois, for example, the General Assembly makes an appropriation for the Budget Stabilization Fund (30 ILCS 122).

Withdrawal by legislative appropriations occurs when legislators can decide to withdraw from BSFs. In Ohio, the governor submits to General Assembly proposals for transfers from the BSF to the general fund (ORC Ann. § 131.43). In Delaware, the revenue estimate and estimated unencumbered funds are determined through a joint resolution approved by the General Assembly and the Governor (Del. Const. Art. VIII, § 6). In Delaware, the executive branch does not autonomously decide on the revenue surplus allocation for BSF deposits. Hence, it falls under category "1" for deposit by legislative appropriation.

Supermajority vote requirements could represent a greater support for the use of BSF. In Alaska, the Constitutional Budget Reserve Fund (CBRF) can be appropriated for any public purpose “with a three-quarters vote of both House and Senate” (Alaska Const. Art. IX, § 17). In Delaware, the General Assembly by a three-fifths vote of the members elected to each House can appropriate from the Budget Reserve Account to compensate for revenue reductions (29 Del. C. § 6533).

***Stringency***: Deposit by legislature does not require a state to save unrestricted general funds. Thus, deposits by legislative appropriation lack specificity regarding the conditions under which funds can be deposited into the BSF. Unlike deposits from revenue surpluses or those contingent upon revenue or economic volatility, they result in a lack of precision.

To determine the level of obligation, withdrawing funds by the legislature necessitates a specific number of votes from legislators. For instance, a supermajority vote requirement is designed to prevent a "tyranny of the majority" and promote careful deliberation and compromise to reach a supermajority.[15] In other words, a supermajority vote requirement creates greater obstacles for states seeking to transfer funds from the BSF to the general fund compared to a simple majority vote. In scholarly discussions, this aspect is often seen as a means of imposing restrictions on the executive's discretion (Hou, 2004; Wagner, 2004).

Therefore, the degree of obligation is indicated by the proportion of legislative votes required in this study. The supermajority vote requires more than 60 percent (3/5), 67 percent (2/3), or 75 percent (3/4) of votes, respectively, while a simple majority vote needs only more than 50 percent of votes cast. Hence, as the required number of votes increases, so does the level of obligation. Specifically, a simple majority for withdrawal is assigned a value of 0.5, 3/5 votes a value of 0.6, 2/3 votes a value of 0.67, and 3/4 votes a value of 0.75 for the degree of obligation.

Nonetheless, it is crucial to highlight that this study avoids classifying the voting requirement as a precise withdrawal condition, especially considering that certain states, like Alaska and New Hampshire, allow the use of their BSFs for "any purpose," a rather loosely defined term.[16] Therefore, it receives zero point for the precision.

[15] National Conference of State Legislatures. Supermajority Vote Requirements. Retrieved September 19, 2021, from https://www.ncsl.org/research/elections-and-campaigns/supermajority-vote-requirements.aspx.

[16] Alaska's Budget Reserve Funds can be used for any purpose with a three-fourths vote of the members of the legislature (Alaska Const. Art. IX, § 17).

### *2.4.4 Deposit/Withdrawal by Revenue Surplus/Shortfall*

The majority of states in the U.S., 30 states, deposit money into their BSFs when revenue surplus occurs. However, some states do not save all surplus but do a small portion of the surplus. In Kansas, 10 percent of the unencumbered ending balance in the general fund can be deposited into the BSF before August 15, 2021 (K.S.A. § 75-6706). In Georgia, any surplus funds at the end of the fiscal year are combined and earmarked for the Revenue Shortfall Reserve (O.C.G.A. § 45-12-71). In New Mexico, any remaining unexpended or unencumbered balance at the end of fiscal year will be *automatically* returned to the tax stabilization reserve.[17] For this reason, this variable is quantitatively expressed as a proportion of the general fund surplus, ranging from 0.1 (representing 10% of the general fund surplus) to 1 (representing 100% of the general fund surplus).

Withdrawal by revenue shortfall refers to withdrawals that are made to address budget shortfalls. Budget shortfalls are also expressed as "budget deficits" (Miss. Code Ann. § 27-103-203) or budget gaps caused by forecast errors in Oregon (ORS § 293.144). In Mississippi, the executive director of the Department of Finance and Administration transfers from the Working Cash-Stabilization Reserve Fund to the general fund to cover deficits and to meet cash-flow needs (Miss. Code Ann. § 27-103-203).

In certain states, like Idaho and Florida, the utilization of Budget Stabilization Funds is permissible for addressing expenses stemming from significant disasters or emergencies (Idaho Code §57-814; Fla. Stat. § 216.222). However, emergency withdrawals may be considered as responses to revenue shortfalls, given that emergency situations often necessitate increased expenditures. Furthermore, the cost variable associated with disasters is

[17] 2002 N.M. ALS 109, 2002 N.M. Laws 109, 2002 N.M. Ch. 109, 2002 N.M. HB 451 (March 6, 2002).

included into our empirical models. Therefore, the structural characteristic known as withdrawal for emergency use is excluded from our analysis.

***Stringency***: Requiring depositing revenue surplus in BSF is an obligation for savings. The degree of obligation depends on the specific proportion of revenue surplus that must be allocated to the BSF. Depositing all revenue surplus in BSF is a greater savings obligation than depositing a small portion of revenue surplus. A higher level of revenue surplus required to be deposited into BSF is deemed more stringent. Since it accurately delineates the proportion of the revenue surplus, it earns one point for the precision of deposit conditions.

"Withdrawal by revenue shortfall" permits a state to access its BSF exclusively in cases of a revenue deficit. This requirement is linked to a specific purpose, such as fiscal stabilization, thereby preventing the BSF from being used for other purposes. Thus, it is awarded one point for the precision of the withdrawal conditions. However, some states do not provide a clear definition of budget shortfall. Without clear definition, "withdrawal based on revenue shortfall" can be susceptible to manipulation by either the governor or legislators seeking to increase spending in order to gain popular support (Hou, 2004; Rose 2008).[18]

### *2.4.5 Deposit/withdrawal tied to revenue volatility (formula)*

Deposit tied to revenue or economic volatility refers to saving money linked to economic or revenue fluctuation (The Pew Charitable Trusts, 2017). It is worth noting that there is no clear definition of what constitutes deposits (or withdrawals) tied to revenue volatility, but different understandings exist in the literature. For example, Wagner (2004) differentiates “deposit by positive revenue growth” from “deposit by formula” in his

[18] For example, the Florida Statute 215.18(1) notes that the BSF may be used when there is a “deficiency in any fund”; such language can be interpreted as revenue shortfalls although it may imply “managerial mistakes or technical errors in revenue forecasting” (Hou, 2004).

categories of BSF rule stringency (p. 787). In contrast, Hou (2004) exclusively incorporates "deposit by formula" into his models, without distinguishing these from deposits tied to revenue or economic volatility. This omission may be attributed to the fact that certain states' formulas incorporate economic or revenue volatility indicators (e.g., year-over-year revenue increases or trend growth rates that smooth out short-term fluctuations) when determining the deposit amounts into their BSFs.

To avoid any confusion regarding the notion of deposit or withdrawal tied to revenue volatility, the study proposes the following definitions: first, “formula-based volatility” pertains to deposits and withdrawals associated with economic or revenue fluctuations calculated using a formula that reflects objective economic indicators (annual growth rate, employment growth rate, real tax revenue growth rate, etc.); second, *proportion-based volatility* refers to deposit or withdrawal linked to a certain proportion of general fund revenues or expenditures.

Arizona's BSF is an example of a formula-based approach to managing volatility, as it uses a statutory formula to determine deposits or withdrawals based on the annual growth rate of real adjusted Arizona Personal Income compared to its 7-year trend growth rate (A.R.S. § 35-144). The annual growth rate reflects year-over-year increases in personal income, adjusted for inflation, indicating current economic performance. The 7-year trend growth rate provides a stable long-term average for comparison. If the annual growth rate exceeds this trend, deposits are made into the BSF; if it falls short, withdrawals may occur to support the budget during economic downturns.

Massachusetts’ Budget Stabilization Fund (BSF) exemplifies proportion-based volatility management by depositing 0.5 percent of its total tax revenues into the fund annually. This fixed-percentage approach ensures consistent contributions, allowing the state

to build up reserves during periods of revenue growth. These reserves can then be used to stabilize the budget during economic downturns, automatically adjusting contributions in line with revenue changes to enhance fiscal resilience.

Withdrawal tied to revenue or economic volatility refers to withdrawal conditions that are based on downward fluctuations in the economy or revenue; when revenue or economic indicators fall below a specific growth rate or baselines, states transfer money from their BSFs to general funds (The Pew Charitable Trusts, 2017). In Minnesota, the budget reserve can be accessed in instances where decreased growth in total wages, retail sales, or employment indicates economic downturns (Minn. Stat. § 16A.152). Arkansas can tap into its BSF if the official forecast of gross general revenue indicates a projected increase of less than three percent compared to the previous year (A.C.A. § 19-6-486).

***Stringency***: Deposit by formula helps ensure that states save unobligated general funds into their BSFs during boom years (Hendrick et al., 2019; Hou, 2004; The Pew Charitable Trusts, 2014; Wagner 2004). Thus, it has a high degree of obligation due to mandatory savings requirements triggered by revenue increases or economic growth. By the same token, withdrawal by formula does not allow states to make unnecessary withdrawal but permits them to use their BSFs only when there is weak or negative revenue or economic growth. Thus, deposits and withdrawals tied to revenue or economic volatility receive one point for obligation. A clearly defined formula limits executive or legislative discretion in determining the amount of deposits or withdrawals. Consequently, deposits and withdrawals tied to revenue or economic volatility also receive one point for precision. However, states adopt numerous formulas and economic indicators to tie deposits/withdrawals with revenue volatility; thus, it makes generalization difficult. I will delve into the deposit tied to revenue volatility in Section 7. Qualitative Analysis.

### *2.4.6 Deposit in Other Ways*

The deposit rules of four states do not fit into any classification of the deposit rules discussed before. Some of them adopted minimum deposit requirement that obliges to maintain a certain percentage of general fund revenues in their BSFs (Hou, 2004). In Maryland, if the account balance is "below 3 percent of the estimated General Fund revenues for that fiscal year," the Governor will include in the budget bill an appropriation to the Account of at least $100 million (Md. State Finance & Procurement Code Ann. Section 7-311).[19] The state of Ohio mandates maintaining an amount of money in the BSF equivalent to 8.5 percent of the general fund revenues from the preceding fiscal year (ORC Ann. 131.43).

***Stringency***: Deposit requirements of Maryland and Ohio oblige states to retain a certain proportion of revenues in their BSFs, such as "3 percent of the general fund revenue" for Maryland or "8.5 percent of the general fund revenue" for Ohio. However, these thresholds do not induce states to save more than a fixed percentage of the general fund revenue. For example, if Ohio already has more than 8.5 percent of the general fund revenues in its BSF, the state is not required to save more revenue even when there is revenue surplus. Therefore, the level of savings commitment is comparatively less stringent in comparison to depositing funds based on revenue surplus or linking deposits to revenue volatility. The requirement for states to allocate additional funds when a revenue surplus is generated applies to both deposits based on revenue surplus and deposits tied to revenue volatility.

[19] The Pew (2017) categorizes Maryland's BSF deposit rule as "deposit tied to revenue volatility" in its State Rainy Day Funds table. However, Maryland's BSF does not link to revenue or economic volatility; instead, it mandates maintaining a BSF balance level relative to a specific amount of revenues or expenditures.

### *2.4.7 Caps on BSF balances*

States impose different levels of caps on the amount of money that must be maintained in their BSFs (Hou 2004; McNichol 2014). Hou (2004) categorized the caps into four ranges based on balance levels expressed as a percentage of each state's general fund expenditures: 1) Cap I: 2 to 4 percent, 2) Cap II: 4 to 7 percent, 3) Cap III: 7 to 12 percent, and 4) Cap IV: No limit (Hou, 2004). In his study, Hou (2004) used the 5 percent rule as a benchmark (the medium cap), as 21 states adopted this rule.

However, several studies claim that the 5 percent rule is not enough to provide an adequate financial cushion (Joyce, 2001; McNichol, 2014; Navin & Navin, 2003; The Pew Charitable Trusts, 2014). 12 states out of 21 states increased their caps on BSF balance levels, and now only 9 states use this range (2-5%). Furthermore, certain states (e.g., Utah's Budget Reserve Account in 2012 and 2015) increase the cap by 1 – 2 percent, rendering the large interval of the category from 4 to 5 percent unable to capture this minor adjustment. To enhance precision and sensitivity to subtle changes, this study employs a numerical variable for the cap, represented as a percentage of general fund expenditures, rather than utilizing a categorical variable with a wide interval.

***Stringency***: The lexical meaning of the "cap" is a limit that is placed on BSF balance. In practice, however, it does not limit the size of BSF balance because states have rarely reached their cap levels; instead, the cap works as a "target not yet reached" (Hou, 2004). The level of stringency depends on the level of the cap. The higher the cap, the greater the target a state can reach. The higher cap allows states to deposit more money into their BSFs, thus it has greater savings obligation than the lower cap level. The cap is precisely defined with specific cap levels, expressed as the percentage of general fund revenues or expenditures, thus one point is given for the precision of saving condition.

### *2.4.8 Withdrawal Limits*

During the first year of the Great Recession, nine states used the entirety of their BSF balances (The Pew Charitable Trusts, 2017). To prevent such fund depletion, many states have set spending limits, ensuring a portion of the BSF balance remains for future use (The Pew Charitable Trusts, 2017). Some states limit the same amount of money withdrawn from their BSFs regardless of BSF balance level or the scale of a budget shortfall, called a "static limit," while others limit the proportion of the BSF balance or the proportion of the budget shortfall, called a "proportional limit" (The Pew Charitable Trusts, 2017).

Alabama and North Carolina provide examples of a proportional withdrawal limit. Expenditures from their BSFs should not surpass 10 percent of the prior fiscal year's general fund appropriations in Alabama (Alabama Const. Art. XIV, [sec.260.02]) and in North Carolina (N.C. Gen. Stat. § 143C-4-2). Mississippi's Working Cash Stabilization Reserve Fund is an example of a static limit. Mississippi can transfer money "not more than fifty million dollars" from the Reserve Fund to general funds to reduce the deficit (Miss. Code Ann. § 27-103-203).

***Stringency***: Withdrawal limit specifies the exact amount of money that can be withdrawn from a state's BSF. It restricts policymakers' discretion in deciding the amount of BSF spending, preventing the levels of BSF balances from drastically decreasing (Hendrick et al., 2019). The restrictive nature of the withdrawal limit can be seen as more demanding than BSF requirements that do not have a limit on the amount of withdrawal, so it receives one point for obligation (or restriction). Additionally, as the withdrawal limit precisely defines the amount of money that can be used, it earns one point for precision. However, as the amounts and methods of the withdrawal limit vary from state to state, further research and careful interpretation are needed to determine the stringency of this requirement.

### *2.4.9 Repayment Provision*

Repayment provision requires states to repay any money drawn down on the BSF within a specified period. Strict repayment provisions are designed to maintain sufficient BSF balances as states are concerned about credit ratings and preparation for the next economic downturn (The Pew Charitable Trust, 2017). A specific repayment period is stipulated in the statutes of most states. For example, the state of Missouri must repay money withdrawn from the Budget Reserve Fund along with interest over the subsequent three fiscal years (Mo. Const. Art. IV, § 27(a)). Minnesota's statute requires the state to restore the budget reserve based on the economic cycle without specifying a repayment schedule (Minn. Stat. § 16A.152). This study divides repayment provision into four operationalized groups: 1) a repayment period is not specified, 2) repay money spent within six years, 3) within three years, and 4) within a one year (Hendrick et al., 2019; The Pew Charitable Trusts, 2017).

***Stringency***: Specific repayment terms make this requirement stringent because it forces a state government to restore the funds within a certain period. Repayment provisions with short repayment schedule made it difficult for states to use their BSFs even during the first year of the Great Recession despite substantial decreases in general fund revenue (The Pew Charitable Trusts, 2017). Thus, the degree of obligation is expressed as the length of the repayment period and shorter repayment schedule indicates greater degree of stringency. Specific repayment terms make the requirement more precise. In contrast, repayment provision without specifying a repayment term is not considered stringent because repayment is flexibly made based on economic or budget conditions. Therefore, for its degree of obligation, a "repay money borrowed from BSF within one year" is assigned one point, whereas a "repayment required without deadline" receives 0.25 points.

### *2.4.10 Number of BSF*

States, such as Alaska, California, New Mexico, and New York, maintain at least two operating BSFs for general funds separately (Thatcher, 2008). Additional BSF may reflect particular service demand and spending needs or spending pressure of states.[20] The General Fund Balance Reserve of Vermont is an example of an additional BSF designed to prevent the state from spending unreserved fund balance, which is different from Budget Stabilization Trust Fund (Vermont Statutes, Title 32, Section 308c). Following the fulfillment of other reserve obligations, any surplus from the end of the fiscal year within the general fund should be allocated to bolster the General Fund Balance Reserve (Vermont Statutes, Title 32, Section 308e).

***Stringency***: The number of BSF is not a structural feature, but an additional fiscal reserve. Thus, the level of stringency depends on the structural features of extra BSFs. However, if states are required to deposit any remaining general fund balances into their second BSF, the extra BSF will work as legal enforcement to restrict discretionary spending of unreserved general funds (Hou, 2004). However, there are also additional BSFs designed for easier access. Alaska established its second BSF in 2013, called Statutory Budget Reserve Fund (SBRF), which can be transferred to the general fund by the legislature with a simple majority vote (Alaska Stat. § 37.05.540). This can be considered less stringent withdrawal requirement than the Constitutional Budget Reserve Fund (CBRF), which requires a three-fourths supermajority vote (Alaska Const. Art. IX, § 17). Thus, the stringency of extra BSF varies according to its structural features. For this reason, no hypothesis is made about the stringency of the number of BSF.

[20] The study will not discuss any other BSFs for special service needs with special funds.

## Table 4. Frequency of BSF Structural Features in 2020

| BSF Rule | States | Freq. |
|---|---|---|
| Funding source | **Non-tax revenue/small portion of tax revenue:** Hawaii, West Virginia (Revenue Shortfall Reserve Fund-Part B), Nebraska (for fiscal years 2004, 2005, and 2006)[21] | 3 |
| | **Tax revenue from natural resources:** Alabama, Alaska, Louisiana, Oklahoma, Texas, Wyoming | 6 |
| Deposit by executive | California (Special Fund for Economic Uncertainties), Idaho, Kansas, Kentucky, Maine, Maryland, Massachusetts, Minnesota, Mississippi, Missouri, Montana, Nebraska, Nevada[22], New Hampshire, New York, N. Carolina, N. Dakota, Ohio, Oklahoma (Constitutional Reserve Fund), Rhode Island, S. Dakota, Texas, Utah, W. Virginia, Wisconsin | 25 |
| Deposit by legislature | Alabama, Arizona, Arkansas, California (Budget Stabilization Account), Delaware[23], Florida, Hawaii, Illinois, Louisiana, Michigan, New Mexico, Oklahoma (Revenue Stabilization Fund), Oregon, Pennsylvania[24], South Carolina, Tennessee[25], Texas, Virginia | 18 |
| Deposit by revenue surplus | $\leq$ **40 % of GF surplus**: Hawaii, Louisiana, Maine, Minnesota, Nevada, Texas, Utah, W. Virginia, Wisconsin | 9 |
| | **50 $\leq$ The Amount of Deposit $\leq$ 60 % of GF surplus**: Idaho, Kansas, Kentucky, Massachusetts, Mississippi, Mississippi, Montana, New Jersey, Texas, West Virginia, and Wisconsin | 11 |
| | **100 % of GF surplus:** California (Special Fund for Economic Uncertainties), Delaware, Georgia, Iowa, Nebraska, New Hampshire, New Mexico, New York, N. Dakota, Oklahoma (Constitutional Reserve Fund), Pennsylvania, S. Dakota, Vermont | 13 |
| Deposit tied to volatility | Arizona, California, Connecticut, Florida, Indiana, Iowa, Massachusetts, Michigan, Nevada, North Carolina, Oklahoma (Revenue Stabilization Fund), Oregon, Rhode Island, Tennessee, Texas, Virginia, Washington | 17 |

[21] Nebraska Legislative Bill 798 featured a provision outlining that the Cash Reserve Fund would be designated to receive federal funds received by the State of Nebraska for undesignated general government purposes, federal revenue sharing, or general fiscal relief of the state. As a result, Nebraska received $29 million in late FY2003 as part of the federal fiscal relief, and another $29 million was received in FY05-06. These funds were deposited into the Cash Reserve Fund to provide temporary financial support to the state during those respective fiscal years (Nebraska Unicameral Legislature, 2005).

[22] According to subsection 1 of NRS 353.288, the State Controller is mandated to transfer from the general fund to the Account: A. 40% of the unrestricted balance of the State General Fund from the previous fiscal year, remaining after deducting 7% of all appropriations made from the State General Fund during that previous fiscal year for the operation of all state departments, institutions, agencies, and schools; B. An additional 1% of the total anticipated revenue for that fiscal year, as projected by the Economic Forum and adjusted by relevant legislation affecting state revenue. It's noteworthy that subsection (b) became effective in July 2015 (FY 2016), as per the 2013 Nevada Statutes, Chapter 446. Additionally, the Governor is responsible for appointing all five members of the Economic Forum, while the Senate Majority Leader and the Speaker of the Assembly each nominate one member for appointment (Nevada Legislature, 2003).

[23] The calculation of estimated unencumbered funds takes into account various factors. The revenue estimate and estimated unencumbered funds are determined through a joint resolution approved by the General Assembly and the Governor (Del. Const. Art. VIII, § 6).

[24] In Pennsylvania, the allocation of surplus funds to the Budget Stabilization Reserve Fund was suspended by the Act 53 of 2008 for fiscal years 2007-2008, and the Act 46 of 2010 for fiscal years 2010-2011 through 2015-2016.

[25] The Reserve for Revenue Fluctuations is typically sourced from budget surpluses. However, it's important to note that surpluses do not automatically flow into the Reserve. Instead, the deposit amount is determined each year based on the specified target balance in the annual appropriations bill (Spears, 2020).

| BSF Rule | States | Freq. |
|---|---|---|
| Deposit in other ways | Maryland, Missouri, Ohio, S. Carolina | 4 |
| Cap | 1. **2-5 % of GF expenditures:** Delaware, Illinois, Kentucky, Louisiana, New Hampshire[26], New Jersey, New York, Rhode Island, S. Carolina, Vermont, Wisconsin | 11 |
| | 2. **6-9 % of GF expenditures:** Indiana, Iowa, Maryland, Mississippi, Missouri, New Mexico (Operating Reserve), N. Carolina, Ohio, Oregon, Pennsylvania, Tennessee, Utah | 12 |
| | 3. **10-14 % of GF expenditures:** Arizona, California (Budget Stabilization Account), Florida, Hawaii, Idaho[27], S. Dakota, Texas, Washington, W. Virginia | 9 |
| | 4. **More than 15 % or no limit:** Alabama, Alaska, California (Special Fund for Economic Uncertainties), Connecticut, Georgia, Maine, Massachusetts, Michigan, Minnesota, Nebraska, Nevada, North Dakota, Oklahoma, Virginia, Wyoming | 15 |
| Withdrawal by executive | Alabama, California, Florida, Illinois[28], Indiana[29], Maine[30], Minnesota, Mississippi, Montana[31], Nebraska, New Jersey[32], New Hampshire, N. Dakota[33], New York, Oklahoma (Revenue Stabilization Fund)[34], Tennessee, Texas, Vermont, W. Virginia, Wisconsin | 20 |

[26] New Hampshire's Revenue Stabilization Reserve Account is limited to a maximum of 10% of the actual General Fund unrestricted revenue for the most recently completed fiscal year (RSA 9:13-e). It is not a 10% of general fund revenues, but 10% of general fund surplus. Thus, New Hampshire is classified into the category 1.

[27] The cap of Idaho's Budget Stabilization Fund had been increased from 10 percent of general fund receipts to 15 percent of total general fund receipts for the fiscal year ending. However, it took effect in July, 2021, thus the state's cap is classified into the category 3 (10-14 % of general fund expenditures) for the fiscal year 2020.

[28] Section 6z-51 of 30 ILCS 105 states that the State Comptroller is authorized to instruct the State Treasurer to transfer funds from the Budget Stabilization Fund to the General Revenue Fund in order to manage "cash flow deficits." This transfer is for the purpose of meeting short-term timing discrepancies within a fiscal year.

[29] The Counter-cyclical Revenue and Economic Stabilization Fund in Indiana allows the executive branch, specifically the budget agency, to transfer additional funds to the general fund if there is a determination of insufficient funds to meet statutory obligations. This transfer requires approval from the governor and review by the budget committee (Burns Ind. Code Ann. § 4-10-18-4).

[30] In Maine, the Governor is responsible for distributing funds from the Stabilization Fund to provide for benefits as stipulated in Title 25, Chapter 195-A, based on specific requests from officials and consultation with the State Budget Officer (5 M.R.S. § 1532).

[31] Montana distinguishes itself from other states by granting the Governor a greater degree of autonomy in two key areas: 1) the authority to reduce expenditures and 2) the capacity to allocate funds from the budget stabilization fund (Carlson et al., 2018). However, the legislature can withdrawal from BSF balance, too (Carlson et al., 2018).

[32] Section 6 clarifies that balances in the "Surplus Revenue Fund" may be used to cover the costs of emergencies identified by the Governor. For such use, proper notification to the Joint Budget Oversight Committee or its successor is required (1990 N.J. Laws 44).

[33] In North Dakota, the governor could order transfers from the budget stabilization fund to the general fund based on different scenarios involving general fund allotments made during the biennium (2017 N.D. Laws 394).

[34] Oklahoma's Revenue Stabilization Fund (RSF) was created in 2016 and both the executive and the legislature can withdraw money from the RSF: The Director of the Office of Management and Enterprise Services is authorized to withdraw up to one-fourth (1/4) of the beginning-of-year balance from the Revenue Stabilization Fund, subject to the limitation of the declared revenue failure amount under Section 34.49 of Title

| BSF Rule | States | Freq. |
|---|---|---|
| Withdrawal by legislature | **1. Simple majority vote**: Alaska (Statutory Budget Reserve Fund), Arizona[35], Arkansas (Rainy Day Fund), Georgia, Idaho, Illinois, Iowa (Economic Emergency Fund), Kansas, Kentucky, Maine, Maryland, Massachusetts, Montana, Nebraska[36], Nevada, New Jersey, New Mexico, Ohio, Oklahoma (Revenue Stabilization Fund), Rhode Island, S. Carolina (General Reserve Fund), Utah, Vermont (General Fund Surplus Reserve), Virginia, W. Virginia, Wisconsin, Wyoming | 27 |
| | **2. 3/5 supermajority votes**: Delaware, Iowa (Cash Reserve Fund), Oregon (Rainy Day Fund), Washington | 4 |
| | **3. 2/3 supermajority votes**: Arkansas, Hawaii, Louisiana, Michigan, Missouri, New Hampshire, New Mexico (Tax Stabilization Reserve), N. Carolina, Oklahoma (Constitutional Reserve Fund), Pennsylvania, S. Carolina (Capital Reserve Fund), S. Dakota, Texas | 13 |
| | **4. 3/4 supermajority votes**: Alaska (Constitutional Budget Reserve Fund) | 1 |
| Withdrawal by revenue shortfalls | Alabama, Arkansas, California (Special Fund for Economic Uncertainties), Delaware, Florida, Georgia, Hawaii, Idaho, Iowa, Illinois, Indiana, Iowa (Cash Reserve Fund), Louisiana, Massachusetts, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Hampshire, New Jersey, New Mexico, New York (Tax Stabilization Reserve Fund), N. Carolina, N. Dakota, Oklahoma, Pennsylvania, Rhode Island, S. Carolina, S. Dakota, Tennessee, Texas, Utah, Vermont, Virginia, W. Virginia, Wisconsin, Wyoming | 38 |
| Withdrawal tied to volatility | Arizona, California (Budget Stabilization Account), Connecticut, Indiana, Michigan, New York (Rainy Day Reserve Fund), Oklahoma, Oregon, Texas, Washington | 10 |
| Withdrawal limits | Alabama, Alaska, California (Budget Stabilization Account), Hawaii, Idaho, Iowa (Cash Reserve Fund), Louisiana, Michigan, Mississippi, Missouri, N. Carolina, Oklahoma, Oregon (Rainy Day Fund), Tennessee, Vermont (General Fund Surplus Reserve), Virginia, W. Virginia | 17 |
| Repayment provision | **No repayment period**: Alabama, Arkansas (Long Term Reserve Fund), California (Special Fund for Economic Uncertainties), Minnesota, Pennsylvania | 5 |
| | **Repay within 4-6 years**: Florida, New York (Tax Stabilization Reserve Fund), South Carolina (General Reserve Fund) | 3 |
| | **Repay within 2-3 years**: Missouri, New York (Rainy Day Reserve Fund) | 2 |
| | **Repay within a year**: Alaska (Constitutional Budget Reserve Fund), Illinois, Iowa, Mississippi, Rhode Island, Texas, W. Virginia | 7 |
| Number of BSF | Alaska, Arkansas, California, Iowa, Nevada, New Mexico, New York, Oklahoma, S. Carolina, Vermont, W. Virginia, Wyoming | 12 |

Note: The State of Colorado is not included in Table 4 as the State does not have an official BSF.

62 of the Oklahoma Statutes. Similarly, under Section 34.49 of Title 62 of the Oklahoma Statutes, the Legislature may appropriate up to one-fourth (1/4) of the beginning-of-year balance from the Revenue Stabilization Fund, provided that it does not exceed the declared revenue failure amount.

[35] The Arizona Economic Estimates Commission (EEC) calculates the amount of deposits or withdrawals of the Budget Stabilization Fund (BSF), by using a statutory formula; however, the EEC calculations must be authorized by legislative actions, according to the Annual Comprehensive Financial Report(2020, p. 81).

[36] As mandated by Laws 2013, LB200, § 1, the State Treasurer is obligated to transfer a total maximum amount of $43,015,459 from the Cash Reserve Fund to the Nebraska Capital Construction Fund within the period spanning from July 1, 2013, to June 30, 2017.

## 2.5 Frequencies of BSF Statute Categories

Table 4 shows the frequency of BSF structural features in 2020. All states except Colorado are included in the Table. First, three states, including Hawaii[37], Nebraska, and West Virginia[38] use non-tax revenue, such as tobacco settlement fund or federal fund to finance their BSFs. Tax revenue on natural resources as a primary source of BSFs are used by six states, including, Alabama, Alaska, Louisiana, Oklahoma, Texas, and Wyoming. Deposit requirements include i) deposit by executive, ii) deposit by legislature, iii) deposit by surplus, iv) deposit tied to revenue or economic volatility, and v) deposit in other ways, as shown in table 4. In twenty-five states, officials in the executive branch are responsible for making deposits into the BSF, whereas in eighteen states, deposits into the fund are made through legislative appropriation.

The most prevalent deposit method is "depositing revenue surplus," which is utilized by 33 states. In Hawaii, five percent of the general fund balances is deposited into their BSF. Kansas initially deposited ten percent of its general fund surplus into its BSF, but subsequently raised the allocation to 50 percent in 2020. Utah and Nevada save 25 percent and 40 percent of their general fund balances, respectively.[39] States, including Idaho, Kentucky, Massachusetts, Mississippi, Montana, New Jersey, Texas, West Virginia, and

[37] Hawaii also relies on General Fund to fund its Emergency and Budget Reserve (EBR) as the state is mandated to deposit five percent of the general fund balance at the conclusion of each fiscal year, provided that state general fund revenues for two consecutive fiscal years surpass the revenue of the preceding fiscal year by five percent (HRS § 328L-3).

[38] West Virginia's Revenue Shortfall Reserve Fund-Part B is comprised of funds transferred from the Tobacco Settlement Medical Trust Fund and repayments made toward the loan from the West Virginia Tobacco Settlement Medical Trust Fund to the Physician's Mutual Insurance Company. Conversely, the state's Revenue Shortfall Reserve Fund-Part A is funded through surplus revenue (W.Va. Code §11B-2-20).

[39] In Louisiana, revenues generated from the production of or exploration for minerals that exceed $750 million are required to be transferred to the BSF (La. Const. Art. VII, § 10.3). The amount of deposit averaged from 2000 to 2019 is $434 million, approximately 36.7 percent of revenues from the production of minerals. Thus, Louisiana is classified in the second category, "deposit 25 – 40 % of revenue surplus."

Wisconsin, need to deposit about half of the general fund surplus into their BSFs.[40] BSFs in thirteen states are required to save all surplus from the general fund.

Seventeen states link deposit to revenue or economic volatility. Among them, nine states, including Arizona, California, Connecticut, Florida, Indiana, Michigan, Oklahoma, Texas, and Washington, link both deposit and withdrawal to revenue or economic volatility. The deposit requirements of four states' BSFs do not fit into any categories.

Eleven states have adopted a low-cap range of 2-5% for their BSFs, while twelve states have implemented a medium-cap range of 6-9%. The cap of New Mexico's Operating Reserve is set at 8 percent of the total recurring appropriations from the general fund for the preceding fiscal year. In this study, however, the cap of New Mexico's BSF is coded 4. This is because when the sum of the excess revenue and the balance in the Operating Reserve exceeds 8% of the appropriations from the general fund for the previous fiscal year, the surplus should be directed to the Tax Stabilization Reserve, the second BSF of New Mexico (N.M. Stat. Ann. § 6-4-4).

Nine states use the range of high cap (10-14%). The remaining states are classified into the category of very high cap (more than 15%). Among them, Alaska, Alabama, Nebraska, and Wyoming have no cap. Arkansas is coded 0 because the state does not have the fixed cap, but the cap is determined by the General Assembly (A.C.A. § 19-6-486). Minnesota also does not place the fixed cap on the Budget and Cash Flow Reserve Accounts, but the cap is determined based on the fluctuation of the general fund's tax structure (Minn. Stat. § 16A.152).[41]

[40] In North Dakota, any general fund surplus exceeding $65 million must be allocated to the BSF (N.D. Cent. Code, § 54-27.2-02). The amount of deposit averaged from 2000 to 2019 is $234 million, about 73% of revenue surplus. Thus, North Dakota is classified in the third category, "deposit 50 – 75 % of revenue surplus."

[41] With the November 2019 forecast for the 2020-21 biennium, $284 million was allocated to the Budget Reserve Account, according to the Minnesota's Annual Comprehensive Financial Report for the Year Ended June 30, 2020 (p. 23). $284 million accounts for about 1 % of General Fund Revenue because General Fund

Withdrawal requirements have four categories, including withdrawal by executive, withdrawal by legislature, withdrawal based on revenue shortfalls, and withdrawal tied to revenue volatility, shown in table 4. The category of "withdrawal by revenue shortfall" has the highest proportion, about 76 percent, as thirty-eight states have adopted this method. "Withdrawal by executive" is utilized by twenty states. Ten states, representing roughly 20 percent, employ the "withdrawal tied to revenue volatility" approach.

"Withdrawal by a simple majority vote of the legislature" serves as the second most prevalent withdrawal method and is employed by twenty-seven states, constituting approximately 55 percent of the total. Eighteen states, 36 percent, require a supermajority vote of the legislature for the use of BSF. Among them, four states, including Delaware, Iowa, Oregon, and Washington, adopt three-fifths supermajority vote for withdrawal. Thirteen states require two-thirds supermajority vote to withdraw money from their BSFs. Only one state, Alaska, uses a three-fourth supermajority vote to use its BSF.

Seventeen states limit the amount of money (or the proportion of BSF balance) that can be withdrawn from BSFs. Iowa cannot use its Cash Reserve Fund if an appropriation results in the fund's balance being less than "three and three-fourths percent of the adjusted revenue estimate" for the year (Iowa Code § 8.56). Meanwhile, the Economic Emergency Fund, Iowa's second reserve, has no withdrawal limit, like the Cash Reserve Fund (Iowa Code § 8.55).

Repayment provisions are adopted by seventeen states, accounting for 35 percentage of the total. Seven states, including Alaska, Arkansas, Illinois, Iowa, Mississippi, Rhode Island, Texas, and West Virginia, require repaying money borrowed from BSFs within one

Revenue and General Fund Spending of the enacted budget for fiscal year 2020 were $23.518 billion and $23.950 billion, respectively.

year. Missouri and New York must replenish the fund used within three years. Florida and South Carolina need to pay back money previously borrowed from the fund within six years. Alabama, Arkansas, California, Minnesota, and Pennsylvania have the repayment provision but does not specify the period for replenishment.

Twelve states, accounting for about 24 percent of the total, have at least two operating BSFs for general funds. These states include Alaska, Arkansas, California, Iowa, Nevada, New Mexico, New York, Oklahoma, South Carolina, Vermont, West Virginia, and Wyoming.

# 3. LITERATURE REVIEW

With the extensive adoption of BSF in the 1980s, scholars have conducted studies on i) motive or purpose of BSF adoption (Lee & Chen, 2022; Wagner & Sobel, 2006), ii) determinants of BSF structural features (Rodríguez-Tejedo, 2012), iii) their impacts on the budget stabilization or fiscal performance (Choi, 2022; Douglas & Gaddie, 2002; Hou, 2003; Hou & Moynihan, 2008; Sobel & Holcombe, 1996), and iv) optimal fiscal reserves (Kriz, 2003; Kriz, 2015) over the last three decades. The most important debate in the literature is whether BSFs achieve the desired policy objective, budget stabilization.

Empirical studies have found that BSFs exhibit "countercyclical effects" with the business cycle (Hou, 2003, 2004) and assist in mitigating "fiscal stress" induced by recession (Douglas & Gaddie, 2002; Hou, 2003; Hou & Moynihan, 2008; Maag & Merriman, 2001; Sobel & Holcombe, 1996). However, the association between BSFs and fiscal condition does not necessarily mean that all BSF policies work well at any time. The remaining questions are *under which conditions states can build effective budget stabilization funds, and which BSF policies most contribute to improving fiscal performance.*

Different theoretical perspectives have been put forward to account for variation in BSF policies and their impacts on fiscal performance. Theoretical perspectives stemming from New Institutional Economics (NIE) have remained central and most influential in the studies of Budget Stabilization Funds. New Institutional Economics (NIE) theorists view stringent BSF rules as effective enforcements that shape the behavior of public officials and policymakers (Hou et al., 2003; Hou & Moynihan, 2008). In contrast to NIE, principal-agent theoretical perspectives do not treat BSF rules as effective enforcements, assuming that

lawmakers and government officials circumvent such rules to pursue their own interests (Rose, 2008).

Organizational theorists treat fiscal reserves as “slack resources” that are necessary to adapt to changing environments (Hendrick, 2006). Hence, both NIE and organizational theorists focus on the role and effectiveness of BSFs in stabilizing state budget and improving fiscal performance. Recently, organizational learning theory sheds new light on the relationship between a government’s past experiences and saving behavior (Lee & Chen, 2022; Schein, 1993). The following subsections will explain theoretical perspectives on BSFs in more detail and engage them in a debate to understand disagreement in the literature.

### 3.1 Public Choice Theory

In a democratic system, the responsiveness of those in power to citizens' demands and interests is crucial, as they rely on the support of the electorate for reelection (Downs, 1961). Elected politicians, therefore, make budgetary decisions that align with voters' needs (Buchanan & Wagner, 1977). The demand-side models of public choice, influenced by spending pressures and voter demands, anticipate the continuous delivery of public services even in the face of decreasing revenues during recessions. Consequently, political support gained through budgetary alignment with voters' needs and preferences tends to drive an increase in expenditures (Kwak, 2014).

If consumer voters can express their policy preferences by moving to other jurisdictions where their demands or policy preferences are most realized (Tiebout, 1956), fiscal policy for services may be implemented to attract citizens by meeting voters policy preferences (Tausanovitch & Warshaw, 2014). Voters may assess the performance of their own incumbents to those of other jurisdictions that would affect elections; this comparative

assessment of incumbents' performance by voters, especially in relation to neighboring jurisdictions, plays a pivotal role in shaping subnational policy decisions to meet voters' expectations (Besley & Case, 1995; Salmon, 1987; Shleifer, 1985).

While demand-side models view politicians and bureaucrats as agents responsive to voters' needs, principal-agent theorists delve into the intricacies of agents' rent-seeking behavior and the common pool problem. The latter arises when politicians allocate tax revenue to targeted public policies, introducing complexities into the decision-making process (von Hagen, 2008; von Hagen & Harden, 2019). Political Budget Cycle (PBC) theory sheds light on opportunistic incumbents manipulating microeconomic performance before elections to increase re-election chances (Nordhaus, 1975; Rogoff, 1990; Ryu et al., 2020). The myopic tendencies of voters, favoring politicians who allocate funds to targeted programs beneficial to specific voter groups, underscore the challenges in equitable resource allocation (Drazen & Eslava, 2006).

From PBC theory, ***politicians are expected to draw money from the BSF to navigate around such unpopular measures, such as tax increases and spending cuts, especially when an election is imminent*** (Rose, 2008). Empirical evidence supports this notion, with studies revealing a pattern of incumbents utilizing fiscal reserves in the lead-up to elections while adopting a more conservative approach in post-election periods (Kneebone & Mckenzie, 2001; Persson et al., 2003; Rose, 2008; Ryu et al., 2020).

Rose (2008) found that lawmakers withdraw nearly three times more funds in response to a deficit shock of a certain magnitude during an election year compared to a non-election year. Additionally, this effect is more pronounced when incumbents are eligible for re-election than when they face term limits. In accordance with the principal-agent theory, Ryu et al. (2020) also found that politicians tend to view a BSF as a secondary savings

account, enabling them to navigate around stringent TELs and accumulate more BSFs following elections. In contrast, Kwak (2014) found that election years do not have a significant impact on fiscal policy.

In addition to BSFs, prior studies indicate a trend where General Fund Balances (GFBs) tend to diminish in the periods preceding and during elections. As election years approach, there is a tendency for politicians to draw from reserves in order to either reduce taxes or increase spending. This strategy holds particular appeal to key voter demographics such as the elderly, healthcare providers, parents, teachers, and taxpayers (Lauth, 2003). Rose (2006) also demonstrates a decrease in GFBs during election years followed by growth in the two years subsequent to the election year.

In sum, from the perspective of Political Budget Cycle (PBC) theory, there is an anticipation that both BSF and GFB levels will decrease in the periods leading up to and during elections. This suggests a pattern where incumbents might strategically reduce these fiscal reserves during electoral periods, potentially for short-term political advantages.

### 3.2 Political Economy of Fiscal Institutions

Fiscal institutions governing the decisions over public finances are intended to shape fiscal behavior or fiscal policy to alleviate the principal-agent problems and the common pool problem (Alesina et al., 1998; Alt & Lassen, 2006; Alt & Lowry, 2003; Brooks & Phillips, 2010; Eichengreen & Bayoumi, 1994; Johnson & Kriz, 2005; von Hagen, 2008). Fiscal institutions that exist in U.S. states include different budget balancing requirements (BBRs), restrictions on tax and spending (TELs) or debt levels, and various requirements for fiscal reserves, including budget stabilizations and general fund balances. The aim of BBRs is to limit their public-sector debts and deficits (Eichengreen & Bayoumi, 1994). TELs are

designed to limit the growth of government from either the revenue or spending (Brooks & Phillips, 2010; Dye et al., 2011; Mullins & Joyce, 1996; Shadbegian, 1996; Sun, 2014).

However, there is a disagreement regarding whether stringent fiscal rules effectively enforce *budget discipline* or create stronger *incentives for rent-seeking*. Theoretical perspective stemming from political economics claims that budgetary institutions contribute to decreasing budget deficits and enabling governments to respond to fiscal shocks efficiently (Alesina & Perotti, 1996; Eichengreen & Bayoumi, 1994; Hou & Smith, 2006). This perspective assumes that the *explicitly designed rules* prevent public officials from using revenues in ways that do not reflect the taxpayers' preferences (Johnson & Kriz, 2005). In contrast, there is literature concerned about the *negative side* of fiscal constraints. Poterba (1994) argues that budgetary institutions lead to inefficient and slower adjustments to external shocks, thereby causing fiscal instability.

Considering the debate about the effects of fiscal institutions on fiscal outcomes, it is worth examining how institutional factors affect budgetary responses and what relationships they have with BSFs. Regarding the relationship BBRs and BSFs, empirical studies have suggested that strict BBRs, such as deficit carryover restrictions, have a significant impact on BSF balance levels (Hou, 2004), general fund balances (Hou & Smith, 2006), and borrowing costs (Wagner, 2004). In contrast, Rose (2008) did not find such evidence. Regarding the relationship between TELs and BSFs, Hou and Duncombe (2008) assert that the imposition of expenditure limits leads to a substantial rise in total savings. Furthermore, Hou and Smith (2010) break down reserves into distinct types and find that expenditure limits contribute to achieving the probability of having a surplus in the overall balance. Conversely, revenue limits diminish the probability of surplus.

As outlined by Wagner and Sobel (2006), states implementing TELs tend to encounter fiscal stress, prompting them to turn to BSFs as a strategy to circumvent TELs and augment reserves. This outcome suggests the possibility that states with stringent TELs may accumulate more funds in their BSFs under less stringent rules governing BSF operations (Wagner & Sobel, 2006). In contrast to Wagner and Sobel (2006), Maher et al. (2017) observe a lack of a significant relationship between the stringency of TELs and the levels of BSFs. However, they do identify a negative association between stringency and the levels of GFBs (Maher et al., 2017). Ryu et al. (2020) find that states with stringent TELs spend fewer general funds, whereas directing more towards savings in BSFs, especially following elections. The research indicates that imposing restrictions on the use of BSFs can act as a safeguard against opportunistic saving behavior in postelection years.

### 3.3 New Institutional Economics

Contrary to the assertion that adopting Budget Stabilization Funds (BSF) primarily aims to bypass political and institutional constraints (Wagner & Sobel, 2006), the perspective from New Institutional Economics (NIE) suggests that policymakers adopt BSF based on reasoned recognition (Hou, 2003). This recognition arises from the critical necessity to prudently allocate financial resources in anticipation of economic downturns, refraining from improper utilization as a coping mechanism for fiscal shocks. This perspective emphasizes the maintenance of stability and fiscal health as crucial criteria for evaluating government fiscal performance (Hou et al., 2003). Government capacity, as determined by factors such as fiscal reserves, plays a key role in fiscal performance (Ingraham & Donahue, 2000; Lynn et al., 2000; O'Toole & Meier, 1999).

The NIE perspective underscores the significance of institutions, including rules and guidelines governing fiscal management, in shaping policymakers' behavior. To connect government capacity to fiscal performance, Hou and Moynihan (2008) introduce the concept of "Countercyclical Fiscal Capacity (CCFC)." This concept involves the development and utilization of financial tools that enable governments to uphold program stability in response to fiscal strain. "Government capacity," conceptualized through fiscal reserves, relies on rules that explicitly guide and restrict the behavior of public officials and politicians regarding deposit and withdrawal, aligning with the NIE perspective (Hou et al., 2003; Hou & Moynihan, 2008).

CCFC views stringent constitutional or statutory requirements concerning BSF deposit and withdrawal as "effective enforcement mechanisms" that can mitigate spending pressures and curb misuse of financial resources (Hou, 2004; Hou et al., 2003; Hou & Moynihan, 2008). If the stringent rules help governments to save funds, this improves government management capacity; therefore, the size of BSFs can be viewed as an "intermediate measure of fiscal performance" or "countercyclical fiscal capacity" (Hou & Moynihan, 2008). From this perspective, it is expected that ***stringent structural features of BSF rules, which prevent unnecessary spending, lead to greater BSF balances***.

Empirical research generally indicates that funds subject to stringent deposit requirements result in higher balances and decrease expenditure volatility (Douglas & Gaddie, 2002; Hou, 2003, 2004; Knight & Levinson, 1999; Sobel & Holcombe, 1996). In their study, Sobel and Holcombe (1996) use key variables such as "saving requirement," "cap on BSF," "cap percentage," and "withdrawal requirement" to evaluate the influence of these factors on alleviating or exacerbating state fiscal stress amid the 1989–1992 recessionary

period.[42] Their findings indicate that states adopting stringent deposit regulations, including "cap" and "required savings," tend to deposit more funds and undergo less fiscal stress compared to states without such stringent rules.

In a subsequent study, Douglas and Gaddie (2002) revisited the same dataset, employing the identical model used by Sobel and Holcombe (1996). However, they opted for a distinct set of features in their analysis, including variables such as "withdrawal by formula," "supermajority vote requirement for BSF use," "savings requirements," and "multiple funds." Douglas and Gaddie (2002) find "savings requirements" and "multiple BSFs" exert significant influences in mitigating the fiscal stress of states.

Hou (2004) observes that the implementation of stringent deposit rules, characterized by features, such as a "high cap" and "deposit by formula" and "general fund surplus," coupled with stringent withdrawal rules, including "withdrawal by formula" and "legislative approval," contributes to the enhancement of BSF levels. These findings illustrate that the structural features of the BSF contribute to a decrease in fiscal stress by effectively smoothing expenditures over the business cycle.

In investigating the relationship between BSF and GFB, Buerger et al. (2022) find that strict deposit and withdrawal rules, such as using formulas tied to economic volatility, improve the association between the business cycle and savings. Conversely, stringent caps on BSFs diminish supplementation effects, while replenishment rule shows strong supplementation effects after fund transfers, but decreases these effects during other periods (Buerger et al., 2022).

[42] Fiscal stress is measured by "the sum of tax increases and expenditure shortfalls as a percentage of general expenditures" in the study of Sobel and Holcombe (1996).

In contrast to the aforementioned studies, Rose (2008) finds that strict rules (e.g., formula, legislative appropriation, and supermajority requirement) have negligible impact on reducing withdrawal from BSFs. Surprisingly, rules that involve a greater number of politicians in the decision-making process, such as requiring the governor's approval for withdrawals, prove effective in curbing opportunistic behavior. These results suggest that strict formula rules do not entirely eliminate political intervention. Consequently, decisions regarding BSFs seem to be more aligned with a political process rather than a purely budgetary one.

### 3.4 Fiscal Slack Model

At the local level, governments do not have BSFs like state governments, but rely on unreserved GFB, which is an informal slack resource, for budget stabilization (Hendrick, 2006; Hou & Brewer, 2010; Marlowe, 2005). To understand the determinants and effects of fiscal reserves at the local level, fiscal slack model has been proposed (Hendrick, 2006). This perspective has paid attention to organizations' adaptation to changing environments (Lawrence & Lorsch, 1967; March & Simon, 1958) and applied to the study of subnational governments' responses to the fiscal stresses during economic recessions in the 1980s (Clark & Ferguson, 1983; Levine et al., 1981; Pammer, 1990).

Organizational adaptation occurs when an organization adjusts its internal environment or processes to achieve equilibrium with its external environment (Simon, 1947). Similar to CCFC, organizational theory posits that organizations, which have more fiscal slack, possess a greater ability to mitigate the effects of fiscal shocks on the organization (Hendrick, 2006). While CCFC emphasizes the connection between BSF rules and the fiscal performance of governments, the fiscal slack model centers on the extent to

which fiscal slack's size affords governments fiscal flexibility that aids governments in reducing deficits and sustaining continuous service provision (Hendrick, 2006). This stands in contrast to the premise of "slack-maximizing models of bureaucracy," which suggests that slack is misappropriated for the benefit of politicians and bureaucrats (Breton & Wintrobe, 1975; Migué & Bélanger, 1974).

Some empirical studies find that unreserved GFB helps improve fiscal conditions and stabilize expenditures (Hendrick, 2006; Marlowe, 2005), while others do not support that GFB has a countercyclical stabilizing effect on expenditure gap (Wang & Hou, 2012). Meanwhile, the stabilizing effect of GFB depends on business cycle, suggesting that GFB is effective in stabilizing expenditures during boom years (Wu & Shi, 2021). Regarding the determinants of fiscal capacity, general fund surpluses and household incomes have a positive relationship with local fiscal reserves (Gorina et al., 2019; Su, 2019). The findings provide an implication for understanding the role of fiscal slack at the state level.

Organizational learning can occur as organizations adapt to environmental changes, leveraging insights from past experiences to effectively manage and mitigate uncertainty (Cyert & March, 1963; Schein, 1993). From the theory, repeated exposure to risky events and risk awareness motivates organizations to become more responsive and adaptable to the next extreme events (Lee & Chen, 2022; Smallman, 1996; Toft & Reynolds, 2005; Zhang et al., 2018). Empirical studies also reveal that states, in response to experiencing significant fiscal challenges, exhibit a tendency to establish or reinforce their fiscal reserves (Lee & Chen, 2022; Schein, 1993). This behavior, attributed to organizational learning, is driven by a proactive strategy to prepare for potential future financial crises (Lee & Chen, 2022; Schein, 1993).

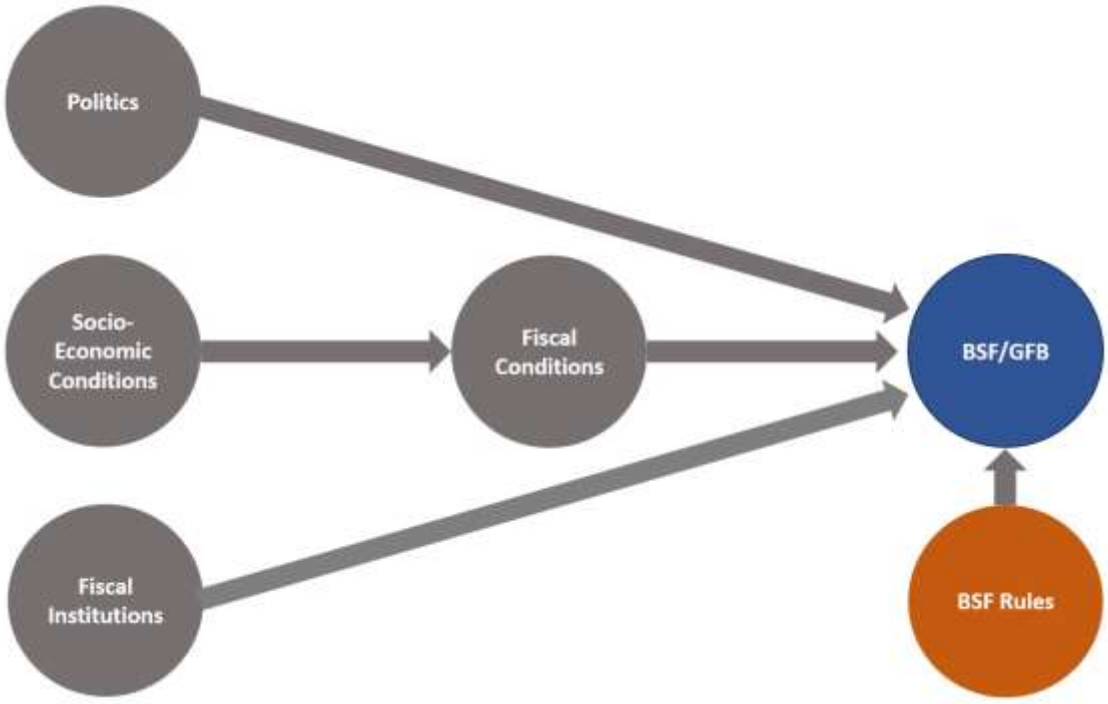
In sum, the existing literature largely agrees that general fund balances are vulnerable to political spending pressures and the stringency of BSF rules depends on policymakers' motives for BSF adoption. However, there are disagreements in the literature regarding i) why policymakers adopt and develop BSF policies, ii) whether stringent BSF rules effectively prevent the political use of general funds, iii) under which conditions BSFs can be effective for alleviating fiscal stress, and iv) what kind of relationship BSF has with GFB. Given the disagreement on the effectiveness of stringent BSF rules, this research contributes to advancing our understanding of the relationship between BSF characteristics and state fiscal performance with respect to general fund balances.

# 4. CONCEPTUAL FRAMEWORK AND HYPOTHESES

## 4.1 Conceptual Framework

This study aims to examine the impact of BSF rules on both BSF and GFB levels. To investigate the effects of BSF rules on BSF and GFB levels, respectively, I will begin by explaining a conceptual framework, derived from Chapter 3. Literature Review. Subsequently, in Section 4.2, I will formulate several hypotheses regarding the effects of BSF structural features on BSF and GFB levels based on the conceptual framework as well as attributes of BSF rule stringency discussed in Section 2.2.

**Figure 1. Causal Path Diagram Derived from the Literature**




Note: Figure 1 visualizes the conceptual framework. Arrows indicate the causal direction.

The study integrates insights from diverse theoretical perspectives to formulate a conceptual framework, visually represented in Figure 1. This framework is designed to analyze the determinants and impacts of both BSF and GFB. The framework incorporates New Institutional Economics (NIE), emphasizing the importance of stringent BSF rules as a key independent variable. NIE posits that such rules act as effective enforcements, shaping policymakers' behavior and contributing to fiscal performance.

There could be a substitution or supplementation effect between BSF and GFB: A substitution effect implies that a rise in the BSF leads to a reduction in the GFB (Hou & Brewer, 2010).[43] In theory, the similarity between the rules governing BSF and GFB determines the substitutability between BSF and GFB (Wagner, 2003). In contrast, a *supplementation effect* expects that the BSF boosts the overall level of total savings as the legal restrictions of BSFs allow states to avoid spending pressures (Hou & Brewer, 2010; Knight & Levinson, 1999).

Drawing inspiration from the literature on substitution and supplementation effects between BSF and GFB, the study investigates the relationship between two dependent variables, BSF levels and GFB levels. In the first hypothesis, the independent variables include BSF rule characteristics and GFB levels, with BSF balance levels as the dependent variable. In the second hypothesis, both BSF structures and levels serve as independent variables, while GFB levels are the dependent variable.

Political factors, including gubernatorial election years, political partisanship, and divided government, play a pivotal role in shaping state government spending behavior (Alt & Lowry, 1994, 2000; Hou, 2003; Poterba, 1994). Gubernatorial election years, discussed in

[43] In consumer choice theory, the substitution effect refers to the effect of a price change of a good on consumption (or the amount of the good demanded by a consumer) (Mankiw, 2018).

the context of the Political Budget Cycle (PBC), witness a significant influence on fiscal policy, with politicians often increasing spending while avoiding tax hikes, a phenomenon known as a "political business cycle" (Lucas, 1976; Rogoff, 1990; Rose, 2008). This strategic manipulation of fiscal measures during election periods, as previously examined in the context of the PBC, reflects policymakers' efforts to enhance their electoral prospects by fostering favorable economic conditions for the electorate.

Political partisanship constitutes another crucial factor impacting public spending. Clark and Ferguson (1983) argue that a Democrat-leaning political culture tends to advocate for expanded government, whereas a Republican culture typically favors fiscal conservatism. Alt and Lowry (1994) note that Democrats target a higher share of personal income for state spending compared to Republicans. Brown (1995) finds that Democratic Party control typically leads to the implementation of more liberal policies and increased welfare efforts, but Barrilleaux et al. (2002) suggest that the influence of party affiliation on state welfare expenditures is contingent upon the competitiveness of the electoral environment.

Differing party affiliations between the governor and the state legislature majority impact gridlock on public expenditures (Niskanen, 2003). Political friction can impede executive proposals, and governors may veto spending bills for local projects (Hou, 2003). The absence of such division may enable increased spending or compromises (Gorina et al., 2019). However, gridlock, hindering prompt responses to fiscal stress, tends to result in reduced spending and increased savings. Empirical evidence is mixed; Hou (2004) identifies heightened BSF balance levels associated with party division, while Gould (2009) observes a rise in per capita expenditures linked to political division within government.

Fiscal institutions, exemplified by Tax and Expenditure Limits (TEL) and Budget Balancing Requirements (BBR), are integral components included in the framework. This

institutional approach explores the impact of specific fiscal constraints on fiscal reserves. TEL imposes restrictions on revenue and spending growth, while BBR dictates the need for a balanced budget. The analysis aims to unravel how these fiscal institutions shape the budgetary decisions made by policymakers.

From an organizational perspective, perceiving fiscal reserves as adaptive "slack resources," the study examines factors influencing economic and fiscal conditions to elucidate states' responses to fiscal stresses, where events like economic recessions or disasters can significantly affect a state's fiscal condition. State governments may interchangeably use fiscal reserves and debt, contingent upon fund balance levels or borrowing costs; they resort to debt financing when fiscal reserves are insufficient (Gore, 2009; Gorina et al., 2019; Su & Hildreth, 2018). Conversely, governments' reliance on debt financing can affect BSF and GFB levels.

The literature on the "flypaper effect" of federal grants suggests that federal grants may affect the fiscal behaviors of states. Gramlich (1977) argues that states raise their taxes to offset the loss of federal grants. Martell and Smith (2004) show that both matching and non-matching grants exhibit a positive and significant impact on full-faith and credit debt issuance, while demonstrating a negative association with non-guaranteed debt issuance. Inman (2011) finds that matching aid has a "price effect," expanding government expenditures.

In alignment with the existing literature on demand-side models of public choice, it becomes imperative to consider public demands or policy preferences. This is essential as these factors have the potential to influence the formulation of fiscal policy and impact the financial management practices adopted by governments. In other words, by considering

public demands and policy preferences, researchers aim to account for external influences on governmental fiscal decisions and financial strategies.

The conceptual framework highlights existing debates and empirical findings, providing a foundation for understanding the complexities surrounding BSF and GFB. The synthesis of these theoretical perspectives forms the basis for analyzing the intricate relationships between political, socioeconomic, fiscal, and institutional factors. This synthesis enriches our understanding of the dynamics between BSFs and GFB, fostering a comprehensive perspective on these fiscal mechanisms.

**Table 5. Summary of Hypotheses**

The Effects of BSF Structural Features on BSF Levels

| | *Independent variables* | *Hypothesis* | *a. Recession* |
|---|---|---|---|
| H1 | **High stringency of deposit requirements** | Positive | Less Positive |
| | Source | | |
| | Cap | | |
| | Deposit by revenue surplus | | |
| | Deposit tied to volatility (formula) | | |
| H2 | **High stringency of withdrawal requirements** | Positive | Negative |
| | Withdrawal tied to volatility | | |
| | Withdrawal by revenue shortfall | | |
| H3 | **High stringency of withdrawal restrictions** | Positive | Positive |
| | Withdrawal limit | | |
| | Repayment provision | | |
| H4 | **Unreserved General Fund balance (GFB)** | Positive | Positive |

The Effects of BSF Structural Features on GFB Levels

| | *Independent variables* | *Hypothesis* | *a. Recession* |
|---|---|---|---|
| H5 | **High stringency of deposit requirements** | Negative | Less Negative |
| | Source | | |
| | Cap | | |
| | Deposit by revenue surplus | | |
| | Deposit tied to volatility (formula) | | |
| H6 | **High stringency of withdrawal requirements** | Negative | Less Negative |
| | Withdrawal tied to volatility | | |
| | Withdrawal by revenue shortfall | | |
| H7 | **High stringency of withdrawal restrictions** | Negative | More Negative |
| | Withdrawal limit | | |
| | Repayment provision | | |
| H8 | **Budget Stabilization Fund balance (BSF)** | Positive | Positive |

## 4.2 Hypotheses

### *4.2.1 The Impact of BSF Deposit and Withdrawal Requirements on BSF Levels*

Drawing from the principles of New Institutional Economics (NIE), I hypothesize that the stringency of rules governing the deposit and withdrawal processes of the BSF serves to bolster the levels of BSF balances. This hypothesis is based on the premise that stringent regulations act as a deterrent against unnecessary spending from the fund. This hypothesis draws on insights from Section 3.1.1, which underscores the pivotal role of deposit and withdrawal rules in shaping the behavior and outcomes of budgetary stabilization mechanisms. By imposing barriers to both deposit and withdrawal, such rules are expected to foster discipline among policymakers and administrators, discouraging the use of BSF resources for short-term or political purposes (Hou & Moynihan, 2008).

Thus, they promote the accumulation of reserves within the BSF, thereby enhancing its capacity to mitigate economic downturns and unforeseen fiscal shocks effectively. This relationship between stringent BSF rules and size is expected to strengthen during boom years when states have the resources to augment the size of the BSF. In contrast, the association between stringent BSF deposit rules and balance levels tends to weaken in bust years, coinciding with revenue shortfalls experienced by most states. As outlined in Section 2.3, the stringency of BSF rules is a function of the degree of obligation (e.g., savings requirements, spending conditions, and restrictions on withdrawal) and precision.

The hypotheses regarding the effects of deposit and withdrawal requirements on BSF balance levels are constructed based on these stringency attributes. For instance, “funding source” is deemed to have high stringency, discussed in Section 2.4.1, because it specifies the funding source (precision) and links BSF deposit to a specific tax with revenue-generating capacity (obligation). “Deposit tied to revenue volatility” compels states to save general

funds during boom years (obligation). The "formula of the deposit tied to revenue volatility" precisely defines the terms of savings to prevent states from wasting their general fund surplus (precision). A higher "cap" level sets a more ambitious target for savings obligation than a lower cap level, as discussed in 2.4.7.

Deposit by executive, deposit by legislature, and deposit in other ways are classified as having low stringency of deposit requirements. As discussed in Sections 2.4.2 and 2.4.3, neither "deposit by executive" nor "deposit by legislature" holds the aforementioned attributes of stringency, as they do not require states to save revenue surplus or certain portions of revenue towards savings. Similarly, "deposit in other ways" does not enforce states to save undesignated general fund balance above thresholds (minimum required amount). In boom years, minimum deposit requirements may exhibit a "floor effect," potentially reaching the threshold level (Hou, 2004). However, if states' BSFs already exceed the thresholds, they will not need to deposit money into BSFs; thus, the minimum deposit requirements will not significantly increase BSF balance levels. Consequently, the business cycle (boom or bust) makes, at best, a marginal change in BSF balance levels for BSFs characterized by weak deposit requirements.

In summary, it is expected that stringent BSF deposit requirements, including i) source, ii) deposit by revenue surplus, iii) deposit tied to revenue volatility, and iv) high cap, lead to higher BSF balance levels. The positive effects of deposit requirements on BSF balances are anticipated to be more pronounced in boom years when revenue surpluses are likely to occur; thus, states can afford to save the funds. In lean years, where revenue tends to decrease while spending needs for public services increase, resulting in a decrease in BSF balance levels. Given budget deficits, states are unable to save their funds; therefore, deposit requirements may not have significant effects during recession years.

**H1.** A high stringency in deposit requirements, which obliges states to save more, has a *positive* impact on BSF balance levels as a percent of General Fund expenditures.

a. The magnitude of the effect in H1 becomes *smaller (less positive or insignificant)* during recession years.

Like stringent deposit requirements, the magnitude and significance of the effects of withdrawal requirements on BSF balances depend on their stringency. Weak withdrawal requirements do not strictly restrict states from using their BSFs in terms of withdrawal terms and amounts. For example, both "withdrawal by executive decision" and "withdrawal by legislative appropriation" are not stringent due to the lack of precision in terms of conditions for withdrawal from BSFs as discussed in 2.4.2 and 2.4.3, respectively. The lack of precision allows public officials or politicians to access their BSFs and use them for political purposes. Thus, it cannot fend off spending pressure regardless of business cycle, thereby reducing BSF balances.

Stringent withdrawal requirements make it challenging for states to use their BSFs during boom years, while allowing withdrawals when budget deficits occur in recession years. For instance, "withdrawal tied to revenue volatility" or "withdrawal by revenue shortfall" permits withdrawals from the BSF only when there is a decrease in revenue, computed by a formula. Conversely, it is expected that these variables will exert a *positive impact* on BSF balances in periods of economic boom. However, they have a *negative impact* on BSF balances in recession years when withdrawals from BSF are needed to cover budget deficits.

It is worth noting that a high stringency of withdrawal requirements contributes to BSF balance levels as it helps reduce the amount of decrease in BSF balance levels compared

to low stringency of withdrawal requirements especially in boom years. For this reason, this study aims to compare the magnitude of the effect of high stringency of withdrawal requirements to that of low stringency of withdrawal requirements. In boom years, a low stringency of withdrawal requirements is expected to reduce BSF balance levels than a high stringency of withdrawal requirements.

**H2.** A high stringency of withdrawal requirements has a *positive* impact on BSF balance levels as a percent of General Fund expenditures.

a. The effect in H2 becomes *negative* during recession years, allowing states to access their BSFs only when budget deficits occur.

A high level of stringency in withdrawal restrictions is expected to mitigate the negative impact of BSF withdrawal requirements, by limiting the amount of money that can be withdrawn from BSFs. Thus, "withdrawal limit" is expected to have a positive impact on BSF balance levels, even during periods of economic recession. This stands in contrast to withdrawal requirements that permit states to access their BSFs during periods of economic downturn. In other words, the difference between withdrawal restrictions and withdrawal requirements stems from their distinct effects during times of fiscal stress.

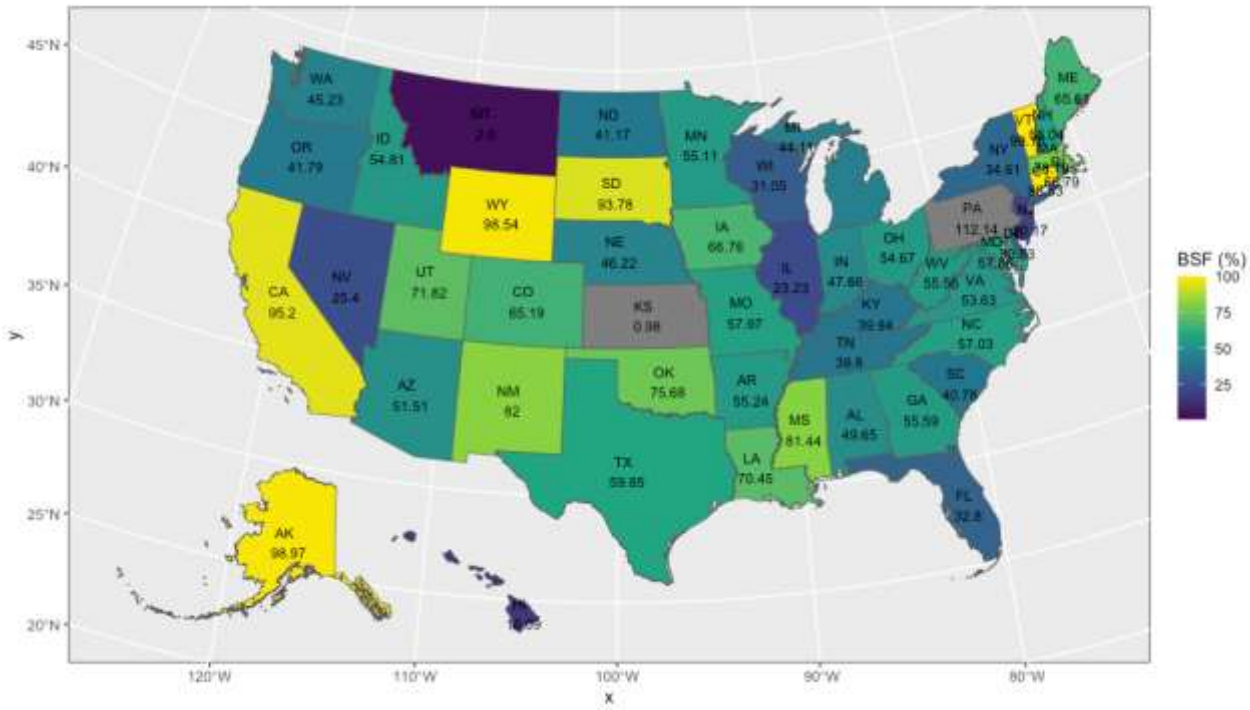
Specifically, stringent withdrawal requirements (e.g., withdrawal by revenue shortfall and withdrawal tied to revenue volatility) are expected to negatively affect BSF levels, as they permit states to use their BSFs to offset budget deficits. Conversely, withdrawal restrictions are expected to yield positive effects on BSF levels by limiting BSF use even amidst economic downturns.

"Repayment provision" can be regarded as both stringent deposit requirements and withdrawal restrictions. It entails precision by specifying the deadline for repayment and imposes an obligation to return borrowed funds. However, mandating repayment within a short timeframe causes states to hesitate in utilizing their BSFs, given the challenge of repaying within such a limited period. Therefore, it functions as a restriction on withdrawals, leading to the expectation that stringent repayment provisions also contribute positively to BSF balance levels.

**H3.** A high stringency of withdrawal restrictions has a *positive* impact on BSF balance levels as a percent of General Fund expenditures.

a. The effect in H3 remains *positive* even during recession years.

**Figure 2. BSF Balances as a Share of Total Balances**




Source: The author created a map, using data on BSF and total balances obtained from NASBO.

Besides Budget Stabilization Funds (BSFs), unreserved General Fund balances (GFBs) also provide another important source of emergency funds to stabilize a state's budget. Figure 2 shows the historical average for BSF balance levels as a share of total balances from 2000 to 2020. In yellow states, including Alaska, Connecticut, California, South Dakota, Vermont, and Wyoming, BSF balances account for more than 90 percent of total balances, which is the sum of BSF and GFB levels. Meanwhile, BSFs in Delaware, Hawaii, Illinois, Kansas, Montana, Nevada, and New Jersey account for less than (or equal to) 30 percent of the total balances. The variation in states' reliance on BSFs (or GFBs) suggests that some states rely more on GFBs than BSFs to finance expenditures. As states have different reliance on their BSFs (or GFBs), it is necessary to control for GFBs when examining the effects of BSF rules on BSF balance levels.[44]

Literature on the effect of GFB on BSF levels is limited. While studies on substitution and supplementation effects offer insights into the relationship between BSF and GFB, they mainly focus on the impact of BSF on the overall balance (BSF plus GFB). For instance, empirically testing for substitution and supplementation effects requires utilizing the total balance as the dependent variable, as demonstrated in prior studies (Buerger et al., 2022; Hou & Brewer, 2010; Knight & Levinson, 1999).

The fiscal slack model, which focuses on organizational responses to both internal and external environmental changes, also provides valuable insights into the dynamics between BSF and GFB. During periods of fiscal stress, which are external environmental factors, states face budget deficits rather than general fund surpluses. Consequently, they

[44]Theoretically, a supplementation effect suggests a positive relationship between BSF and GFB, emphasizing BSF's role in boosting total savings. Conversely, a substitution effect posits that GFB is replaced by BSF, leading to no increase in total savings. Both effects focus on BSF's impact on total savings, treating it as a predictor of balances. However, these effects are not utilized in hypotheses 1-4, which treat GFB as an independent or control variable for predicting BSF levels.

need to utilize their BSFs, leading to a reduction in BSF levels. Conversely, in times of budget surplus, state governments do not need to use the BSF. Instead, they can allocate surplus revenue to the BSF. During economic booms, states often experience higher levels of both BSF and GFB as they are less likely to draw from either fund. Thus, a positive correlation between BSF and GFB is hypothesized, although this does not necessarily imply a causal relationship.

**H4.** GFB levels are *positively* associated with BSF levels, as both BSF and GFB levels increase in boom years and decrease in recession years.

### *4.2.2 The Impact of BSF Deposit and Withdrawal Requirements on GFB Levels*

Although GFB is also crucial savings tool, it is little known whether BSF structural features affect GFB levels as most studies focus on the relationship between BSF characteristics and BSF balance levels. Unlike BSF balance levels, which are improved by stringent BSF deposit and withdrawal requirements, a high stringency in deposit and withdrawal requirement is expected to decrease GFB levels. Under relatively stringent deposit rules like "deposit revenue surplus," for example, general fund surplus must be transferred to a state's BSF, so this surplus no longer remains in the General Fund account, thereby reducing GFB levels.

In contrast, weak deposit requirements, including "deposit by executive" and "deposit by legislative appropriation," do not require transferring general fund surplus to BSF. Thus, the general fund surplus is more likely to remain in the General Fund account. In lean years, revenue tends to decrease whereas spending needs for public services increase, so revenue

surplus rarely occurs. Therefore, deposit requirements may not have significant effects during recession years.

**H5.** A high stringency of deposit requirements has a *negative* impact on GFB levels as a percent of General Fund expenditures.

a. The magnitude of the effect in H5 becomes *less negative (or insignificant)* during recession years.

Similarly, strict withdrawal requirements make it difficult for states to use BSF, especially during boom years, so states with strict withdrawal requirements may need to use GFB instead. Therefore, strict withdrawal requirements, such as “withdrawal tied to revenue volatility,” are expected to decrease GFB levels. However, the impact of stringent withdrawal rules on GFB levels during recession years is less negative or even insignificant, as these rules enable states to utilize their BSF during economic downturns to alleviate fiscal stress.

In contrast, weak withdrawal requirements, such as "withdrawal by executive decision" and "withdrawal by legislative appropriation," allow states to use BSF more easily than stringent withdrawal requirements, thereby reducing their reliance on GFB, especially when states maintain sufficient BSF levels. However, states with lenient withdrawal requirements coupled with lax deposit rules are prone to maintaining inadequate BSF levels, rendering them less dependent on BSF funds. Therefore, the impact of the low stringency of BSF withdrawal requirements on GFB is contingent upon BSF levels. This study focuses on the high stringency of deposit and withdrawal rules concerning BSF and GFB because understanding these rules provides insights into how states manage their reserves and fiscal stress, highlighting the importance of stringent rules in maintaining fiscal stability.

**H6.** A high stringency of withdrawal requirements has a *negative* impact on GFB levels as a percent of General Fund expenditures.

b. The magnitude of the effect in H6 becomes *less negative (or insignificant)* during recession years.

Unlike strict withdrawal rules (e.g., withdrawal tied to revenue volatility), strict withdrawal restrictions (e.g., spending limits, repayment provision) create obstacles for states in accessing the BSF, even in times of economic recession. Thus, states with strict withdrawal restrictions may make states rely more on GFB instead, thereby decreasing GFB levels. The negative impact of stringent withdrawal restrictions on GFB levels is expected to be stronger during recession years. This is attributed to the increased financial requirements of states to address fiscal stress during economic downturns, coupled with limited access to BSF due to withdrawal restrictions. Thus, states find themselves compelled to rely on GFB levels to offset budget deficits.

**H7.** A high stringency of withdrawal restrictions has a *negative* impact on GFB levels as a percent of General Fund expenditures.

a. The magnitude of the effect in H7 becomes *more negative* during recession years.

As I mentioned before, the substitution and supplementation effects attempt to explain the relationship between BSF and GFB. A substitution effect implies that a rise in BSF leads to a decline in GFB (Hou & Brewer, 2010). In contrast, a supplementation effect assumes that BSF increases the overall level of total savings, as the legal restrictions of BSFs enable states to mitigate spending pressures (Hou & Brewer, 2010; Knight & Levinson, 1999). However, a

supplementation effect does not necessarily mean an increase in GFB because an increase in BSF alone can boost total savings without an increase in GFB. Thus, it is difficult to predict the effect of BSF on GFB levels from the supplementation effect.

Based on the substitution effect, it is expected that BSF levels exert a negative influence on GFB levels. This occurs because the BSF account simply replaces the General Fund account; consequently, an increase in BSF levels leads to a decrease in GFB levels. However, the relationship between BSF and GFB may be contingent upon the fiscal condition of state governments. During recession periods, revenues tend to diminish, resulting in a decrease in the amount of money deposited into BSF. Similarly, GFB levels also decrease as budget deficits are more likely to occur during recession years.

In contrast, during boom years, revenues are more likely to increase, leading to a rise in BSF levels. GFB levels also increase as budget surpluses are more likely to occur during booms. In this scenario, a positive association between BSF and GFB levels is hypothesized. However, this association does not imply a causal effect of BSF levels on GFB.

**H8.** BSF levels are *positively* associated with GFB levels, as both BSF and GFB levels increase in boom years and decrease in recession years.

**Table 6. Operationalization of Variables and Data Source**

| Variable | Measure | Data Source |
|---|---|---|
| BSF | Budget Stabilization Fund balance calculated as a % of general fund expenditures | NASBO Fiscal Survey of States |
| GFB | Unreserved General Fund balance calculated as a % of general fund expenditures | NASBO Fiscal Survey of States |
| $BSF_{(t-1)}$ | Lagged Budget Stabilization Fund balance calculated as a % of general fund expenditures | NASBO Fiscal Survey of States |
| $GFB_{(t-1)}$ | Lagged unreserved General Fund balance calculated as a % of general fund expenditures | NASBO Fiscal Survey of States |
| Deposit | Vector of binary BSF deposit requirements | State statutes or constitutions |
| Withdrawal | Vector of binary BSF withdrawal requirements | State statutes or constitutions |
| Restriction | Vector of statutory BSF withdrawal restrictions | State statutes or constitutions |
| Number | Number of BSF that a state operates | State statutes or constitutions |
| Disasters | The costs of natural disasters, measured in million dollars, incurred by states | NCEI |
| Unemployment | Unemployment rates for U.S. States are expressed as a percentage of the labor force | Bureau of Labor Statistics |
| GSP | Gross State Product that estimates the total value of goods and services produced within a state | Bureau of Economic Analysis |
| Federal IGR | Total intergovernmental revenue received from Federal governments/state population | State Government Finance series. |
| Debt per capita | Total outstanding debt/State population | State Government Finances series. |
| Credit | Credit ratings, converted into a numerical scale from 0 to 5: BBB = 0, A = 1, AA- = 2, AA = 3, AA+ = 4, AAA = 5 | Ballotpedia |
| Election | Gubernatorial election years, measured by a dummy variable: 1 for an election year and 0 otherwise | Book of the States |
| Partisanship | Political partisanship, measured on a scale from 1 to 5: 1 = more than 80 % of the Republican party, 5 = more than 80 % of the Democratic party | Book of the States |
| Division | Divided government, measured by a dummy variable: 1 for different party affiliation between a governor and the majority in legislature and 0 otherwise | Book of the States |
| BBR | Budget balancing requirements, measured by a dummy variable: 1 for a state that cannot carry over deficits into the next fiscal year and 0 otherwise | Book of the States |
| TEL | Stringency index of state TELs, developed by Amiel et al. (2014), ranges from 0 (no TEL) to 33 (most restrictive). | Amiel et al. (2014) |
| Population | Population in the natural log form | Statistical Abstract of the US series |
| Personal income | Per capita personal income (in thousands) | Bureau of Economic Analysis |

**Table 7. Descriptive Statistics**

| Variable | N | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| BSF_percent | 817 | 5.1 | 5 | 0 | 33 |
| GFB_percent | 817 | 5.5 | 6.8 | -7.8 | 60 |
| Number | 817 | 0.18 | 0.38 | 0 | 1 |
| Source_percent | 817 | 0.11 | 0.6 | 0 | 7.2 |
| Cap_percent | 817 | 10 | 14 | 0 | 100 |
| DepoExec | 817 | 0.56 | 0.5 | 0 | 1 |
| DepoLegis | 817 | 0.38 | 0.49 | 0 | 1 |
| DepoSurplus_numeric | 817 | 0.43 | 0.41 | 0 | 1 |
| DepoVol_formula | 817 | 0.098 | 0.3 | 0 | 1 |
| DepoVol_propor | 817 | 0.18 | 0.39 | 0 | 1 |
| WithExec | 817 | 0.45 | 0.5 | 0 | 1 |
| WithLegis_numeric | 817 | 0.44 | 0.24 | 0 | 0.67 |
| WithShortfall | 817 | 0.82 | 0.38 | 0 | 1 |
| WithVol | 817 | 0.14 | 0.35 | 0 | 1 |
| WithLim | 817 | 0.24 | 0.43 | 0 | 1 |
| Repay_4bin | 817 | 0.82 | 1.4 | 0 | 4 |
| Disasters (million dollars) | 817 | 0.16 | 0.72 | 0 | 15 |
| Debt per capita | 817 | 3.6 | 2.2 | 0.6 | 12 |
| Fed IGR | 817 | 1.8 | 0.6 | 0.59 | 5.5 |
| Unemployment | 817 | 5.7 | 2.1 | 2.2 | 14 |
| Credit rating | 813 | 3.9 | 0.88 | 0 | 5 |
| GSP | 817 | 1.5 | 2.7 | -11 | 22 |
| Income (million) | 817 | 0.043 | 0.0099 | 0.023 | 0.079 |
| Population (million) | 817 | 6.8 | 7.2 | 0.62 | 39 |
| Election | 817 | 0.27 | 0.44 | 0 | 1 |
| Democrat share | 817 | 0.49 | 0.17 | 0.11 | 0.93 |
| Division | 817 | 0.33 | 0.47 | 0 | 1 |
| TEL | 817 | 9.4 | 8.4 | 0 | 28 |
| BBR | 817 | 0.76 | 0.42 | 0 | 1 |

Note: Alaska, Alabama, Colorado, Kansas, Montana, Oregon, and Wyoming, are excluded from the Dataset.

# 5. DATA AND MEASURES

This chapter provides an overview of the data collection methods employed, as well as the operational definitions of the dependent, independent, and control variables utilized in the quantitative analyses. I collected comprehensive data on state governments' Budget Stabilization Funds policies from 2000 to 2020. This involved a careful examination of the language, provisions, and amendments related to BSFs as outlined in state legislative documents. Additionally, I cross-referenced BSF statutes with states' Annual Comprehensive Financial Reports (ACFRs), and relevant news articles to verify my coding and gain insights into their practical implementation. Appendix on page 174 provides a summary of changes in BSF rules from 2000 to 2020, based on the collected data.

Table 6 displays the operationalization and data sources for the variables used in the forthcoming quantitative analysis. Descriptive statistics of that same data can be found in Table 7. Section 5.1 delves into our primary independent variables, specifically BSF rules, alongside the dependent variables encompassing BSF levels and GFB levels. Section 5.2 introduces control variables to be incorporated into regression models. Section 5.2 begins by presenting measures of economic conditions, such as unemployment rates and Gross State Product (GSP). Following that, it elaborates on variables impacting fiscal conditions, including federal funds, debt per capita, and the costs of disasters experienced by states. The next part describes three variables, including gubernatorial election years, political partisanship, and divided government, used to capture the effects of state politics. Subsequently, fiscal institutions are discussed. The final part incorporates sociodemographic factors, such as population and personal income.

### 5.1 Independent and Dependent Variables

As discussed in Chapter 4. Conceptual Framework, the study uses two dependent variables: Budget Stabilization Fund (BSF) levels and General Fund Balance (GFB) levels. The size of BSF is determined by its total balance, calculated as a percentage of general fund expenditures. Similarly, the size of GFB is determined by its total balance, calculated as a percentage of general fund expenditures. This data is obtained from the Pew Charitable Trusts (2022). As outlined in Chapter 2, our main independent variables revolve around the structural attributes of the BSF.

As discussed in Chapter 2, the cap on BSF deposit and the source of funding are expressed as percentages of general fund expenditures. The deposit from revenue surplus is calculated as a percentage of the general fund surplus, whereas withdrawal by the legislature is articulated as a fraction of the total number of votes. The repayment terms are divided into four groups based on the duration required for reimbursement. Other variables, such as number, deposit by legislature, deposit tied to revenue volatility, withdrawal based on shortfall, and withdrawal tied to revenue volatility, are coded as binary variables due to the challenge of expressing them numerically.

**Table 8. Correlation Coefficients**

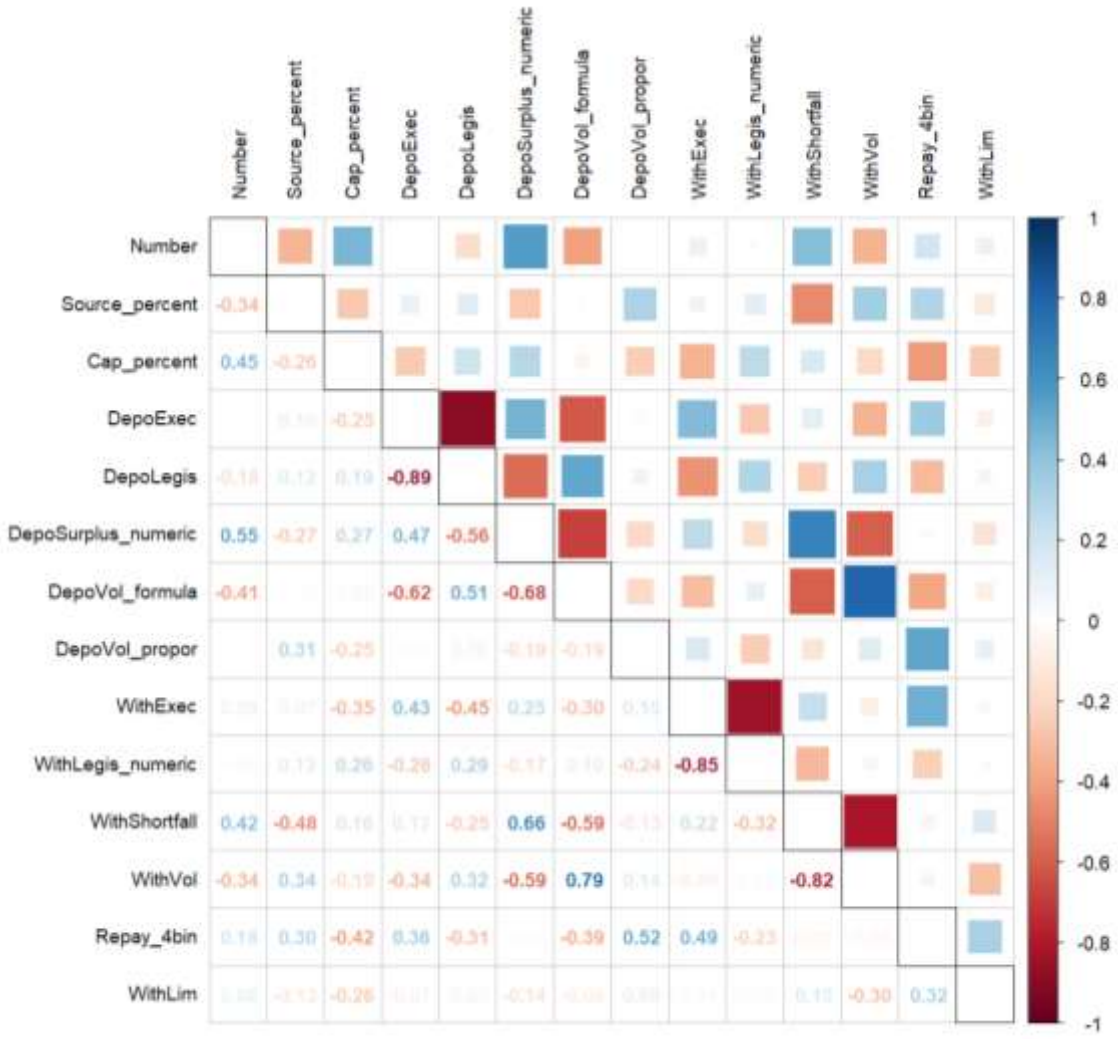



Table 8 illustrates the correlation coefficients among various BSF structural attributes. The purpose of Table 8 is to reduce the number of BSF rules, by consolidating highly correlated ones to mitigate the issue of multicollinearity. Notably, the correlation coefficient between "deposits tied to revenue volatility, using formula (DepoVol_formula)" and "withdrawals tied to revenue volatility (WithVol)" stands at 0.79, signifying the highest correlation observed. In essence, this indicates that states that opt to link their BSF deposits to revenue or economic volatility also tend to establish a similar linkage for withdrawals.

“Deposit revenue surplus (DepoSurplus_numeric)” is strongly positively correlated with “withdrawals based on revenue shortfalls (WithShortfall),” with a correlation coefficient of 0.66. This suggests that states, requiring saving an excess of revenue, also tend to enact the requirement for withdrawal based on budget deficit.

The variables “deposit by legislature (DepoLegis)” and “deposit by executive (DepoExec)” exhibit a substantial negative correlation, denoted by a correlation coefficient of -0.89. Given their dummy nature, this correlation suggests a strong tendency for instances where one variable is represented to coincide with the absence of the other, and vice versa, in the dataset. Consequently, including “deposit by executive” in regression models may lead to multicollinearity concerns or biased coefficient estimates due to its pronounced negative correlation with “deposit by legislature.” Thus, “deposit by executive” will be dropped from the regression analysis to ensure robust model estimation.

The dummy variable “withdrawal by executive (WithExec)” exhibits a robust negative correlation with the numeric variable representing “withdrawal by legislatures (WithLegis),” with a correlation coefficient of -0.85. This indicates a consistent inverse relationship between executive withdrawals and legislative withdrawals in the dataset. Given the pronounced negative correlation, including “withdrawal by executive” in regression models may introduce multicollinearity concerns. Consequently, to ensure accurate and robust model estimation, “withdrawal by executive” will be excluded from the regression analysis.

A positive correlation of 0.52 exists between “repayment provision (Repay_4bin)” and “deposit tied to revenue volatility (DepoVol_propor).” This suggests that states with deposit tied to revenue volatility tend to have provisions mandating the repayment of borrowed funds into BSF.

## 5.2 Control Variables

This study utilizes unemployment rates to assess the economic conditions or recessions in U.S. states. Unemployment rates, sourced from the Bureau of Labor Statistics, are expressed as a percentage of the labor force. Unemployment rates are a better measure of economic conditions in U.S. states compared to using a dummy variable for recession. Unemployment rates provide a continuous and nuanced measure, capturing the severity of economic conditions by reflecting the proportion of the labor force that is unemployed and actively seeking work. In other words, they are highly sensitive to economic cycles, rising during recessions and falling during periods of growth. This responsiveness makes them an effective measure for tracking economic performance over time.

Gross State Product (GSP) estimates the "total value of goods and services produced within a state" and is sourced from the Bureau of Economic Analysis.[45] GSP can effectively supplement the unemployment rate as a measure of economic conditions for U.S. states. The unemployment rate highlights labor market challenges, while GSP reveals the level of economic activity and production. Moreover, GSP data can help identify structural economic changes and trends over time, complementing the more immediate labor market information provided by unemployment rates. This combination of GSP and unemployment rates allows for a nuanced and holistic assessment of economic conditions, providing valuable insights for both economic analysis and policy formulation.

Fiscal conditions, which may affect BSF and GFB, include debt per capita, federal grants, and disaster. To control for the impact of public debt on fiscal reserves, the variable of debt per capita, taken from the State Government Finance series and U.S. Census, is included

[45] U.S. Bureau of Economic Analysis. (2024). Gross Domestic Product by State. Retrieved from https://www.bea.gov/data/gdp/gdp-state.

in the models. The study uses intergovernmental revenue (IGR) per capita, “amounts received from Federal governments” (e.g., grants and shared taxes) divided by state population (Pierson et al., 2015).

The variable of disaster damages is included in our models to gauge a state's experience with disasters. Data regarding disaster damages is sourced from the National Centers for Environmental Information (NCEI), which covers various types of natural disasters (e.g., hurricanes, tornadoes, storms, snow, drought, floods, lightning, etc.). This data includes the costs of disasters that occurred in specific states and associated damage estimates, such as expenses like property damage and healthcare and lost productivity.

As discussed in Chapter 4, politics is critical to understanding state government’s spending behavior (Poterba, 1994; Alt & Lowry, 1994, 2000; Hou, 2003). The political factor is divided into three categories: 1) gubernatorial election years, 2) political partisanship, and 3) divided government. The "election year" variable is a dummy variable that equals 1 during an election year in state *i* in year *t*, and 0 otherwise. Data on election years is obtained from the Book of States.

To measure legislative party control of state government, I use a ranking scale of 1 to 5 where 1 indicates the dominance of the Republican party (more than 80%) and 5 reflects the dominance of the Democratic party (more than 80%) in the state’s governorship and legislative chambers (Pallay, 2013). The "Book of the States" series furnishes information on the party affiliations of legislators and governors. To assess divided government between the executive and legislative branches, a dummy variable is employed, where a value of 1 signifies distinct party affiliations between the governor and the legislative majority, and 0 otherwise.

The stringency of BBRs varies across states: some states allow to carry over deficits into the next fiscal year, while others do not (Hou, 2003). Deficit carryover restrictions are deemed the strictest requirement that reduce budget deficits, leading to higher general fund balances (Hou & Smith, 2006). BBR is a binary variable that equals 1 if a state cannot carry deficits into the next fiscal year, and 0 otherwise (Hou & Smith, 2006). The Book of the States presents the data on BBR. The variable of TEL represents the stringency of state-level TELs, developed by Amiel et al. (2014). The stringency index of TELs is measured on a scale from 0 to 33, with zero indicating no TEL, and 33 representing the most restrictive (Amiel et al., 2014; Kallen, 2017).

Sociodemographic variables, such as personal income and population change, are used in the empirical analysis because they reflect demand for public services and affect tax revenues and spending needs (Poterba, 1994). The population may positively influence total expenditures, as state governments offer public services to their residents. Per capita personal income reflects a state's wealth and economic activity, thus positively correlating with tax revenues and BSF balances. Population data is sourced from the Statistical Abstract of the United States series, while per capita personal income data is extracted from the Bureau of Economic Analysis database.

# 6. QUANTITATIVE ANALYSIS

As discussed earlier, the study aims to conceptualize BSF rule stringency and investigate the effects of BSF rules on BSF and GFB levels. To estimate the impact of BSF rules on the size of BSF, the study starts with Ordinary Least Squares regression (OLS). However, significant deviations from constant error variance and non-normality of residuals were identified in all OLS models ($p < .001$). To address heteroscedasticity and non-normality of residuals, I implement Panel Data Fixed Effects Models with robust standard errors. These models account for individual-specific or time-specific effects that may contribute to these issues. Details will be provided in the following section.

The dataset includes 44 states spanning fiscal years 2002 through 2020, encompassing national recessions experienced over the last two decades. The state of Alaska and the state of Wyoming are removed from the data set because their budget stabilization funds are too large to be compared to the BSFs in other states. From 2002 to 2020, the average BSF balance for the 50 states is four percent of general fund expenditures (Choi, 2022). In comparison, Alaska and Wyoming boast average BSF balances of 122.7 percent and 50.0 percent, respectively (Choi, 2022).

Kansas and Montana recently established their BSFs, thus I remove them from the dataset. I also do not include the state of Oregon in the data set since the state established its Rainy Day Fund for general purpose in 2007. The state of Colorado does not have an official BSF although it has a “required reserve” (NCSL, 2018). Thus, the state of Colorado is also excluded from the data set.

### 6.1 Panel Data Analysis

To examine all hypotheses explained in Chapter 4, fixed-effects models for panel data are used for this study. The main advantage of fixed-effects estimations is the control of omitted variable bias due to unobserved heterogeneity when this heterogeneity is constant over time (Hill et al., 2020). In the fixed-effects models, the unobserved heterogeneity can be eliminated from the data through "differencing, subtracting the group-level average over time" (Wooldridge, 2013). The key independent variables are BSF structural features, and the dependent variables include the levels of BSF and GFB. The models are specified to include fixed effects to control for year- and state-specific fixed effects. The plm package in R is used for model estimation.

To determine whether to employ fixed effects or random effects, a Hausman test was conducted. The null hypothesis proposes that the preferred model is the random effects model, while the alternative hypothesis suggests a preference for the fixed effects model (Greene, 2012) The purpose of the Hausman test is to examine whether the unique errors ($u_i$) in a model are correlated with the regressors (Torres-Reyna, 2014). If the p-value from the test is statistically significant ($p < 0.05$), it suggests that the fixed effects model is preferred. The results of the Hausman test indicate a significant p-value ($p < 0.01$), providing justification for selecting the fixed effects model.

### *6.1.1. Fixed-Effects Model Specification*

***Panel data regression***

$$BSF_{it} = \beta_1 GFB_{it-1} + \beta_2 Deposit_{it} + \beta_3 Withdrawal_{it} + \beta_4 Restriction_{it} + \beta_5 Number_{it} + \beta_6 Economic\ Conditions_{it} + \delta_1 w_{it} + \alpha_i + \gamma_t + \varepsilon_{it} \quad (1)$$

$$GFB_{it} = \beta_1 BSF_{it-1} + \beta_2 Deposit_{it} + \beta_3 Withdrawal_{it} + \beta_4 Restriction_{it} + \beta_5 Number_{it} + \beta_6 Economic\ Conditions_{it} + \delta_1 w_{it} + \alpha_i + \gamma_t + \varepsilon_{it} \quad (2)$$

In the fixed-effects models expressed as equations 1 and 2, the left-hand side variables indicate the measures of BSF and GFB size of the state *i* in year *t*, respectively. Specifically, the size of BSF is measured by the total dollar balance of BSF calculated as a percent of general fund expenditures in equation 1. The size of GFB is measured by the total dollar balance of GFB calculated as a percent of general fund expenditures in equation 2.

The right-hand side variables include the key independent variables, such as structural features, lagged BSF and lagged GFB levels. Deposit refers to a vector of deposit requirements. Withdrawal indicates a vector of withdrawal requirements. Restriction denotes a vector of withdrawal restrictions. Number represents a number of BSF that a state has. Economic conditions capture the periods and degree of the fiscal stress that a state had faced. $w_{it}$ is a column vector of control variables. $\alpha_i$ and $\gamma_t$ are the state- and year-fixed effects to control for i) time-invariant state-specific effects and ii) aggregate cross-sectional effects at the national level, respectively. $\varepsilon_{it}$ is a random disturbance.

## Table 9. Fixed Effects Models

## The Effects of BSF Structures on BSF Levels

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| GFB_percent_lag | 0.18 (0.05)*** | 0.19 (0.05)*** | 0.19 (0.05)*** | 0.19 (0.05)*** |
| Number | 1.54 (1.75) | 1.27 (2.10) | 2.05 (2.63) | 1.31 (1.72) |
| Source_percent | -0.01 (0.27) | -0.84 (0.49)* | -1.03 (0.51)** | -1.06 (0.50)** |
| Cap_percent | 0.35 (0.15)** | 0.34 (0.16)** | 0.39 (0.15)*** | 0.35 (0.15)** |
| DepoLegis | 1.53 (1.77) | 1.44 (1.91) | 0.21 (1.76) | 0.47 (1.82) |
| DepoSurplus_numeric | 3.00 (1.60)* | 4.51 (2.03)** | 0.39 (1.40) | 0.60 (1.43) |
| DepoVol_formula | 3.74 (2.15)* | 6.19 (3.10)** | 9.69 (5.31)* | 3.64 (2.06)* |
| DepoVol_propor | -1.34 (1.38) | -1.61 (1.86) | -2.47 (1.31)* | -2.05 (1.27) |
| WithLegis_numeric | 4.94 (3.74) | 3.63 (4.20) | 5.43 (4.24) | 4.12 (3.61) |
| WithShortfall | -3.02 (1.62)* | -3.02 (1.94) | -2.33 (1.69) | -2.13 (1.47) |
| WithVol | -1.93 (1.32) | -3.62 (2.63) | -2.64 (1.48)* | -2.04 (1.32) |
| Repay_4bin | -0.21 (0.23) | -0.93 (0.39)** | -1.10 (0.34)*** | -1.13 (0.33)*** |
| WithLim | 1.39 (0.75)* | 0.96 (1.07) | 0.82 (0.85) | 1.00 (0.80) |
| Disasters | 0.31 (0.11)*** | 0.38 (0.11)*** | 0.37 (0.10)*** | 0.38 (0.10)*** |
| Fed_IGR | 1.14 (0.66)* | 1.26 (0.69)* | 0.97 (0.62) | 1.03 (0.64) |
| Debt_per_capita | -0.09 (0.34) | -0.03 (0.34) | -0.01 (0.32) | -0.07 (0.33) |
| GSP | -0.01 (0.07) | -0.02 (0.06) | -0.02 (0.06) | -0.02 (0.06) |
| Unemployment | -0.96 (0.17)*** | -1.12 (0.33)*** | -1.04 (0.16)*** | -1.04 (0.16)*** |
| Credit_rating | 0.72 (0.25)*** | 0.69 (0.26)*** | 0.71 (0.24)*** | 0.75 (0.25)*** |
| Income_thousands | -0.04 (0.11) | -0.04 (0.11) | -0.05 (0.10) | -0.04 (0.10) |
| Population_million | 1.21 (0.66)* | 1.32 (0.68)* | 1.23 (0.72)* | 1.24 (0.69)* |
| TEL | -0.12 (0.08)* | -0.13 (0.08) | -0.11 (0.07) | -0.10 (0.07) |
| BBR | -0.49 (0.65) | 0.16 (0.64) | -0.13 (0.59) | -0.08 (0.60) |
| Election | -0.03 (0.19) | 0.00 (0.19) | 0.03 (0.19) | 0.02 (0.19) |
| Democrat_share | 1.02 (1.91) | 1.08 (1.98) | 1.88 (1.79) | 1.40 (1.91) |
| Division | 0.39 (0.36) | 0.26 (0.37) | 0.32 (0.36) | 0.31 (0.36) |
| Number:Unemployment | | 0.05 (0.14) | | |
| Source_percent:Unemployment | | 0.16 (0.06)** | 0.20 (0.06)*** | 0.20 (0.06)*** |
| Cap_percent:Unemployment | | 0.00 (0.00) | | |
| DepoSurplus_numeric:Unemployment | | -0.29 (0.22) | | |
| DepoVol_formula:Unemployment | | -0.38 (0.27) | | |
| DepoVol_propor:Unemployment | | 0.04 (0.15) | | |
| WithLegis_numeric:Unemployment | | 0.25 (0.40) | | |
| WithShortfall:Unemployment | | 0.02 (0.19) | | |
| WithVol:Unemployment | | 0.20 (0.22) | | |
| Repay_4bin:Unemployment | | 0.11 (0.04)*** | 0.14 (0.03)*** | 0.14 (0.03)*** |
| WithLim:Unemployment | | 0.02 (0.14) | | |
| Cap_percent:DepoSurplus_numeric | | | 0.09 (0.01)*** | 0.09 (0.01)*** |
| Cap_percent:DepoVol_formula | | | -0.49 (0.36) | |
| Number:WithLegis_numeric | | | -1.60 (4.79) | |
| WithVol:WithLim | | | 1.27 (1.88) | |
| $R^2$ | 0.29 | 0.31 | 0.32 | 0.32 |
| Adj. $R^2$ | 0.21 | 0.21 | 0.23 | 0.23 |
| Num. obs. | 813 | 813 | 813 | 813 |

***p < 0.01; **p < 0.05; *p < 0.1

## Table 10. Fixed Effects Models with Reduced Variables

## The Effects of BSF Structures on BSF Levels

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| GFB_percent_lag | 0.19 (0.05)*** | 0.20 (0.05)*** | 0.19 (0.05)*** | 0.19 (0.05)*** |
| Number | 1.19 (1.58) | 0.58 (1.72) | -0.06 (2.42) | 0.85 (1.59) |
| Source_percent | 0.02 (0.26) | -1.01 (0.52)* | -1.00 (0.47)** | -0.99 (0.46)** |
| Cap_percent | 0.36 (0.14)*** | 0.34 (0.15)** | 0.34 (0.14)** | 0.33 (0.14)** |
| DepoSurplus_numeric | 2.19 (1.00)** | 3.76 (1.67)** | 0.62 (0.71) | 0.63 (0.72) |
| DepoVol_formula | 5.58 (1.65)*** | 6.43 (2.08)*** | 4.98 (1.35)*** | 4.90 (1.30)*** |
| WithLegis_numeric | 0.66 (2.92) | 0.01 (3.49) | 0.65 (2.90) | 0.81 (2.78) |
| Repay_4bin | -0.31 (0.29) | -1.13 (0.46)** | -1.25 (0.39)*** | -1.24 (0.39)*** |
| Disasters | 0.31 (0.11)*** | 0.37 (0.10)*** | 0.37 (0.09)*** | 0.37 (0.09)*** |
| Fed_IGR | 1.13 (0.64)* | 1.14 (0.69) | 0.96 (0.64) | 0.94 (0.64) |
| Debt_per_capita | -0.04 (0.36) | 0.01 (0.36) | -0.02 (0.35) | -0.02 (0.35) |
| GSP | -0.02 (0.07) | -0.03 (0.07) | -0.03 (0.06) | -0.03 (0.06) |
| Unemployment | -1.00 (0.17)*** | -1.09 (0.24)*** | -1.08 (0.16)*** | -1.08 (0.17)*** |
| Credit_rating | 0.79 (0.24)*** | 0.74 (0.26)*** | 0.81 (0.25)*** | 0.80 (0.25)*** |
| Income_thousands | -0.07 (0.11) | -0.08 (0.11) | -0.07 (0.10) | -0.07 (0.10) |
| Population_million | 1.03 (0.66) | 1.08 (0.70) | 1.08 (0.72) | 1.06 (0.70) |
| TEL | -0.10 (0.07) | -0.09 (0.07) | -0.06 (0.07) | -0.06 (0.07) |
| BBR | -0.47 (0.64) | 0.03 (0.63) | -0.20 (0.54) | -0.19 (0.53) |
| Election | -0.04 (0.19) | -0.01 (0.19) | 0.02 (0.19) | 0.02 (0.19) |
| Democrat_share | 1.81 (1.87) | 1.44 (1.98) | 1.67 (1.74) | 1.53 (1.75) |
| Division | 0.51 (0.37) | 0.39 (0.38) | 0.41 (0.39) | 0.40 (0.39) |
| WithLim | | 0.27 (1.17) | | |
| Number:Unemployment | | 0.09 (0.13) | | |
| Source_percent:Unemployment | | 0.20 (0.06)*** | 0.19 (0.05)*** | 0.19 (0.05)*** |
| Cap_percent:Unemployment | | 0.00 (0.00) | | |
| DepoSurplus_numeric:Unemployment | | -0.28 (0.20) | | |
| DepoVol_formula:Unemployment | | -0.18 (0.19) | | |
| WithLegis_numeric:Unemployment | | 0.12 (0.35) | | |
| Repay_4bin:Unemployment | | 0.12 (0.04)*** | 0.14 (0.03)*** | 0.14 (0.03)*** |
| Unemployment:WithLim | | -0.01 (0.14) | | |
| Cap_percent:DepoSurplus_numeric | | | 0.09 (0.01)*** | 0.09 (0.01)*** |
| Number:WithLegis_numeric | | | 1.88 (4.84) | |
| $R^2$ | 0.28 | 0.30 | 0.31 | 0.30 |
| Adj. $R^2$ | 0.20 | 0.21 | 0.22 | 0.22 |
| Num. obs. | 813 | 813 | 813 | 813 |

***p < 0.01; **p < 0.05; *p < 0.1

## Table 11. Pooled OLS Models

## Effects of BSF Rules on BSF Levels

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| (Intercept) | 10.55 (2.20)*** | 12.28 (3.10)*** | 10.13 (2.42)*** | 10.21 (2.43)*** |
| GFB_percent_lag | 0.24 (0.03)*** | 0.21 (0.03)*** | 0.21 (0.03)*** | 0.22 (0.03)*** |
| Number | 0.39 (0.43) | -2.06 (1.06)* | 2.57 (2.25) | 3.27 (2.04) |
| Source_percent | 0.89 (0.33)*** | -0.44 (1.66) | 1.03 (0.35)*** | 0.99 (0.34)*** |
| Cap_percent | 0.06 (0.02)*** | 0.06 (0.10) | 0.02 (0.02) | 0.02 (0.02) |
| DepoLegis | -0.62 (0.29)** | -0.62 (0.31)** | -0.48 (0.32) | -0.55 (0.31)* |
| DepoSurplus_numeric | 2.51 (0.38)*** | 5.94 (1.01)*** | 5.08 (1.01)*** | 5.10 (1.00)*** |
| DepoVol_formula | 0.88 (0.58) | -0.41 (2.19) | 3.34 (1.98)* | 1.19 (0.60)** |
| DepoVol_propor | 0.72 (0.37)** | -0.57 (1.18) | 0.80 (0.37)** | 0.73 (0.36)** |
| WithLegis_numeric | -2.64 (0.69)*** | -6.41 (2.00)*** | -5.04 (1.80)*** | -5.14 (1.79)*** |
| WithShortfall | -2.79 (0.43)*** | -3.76 (1.19)*** | -2.60 (0.41)*** | -2.46 (0.41)*** |
| WithVol | -0.80 (0.64) | 1.22 (2.54) | -1.22 (0.71)* | -0.75 (0.63) |
| Repay_4bin | 0.36 (0.10)*** | -0.27 (0.35) | -0.27 (0.33) | -0.27 (0.33) |
| WithLim | 1.71 (0.37)*** | 0.79 (0.98) | 1.63 (0.38)*** | 1.63 (0.36)*** |
| Disasters | 0.53 (0.27)* | 0.55 (0.27)** | 0.57 (0.31)* | 0.58 (0.29)** |
| Fed_IGR | 0.28 (0.52) | 0.25 (0.55) | 0.28 (0.53) | 0.28 (0.53) |
| Debt_per_capita | 0.35 (0.13)*** | 0.36 (0.14)*** | 0.32 (0.13)** | 0.32 (0.13)** |
| GSP | 0.07 (0.08) | 0.05 (0.08) | 0.04 (0.08) | 0.04 (0.08) |
| Unemployment | -0.97 (0.12)*** | -1.51 (0.34)*** | -1.16 (0.20)*** | -1.15 (0.20)*** |
| Credit_rating | 0.19 (0.16) | 0.30 (0.16)* | 0.34 (0.16)** | 0.35 (0.15)** |
| Income_thousands | -0.11 (0.05)** | -0.12 (0.05)** | -0.08 (0.05)* | -0.09 (0.05)* |
| Population_million | 0.01 (0.03) | 0.04 (0.03) | -0.03 (0.04) | -0.03 (0.04) |
| TEL | -0.01 (0.02) | -0.01 (0.02) | -0.02 (0.02) | -0.02 (0.02) |
| BBR | -0.34 (0.27) | -0.14 (0.28) | 0.02 (0.25) | 0.05 (0.26) |
| Election | -0.02 (0.35) | 0.02 (0.34) | 0.06 (0.34) | 0.05 (0.34) |
| Democrat_share | -2.99 (1.39)** | -2.04 (1.39) | -2.99 (1.41)** | -2.81 (1.41)** |
| Division | -0.01 (0.26) | -0.04 (0.29) | -0.09 (0.26) | -0.06 (0.26) |
| factor(Year)2003 | -0.17 (0.60) | -0.11 (0.60) | -0.14 (0.58) | -0.13 (0.58) |
| factor(Year)2004 | 0.39 (0.61) | 0.44 (0.63) | 0.24 (0.62) | 0.26 (0.62) |
| factor(Year)2005 | 1.10 (0.70) | 1.19 (0.69)* | 0.88 (0.67) | 0.89 (0.67) |
| factor(Year)2006 | 1.65 (0.72)** | 1.77 (0.71)** | 1.30 (0.68)* | 1.33 (0.68)* |
| factor(Year)2007 | 2.34 (0.82)*** | 2.42 (0.80)*** | 2.03 (0.79)** | 2.05 (0.79)** |
| factor(Year)2008 | 3.31 (0.74)*** | 3.34 (0.76)*** | 2.87 (0.73)*** | 2.91 (0.74)*** |
| factor(Year)2009 | 5.68 (0.93)*** | 5.67 (0.97)*** | 5.06 (0.95)*** | 5.12 (0.95)*** |
| factor(Year)2010 | 5.82 (1.11)*** | 5.90 (1.11)*** | 5.29 (1.10)*** | 5.36 (1.10)*** |
| factor(Year)2011 | 5.07 (1.15)*** | 5.20 (1.15)*** | 4.47 (1.15)*** | 4.55 (1.15)*** |
| factor(Year)2012 | 4.41 (1.06)*** | 4.54 (1.06)*** | 3.80 (1.05)*** | 3.88 (1.06)*** |
| factor(Year)2013 | 4.55 (1.03)*** | 4.66 (1.04)*** | 3.96 (1.02)*** | 4.04 (1.03)*** |
| factor(Year)2014 | 3.62 (1.11)*** | 3.80 (1.12)*** | 2.99 (1.10)*** | 3.11 (1.10)*** |
| factor(Year)2015 | 3.68 (1.18)*** | 3.82 (1.20)*** | 3.06 (1.19)*** | 3.19 (1.19)*** |
| factor(Year)2016 | 3.37 (1.22)*** | 3.51 (1.24)*** | 2.76 (1.22)** | 2.89 (1.23)** |
| factor(Year)2017 | 2.98 (1.29)** | 3.18 (1.32)** | 2.47 (1.29)* | 2.61 (1.29)** |
| factor(Year)2018 | 3.73 (1.41)*** | 3.93 (1.45)*** | 3.15 (1.42)** | 3.31 (1.42)** |
| factor(Year)2019 | 5.44 (1.41)*** | 5.71 (1.48)*** | 4.93 (1.44)*** | 5.07 (1.44)*** |
| factor(Year)2020 | 9.38 (1.73)*** | 9.54 (1.77)*** | 8.48 (1.70)*** | 8.71 (1.70)*** |

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Number:Unemployment | | 0.48 (0.17)*** | 0.37 (0.16)** | 0.35 (0.16)** |
| Source_percent:Unemployment | | 0.24 (0.28) | | |
| Cap_percent:Unemployment | | -0.00 (0.02) | | |
| DepoSurplus_numeric:Unemployment | | -0.63 (0.16)*** | -0.62 (0.16)*** | -0.63 (0.16)*** |
| DepoVol_formula:Unemployment | | 0.31 (0.36) | | |
| DepoVol_propor:Unemployment | | 0.23 (0.18) | | |
| WithLegis_numeric:Unemployment | | 0.78 (0.31)** | 0.63 (0.28)** | 0.63 (0.27)** |
| WithShortfall:Unemployment | | 0.21 (0.19) | | |
| WithVol:Unemployment | | -0.36 (0.39) | | |
| Repay_4bin:Unemployment | | 0.10 (0.05)* | 0.13 (0.05)** | 0.12 (0.05)** |
| WithLim:Unemployment | | 0.20 (0.18) | | |
| Cap_percent:DepoSurplus_numeric | | | 0.06 (0.03)* | 0.06 (0.03)** |
| Cap_percent:DepoVol_formula | | | -0.20 (0.19) | |
| Number:WithLegis_numeric | | | -8.43 (3.22)*** | -9.51 (2.94)*** |
| WithVol:WithLim | | | 1.61 (1.65) | |
| $R^2$ | 0.59 | 0.62 | 0.63 | 0.62 |
| Adj. $R^2$ | 0.57 | 0.59 | 0.60 | 0.60 |
| Num. obs. | 813 | 813 | 813 | 813 |

***p < 0.01; **p < 0.05; *p < 0.1

### 6.2 Results from Panel Data Analysis

Table 9 presents the fixed effects models, analyzing the impacts of BSF structural features on BSF levels, measured as a share of general fund expenditures. Model 1 comprises key independent variables, BSF deposit and withdrawal rules, as well as control variables found in Tables 9, 10, and 11. Model 2 introduces interaction terms between the BSF rules and the unemployment variable. Model 3 incorporates interaction terms concerning various BSF rules. In Model 4, only significant interaction terms are retained, while insignificant interaction terms are removed to enhance the model's parsimony.

All reported standard errors were calculated, using “double-clustering robust covariance matrix estimators” (Cameron et al., 2011; Cameron & Miller, 2015). Cameron et al. (2011) and Cameron and Miller (2015) introduced the concept of double-clustering robust standard errors, designed to correct biases arising from effective clustering. This method adjusts standard errors by accounting for two levels of clustering: the first clustering involves grouping observations, while the second clustering involves grouping errors (Cameron et al., 2011; Cameron & Miller, 2015).

It is worth noting that certain interaction terms may indeed exhibit a significant degree of collinearity, which can pose problems, especially when standard errors are high. This potential multicollinearity poses challenges, as it can artificially inflate standard errors, complicating the estimation of confidence intervals for regression coefficients and the determination of statistical significance. To mitigate this issue, I simplified the fixed effects models, by removing insignificant variables. These variables were not only found to be statistically insignificant, but also exhibited high correlation with other variables in the original model.

The variables removed from the original models are deposits by legislature (DepoLegis), deposits tied to a certain proportion of general fund revenues or expenditures (DepoVol_propor), withdrawal limits (WithLim), withdrawals based on revenue shortfalls (WithShortfall), and withdrawals tied to revenue volatility (WithVol). In the reduced model, thus, the deposit tied to revenue volatility (DepoVol_formula) and number are the remaining dummy variables. The study also employs a Pooled Ordinary Least Squares (OLS) regression model, which solely incorporates year dummy variables, while excluding state fixed effects. This model is presented in Table 11.

### *6.2.1 Comparison of Model Performance: Effects of BSF Rules on BSF Levels*

Hou (2004) employed the Prais-Winsten model to examine the effects of BSF structural features on BSF levels. The model yields an R-squared value of 0.20, indicating that 20 % of the variance in the dependent variable is explained by the independent variables included in his model. In Hou's study (2004, p. 54), only the Cap variable demonstrated statistical significance, while the other deposit variables exhibited insignificant effects on BSF levels, as shown in Table 2. Specifically, deposit requirements, such as “funding by formula, funding from general fund surplus, funding by appropriation, and funding from special revenue,” had insignificant effects on BSF levels as a percent of general fund expenditures (Hou, 2004).

In Table 3 of Hou's (2004, p. 56) study, regressions were run using only each group of structural features, which are divided into: “Panel A: Purpose of Use (default: for cash flow), Panel B: Sources of BSF (default: from special revenue), Panel C: Maximum Balance Allowable (default: Cap I), and Panel D: Procedure for Use Approval (default: executive discretion), excluding the default values. In the BSF sources group (panel B), the estimate for

“funding by formula” is statistically significant, unlike the insignificant result of this variable shown in Table 2. For use approval procedures (panel D), “use by formula” more effectively maintains the BSF balance than “executive discretion”; although “use by appropriation” is not statistically significant (Hou, 2004).

Our study's fixed effects models show similar results to Hou's (2004) study but reveal a greater number of statistically significant variables, which will be elaborated upon in subsequent sections. Consequently, our study achieves an improved R-squared value of approximately 0.31 to 0.32, indicating enhanced explanatory power compared to Hou's Prais-Winsten model.

**Table 12. Comparison of Model Performance Indices for Fixed Effects Models**

| Name | R2 | RMSE | Sigma | AIC weights | AICc weights | BIC weights | Score |
|---|---|---|---|---|---|---|---|
| Model 4 | 0.32 | 2.53 | 2.58 | 0.47 | 0.53 | 1.00 | 91.04% |
| Model 3 | 0.32 | 2.52 | 2.57 | 0.53 | 0.47 | 9.68E-04 | 83.91% |
| Model 2 | 0.31 | 2.55 | 2.61 | 1.81E-06 | 9.92E-07 | 2.61E-14 | 26.73% |
| Model 1 | 0.29 | 2.58 | 2.62 | 1.59E-06 | 2.26E-06 | 0.00 | 0.06% |

Table 12 compares the performance metrics of fixed effects Models 1 to 4 in Table 9. This presentation highlights the comprehensive evaluation capabilities offered by the “performance” package in R. Root Mean Squared Error (RMSE) and Sigma measure the average prediction error. Higher weights for AIC (Akaike Information Criterion), AICc (Corrected Akaike Information Criterion), and BIC (Bayesian Information Criterion) indicate better model fit relative to other models. The “Score” represents the overall assessment of the models based on combined performance metrics.

Model 4 performs the best with a score of 91.04%, followed by Model 3 with 83.91%. Model 2 scores 26.73%, and Model 1 performs the worst with a score of 0.06%. The R-squared values for the models are similar, approximately around 0.3, indicating a comparable proportion of variance explained by each model. RMSE and Sigma are also similar to each other across the models, indicating that the average differences between observed and predicted values are comparable among the models. This suggests consistency in the models' predictive accuracy.

On the other hand, there are substantial variations in AIC, AICc, and BIC weights among the models. These weights reflect the relative quality of the models in terms of goodness of fit and complexity. Model 4's superior AIC, AICc, and BIC values stem from its approach of retaining only significant interaction terms, enhancing parsimony without sacrificing explanatory power. This balanced strategy prevents overfitting, ensuring that the model captures meaningful relationships rather than noise. As a result, Model 4 achieves the best balance between complexity and explanatory ability among the models, indicating its highest performance.

**Table 13. Comparison of Model Performance Indices between Different Models**

| Model 4 | R2 | RMSE | Sigma | AIC weights | AICc weights | BIC weights | Score |
|---|---|---|---|---|---|---|---|
| Full | 0.32 | 2.53 | 2.58 | 0.83 | 0.76 | 0.00 | 58.02% |
| Reduced | 0.30 | 2.56 | 2.59 | 0.17 | 0.24 | 1.00 | 49.31% |
| Pooled | 0.63 | 3.03 | 3.13 | 0.00 | 0.00 | 0.00 | 28.57% |

Table 13 compares model performance metrics for Model 4 across full fixed effects, reduced fixed effects models, and pooled OLS. Among the models considered, the "full fixed effects" model performs the best overall, followed by the "reduced fixed effects" model, and

then the "pooled OLS" model. The pooled OLS model has weights of 0 for AIC, AICc, and BIC, suggesting that it is not favored relative to the other models based on these criteria. In addition, the pooled OLS model fails to account for unobserved heterogeneity across states. Thus, this omission can lead to omitted variable bias, resulting in biased parameter estimates.

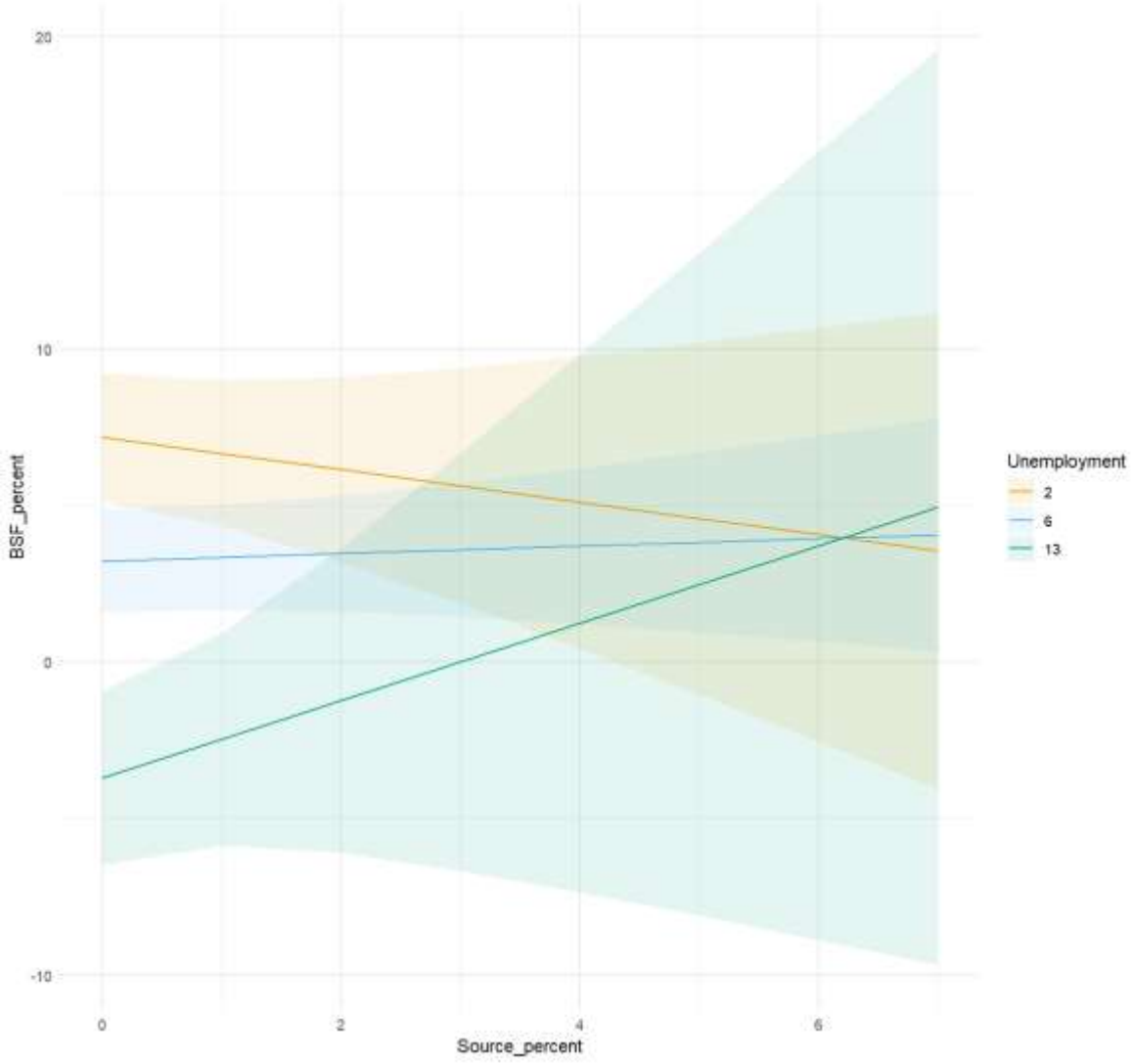
Meanwhile, the results from both the fixed effects model and the fixed effects model with reduced variables exhibit similarity. The similarity in results between the full model and the reduced model suggests that the excluded variables may not have a substantial impact on the overall model performance. In other words, in the original model, the potential collinearity between variables is not a significant concern, despite minor differences between the two models. This implies that if the reduced model and the full model yield similar results, the collinearity concern is not significant. Specifically, the collinearity does not substantially affect the stability and predictive power of the model, indicating that the excluded variables do not play a crucial role in the model's performance. Hence, the next section will focus on analyzing the results derived from the original fixed effects model.

### *6.2.2 Effects of Deposit Requirements on BSF Levels*

A one-unit increase in the one-year lagged unassigned general fund balance (GFB) levels is positively associated with an approximate 0.18 – 0.19 percentage point increase in BSF levels as a share of general fund expenditure across all models in Table 9 ($p<0.01$). This finding supports the Hypothesis 4, assuming a positive association between BSF and GFB levels. The rationale behind this association lies in the tendency for both BSF and GFB levels to increase during economic boom years and decrease in recessionary periods.

**Figure 3. Interaction Effects of**

**Source and Unemployment on BSF Levels**




The variable "funding source (Source_percent)" shows a negative effect on BSF levels in the fixed effects models. Specifically, during economic booms characterized by very low unemployment rates (close to zero), a one-unit increase in special revenue as a funding source (Source_percent) is associated with about a one percentage point decrease in BSF levels as a proportion of general fund expenditures ($p < 0.05$). This suggests that states with a greater dependence on special revenue for BSF funding (e.g., federal funds, tobacco

settlement funds, severance tax revenue, etc.) typically demonstrate lower BSF levels during periods of economic prosperity.

However, the interaction term between “source” and “unemployment rate” is positive and significant. This positive interaction term indicates that the effect of “source” on BSF levels is moderated by the unemployment rate. Specifically, for every one-unit increase in “unemployment rate,” the negative effect of “source” on BSF levels is reduced by 0.16, 0.20, and 0.20 units in Models 2, 3, and 4, respectively ($p<0.01$). When the unemployment rate is about 2 percent, the relationship between the funding source and BSF levels shows a negative slope, as illustrated in Figure 3. Conversely, when the unemployment rate reaches around 13 percent, the slope of the relationship between Source and BSF levels becomes positive. This indicates that the negative impact of source on BSF levels is lessened as the unemployment rate increases, suggesting that higher unemployment mitigates the negative effect of source.

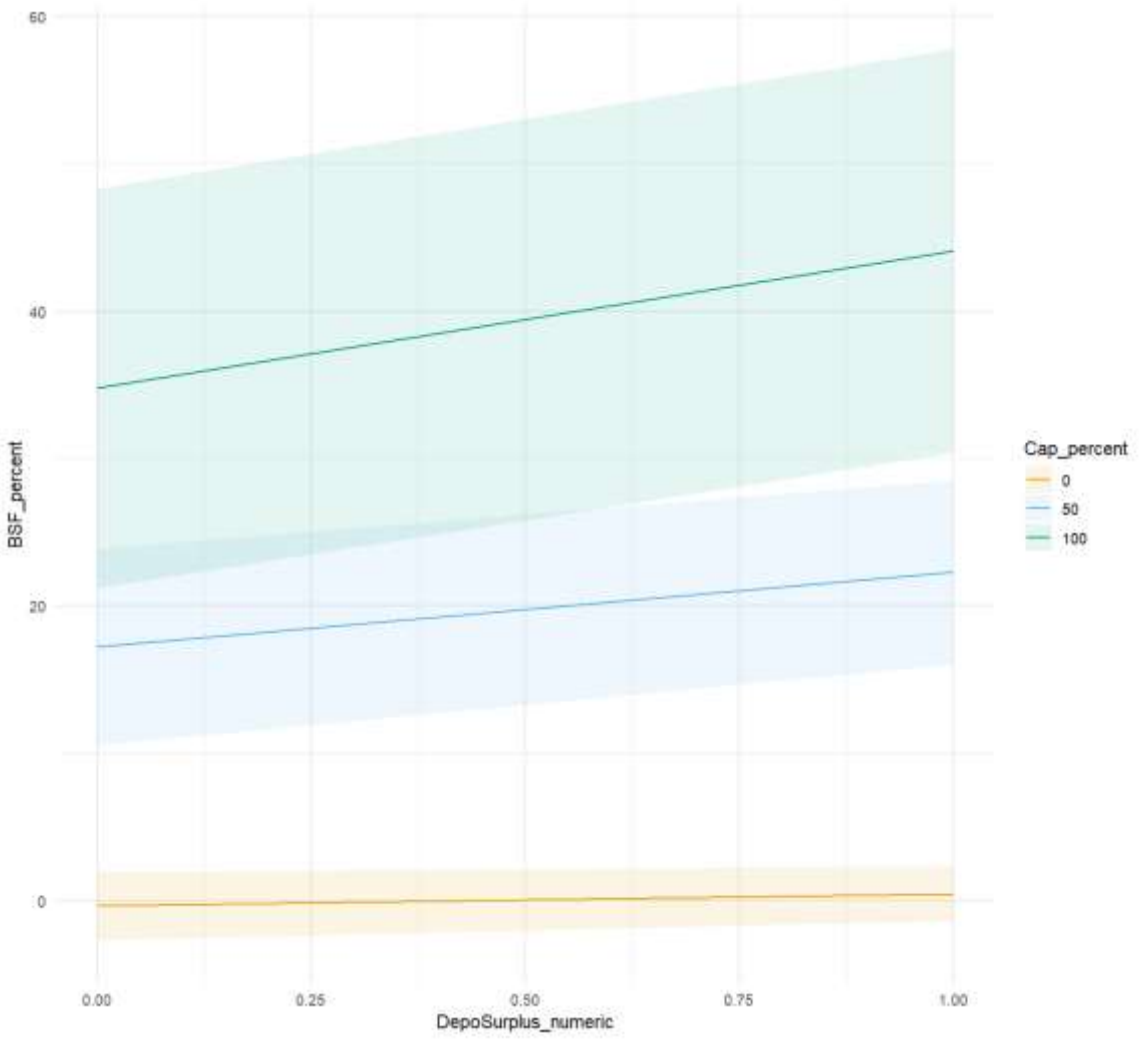
The variable "cap (Cap_percent)" demonstrates a positive effect on BSF levels in the fixed effects models. Specifically, a one unit increase in cap corresponds to approximately a 0.35 – 0.39 percentage point increase in BSF levels as a share of general fund expenditures in all models, holding all other factors constant ($p<0.05$). These findings support the expectation that a higher cap would significantly positively impact BSF levels. "Deposit revenue surplus (DepoSurplus_numeric)" exhibits a significant positive impact on BSF levels in both fixed effects and pooled OLS models. In the fixed effects model, this variable demonstrates a significant impact on BSF levels in models 1 and 2.

Additionally, there exists a positive interaction effect between deposit revenue surplus (DepoSurplus_numeric) and cap (Cap). This interaction is statistically significant in models 3 and 4 with a coefficient of 0.09 ($p < 0.01$). As depicted in Figure 3.2, the effect of deposit revenue surplus is nearly negligible when the Cap is set to zero. However, the slope of

deposit revenue surplus demonstrates a significantly positive trend when the Cap is equal to 100, indicating the absence of any imposed cap. This indicates that as the cap percentage increases, the positive impact of deposit surplus on BSF levels is further enhanced by 0.09 percentage points, reinforcing the positive effect of a higher deposit surplus when there is a higher cap percentage. This finding validates Hypothesis 1, which posits that a stringent deposit revenue surplus has a significant positive impact on BSF levels.

**Figure 4. Interaction Effects of**

**Cap and Deposit Revenue Surplus on BSF Levels**



A “deposit tied to revenue volatility (formula)” shows a statistically significant positive impact on BSF levels in all fixed effects models. States that link their BSF deposit to revenue fluctuations tend to have higher BSF levels by 3.6 percentage points compared to states that do not in model 4, controlling for all other variables ($p < 0.1$). This relationship attains greater statistical significance in the fixed effects model with reduced variables ($p < 0.01$).

The variable "number" does not exhibit significant predictive power on BSF levels in the fixed effects model. Similarly, "deposit by legislature (DepoLegis)" shows no significant impact on BSF levels across all fixed effects models. The "deposit tied to revenue volatility (proportion)" also shows an insignificant coefficient in fixed effects models, except for model 3. However, it is important to note that different states have different approaches to linking deposits to revenue volatility, and considering these variations is crucial for accurately assessing the rule’s impact on BSF size. I extensively explore the BSFs of Connecticut, Arizona, and Virginia, conducting comprehensive case studies of their deposits linked to revenue volatility in Chapter 7.

### *6.2.3 Effects of Withdrawal requirements on BSF levels*

Hou (2004) notes that “withdrawal by executive discretion” is considered the least stringent category in terms of BSF, whereas “withdrawal by legislative appropriation” is viewed as a more stringent category. This emphasizes the importance of considering the decision-making authority involved in BSF withdrawal when analyzing its impact on fiscal reserves. However, it is important to note that many states have transitioned away from relying solely on the governor’s discretion and have instead implemented more democratic procedures over the past two decades.

Previously, “withdrawal by executive discretion” referred to the governor’s discretion in withdrawal from BSF. However, nowadays, the governor’s discretion in withdrawal from the BSF is rarely observed unless it is an emergency situation. Thus, public officials are mainly responsible for implementing well-defined withdrawal requirements. Furthermore, due to the significant negative correlation coefficient of -0.85 between withdrawal by the executive (WithExec) and withdrawal by the legislature (WithLegis_numeric), I opted to exclude “withdrawal by the executive” from the model in order to mitigate issues related to multicollinearity. The variable “withdrawal by the legislature” is statistically insignificant in all fixed effects model.

A stringent withdrawal requirement, such as withdrawal tied to revenue volatility (WithVol) and withdrawal based on revenue shortfall (WithShortfall) demonstrates an insignificant impact on levels in the fixed effects models 2 through 4. Their insignificance can be attributed to their redundancy in explaining the variation in the dependent variable. This redundancy arises because these variables share a substantial amount of variance with deposit tied to revenue volatility and deposit revenue surplus, respectively. Consequently, including them in the model may not yield additional explanatory power, resulting in insignificant coefficients.

In fixed effects Model 4, the main effect of the “repayment provision (Repay_4bin)” on BSF levels is significantly negative with a coefficient of -1.13 ($p < 0.01$) when the unemployment rate is set to zero. This suggests that states with stringent repayment provisions tend to have lower BSF levels during periods of economic prosperity. However, the interaction term between repayment provision and unemployment rate with a coefficient of 0.14 ($p < 0.01$) is positive and significant. Specifically, for each unit increase in the unemployment rate, the negative effect of stringent repayment provisions on BSF levels is

mitigated by 0.14 percentage points. This finding suggests that repayment provisions provide a stabilizing effect during economic recession periods.

**Figure 5. Interaction Effects of**

**Repayment Provision and Unemployment on BSF Levels**

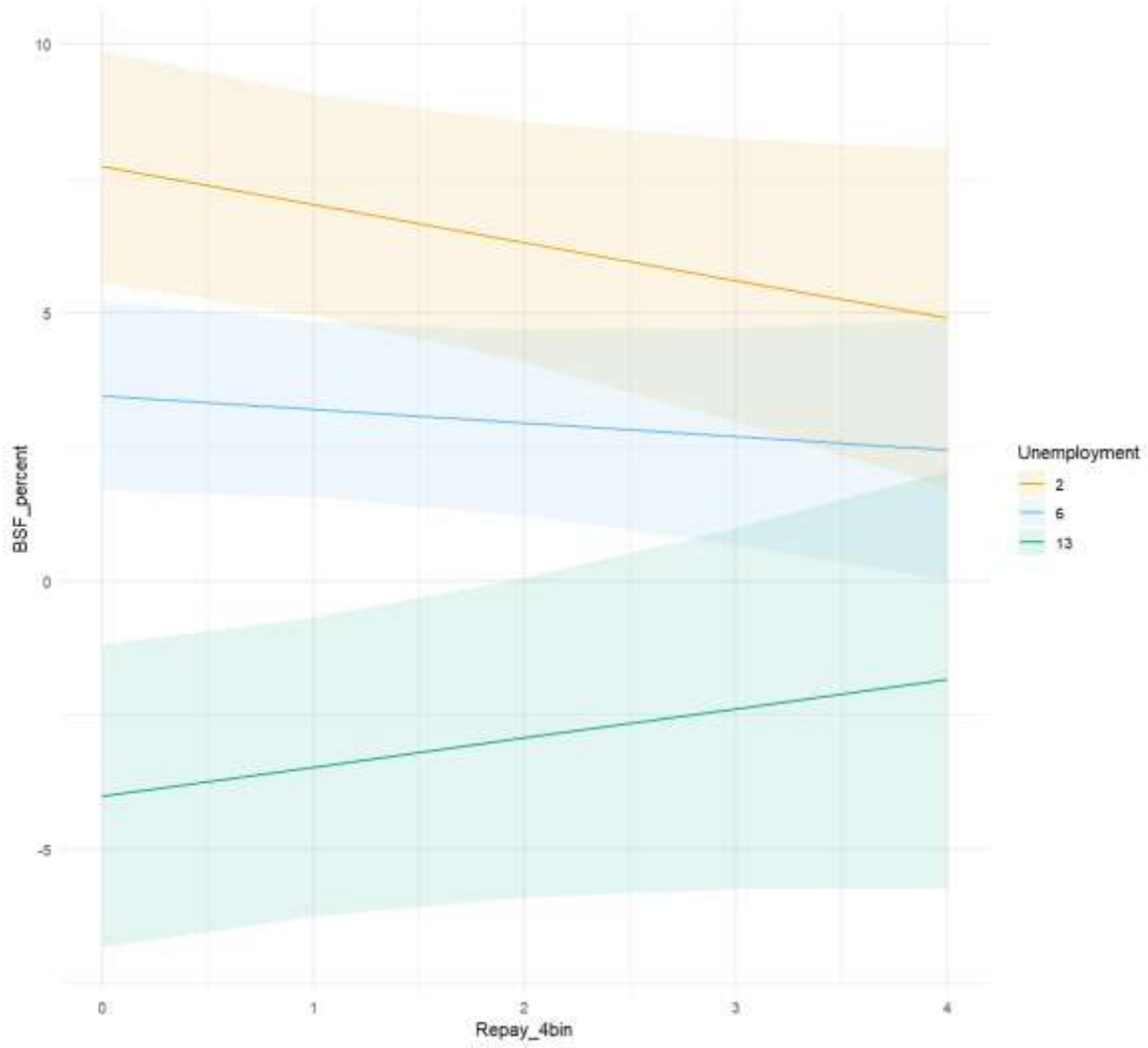



Figure 5 demonstrates that the effect of the repayment provision on BSF levels depends on the state's economic condition, as measured by the unemployment rate. Specifically, when the unemployment rate is approximately 2 percent, the relationship

between the repayment provision and BSF levels exhibits a negative slope. In contrast, when the unemployment rate rises to around 13 percent, the slope of the relationship becomes positive. This suggests that stringent repayment provisions make it challenging for state governments to utilize their Budget Stabilization Funds during economic downturns, thereby mitigating the negative impact on BSF levels. The variable of "withdrawal limit" demonstrates an insignificant impact on BSF levels across all fixed effects models except for fixed effects model 1.

### *6.2.4 Effects of Control variables on BSF Levels*

The disasters variable, which measures the cost of disasters (in units of $10 billion) that states have experienced in the past, demonstrates a significant impact on BSF levels in both fixed effects and pooled OLS models. In the fixed effects model, a one unit increase in disasters is linked to a 0.3 to 0.4 percentage point change in BSF levels ($p<0.01$), after controlling for all other variables. This discovery aligns with the theory of organizational learning, suggesting that states facing significant fiscal challenges are inclined to strengthen their fiscal reserves (Lee & Chen, 2022; Schein, 1993).

The Federal IGR variable demonstrates an insignificant impact on BSF levels, except for fixed effects models 1 and 2. Both debt per capita and GSP are also statistically insignificant in all fixed effects models. Unemployment rate shows a significant negative impact on BSF levels in all models. A one unit increase in unemployment rate reduces BSF levels by about 1 percentage point, holding all other variables constant ($p<0.01$). This finding suggests that states are less likely to deposit money into their BSFs during economic downturns or more likely to withdraw money from their BSFs.

There is a strong positive correlation between credit rating and BSF levels across all fixed effects models ($p < 0.01$). Specifically, a one unit rise in credit rating corresponds to approximately a 0.7 to 0.75 percentage point increase in BSF levels, while controlling for other variables ($p < 0.01$). Income does not demonstrate a significant impact in any of the fixed effects models. Population exhibits a positive impact on BSF levels in all original fixed effects models. However, it becomes insignificant in the fixed effects models with reduced variables. Other control variables, including political partisanship (Democrat_share), election years (Election), divided government (Division), and fiscal institutions (e.g., TEL and BBR), do not exhibit statistical significance across all models.

## Table 14. Fixed Effects Models

## The Effects of BSF Structures on GFB Levels

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| BSF_percent_lag | 0.19 (0.10)* | 0.21 (0.09)** | 0.21 (0.09)** | 0.22 (0.09)*** |
| Number | 2.43 (0.84)*** | -0.01 (2.14) | 2.64 (0.84)*** | 2.63 (0.84)*** |
| Source_percent | 0.73 (0.58) | 4.69 (0.92)*** | 5.55 (1.13)*** | 5.58 (1.14)*** |
| Cap_percent | -0.12 (0.18) | -0.23 (0.18) | -0.18 (0.19) | -0.19 (0.18) |
| DepoLegis | 2.87 (1.84) | 3.10 (1.80)* | 1.23 (2.06) | 1.85 (1.92) |
| DepoSurplus_numeric | -1.65 (1.41) | 0.58 (1.89) | -3.10 (1.94) | -2.12 (1.41) |
| DepoVol_formula | 5.94 (3.74) | -2.26 (4.53) | 2.47 (3.50) | 2.51 (3.48) |
| DepoVol_propor | 0.39 (1.24) | 1.40 (2.02) | 0.48 (1.33) | 0.79 (1.22) |
| WithLegis_numeric | -2.39 (1.60) | -5.99 (3.05)* | -2.87 (1.85) | -2.48 (1.68) |
| WithShortfall | 1.17 (0.89) | -0.19 (1.85) | 1.49 (0.96) | 1.23 (0.81) |
| WithVol | -2.18 (1.60) | 1.33 (3.04) | -3.77 (1.18)*** | -3.62 (1.26)*** |
| Repay_4bin | -0.12 (0.28) | -0.08 (0.57) | -0.05 (0.23) | -0.06 (0.23) |
| WithLim | 3.14 (2.05) | 2.91 (2.45) | 1.26 (2.17) | 1.34 (2.17) |
| Disasters | 0.02 (0.15) | -0.15 (0.12) | -0.10 (0.12) | -0.10 (0.12) |
| Fed_IGR | -0.02 (1.14) | -0.22 (1.15) | -0.17 (1.05) | -0.12 (1.07) |
| Debt_per_capita | -2.35 (0.93)** | -2.23 (0.91)** | -2.30 (0.92)** | -2.29 (0.92)** |
| GSP | 0.50 (0.25)** | 0.51 (0.24)** | 0.52 (0.24)** | 0.51 (0.24)** |
| Unemployment | -0.19 (0.29) | -0.96 (0.50)* | -0.25 (0.31) | -0.25 (0.31) |
| Credit_rating | 0.62 (0.54) | 0.58 (0.51) | 0.68 (0.51) | 0.68 (0.51) |
| Income_thousands | 0.62 (0.26)** | 0.61 (0.26)** | 0.60 (0.24)** | 0.60 (0.25)** |
| Population_million | -1.99 (0.52)*** | -2.20 (0.60)*** | -2.29 (0.56)*** | -2.30 (0.57)*** |
| TEL | -0.09 (0.10) | -0.06 (0.10) | -0.09 (0.10) | -0.10 (0.10) |
| BBR | -1.27 (1.17) | -1.56 (1.10) | -1.43 (1.15) | -1.42 (1.16) |
| Election | 0.47 (0.32) | 0.44 (0.32) | 0.46 (0.31) | 0.44 (0.31) |
| Democrat_share | 2.95 (3.73) | 2.48 (3.72) | 3.80 (3.88) | 3.70 (3.86) |
| Division | -0.24 (0.32) | -0.12 (0.33) | -0.14 (0.32) | -0.13 (0.32) |
| Number:Unemployment | | 0.41 (0.30) | | |
| Source_percent:Unemployment | | -0.72 (0.13)*** | -0.88 (0.11)*** | -0.88 (0.11)*** |
| Cap_percent:Unemployment | | 0.01 (0.01) | | |
| DepoSurplus_numeric:Unemployment | | -0.39 (0.28) | | |
| DepoVol_formula:Unemployment | | 1.42 (0.53)*** | 0.88 (0.28)*** | 0.88 (0.28)*** |
| DepoVol_propor:Unemployment | | -0.03 (0.23) | | |
| WithLegis_numeric:Unemployment | | 0.56 (0.52) | | |
| WithShortfall:Unemployment | | 0.35 (0.29) | | |
| WithVol:Unemployment | | -0.54 (0.37) | | |
| Repay_4bin:Unemployment | | 0.00 (0.07) | | |
| WithLim:Unemployment | | 0.10 (0.30) | | |
| Cap_percent:DepoSurplus_numeric | | | 0.04 (0.03) | |
| WithVol:WithLim | | | 5.94 (2.77)** | 5.89 (2.77)** |
| $R^2$ | 0.26 | 0.31 | 0.30 | 0.30 |
| Adj. $R^2$ | 0.17 | 0.22 | 0.21 | 0.21 |
| Num. obs. | 813 | 813 | 813 | 813 |

***p < 0.01; **p < 0.05; *p < 0.1

## Table 15. Fixed Effects Models with Reduced Variables

### The Effects of BSF Structures on GFB Levels

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| BSF_percent_lag | 0.20 (0.10)* | 0.20 (0.09)** | 0.21 (0.09)** | 0.21 (0.09)** |
| Number | 2.58 (0.72)*** | 0.72 (1.87) | 2.61 (0.68)*** | 2.61 (0.68)*** |
| Source_percent | 0.72 (0.58) | 5.50 (1.08)*** | 5.65 (1.13)*** | 5.65 (1.13)*** |
| Cap_percent | -0.10 (0.17) | -0.19 (0.17) | -0.15 (0.16) | -0.15 (0.16) |
| DepoSurplus_numeric | -2.33 (1.33)* | 1.39 (1.67) | -1.08 (1.75) | -1.08 (1.75) |
| WithVol | -2.02 (1.44) | -3.54 (2.55) | -3.63 (1.14)*** | -3.63 (1.14)*** |
| WithLegis_numeric | -0.19 (2.58) | -2.28 (4.33) | 0.48 (2.80) | 0.48 (2.80) |
| Repay_4bin | -0.21 (0.33) | 0.39 (0.56) | 0.05 (0.28) | 0.05 (0.28) |
| WithLim | 2.64 (1.81) | 1.92 (2.26) | 0.98 (1.94) | 0.98 (1.94) |
| Disasters | 0.00 (0.16) | -0.12 (0.13) | -0.08 (0.11) | -0.08 (0.11) |
| Fed_IGR | 0.10 (1.11) | 0.07 (1.11) | -0.09 (1.03) | -0.09 (1.03) |
| Debt_per_capita | -2.32 (0.87)*** | -2.18 (0.85)** | -2.19 (0.88)** | -2.19 (0.88)** |
| GSP | 0.49 (0.25)* | 0.52 (0.24)** | 0.50 (0.24)** | 0.50 (0.24)** |
| Unemployment | -0.20 (0.29) | -0.41 (0.40) | -0.02 (0.29) | -0.02 (0.29) |
| Credit_rating | 0.51 (0.51) | 0.44 (0.52) | 0.42 (0.51) | 0.42 (0.51) |
| Income_thousands | 0.62 (0.25)** | 0.62 (0.25)** | 0.61 (0.24)** | 0.61 (0.24)** |
| Population_million | -1.95 (0.53)*** | -2.02 (0.58)*** | -2.17 (0.55)*** | -2.17 (0.55)*** |
| TEL | -0.09 (0.09) | -0.11 (0.09) | -0.10 (0.09) | -0.10 (0.09) |
| BBR | -1.83 (1.16) | -1.86 (1.20) | -1.65 (1.10) | -1.65 (1.10) |
| Election | 0.44 (0.31) | 0.45 (0.31) | 0.47 (0.31) | 0.47 (0.31) |
| Democrat_share | 2.71 (3.59) | 2.33 (3.45) | 3.05 (3.62) | 3.05 (3.62) |
| Division | -0.34 (0.32) | -0.38 (0.33) | -0.35 (0.32) | -0.35 (0.32) |
| Number:Unemployment | | 0.34 (0.28) | | |
| Source_percent:Unemployment | | -0.87 (0.13)*** | -0.90 (0.11)*** | -0.90 (0.11)*** |
| Cap_percent:Unemployment | | 0.02 (0.01) | | |
| DepoSurplus_numeric:Unemployment | | -0.61 (0.25)** | -0.39 (0.23)* | -0.39 (0.23)* |
| WithVol:Unemployment | | 0.16 (0.35) | | |
| WithLegis_numeric:Unemployment | | 0.37 (0.57) | | |
| Repay_4bin:Unemployment | | -0.07 (0.07) | | |
| WithLim:Unemployment | | 0.18 (0.31) | | |
| Cap_percent:DepoSurplus_numeric | | | 0.04 (0.03) | 0.04 (0.03) |
| WithVol:WithLim | | | 5.49 (2.42)** | 5.49 (2.42)** |
| $R^2$ | 0.25 | 0.29 | 0.29 | 0.29 |
| Adj. $R^2$ | 0.17 | 0.20 | 0.20 | 0.20 |
| Num. obs. | 813 | 813 | 813 | 813 |

***p < 0.01; **p < 0.05; *p < 0.1

## Table 16. Pooled OLS Models

## Effects of BSF Rules on GFB Levels

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| (Intercept) | -9.25 (4.39)** | -1.55 (4.94) | -2.62 (4.32) | -2.43 (4.29) |
| BSF_percent_lag | 0.49 (0.09)*** | 0.39 (0.09)*** | 0.40 (0.09)*** | 0.40 (0.09)*** |
| Number | 1.24 (0.68)* | -3.24 (1.84)* | -3.74 (1.53)** | -3.64 (1.51)** |
| Source_percent | 0.76 (0.43)* | 5.61 (2.38)** | 5.52 (2.39)** | 5.48 (2.42)** |
| Cap_percent | 0.02 (0.02) | -0.00 (0.08) | 0.05 (0.04) | 0.02 (0.02) |
| DepoLegis | 3.03 (0.70)*** | 3.05 (0.69)*** | 3.17 (0.69)*** | 3.08 (0.69)*** |
| DepoSurplus_numeric | 0.62 (0.69) | 0.25 (1.88) | 1.07 (0.80) | 0.72 (0.69) |
| DepoVol_formula | -1.27 (0.93) | -11.64 (2.81)*** | -10.77 (2.67)*** | -10.93 (2.60)*** |
| DepoVol_propor | -1.55 (0.55)*** | -2.81 (1.45)* | -0.89 (0.55) | -0.97 (0.53)* |
| WithLegis_numeric | -4.87 (1.21)*** | -18.21 (3.12)*** | -16.93 (2.80)*** | -17.32 (2.81)*** |
| WithShortfall | 0.64 (0.79) | 0.92 (2.04) | 0.74 (0.76) | 0.84 (0.75) |
| WithVol | 1.55 (0.97) | 5.49 (2.77)** | 4.68 (2.78)* | 5.06 (2.55)** |
| Repay_4bin | 0.24 (0.16) | 0.42 (0.47) | 0.34 (0.16)** | 0.28 (0.16)* |
| WithLim | -2.10 (0.61)*** | -3.81 (1.57)** | -3.84 (1.56)** | -3.77 (1.52)** |
| Disasters | -0.32 (0.47) | -0.55 (0.35) | -0.60 (0.29)** | -0.59 (0.32)* |
| Fed_IGR | -0.35 (0.90) | -0.40 (0.93) | -0.23 (0.91) | -0.35 (0.91) |
| Debt_per_capita | -0.23 (0.28) | -0.09 (0.26) | -0.10 (0.26) | -0.09 (0.26) |
| GSP | 0.59 (0.27)** | 0.60 (0.26)** | 0.59 (0.26)** | 0.60 (0.26)** |
| Unemployment | 0.28 (0.25) | -1.39 (0.50)*** | -1.15 (0.30)*** | -1.20 (0.30)*** |
| Credit_rating | 0.97 (0.31)*** | 1.23 (0.31)*** | 1.20 (0.30)*** | 1.23 (0.30)*** |
| Income_thousands | 0.09 (0.10) | 0.08 (0.10) | 0.08 (0.10) | 0.08 (0.10) |
| Population_million | -0.19 (0.05)*** | -0.14 (0.05)*** | -0.16 (0.05)*** | -0.14 (0.05)*** |
| TEL | -0.02 (0.03) | -0.02 (0.03) | -0.03 (0.03) | -0.02 (0.03) |
| BBR | 1.14 (0.46)** | 1.14 (0.46)** | 1.07 (0.46)** | 1.05 (0.46)** |
| Election | 0.28 (0.60) | 0.31 (0.58) | 0.29 (0.58) | 0.31 (0.58) |
| Democrat_share | 4.25 (2.09)** | 4.26 (2.00)** | 3.65 (2.13)* | 4.17 (2.03)** |
| Division | -0.94 (0.43)** | -0.64 (0.42) | -0.66 (0.41) | -0.67 (0.41) |
| factor(Year)2003 | 0.43 (1.07) | 0.24 (1.09) | 0.23 (1.10) | 0.26 (1.09) |
| factor(Year)2004 | 2.28 (1.24)* | 1.89 (1.24) | 1.99 (1.24) | 1.91 (1.23) |
| factor(Year)2005 | 4.10 (1.31)*** | 3.78 (1.29)*** | 3.85 (1.29)*** | 3.79 (1.28)*** |
| factor(Year)2006 | 5.39 (1.43)*** | 4.95 (1.41)*** | 5.00 (1.40)*** | 4.95 (1.40)*** |
| factor(Year)2007 | 4.57 (1.52)*** | 4.45 (1.45)*** | 4.53 (1.44)*** | 4.45 (1.44)*** |
| factor(Year)2008 | 2.92 (1.55)* | 3.11 (1.51)** | 3.17 (1.50)** | 3.10 (1.50)** |
| factor(Year)2009 | 0.69 (1.75) | 1.40 (1.75) | 1.30 (1.73) | 1.32 (1.72) |
| factor(Year)2010 | -1.02 (2.02) | -0.47 (1.95) | -0.55 (1.94) | -0.53 (1.93) |
| factor(Year)2011 | 2.99 (2.13) | 3.48 (2.04)* | 3.35 (2.05) | 3.42 (2.04)* |
| factor(Year)2012 | 2.69 (1.81) | 3.18 (1.73)* | 3.09 (1.74)* | 3.12 (1.72)* |
| factor(Year)2013 | 4.49 (1.72)*** | 4.96 (1.66)*** | 4.88 (1.67)*** | 4.90 (1.66)*** |
| factor(Year)2014 | 1.17 (2.05) | 1.17 (1.98) | 1.07 (2.00) | 1.14 (1.99) |
| factor(Year)2015 | 2.23 (2.21) | 2.23 (2.15) | 2.09 (2.17) | 2.19 (2.15) |
| factor(Year)2016 | 2.09 (2.29) | 2.12 (2.24) | 1.96 (2.26) | 2.07 (2.25) |
| factor(Year)2017 | 1.05 (2.52) | 1.38 (2.46) | 1.24 (2.47) | 1.35 (2.46) |
| factor(Year)2018 | 2.07 (2.78) | 2.40 (2.73) | 2.16 (2.75) | 2.33 (2.74) |
| factor(Year)2019 | 3.38 (2.89) | 3.74 (2.85) | 3.48 (2.86) | 3.65 (2.86) |
| factor(Year)2020 | 4.38 (3.82) | 5.02 (3.62) | 4.69 (3.64) | 5.00 (3.63) |

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| Number:Unemployment | | 0.81 (0.27)*** | 0.88 (0.20)*** | 0.88 (0.20)*** |
| Source_percent:Unemployment | | -0.88 (0.43)** | -0.85 (0.43)* | -0.85 (0.44)* |
| Cap_percent:Unemployment | | 0.00 (0.01) | | |
| DepoSurplus_numeric:Unemployment | | 0.09 (0.33) | | |
| DepoVol_formula:Unemployment | | 1.89 (0.48)*** | 1.73 (0.46)*** | 1.75 (0.44)*** |
| DepoVol_propor:Unemployment | | 0.31 (0.22) | | |
| WithLegis_numeric:Unemployment | | 2.53 (0.51)*** | 2.30 (0.43)*** | 2.36 (0.44)*** |
| WithShortfall:Unemployment | | -0.00 (0.34) | | |
| WithVol:Unemployment | | -0.76 (0.42)* | -0.70 (0.40)* | -0.70 (0.37)* |
| Repay_4bin:Unemployment | | -0.02 (0.07) | | |
| WithLim:Unemployment | | 0.50 (0.28)* | 0.43 (0.26)* | 0.48 (0.27)* |
| Cap_percent:DepoSurplus_numeric | | | -0.05 (0.04) | |
| WithVol:WithLim | | | 3.29 (2.89) | |
| $R^2$ | 0.38 | 0.44 | 0.44 | 0.44 |
| Adj. $R^2$ | 0.34 | 0.40 | 0.40 | 0.40 |
| Num. obs. | 813 | 813 | 813 | 813 |

***p < 0.01; **p < 0.05; *p < 0.1

### *6.2.5 Comparison of Model Performance: Effects of BSF Rules on GFB Levels*

Table 17 compares the performance metrics of fixed effects Models 1 to 4 in Table 14. Based on the provided table, Model 4 performs the best with a score of 92.83%, followed by Model 3 with 71.31%. Model 2 scores 59.55%, and Model 1 performs the worst with a score of 0.00%. The R-squared values for the models are similar, approximately around 0.3, indicating a comparable proportion of variance explained by each model. RMSE and Sigma are also similar across the models, indicating comparable predictive accuracy. However, there are substantial variations in AIC, AICc, and BIC weights among the models. These weights reflect the relative quality of the models in terms of goodness of fit and complexity. Model 4 achieves a superior balance between model fit and complexity by retaining only significant interaction terms, enhancing parsimony without sacrificing explanatory power.

**Table 17. Comparison of Model Performance Indices for Fixed Effects Models**

| Name | R2 | RMSE | Sigma | AIC weights | AICc weights | BIC weights | Score |
|---|---|---|---|---|---|---|---|
| Model4 | 0.30 | 3.70 | 3.77 | 0.55 | 0.58 | 0.94 | 92.83 % |
| Model3 | 0.30 | 3.69 | 3.76 | 0.39 | 0.38 | 0.06 | 71.31 % |
| Model2 | 0.31 | 3.67 | 3.76 | 0.06 | 0.03 | 0.00 | 59.55 % |
| Model1 | 0.26 | 3.81 | 3.87 | 0.00 | 0.00 | 0.00 | 0.00 % |

To check multicollinearity, I examine the correlation matrix of the predictors. The correlation matrix of the predictors reveals three significant correlations: 1) the “formula-based deposit tied to revenue volatility” (DepoVol_formula) correlates perfectly with its interaction term with “withdrawal tied to revenue volatility” (WithVol) (correlation: 1.00), 2) the “formula-based deposit tied to revenue volatility” correlates strongly with its interaction term with “Cap (Cap_percent)” (correlation: 0.86), and 3) the variable “Number” correlates

highly with its interaction term with “withdrawal by the legislature (WithLegis_numeric)” (correlation: 0.92).

A correlation coefficient of 1.00 indicates a perfect positive linear relationship between DepoVol_formula and its interaction term with WithVol. This means that they are essentially identical or redundant. With a correlation coefficient of 0.856, there is also a strong positive linear relationship between DepoVol_formula and its interaction term with Cap. A correlation coefficient of 0.92 between Number and its interaction term with WithLegis_numeric indicates an extremely strong positive linear relationship. Therefore, three interaction terms, namely between DepoVol_formula and WithVol, between DepoVol_formula and Cap, and between Number and WithLegis_numeric, are eliminated from the models.

In contrast to the reduced model examining the effects of BSF rules on BSF levels, the withdrawal linked to revenue volatility (WithVol) remains in the reduced model, whereas the deposit linked to revenue volatility (DepoVol_formula) is omitted. This decision stems from the understanding that strict withdrawal regulations are more likely to influence GFB, as states are compelled to resort to the use of GFB when unable to access the BSF due to stringent withdrawal conditions. The deposit of revenue surplus (DepoSurplus_numeric) is incorporated into the reduced model because it involves transferring general fund balances, thereby directly impacting the GFB, unlike deposits tied to revenue volatility, which sets aside a certain portion of revenue.

Thus, the variables removed from the original models are deposits by legislature (DepoLegis), deposit tied to revenue volatility through formula (DepoVol_formula), deposits a certain proportion of revenue (DepoVol_propor), and withdrawals based on revenue shortfalls (WithShortfall). In other words, the withdrawal tied to revenue volatility, number,

and withdrawal limit are the remaining dummy variables in the reduced model. All remaining dummy variables undergo changes over time. Thus, they are less likely to have multicollinearity or collinearity with state fixed effects as they capture variation in the data that is not already explained by the fixed effects.

**Table 18. Comparison of Model Performance Indices between Different Models**

| Model 4 | R2 | RMSE | Sigma | AIC weights | AICc weights | BIC weights | Score |
|---|---|---|---|---|---|---|---|
| Full | 0.30 | 3.69 | 3.76 | 1.00 | 0.98 | 0.00 | 59.30% |
| Reduced | 0.29 | 3.73 | 3.79 | 0.02 | 0.03 | 1.00 | 42.87% |
| Pooled | 0.44 | 5.10 | 5.27 | 0.00 | 0.00 | 0.00 | 28.57% |

Table 18 offers an assessment of model performance, comparing full fixed effects, reduced fixed effects, and pooled OLS models. Among the models considered, the "full fixed effects" model performs the best overall, followed by the "reduced fixed effects" model, and then the "pooled OLS" model. The "full fixed effects" model has the highest AIC weights, AICc weights, and Score, indicating superior performance. The "pooled OLS" model, on the other hand, has weights of 0 for AIC, AICc, and BIC, suggesting it is not favored relative to other models based on these criteria.

The findings from both the fixed effects model in Table 14 and the reduced fixed effects model in Table 15 show a notable similarity. This similarity indicates that the omitted variables might not significantly influence the overall model performance. Consequently, the subsequent section will focus on examining the results obtained from the original fixed effects model.

### *6.2.5 Effects of Deposit Requirements on GFB Levels*

As shown in Table 14, the one-year lagged BSF levels are positively associated with GFB levels as a share of general fund expenditures in all models, leading to an approximate increase of 0.19 – 0.22 percentage points in GFB levels as a share of general fund expenditures ($p<0.01$). The variable of "number" significantly influences GFB levels in all models except for model 2, as demonstrated in Table 14. States that operate more than one BSF tend to exhibit BSF levels that are 2.6 percentage points higher compared to states without additional BSFs, when controlling for all other variables ($p<0.01$). This suggests that states with multiple BSFs are less likely to experience budget deficits or need the use of GFB to address such deficits, compared to states without additional BSFs.

The main effect of the "source" variable is significantly positive when the unemployment rate is set to zero. In models 2, 3, and 4, this effect translates to an increase of approximately 4.7 to 5.6 percentage points in GFB levels, holding all other variables constant ($p < 0.01$). This suggests that states which utilize special revenue as a funding source for their BSF tend to exhibit higher GFB levels. This is likely because these states do not allocate the general fund to the BSF; instead, they retain the money within the GFB account, thereby increasing GFB levels, as they deposit special revenue into their BSF.

Interestingly, the positive impact of source on GFB levels is mitigated by unemployment rate. The interaction term between source and unemployment rate has a negative coefficient of -0.88. This means that for every one-unit increase in unemployment, the positive effect of source on GFB levels decreases by 0.88 units.

**Figure 6. Interaction Effects of**

**Source and Unemployment on GFB Levels**

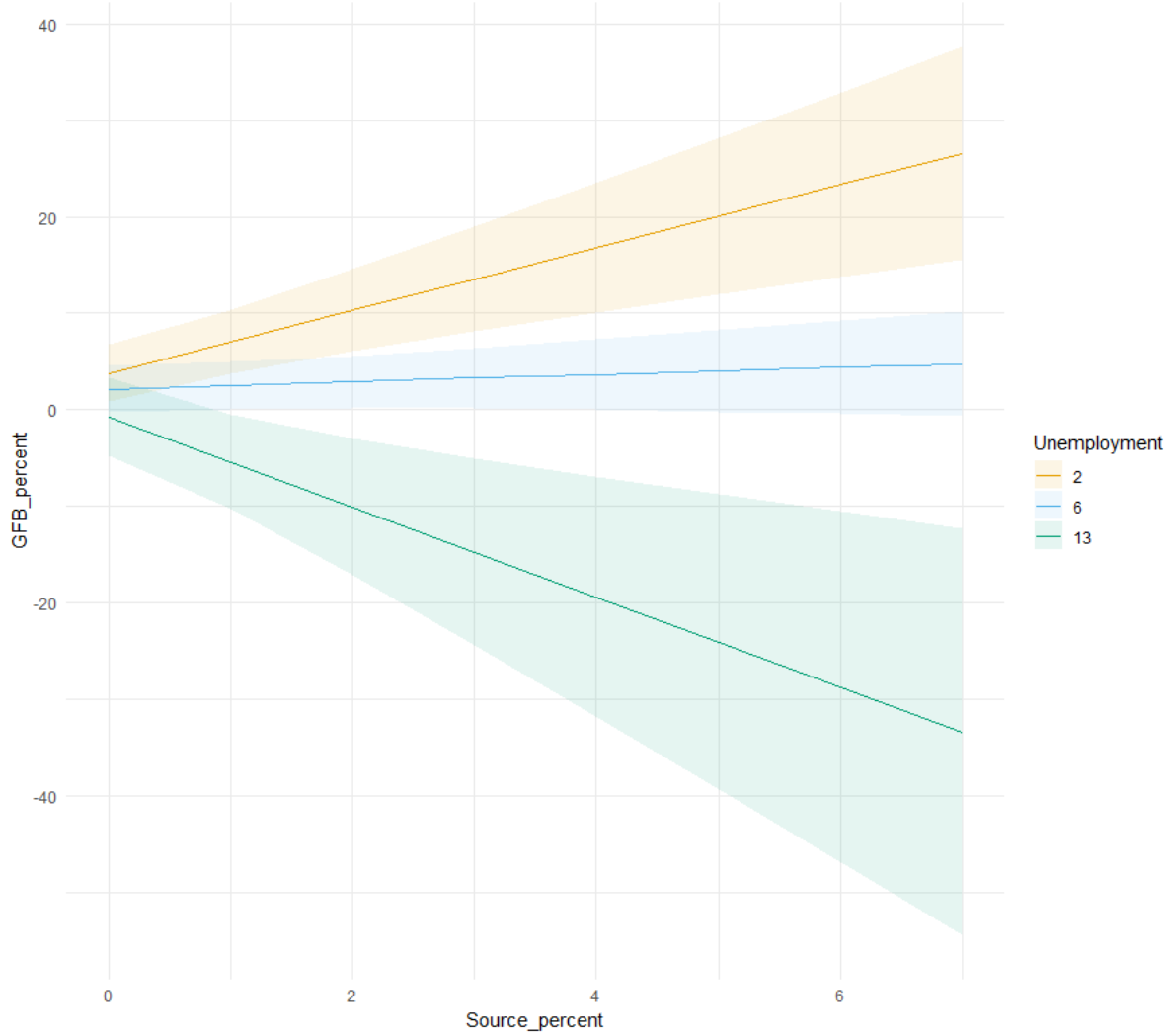


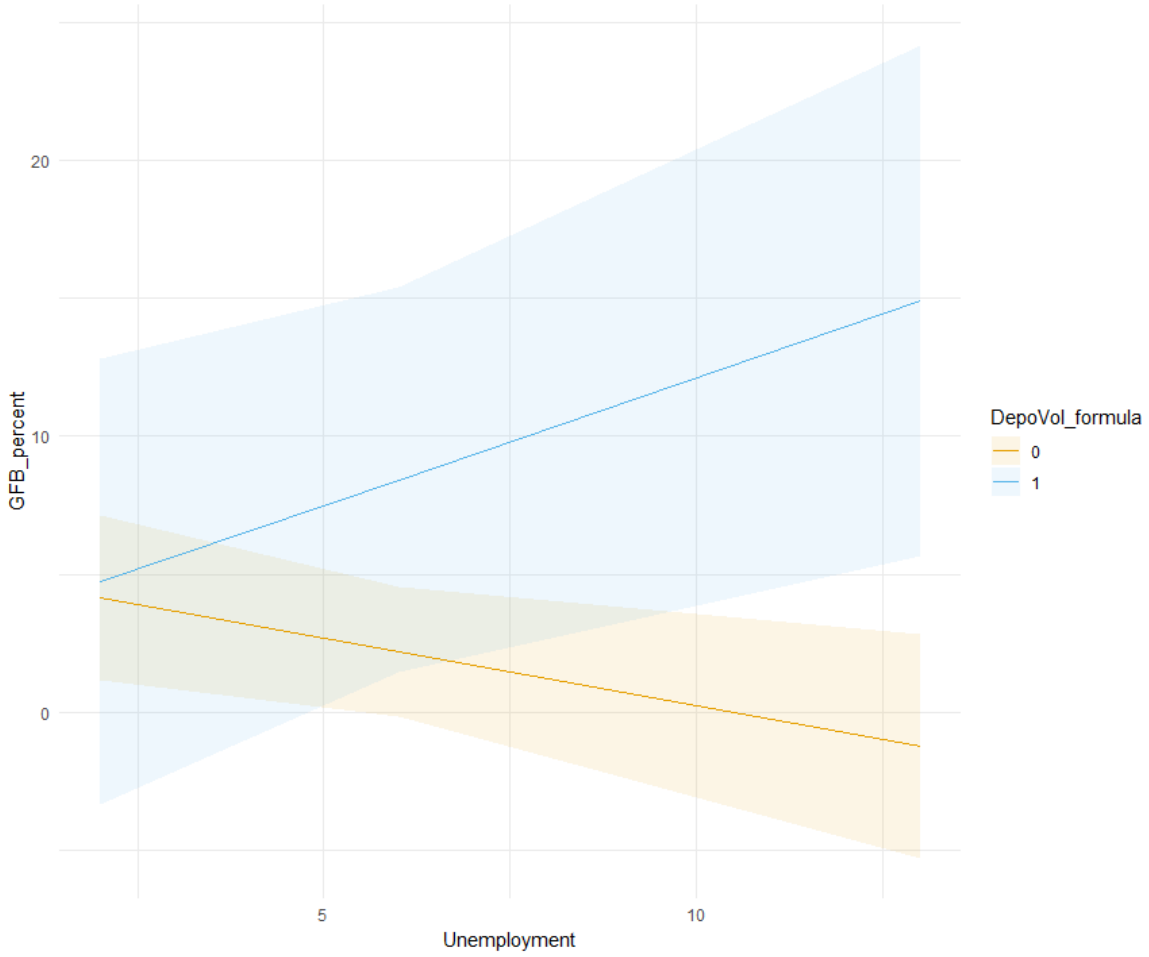
Figure 6 also shows that the effect of the funding source on GFB levels varies depending on the economic condition of the state. When the unemployment rate is approximately 2 percent, the relationship between the funding source and BSF levels shows a positive slope. This is because the net effect of source is 3.82, calculated by adding the base effect of 5.58 to the interaction effect of -1.76 (which is -0.88 multiplied by 2 percent unemployment rate). Conversely, when the unemployment rate rises to around 13 percent, the slope of the relationship becomes negative, as the net effect of source is -5.86, calculated by adding the base effect of 5.58 to the interaction effect of -11.44 (which is -0.88 multiplied by 13 percent unemployment rate).

This suggests that during recessions, states relying more on special revenue tend to have lower GFB levels compared to states using the general fund as a funding source for their BSF. However, it does not necessarily imply that the source has a negative impact on GFB levels during recessions. Instead, this could be attributed to states facing budget shortfall, as indicated by low or negative GFB levels, being more likely to receive federal funds or rely on alternative revenue sources besides general funds.

"Cap" shows insignificant influence on GFB levels across all models. All other deposit rules, including deposit by legislature, depositing revenue surplus, and deposit tied to revenue volatility, have an insignificant impact on GFB levels in all models. These findings do not substantiate the hypothesis 5, which posited that imposing stringent deposit obligation negatively affects GFB levels.

**Figure 7. Interaction Effects of**

**Deposit Tied to Revenue volatility and Unemployment on GFB Levels**



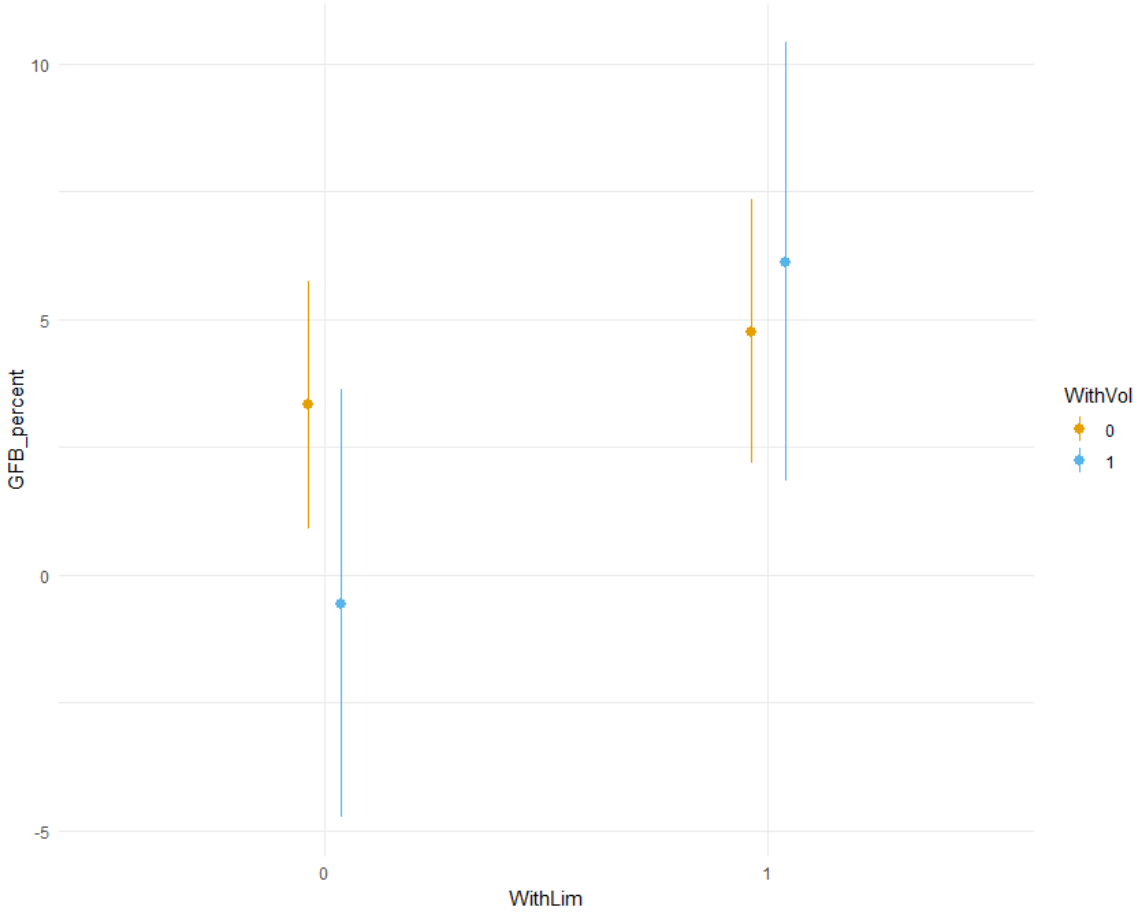

The main effect of "deposits tied to revenue volatility (DepoVol_formula)" on GFB levels is statistically insignificant. However, the interaction term between deposit tied to revenue volatility (DepoVol_formula) and unemployment rate (Unemployment) has a positive coefficient of 0.88 in models 3 and 4. This means that for every one-unit increase in unemployment, the positive effect of deposit tied to revenue volatility on GFB levels increases by 0.88 units.

As depicted in Figure 7, when the unemployment rate is low, around 0 percent, the net effect of “deposits tied to revenue volatility” on GFB levels is approximately 2.51, calculated

by adding the base effect of 2.51 to the interaction effect of 0 (0.88 multiplied by 0 percent unemployment). Conversely, when the unemployment rate is around 13 percent, the net effect of “deposits tied to revenue volatility” on GFB levels becomes significantly positive, at 13.95, calculated by adding the base effect of 2.51 to the interaction effect of 11.44 (0.88 multiplied by 13 percent unemployment). This suggests that during periods of high unemployment, states linking their BSF to revenue volatility have higher GFB levels, while at low unemployment rates, GFB levels are more similar between states with and without this linkage.

**Figure 8. Interaction Effects of**

**Withdrawal Tied to Revenue Volatility and Withdrawal Limit on GFB Levels**



### *6.2.6 Effects of Withdrawal Requirements on GFB Levels*

"Withdrawal by a simple majority vote of the legislature (WithLegis_numeric)" demonstrates statistical insignificance in impacting GFB levels in all models except for model 2. "Withdrawal by revenue shortfall (WithShortfall)" and "withdrawal limit (WithLim)" also show an insignificant impact on GFB levels in all models. "Withdrawal tied to revenue volatility (WithVol)" is not statistically significant in models 1 and 2. However, in models 3 and 4, states that link withdrawal to revenue volatility (WithVol) without imposing withdrawal limits (WithLim) exhibit lower GFB levels by approximately 3.6 to 3.7 percentage points, compared to states that have neither withdrawal tied to revenue volatility nor withdrawal limit ($p < 0.01$).

States that implement both "withdrawal tied to revenue volatility" (WithVol) and "withdrawal limits" (WithLim) show approximately a 5.9 percentage point increase in their GFB levels compared to states that have neither policy. Specifically, the interaction term indicates that when both WithVol and WithLim are present (i.e., both are 1), their combined effect on GFB levels is 5.94 units. This substantial positive interaction suggests that these policies together strongly moderate the negative effect of "withdrawal tied to revenue volatility" (WithVol), leading to a notable positive effect on GFB levels as a share of general fund expenditures.

These observations suggest that *when a state is burdened by multiple stringent regulations hindering the use of the BSF, it is inclined to maintain funds in the GFB account, as it offers a more easily accessible and available option than utilizing the BSF*. However, further research is warranted to validate this initial finding. Other variables, including repayment provision and withdrawal limit, do not have a significant impact on GFB levels.

### *6.2.7 Effects of Control Variables on GFB Levels*

Both disasters and federal IGR do not have a significant impact on GFB levels. A one unit increase in debt per capita variable decreases GFB levels by about 2 percentage points in models 1 through 4, holding all other variables constant ($p < 0.05$). In contrast, GSP boosts GFB levels by about 0.5 percentage points, controlling for all other variables. Both unemployment rates and credit rating show an insignificant impact on GFB levels except for model 2.

The income variable contributes to an increase in GFB levels by approximately 0.6 percentage points ($p < 0.05$) in all models. This finding suggests that states with a wealthier population are more likely to have a general fund surplus. The population variable tends to decrease GFB levels by approximately 2 percentage points ($p < 0.01$). This suggests that states with larger populations have higher spending needs, resulting in a decrease in GFB levels. TEL, election, political partisanship, and division, denoting a disparity in party affiliation between a governor and the legislative majority, are not statistically significant in all models. Fiscal institutions, such as TEL and BBR, also have an insignificant impact on GFB levels across all models.

In summary, the regulations governing BSF deposits have a more pronounced effect on BSF levels compared to withdrawal rules. Specifically, stringent deposit rules, such as cap, deposit revenue surplus, and deposit tied to revenue volatility (formula), tend to substantially increase BSF levels. Meanwhile, strict withdrawal rules, such as withdrawal by revenue shortfall, withdrawal tied to revenue volatility, and withdrawal limits, exhibit an insignificant impact on BSF levels.

On the other hand, the regulations governing BSF withdrawal have a more significant impact on GFB levels. The presence of withdrawal tied to revenue volatility and withdrawal

limits tends to mitigate the negative effects of the revenue volatility rule on GFB levels. This interaction often compels states to place a heavier reliance on GFB levels, which offer greater accessibility compared to the BSF.

In essence, policymakers may consider prioritizing regulations that enhance BSF deposits, particularly those aimed at increasing reserves through stringent deposit rules. Additionally, understanding the impact of withdrawal regulations on GFB levels can inform decisions regarding the allocation of resources and the design of fiscal policies to manage budgetary constraints effectively.

### 6.3. Generalized Synthetic Control Method (GSCM)

To assess the causal effects of policy changes on outcomes, Difference-in-Differences (DD) estimation is one of the most commonly used methods (Xu, 2017a). The DD combines two different quasi-experimental designs, nonequivalent groups design and pre-post comparison group design, to create a better counterfactual situation, addressing selection and history threats (Angrist & Pischke, 2009). The nonequivalent groups design is not adept at isolating causal effects due to *selection threats*, while the pre-post comparison group design before and after the policy may suffer from *history threats* (where current event affects the change in the dependent variable) (Kratochwill et al., 2010). The DD impact is quantified by calculating the pre-post difference for the treatment group and subtracting the pre-post difference for the comparison group: the change in outcome for the comparison group serves as a good counterfactual for the change in outcome for the treatment group in the absence of the policy (Angrist & Pischke, 2009).

The key assumption of the DD design is that there are parallel trends in other factors that can explain the impact of the treatment. These parallel trends imply that the change in the mean value of the outcome in the treatment group, in the absence of treatment, would mirror the change in the mean value of the outcome in the comparison group (Angrist & Pischke, 2009). In many cases, however, data do not support "parallel pretreatment trends," which can be violated for the following reasons: 1) differences in pre-existing trends between treatment and comparison groups; 2) differences in attrition; 3) external events (Abadie et al., 2010, 2015); and 4) the presence of unobserved time-varying confounders (Xu, 2017a). In addition, traditional experimental designs, such as DD or the Instrumental Variable approach, are not viable for our study. This is attributed to the presence of numerous independent variables and

changes in various structural features of BSFs occurring at different times as part of policy interventions.

To relax the parallel trends assumption, I employ the Generalized Synthetic Control method (GSCM) (Xu, 2017a). This method is particularly well-suited for my dataset characterized by changes in various BSF policies occurring at different times. Indeed, the GSCM effectively integrates elements of a case study approach with difference-in-differences analysis, making it well-suited for such datasets. Specifically, the GSCM combines the synthetic control method (SCM) with interactive fixed-effects (IFE) models under a difference-in-differences (Xu, 2017a). The SCM constructs a "synthetic control unit" that is similar to the treatment unit based on important predictors by weighting the control units (Abadie et al., 2010, 2015). In essence, a weighted average of the control units approximates the treated units in the pre-treatment period, serving as a counterfactual. The IFE model is designed to address unobserved time-varying confounders (Bai, 2009). It is estimated by iteratively conducting a factor analysis of the residuals from a linear model and then estimating the linear model, considering the effects of several of the most significant factors (Xu, 2017a).

The GSCM operates within the framework of the synthetic control method, similar to the SCM, as it weights control units based on pre-intervention treated outcomes to predict counterfactuals through cross-sectional correlations between treated and control units (Xu, 2017a). However, unlike the SCM, the GSCM reduces dimensions before reweighting by utilizing a factor model. It treats counterfactuals of treated units as "missing data" and predicts these counterfactuals for post-intervention outcomes using an IFE model (Xu, 2017a). The factor model assumes that time-varying coefficients (or latent factors) interact with unit-specific factor loadings to produce the outcome (Bai, 2009).

According to the generalized synthetic control framework, the outcome for unit *i* at time *t* is expressed as the following equation:

$$Y_i(t) = \delta_{it} D_{it} + x'_{it}\beta + \lambda'_i f_t + \varepsilon_{it} \quad (5)$$

where $D_{it}$ is a "treatment indicator," taking the value of 1 if the unit *i* receives treatment at time t and 0 otherwise; $\delta_{it}$ denotes "heterogeneous treatment effect" on unit *i* at time t; $x_{it}$ indicates a "vector of observed covariates" and $\beta$ is a "vector of coefficients"; $\lambda_i$ represents "factor loadings" and $f_t$ is "unobserved common factors"; and $\varepsilon_{it}$ refers to "unobserved idiosyncratic shocks" for unit *i* at time *t* (Xu, 2017a). Equation (5) assumes that the same factors affect the treated and control units during the observed time periods. The factor component of the model, $\lambda'_i f_t = \lambda_{i1} f_{1t} + \lambda_{i2} f_{2t} + \cdots + \lambda_{ir} f_{rt}$, has a linear, additive form by the assumption of equation (5), covering unobserved heterogeneities (Xu, 2017a).

To use the GSCM, first, I estimate the latent factors, $f_t$, and the coefficients on the covariates, $\beta$, using the control group data; second, "factor loadings for each treated unit," $\lambda_i$, are determined by optimizing a "least squares equation for the treated units' outcomes in the pre-treatment period"; third, counterfactual outcomes in the post-treatment period are constructed based on the estimated factors and factor loadings (Xu, 2017a). The potential outcomes for individual *i* at time *t* are $Y_{it}(1) = \delta_{it} + x'_{it}\beta + \lambda'_i f_t + \varepsilon_{it}$ when $D_{it} = 1$ and $Y_{it}(0) = x'_{it}\beta + \lambda'_i f_t + \varepsilon_{it}$ when $D_{it} = 0$, respectively; thus, the individual treatment effect on treated unit *i* at time *t* is $\delta_{it} = Y_{it}(1) - Y_{it}(0)$ (Xu, 2017a). The ATT is calculated as the average of the observed post-treatment outcomes minus the expected untreated outcomes:

$$\text{ATT(t)} = \frac{1}{N_t}\sum_i [Y_{it}(1) - Y_{it}(0)] = \frac{1}{N_t}\sum_i \delta_{it} \quad (6)$$

where the summation denotes the sum of the individual treatment effects and $N_t$ indicates the number of treated units. This method allows us to compare BSF balances between the treatment group and control group in the post-treatment years (Xu, 2017a).

There are several advantages of the GSCM as follows. First, the SCM can be used only for one treated unit (Abadie et al., 2010, 2015), while the GSCM can cover multiple treated units, observed covariates, and variable intervention periods, thereby constructing treated counterfactuals in a single run (Xu, 2017a). Another strength of the GSCM is that the factor structure can model unobserved time-varying confounders that can take into account heterogeneous treatment effects, unlike difference-in-differences (Zeldow & Hatfield, 2019). Lastly, it provides valid inference, by using a *parametric bootstrap procedure* based on simulated data (Xu, 2017a). However, the limitation of the GSCM is to need more pretreatment data than fixed effects estimators (Xu, 2017a).

The "gsynth" package for R is used for implementing generalized synthetic control methods to estimate the causal effects of BSF policies on BSF balance levels (Xu, 2017b). The states in the treatment groups are compared to control states that are a weighted combination of groups created by using the GSCM (Xu, 2017a). I focus on analyzing the impact of "deposit (withdrawal) tied to revenue volatility" due to their significant impact on BSF (GFB) as stringent regulatory measures. The GSCM offers another rationale for use, as making comprehensive generalizations about deposits (or withdrawal) tied to revenue volatility presents challenges due to the diverse approaches that states employ in linking deposits to revenue or economic conditions. These variations cannot be sufficiently analyzed using fixed effects models alone but warrant detailed case studies. Furthermore, the findings

from the GSCM can serve to validate the consistency of results with those obtained from fixed effects models.

**Table 19. Effect of Deposit Tied to Revenue Volatility (formula) on BSF Levels**

| | **Model 1** | **Model 2** | **Model 3** |
|---|---|---|---|
| DepoVol_formula | 15.28 (8.15)** | 12.7 (5.93)** | 10.89 (6.41)* |
| GFB_percent_lag | 0.03 (0.05) | 0.02 (0.03) | 0.02 (0.03) |
| Number | 1.74 (2.13) | 0.82 (1.34) | 1.02 (1.39) |
| Source_percent | 0.48 (0.29)* | 0.52 (0.24)** | 0.50 (0.32)* |
| Cap_percent | 0.40 (0.14)*** | 0.41 (0.13)*** | 0.40 (0.14)*** |
| DepoSurplus_numeric | 3.55 (1.51)** | 4.13 (1.05)*** | 4.75 (1.13)*** |
| WithLegis_numeric | -2.61 (11.41) | -2.06 (8.43) | -0.50 (7.62) |
| Repay_4bin | -0.13 (1.34) | -0.02 (0.83) | -0.03 (1.20) |
| WithLim | 1.12 (1.35) | 0.66 (1.12) | 0.74 (1.12) |
| Unemployment | -0.32 (0.22)* | -0.50 (0.17)*** | -0.49 (0.17)*** |
| Disasters | | 0.00 (0.00) | -0.04 (0.14) |
| Fed_IGR | | -0.72 (0.63) | -0.66 (0.63) |
| Debt_per_capita | | -0.16 (0.39) | -0.15 (0.39) |
| GSP | | -0.04 (0.04) | -0.04 (0.05) |
| Credit_rating | | 0.07 (0.36) | 0.09 (0.37) |
| Income_thousands | | 0.01 (0.12) | 0.01 (0.13) |
| Population_million | | 0.99 (0.85) | 1.02 (0.90) |
| TEL | | -0.08 (0.09) | -0.09 (0.09) |
| BBR | | -0.80 (1.19) | -0.86 (1.29) |
| Election | | -0.19 (0.17) | -0.20 (0.17) |
| Democrat_share | | 3.74 (2.54) | 3.17 (2.53) |
| Division | | 0.36 (0.24) | 0.27 (0.23) |
| WithShortfall | | | -1.86 (1.53) |

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Note: Standard errors are shown in the parentheses.

### 6.4. Results from Generalized Synthetic Control Method

Table 18 displays the average treatment effect (ATT) of deposit tied to revenue volatility based on the formula on BSF levels, averaged over all periods, as well as the beta coefficients of the covariates. Table 19 presents the ATT of deposit tied to revenue volatility on GFB levels, along with the beta coefficients of the covariates. The treated unit is Connecticut's Budget Reserve Fund, chosen for its ample pretreatment periods. Arizona, Indiana, Michigan, and Virginia, are automatically excluded from the analysis due to their limited number of pre-treatment periods. Consequently, these states neither serve as treated units nor as control units in the GSCM analysis.

Therefore, the remaining states, excluding Alaska, Colorado, Kansas, Montana, Oregon, Wyoming, Arizona, Indiana, Michigan, and Virginia, serve as potential control units. The GSCM algorithm assigns optimal weights to each control state to create a synthetic control unit based on pre-treatment BSF levels and other relevant characteristics. This optimization process minimizes the difference between Connecticut and the synthetic control unit during the pre-treatment period. In other words, the synthetic control is constructed using the weighted average of the control states to replicate Connecticut’s pre-treatment path as closely as possible.

Model 1 includes essential independent variables, such as BSF deposit and withdrawal regulations, alongside unemployment rates. Model 2 extends this by introducing control variables, such as fiscal and economic conditions, sociodemographic factors, state politics, and fiscal institutions, to enhance the fit between a treated state and synthetic controls. Model 3 further expands upon this, by integrating withdrawal due to revenue shortfall (WithShortfall), which is strongly associated with deposit revenue surplus (DepoSurplus_numeric) to check the consistency of the findings.

However, withdrawal tied to revenue volatility (WithVol) has been excluded from all models due to multicollinearity with deposit linked to revenue volatility (DepoVol_formula). This decision stems from Connecticut's simultaneous linking of both deposit and withdrawal to revenue volatility during the same period in 2017. In the GSCM, accurate weight assignment to control units is crucial for creating a synthetic control. Multicollinearity can impede this process, resulting in a synthetic control that fails to adequately match the treated unit's characteristics. Furthermore, multicollinearity can increase variance in estimates, reducing the precision of treatment effect estimates.

As shown in Table 19, there is a noteworthy rise of approximately 11 to 15 percentage points in BSF as a proportion of General Fund expenditures in Connecticut, the state under examination. In other words, implementing a deposit tied to revenue volatility, as determined by the formula (DepoVol_formula), results in higher levels of BSF balance compared to a counterfactual scenario where the BSF is not linked to revenue volatility. This finding supports our hypothesis that stringent BSF rules, characterized by well-defined savings obligations, play a crucial role in enhancing the size of the BSF.

The findings concerning deposit requirements are consistent with the results obtained from fixed effects models. The coefficients for Cap as a percentage of general fund expenditures (Cap_percent) are consistently positive and highly statistically significant. An increase of one unit in Cap leads to a rise in BSF levels by 0.4 percentage points, all else being equal ($p < 0.01$). Similarly, deposit revenue surplus (DepoSurplus_numeric) consistently displays positive coefficients across all models. An increase of one unit in deposit revenue surplus results in an approximate increase of about 4 to 5 percentage points in BSF levels, while accounting for other variables ($p < 0.01$).

In contrast to the fixed effects model, where source indicates a negative impact on BSF levels, “source (Source_percent)” demonstrates a significant positive effect on BSF levels in all GSCM models, leading to an increase of 0.5 percentage points ($p < 0.1$). This finding supports our hypothesis 1, suggesting a positive impact of strict deposit regulations on BSF levels. Among the covariates, General Fund Balance (GFB) levels do not significantly impact BSF levels, diverging from the results from the fixed effects models.

Consistent with fixed effects model, the variable of unemployment rate shows negative coefficients across all models, indicating that higher unemployment rates are associated with lower BSF levels ($p < 0.01$). These findings suggest that BSF levels tend to decrease during economic downturns. However, other control variables, including disasters, federal intergovernmental revenue, debt per capita, credit rating, state politics, and fiscal institutions, are not statistically significant in all models.

Figure 9 illustrates the estimated effects of the deposit tied to revenue volatility, calculated by the formula, on BSF balance levels across various years. The blue dotted line represents the counterfactual BSF balance levels, while the solid black line represents the BSF balance levels of a treated state. The impact of the deposit tied to revenue volatility (formula) is evident in the discrepancies observed between a treated state and its synthetic controls during the post-treatment period. Figure 9 depicts a significant increase in BSF as a percentage of general fund expenditures during the fiscal years 2018 through 2020.

**Figure 9. ATT of deposit tied to revenue volatility on BSF levels over time**

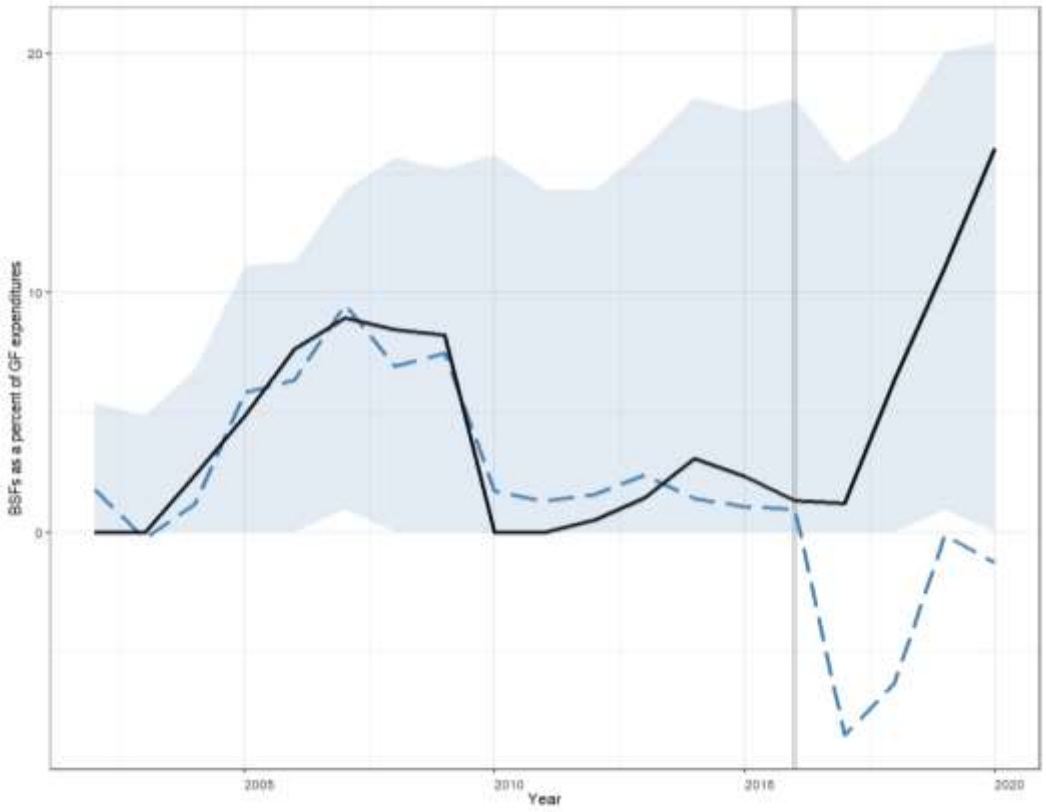


**Table 20. Effect of Deposit Tied to Revenue Volatility (formula) on GFB Levels**

| | **Model 1** | **Model 2** | **Model 3** |
|---|---|---|---|
| DepoVol_formula | 5.52 (11.10) | 5.89 (11.70) | 8.12 (11.39) |
| BSF_percent_lag | 0.06 (0.10) | 0.05 (0.07) | 0.06 (0.08) |
| Number | 1.80 (1.71) | 2.28 (1.40)* | 2.26 (1.35)* |
| Source_percent | 0.54 (1.02) | 0.15 (0.72) | 0.14 (0.68) |
| Cap_percent | -0.13 (0.20) | -0.19 (0.19) | -0.16 (0.20) |
| DepoSurplus_numeric | 1.87 (2.41) | 0.66 (1.69) | -0.04 (1.80) |
| WithLegis_numeric | -0.51 (12.64) | -1.90 (14.88) | -5.03 (10.57) |
| Repay_4bin | 0.10 (1.43) | -0.22 (1.29) | -0.21 (1.09) |
| WithLim | 0.49 (1.89) | 1.64 (6.82) | 1.66 (1.65) |
| Unemployment | -0.32 (0.33) | -0.36 (0.27) | -0.33 (0.27) |
| Disasters | | 0.00 (0.20) | 0.01 (0.20) |
| Fed_IGR | | 0.17 (0.93) | 0.12 (0.96) |
| Debt_per_capita | | -2.40 (0.77)*** | -2.32 (0.76)*** |
| GSP | | 0.04 (0.08) | 0.05 (0.07) |
| Credit_rating | | 0.62 (0.66) | 0.64 (0.61) |
| Income_thousands | | 0.66 (0.22)*** | 0.66 (0.24)*** |
| Population_million | | -1.96 (0.93)** | -2.03 (1.02)** |
| TEL | | -0.02 (0.12) | -0.01 (0.12) |
| BBR | | -1.08 (1.87) | -0.72 (1.96) |
| Election | | 0.17 (0.24) | 0.19 (0.24) |
| Democrat_share | | 0.53 (3.73) | 1.36 (3.76) |
| Division | | 0.06 (0.38) | 0.11 (0.39) |
| WithShortfall | | | 1.61 (2.34) |

$^{***}p < 0.01$; $^{**}p < 0.05$; $^{*}p < 0.1$

Note: Standard errors are shown in the parentheses.

The deposit tied to revenue volatility does not exhibit a significant impact on GFB levels, as indicated in Table 20. Meanwhile, the presence of multiple BSFs (Number) significantly affects GFB levels in models 2 and 3. This implies that states with multiple BSFs are less prone to facing budget deficits or needing to use GFB to address such deficits, compared to states lacking additional BSFs. This aligns with findings from the fixed effects model presented in Table 14. However, none of the other deposit and withdrawal rules demonstrate statistically significant effects on GFB levels. Meanwhile, it appears that debt per capita and population tend to exert a significant negative impact on GFB levels, whereas high income has a positive effect on GFB levels.

**Figure 10. ATT of deposit tied to revenue volatility on GFB levels over time**

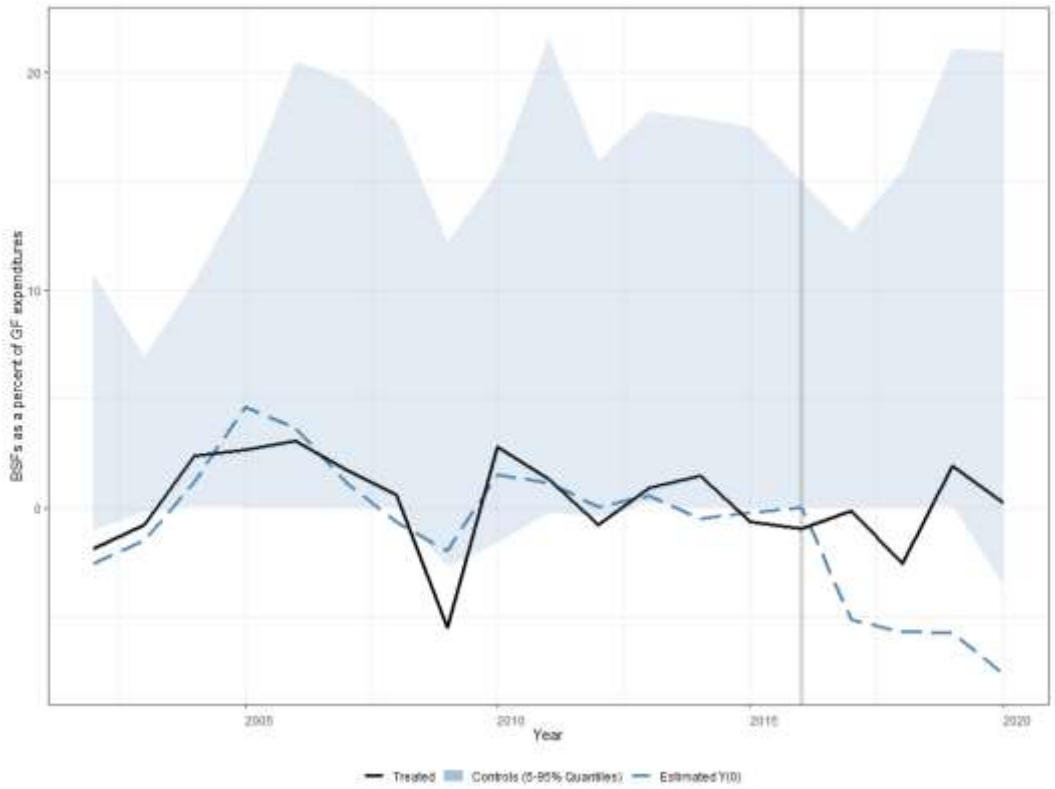


Figure 10 illustrates the estimated effects of the deposit tied to revenue volatility, calculated by the formula, on GFB levels across various years. The blue dotted line represents the counterfactual GFB levels, while the solid black line represents the GFB levels of the treated state. The impact of the deposit tied to revenue volatility on GFB levels is not statistically different between the treated state and its synthetic controls during the post-treatment period.

In sum, the findings underscore a critical policy implication regarding the effectiveness of stringent BSF rules governing BSF. The findings indicate that implementing strict deposit requirements, including source restrictions, high caps, deposits tied to revenue volatility, and depositing revenue surplus, positively influences BSF levels, as demonstrated by the results from the GSCM. The example of Connecticut's practice of tying deposits to revenue volatility through the use of a formula underscores the significance of establishing clear saving obligations within BSF frameworks to enhance their size and resilience. Such policies can serve as valuable tools for state governments in preparing for economic downturns and mitigating fiscal stress.

**Table 21. Summary of Hypotheses and Results**

A. The Effects of BSF Structural Features on BSF Levels

| | Are empirical results supported? | *Hypotheses* | *Fixed Effects* | *GSCM* |
|---|---|---|---|---|
| H1 | **High stringency of deposit requirements** | Positive | | |
| | Source | | | ✓ |
| | Cap | | ✓ | ✓ |
| | Deposit by revenue surplus (high) | | ✓ | ✓ |
| | Deposit tied to volatility (formula) | | ✓ | ✓ |
| H1a | **High stringency of deposit requirements** | Less Positive | | |
| | Source | | | |
| | Cap | | | |
| | Deposit by revenue surplus (high) | | | |
| | Deposit tied to revenue volatility (formula) | | | |
| H2 | **High stringency of withdrawal requirements** | Positive | | |
| | Withdrawal tied to revenue volatility | | | |
| | Withdrawal by revenue shortfall | | | |
| H2a | **High stringency of withdrawal requirements** | Negative | | |
| | Withdrawal tied to revenue volatility | | | |
| | Withdrawal by revenue shortfall | | | |
| H3 | **High stringency of withdrawal restrictions** | Positive | | |
| | Withdrawal limit | | | |
| | Repayment provision (high) | | | |
| H3a | **High stringency of withdrawal restrictions** | Positive | | |
| | Withdrawal limit | | | |
| | Repayment provision (high) | | | |
| H4 | **Unreserved General Fund balance (GFB)** | Positive | ✓ | |

Table 21. Summary of Hypotheses and Results compares hypotheses with the findings from both fixed effects and GSCM models. Specifically, the findings commonly support Hypothesis 1, emphasizing the positive impact of stringent deposit rules, such as high caps, deposit revenue surplus, and deposit tied to revenue volatility. This highlights the importance of establishing clear saving obligations within BSF frameworks to enhance their size. However, empirical results do not support hypotheses 2 and 3, indicating insignificant effects of stringent withdrawal requirements and restrictions on BSF levels.

**Table 21. Summary of Hypotheses and Results**

B. The Effects of BSF Structural Features on GFB Levels

| | Are empirical results supported? | *Hypotheses* | *Fixed Effects* | *GSCM* |
|---|---|---|---|---|
| H5 | **High stringency of deposit requirements** | Negative | | |
| | Source | | | |
| | Cap | | | |
| | Deposit by revenue surplus (high) | | | |
| | Deposit tied to volatility (formula) | | | |
| H5a | **High stringency of deposit requirements** | Less Negative | | |
| | Source | | | |
| | Cap | | | |
| | Deposit by revenue surplus (high) | | | |
| | Deposit tied to revenue volatility (formula) | | | |
| H6 | **High stringency of withdrawal requirements** | Negative | | |
| | Withdrawal tied to revenue volatility | | ✓ | |
| | Withdrawal by revenue shortfall | | | |
| H6a | **High stringency of withdrawal requirements** | Less Negative | | |
| | Withdrawal tied to revenue volatility | | | |
| | Withdrawal by revenue shortfall | | | |
| H7 | **High stringency of withdrawal restrictions** | Negative | | |
| | Withdrawal limit | | | |
| | Repayment provision (high) | | | |
| H7a | **High stringency of withdrawal restrictions** | More Negative | | |
| | Withdrawal limit | | | |
| | Repayment provision (high) | | | |
| H8 | **Budget Stabilization Fund (BSF)** | Positive | ✓ | |

The empirical findings from the fixed effects and GSCM models generally do not support our hypotheses regarding the effects of deposit and withdrawal rules on GFB levels. In the fixed effects models, it is observed that only withdrawal tied to revenue volatility affects GFB levels, whereas stringent deposit rules do not demonstrate a significant impact. Meanwhile, the presence of both withdrawal tied to revenue volatility and withdrawal limit mitigates the negative effect of withdrawal tied to revenue volatility, as indicated by the fixed effects model results. The policy implications regarding these findings will be discussed in Chapter 8.

# 7. QUALITATIVE ANALYSIS

## 7.1 Case Studies

Quantitative research can provide a “general picture of the research problem” (Ivankova et al., 2007, p. 7) because it collects data from a large number of cases to support generalizations (Coppedge, 1997). However, quantitative research has its weaknesses. First, quantitative research runs the risk of “conceptual stretching,” in which dissimilar cases are grouped together into the same variable to obtain a larger sample (George & Bennett, 2005, p. 19). Second, quantitative research cannot account for "contextual factors" beyond those explicitly captured within the variables being measured (Starman, 2013, p. 37). Some variables, such as norms or organizational culture, are hard to measure. I conduct qualitative case studies to address quantitative method weaknesses, serving three distinct purposes.

The first objective is to provide a detailed elucidation of how causal mechanisms operate in individual cases. While the characteristics of Budget Stabilization Funds are quantified and coded for regression analysis, the BSF rules themselves do not inherently reveal whether states adhere to BSF deposit and withdrawal requirements. Case studies aid in enhancing our comprehension of the contextual factors within states and in identifying any disparities between the stipulated BSF rules and their actual implementation. The second objective is to unravel complex causal relationships and intricate interactions among various BSF rules, when states have undergone multiple changes to their BSF structures within a similar timeframe. In these scenarios, case studies allow us to disentangle the intricate web of causal connections, tracking individual developments.

The third aim of these case studies is to elucidate or complement the statistical results (Bowen, 2009). As previously discussed, notable discrepancies exist between the results

derived from fixed effects models and GSCM concerning specific deposit and withdrawal rules. Employing case studies serves to illuminate these disparities in the results of these two modeling methodologies and facilitates the identification of the impacts of policy interventions on fiscal reserves (Abadie et al., 2010). Case studies provide qualitative insights into real-world contexts, data peculiarities, and unique dynamics contributing to divergent model outcomes. They bridge the gap between statistical analysis and practical insights, enhancing research robustness and applicability.

### 7.2 Document Analysis

For the case studies, the document analysis is used to collect and analyze the text data on *1) BSF structural features, 2) fiscal conditions and fiscal practices (e.g., compliance with BSF deposit and withdrawal requirements and balanced budget requirements), and 3) political and fiscal context* to understand policy actions of state governments. Document analysis refers to reviewing documents and interpreting data to understand and develop empirical knowledge (Roller & Lavrakas, 2015). As a research method, document analysis helps the researcher understand meaning and uncover insights relevant to the research problem (Merriam, 2009). It can generate "rich descriptions of a single phenomenon, event, organization, or program" (Bowen, 2009, p. 29).

Documents, which I reviewed, include state statutes, local newspapers, professional and government watchdog organizations' reports, and state budget documents. First of all, I reviewed the legal documents on BSF structural features and describe how selected states' BSF characteristics differ from other states. Second, I reviewed state budget documents (e.g., Annual Comprehensive Financial Reports and Budget Books) to understand selected states' financial management practices, specifically their adherence with deposit and withdrawal

requirements and reliance on fiscal reserves to adjust budgets. Local newspapers and watchdog organizations' reports were reviewed to understand financial management practices and state politics (e.g., the relationship between the executive and the legislative branches).

These documents not only produce research data, but also help verify findings or help corroborate evidence from other sources (Bowen, 2009). Data analysis involves providing a detailed explanation of BSF deposit and withdrawal rules and states' fiscal and political context. To validate the findings, I combine different sources of information (e.g., document analysis and regression analysis results) for "triangulation," referring to the combination of methodologies in the study of the same phenomenon (Bowen, 2009; Corbin & Strauss, 2012), and compare the results of quantitative and qualitative research. The use of multiple sources of data and methods reduces potential biases, thereby increasing the credibility of the findings (Eisner, 1991).

### 7.3 Deposit Tied to Revenue Volatility

As previously mentioned, it is challenging to make broad generalizations about deposit tied to revenue volatility since states employ diverse approaches to link deposits to revenue or economic conditions. These disparities cannot be adequately represented by the binary variable denoting the presence of a deposit tied to revenue volatility. Collapsing various deposit or withdrawal mechanisms into a single variable can lead to a "conceptual stretching" (George & Bennett, 2005, p. 19).

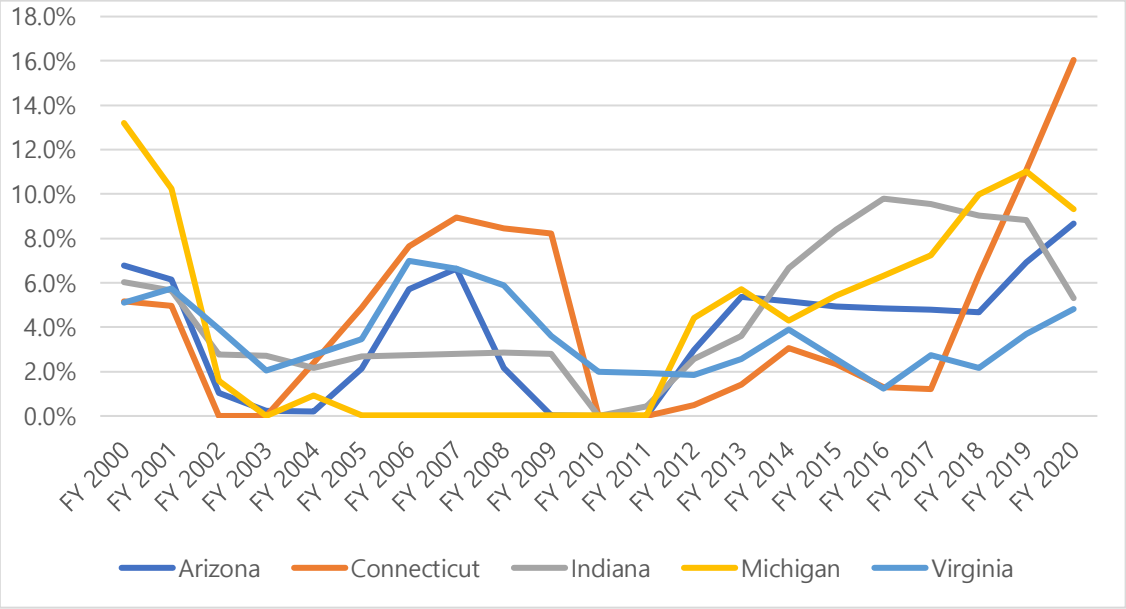
Despite the existence of stringent deposit and withdrawal regulations, some states did not effectively enforce these regulations. For example, the deposit tied to revenue volatility was either temporarily suspended or the actual implementation of the rule was obstructed due to the use of budgetary tactics. This is why the case studies focus on the practical application

of the deposit/withdrawal tied to revenue volatility in certain states. Six states, including Arizona, Connecticut, Indiana, Michigan, Oklahoma (Revenue Stabilization Fund), and Virginia implemented a statutory formula that links deposit to revenue or economic volatility.

This study specifically focuses on three out of the six states considered: Connecticut, Arizona, and Virginia. Among them, the Budget Reserve Fund (BRF) in Connecticut is singled out in the case study of deposit tied to revenue volatility for a distinct reason. Connecticut implemented a rule linking BRF deposit and withdrawal to revenue volatility in 2017 as discussed in Section 6.4, unlike other states (e.g., Arizona) had already adopted similar rules when they established their BSFs. By studying Connecticut's BRF, we can effectively compare its BRF levels in the post-treatment periods to those in the pre-treatment periods.

**Figure 11. Trends of Budget Stabilization Funds' Levels:**

**Arizona, Connecticut, Indiana, Michigan, and Virginia**



Connecticut's BRF will be compared to Arizona's Budget Stabilization Fund and Virginia's Revenue Stabilization Fund. This is due to the fact that the BSF balances of Arizona and Virginia have consistently remained lower than those of other states. Virginia's Budget Stabilization Fund averages approximately 3.6 percent of general fund expenditures, while Arizona's stands at 3.8 percent for the period from 2000 to 2020, as shown in Figure 11. In contrast, other states maintain an average of 4.3 to 4.6 percent. Notably, the BSF levels in these states have shown an upward trend since fiscal year 2011. However, Arizona and Virginia did not experience this upward trajectory, particularly between 2014 and 2018. The following sections will explore how these states have implemented the "deposit (or withdrawal) tied to revenue volatility" differently.

Oklahoma's Revenue Stabilization Fund is not included in this case study. Enacted in 2016 through HB 2763, the fund serves as a reserve to protect the state budget from fluctuations in gross production and corporate income tax collections. Deposits into this fund depend on state revenues recovering to pre-2014-16 tax decline levels. The threshold was reached for the first time in fiscal year 2019, making it likely that deposits into this fund would be required in fiscal year 2021.[46] However, our dataset covers the period from 2002 to 2020, so fiscal year 2021 is not within its scope.

[46] Oklahoma Policy Institute. "Rainy Day Fund." Accessed on January 19, 2024. Retrieved from https://okpolicy.org/resources/online-budget-guide/budget-process/essentials-of-public-budgeting/rainy-day-fund/.

### *7.3.1 Connecticut's Budget Reserve Fund*

The state of Connecticut adopted its Budget Reserve Fund (BRF) in 1978 and had not changed its BRF rules from 2003 to 2016. In 2017, Connecticut increased its cap and linked both deposit and withdrawal to revenue volatility. During the June Special Session, Public Act 17-2, effective Oct. 31, 2017, changed the withdrawal rule of Connecticut's BRF.[47] The 2017 Amendment granted the General Assembly authority to transfer funds from the BRF to the General Fund, contingent on a 1 percent or more decline in General Fund revenues forecasted by the consensus revenue estimate. Public Act 17-2 also introduced a provision directing personal income tax revenue exceeding a threshold of $3.15 billion received from personal income tax to the BRF. This threshold amount, set at $3.15 billion, is "adjusted annually by the compound annual growth rate of personal income in the state over the preceding five calendar years," using data taken from the U.S. Bureau of Economic Analysis (Conn. Gen. Stat. § 4-30a).

In fiscal year 2018, Connecticut's BRF ended with a substantial balance of $1.2 billion, a significant increase from the previous year's $212.9 million, primarily due to this new provision (p. 17).[48] The total collections from estimated and final income tax payments amounted to $4.6 billion, resulting in a significant revenue volatility deposit of $1.5 billion into the BRF, according to the Annual Comprehensive Financial Reports (ACFR) for fiscal year 2018 (p. 17). In fiscal year 2019, the BRF saw a significant increase, reaching $2.5 billion, more than doubling its prior year's balance of $1.2 billion. A $949.7 million volatility transfer was made to the BRF

[47] 2017 Ct. ALS 2, 2017 Ct. P.A. 2, 2017 Ct. SB 1502 (October 31, 2017). Public Act 18-49 amended Subsection (a) by adding a reference to the affected business entity tax imposed under Section 12-699. This amendment was effective from May 31, 2018. Furthermore, Public Act 18-81 amended Subsection (a) by designating the existing provision regarding the transfer of estimated and final payments of personal income tax as Subdivision (1), making amendments to add an annual adjustment of the threshold amount, and adding Subdivision (2) that relates to the amendment of the threshold amount by the General Assembly. This amendment was effective from May 15, 2018, corresponding to the fiscal year 2018.

[48] State of Connecticut. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2018.

according to the fiscal year 2019 ACFR. At the close of fiscal year 2019, the BRF balance was $1,185.3 million, roughly 6.2 percent of net General Fund appropriations. With the addition of a $370.67 million surplus transfer, the BRF's year-end balance exceeded $2.5 billion, approximately 13 percent of net General Fund appropriations for fiscal year 2020. This signifies a substantial increase in the BRF balance based on fiscal year 2019 results.

In Connecticut, both deposit and withdrawal are linked to revenue volatility over a similar period. This suggests a potential interaction effect between "deposit tied to revenue volatility (DepoVol_formula)" and "withdrawal tied to revenue volatility (WithVol)." However, due to the problem of multicollinearity, the interaction effect between DepoVol_formula and WithVol is omitted from fixed effects models, as illustrated in Table 9. Connecticut also made changes to both "cap" and "deposit tied to revenue volatility (DepoVol_formula)" in 2017. However, the results derived from the fixed effects models do not provide evidence supporting the interaction effect between the "cap" and "deposit tied to revenue volatility," as illustrated in Table 9.

In summary, the evidence from budget documents further corroborates the significant positive impact of revenue volatility linked to deposits on Connecticut's BRF. This finding aligns with the results observed in both fixed effects models and GSCM models, as discussed in Chapter 6.

### *7.3.2 Arizona's Budget Stabilization Fund*

Arizona uses a statutory formula to link contributions to its Budget Stabilization Fund (BSF) with rises in total personal income tax collections, adjusted for inflation. The deposit or withdrawal from the BSF in a specific fiscal year is determined by comparing the annual growth rate of real adjusted Arizona Personal Income for that calendar year, ending in the fiscal year, to

its 7-year trend growth rate (A.R.S. § 35-144). The Arizona Economic Estimates Commission (EEC) makes the final determination of the appropriations or transfers from the BSF for the upcoming budget year on June 1.[49]

However, *the statutory formula does not automatically trigger deposits or withdrawals, but it requires legislative authorization*, according to the Arizona's Annual Comprehensive Financial Report (ACFR). Originally, the State Treasurer has the authority to temporarily divest funds from the BSF to meet immediate cash needs in the general fund when there is a negative cash balance.[50] However, the 2000 amendment to Section 35-144 of the Arizona Revised Statutes eliminates the obligation for the state treasurer to allocate or transfer the earnings from investments to the BSF.[51]

After the 2000 amendment, the State Legislature, with the Governor's agreement, has the power to decrease deposits or increase withdrawals by a two-thirds majority vote. The discretion exercised by Arizona's legislature appears to impact the BSF balances, by decreasing its required deposits. Indeed, *the legislature discontinued making contributions to the BSF for the fiscal years 2015*[52]*, 2016, 2017*[53]*, and 2018*.[54] As illustrated in Figure 4, Arizona's BSF balances declined from 5.2% to 4.9% of general fund expenditures, and then remained at around 4.7% to 4.8% from fiscal years 2016 to 2018.

It is worth emphasizing that in 2015, the annual growth rate reached 3.07%, surpassing the trend growth rate, which is represented by the 7-year average growth of 0.42%. Consequently, the calculation of Arizona Department of Revenue for fiscal years 2015 – 2016

[49] State of Arizona. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2018.
[50] 1990 Ariz. ALS 6, 1990 Ariz. Ch. 6, 1990 Ariz. HB 2011 (July 5, 1990).
[51] 2000 Ariz. ALS 193, 2000 Ariz. Sess. Laws 193, 2000 Ariz. Ch. 193, 2000 Ariz. SB 1426 (April 7, 2000).
[52] State of Arizona. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2015 (p. 252).
[53] State of Arizona. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2017 (p. 252).
[54] State of Arizona. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2018 (p. 266).

suggests that a transfer of $237 million should be made to Arizona's BSF.[55] Likewise, during the fiscal years 2016-2017, the annual growth rate stood at 3.17%, exceeding the trend growth rate represented by the 7-year average of 2.26%. Accordingly, based on the calculations of the Arizona Department of Revenue for those fiscal years, it is recommended that a transfer of $84.3 million be allocated to Arizona's BSF.[56] Nevertheless, the legislature did not allocate any contributions to the BSF for the fiscal years 2015 through 2017.

### *7.3.3 Virginia's Revenue Stabilization Fund*

In 1992, Virginia established a Revenue Stabilization Fund (RSF) through a constitutional amendment. The General Assembly must appropriate the estimated amount required for deposit to the RSF accordance with Article X, Section 8 of the Constitution of Virginia.[57] The Constitution mandates a deposit based on the following formula specified in the state's constitution: "Deposit $\geq 0.5 \times$ [(certified tax revenues) $\times$ (fiscal year's percent increase—average increase over six years)]." This deposit can exclude revenue growth resulting from tax rate increases or exemption repeal for up to six years. Growth in certified tax revenues can be excluded from the computation for a maximum of six calendar years from the year of the tax rate increase or exemption repeal's effectiveness. Withdrawals are authorized exclusively when the appropriated general fund revenues exceed the revised general fund revenue forecast

[55] Arizona Department of Revenue. Economic Estimates Commission Fiscal Year 15/16 Calculations for Budget Stabilization Funds. Retrieved from https://azdor.gov/sites/default/files/2023-03/REPORTS_ESTIMATES_2016_bsf-fy2015-16.pdf.
[56] Arizona Department of Revenue. Economic Estimates Commission Fiscal Year 16/17 Calculations for Budget Stabilization Funds. Retrieved from https://azdor.gov/sites/default/files/2023-03/REPORTS_ESTIMATES_2017_bsf-fy2016-17.pdf.
[57] Va. Const. art. X, § 8 The amendment ratified November 3, 1992 and effective January 1, 1993—Added the second, third, and fourth paragraphs. Retrieved from https://law.lis.virginia.gov/constitutionexpand/article10/.

by more than 2.0 percent of the certified tax revenues collected in the latest fiscal year (Va. Const. art. X, § 8).

Virginia, unlike many other states that mandate depositing the entirety of their revenue growth into their Budget Stabilization Funds (BSF), *only allocates half of the increase in tax revenues*, as specified by the previously mentioned formula. Saving only half of the revenue growth means that the BSF will accumulate funds at a slower rate compared to states that deposit the entire revenue growth. Over time, this can result in a smaller overall BSF balance. During fiscal years 2005 through 2010, a "dual computation" was performed to assess potential deposits with and without considering the effects of changes in tax rate structure, according to the Annual Comprehensive Financial Report (ACFR) for the fiscal year 2011.[58]

The dual computation of Virginia's RSF typically involves two key components: First, Computation Based on Revenue Growth resulting from tax rate increases, as mentioned before. For example, the law might stipulate that a certain percentage (e.g., 1%) of the prior year's revenues should be deposited into the RSF. In addition to the revenue-based computation, Virginia's RSF may also include a component that takes into account economic conditions and budgetary needs. When the state's economy is strong and revenues are growing, this component might require additional deposits into the RSF.

However, a dual computation was not required for fiscal year 2011, according to the ACFR for fiscal year 2011. Based on fiscal year 2011 revenue collections, a deposit of $132.7 million is required for fiscal year 2013, as specified in Article X, Section 8 of the Constitution of Virginia.[59] Thus, neither withdrawals nor deposits, aside from interest earnings, were required

[58] State of Virginia. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2011 (p.92). Retrieved from https://www.doa.virginia.gov/reports/ACFReport/2011/2011ACFReport.pdf.
[59] Ibid.

for the RSF in fiscal year 2011. In Virginia, a withdrawal from the RSF can only occur when the allocated general fund revenues surpass the revised general fund revenue forecast by more than 2 percent of the certified tax revenues collected from the prior year. This condition is established by the regulations specified in Article X, Section 8 of the Constitution of Virginia and Section 2.2-1830 of the Code of Virginia.

In fiscal year 2015, a withdrawal of $467.7 million was authorized from the fund (p. 93).[60] In fiscal year 2016, a withdrawal of $235.5 million was disbursed from the RSF (p. 92).[61] The budget deficit arose due to a 3.1 percent increase in total final budget expenditures, exceeding the original budget by $612.2 million in 2016. The substantial rise can be chiefly attributed to budgeted expenses in the categories of individual and family services, which increased by $292.6 million, administration of justice with a $115.7 million increment, capital outlay rising by $82.9 million, and education expenses surging by $72.2 million (p. 34).[62] Individual and family services in the state of Virginia typically refer to a range of social and support services provided to individuals and families, such as child welfare services and funding for health services to promote their well-being and address various needs.

From 2014 to 2018, Virginia was governed by Democratic Governor Terry McAuliffe. During McAuliffe's tenure, the state legislature was under Republican control, and he exercised his veto power extensively, setting a record for the number of vetoes by a Virginia governor (Schneider, 2017). For instance, McAuliffe exercised a veto on a bill aimed at restricting funding for Planned Parenthood, an organization that offers abortion services alongside other healthcare

[60] State of Virginia. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2015. Retrieved from https://www.doa.virginia.gov/reports/ACFReport/2015/2015ACFReport.pdf.
[61] State of Virginia. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2016. Retrieved from https://www.doa.virginia.gov/reports/ACFReport/2016/2016ACFReport.pdf.
[62] Ibid.

options (Reuters, 2017). The bill, approved by the Republican-controlled legislature, aimed to prohibit the state from allocating funds to clinics that performed abortions not covered by Medicaid, the federal healthcare program for low-income individuals (Reuters, 2017). Amid the partisan division between a Democratic governor and a Republican-controlled legislature in Virginia, *the governor wielded his veto power to safeguard welfare services for low-income individuals and families*. Consequently, a budget deficit arose, compelling the state to tap into its RSF, notably during fiscal years 2015 and 2016.

### *7.3.4 Connecticut's BRF Compared to Arizona's BSF and Virginia's RSF*

How does Connecticut's deposit requirement work, and what are the differences when compared to Arizona and Virginia's cases? Connecticut's ability to implement its deposit and withdrawal rule with minimal political intervention sets it apart from Arizona and Virginia, reflecting a distinctive regulatory approach. Specifically, Connecticut's deposit rule operates with a high degree of automation, wherein *deposits and withdrawals are automatically triggered based on a statutory formula*. This streamlined process minimizes the need for direct legislative authorization.

In contrast, Arizona, despite having a statutory formula in place, requires legislative approval even in favorable economic conditions when revenue surpluses occur. Consequently, Arizona has sometimes refrained from making transfers from the general fund to its BSF, highlighting the involvement of legislative discretion in the deposit process, a key point of differentiation with Connecticut. Furthermore, the political landscape further distinguishes Connecticut from Virginia. Unlike Virginia, where a period of political conflict unfolded from

2014 to 2018, marked by a partisan division between a Democratic governor and a Republican-controlled legislature, Connecticut experienced relative political stability.

In 2017, Connecticut was among six states with a Democratic state government trifecta, which occurs when one political party holds the governor's office, a majority in the state Senate, and a majority in the state House (Ballotpedia, 2016). This political alignment in Connecticut minimized the need for the governor to employ veto power to defend specific programs favored by their political supporters, as was the case in Virginia. Connecticut's political environment was less contentious during this period, unlike Virginia. The lower level of disagreement between Connecticut's governor and the legislature regarding the budget, contrasting with the contentious political landscape in Virginia, seems to have played a role in fostering increased savings.

### 7.4. Deposit Revenue Surplus

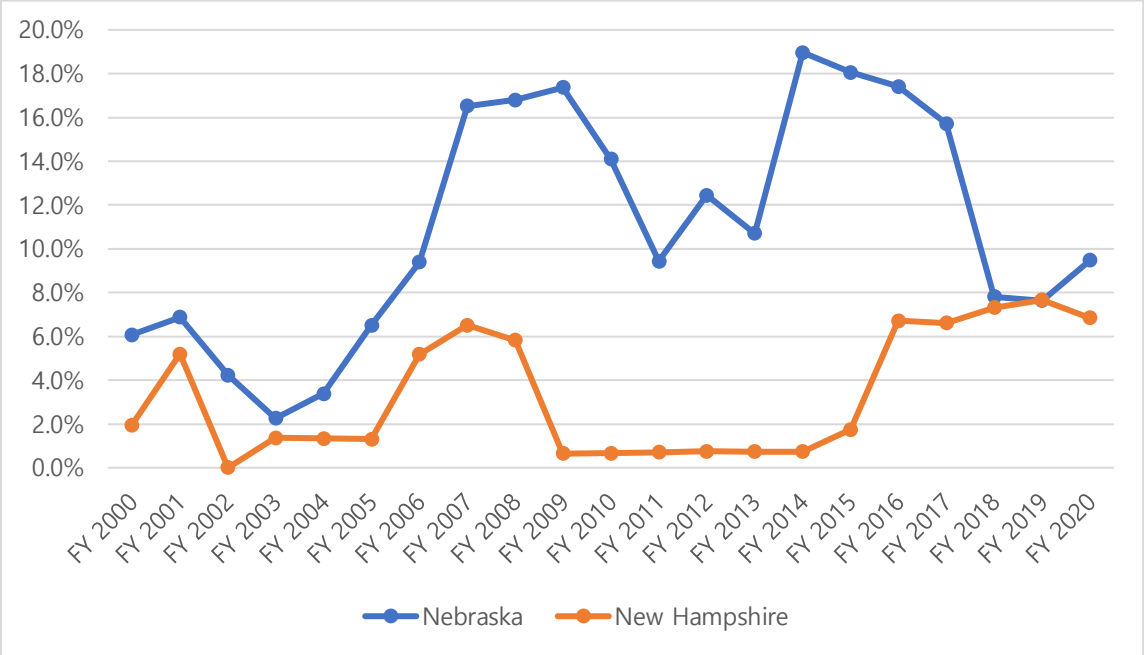
The variable labeled “deposit revenue surplus (DepoSurplus_numeric)” has exhibited a significant impact on the levels of the BSF in both fixed effects and GSCM models. This result is consistent with our initial hypothesis. This study aims to comprehend the causal mechanism underlying the deposit revenue surplus, specifically examining two distinct funds: New Hampshire's Revenue Stabilization Fund, commonly known as the Rainy Day Fund (RDF), and Nebraska’s Cash Reserve Fund (CRF).

The selection of these cases is motivated by New Hampshire’s recent modification of the deposit requirements, introduced through the 2016 amendment, which will be elaborated on in the subsequent subsection. In the case of Nebraska, although the state did not alter its deposit rule from 2003 to 2020, there has been notable fluctuation in its balance levels from 2002 to 2020, as shown in Figure 12. Consequently, the focus of this examination is on determining

whether withdrawals from the CRF mitigate the positive impact of depositing revenue surpluses on its overall balance.

**Figure 12. Trends of Budget Stabilization Funds' Levels:**

**Nebraska and New Hampshire**




### *7.4.1 New Hampshire's Revenue Stabilization Fund*

New Hampshire established the Revenue Stabilization Reserve Account, now known as the Rainy Day Fund (RDF), in 1986, as outlined in the New Hampshire Revised Statutes Annotated (RSA) 9:13-e. The amendment, introduced by Chapter 158:41, Laws of 2001, mandates that at the end of every fiscal biennium and all subsequent ones, any surplus, determined via official audit per RSA 21-I:8, I(h), would be transferred to the RDF.

However, in any given fiscal year, "the total of such transfer shall not exceed half of the total potential maximum balance allowable under paragraph V.[63] It means that the amount of surplus funds transferred from the General Fund to the RDF in any given fiscal year cannot be more than half of the 10 % of the actual general fund unrestricted revenues, which is maximum balance allowable. This restriction is in place to ensure that the transfer of surplus funds does not deplete the General Fund excessively. However, *the aforementioned restriction on the amount of transfer was removed by the 2016 amendment under Chapter 237*.[64] Consequently, New Hampshire implemented the RDF policy that allows for the deposit of surplus funds into the RDF without any limitations.

By conducting a case study of New Hampshire's RDF, we can accurately contrast its RDF balance levels during the post-treatment periods with those observed in the pre-treatment periods. It is crucial to emphasize that the funds residing in the RDF cannot be used for any other purpose without specific approval from two-thirds of each house of the Legislature and the Governor. This provision ensures that the funds in the account are safeguarded for deficit reduction and requires a significant majority consensus for any deviation from this purpose. In the event of a General Fund undesignated fund balance deficit at the end of a fiscal biennium, a transfer from the reserved for RDF may only be executed if the General Fund's unrestricted revenues are lower than the budgeted amount. The transfer amount is restricted to the lesser of the General Fund undesignated fund balance deficit.

Chapter 319:33, Laws of 2003, the transfer from the RDF to the General Fund is authorized in the situation of a General Fund deficit at the end of fiscal year 2003. At June 30, 2004, there were no transfers to or from the RDF. Therefore, the balance remained at $17.3

[63] 2001 NH ALS 158, 2001 NH Ch. 158, 2001 NH HB 170 (July 5, 2001).
[64] 2016 NH ALS 237, 2016 NH Ch. 237, 2015 NH HB 1527 (June 10, 2016).

million, according to the Annual Comprehensive Financial Report (ACFR). for FY 2004.[65] As per Chapter 177:53, Laws of 2005, the biennial transfer of surplus funds was temporarily suspended. Consequently, in fiscal year 2005, no transfers were made either into or out of the Rainy Day Fund (RDF). However, Chapter 35:1, Laws of 2006 directed that any undesignated general fund surplus for the fiscal year ending June 30, 2005, exceeding $30.5 million, should be transferred to the revenue stabilization reserve account (p. 10).[66] Consequently, in fiscal year 2006, an amount of $51.7 million was transferred to the RDF, increasing the balance to $69.0 million as of June 30, 2006. The State's RDF remained at a steady $9.3 million balance from 2009 until 2015.

During fiscal year 2015, however, the RDF balance saw its first increase, rising to $22.3 million.[67] Furthermore, in fiscal year 2015, the implementation of Chapter 214, Laws of 2014 took effect; this legislative directive specified that when the Department of Justice receives judgment or settlement funds exceeding $1 million, the initial 10 percent of those funds must be allocated to the RDF.[68] While the RDF balance did increase in fiscal year 2015 compared to previous levels, it remains at 1.7% of general fund expenditures. This level is still considered modest when compared to reserves in other states. Moving into fiscal year 2016, the State received substantial environmental litigation settlement payments, totaling $307.2 million; thus, this resulted in a substantial $30.7 million boost to the RDF's balance.[69] Additionally, due to revenues exceeding expectations, an additional $40 million was transferred to the RDF during

[65] State of New Hampshire. Annual Comprehensive Financial Report for the fiscal year ended June 30, 2004.
[66] State of New Hampshire. Annual Comprehensive Financial Report for the fiscal year ended June 30, 2006.
[67] State of New Hampshire. Annual Comprehensive Financial Report for the fiscal year ended June 30, 2019.
[68] Ibid.
[69] Ibid.

the fiscal year, culminating in a balance of $93.0 million as of June 30, 2016, according to the 2019 ACFR.

The 2016 amendment outlined in Chapter 237 played a role in augmenting the RDF balance by modifying the statutory framework for RDF contributions. However, it should be noted that the growth of the RDF balance in New Hampshire was also influenced by revenue surpluses with robust economic conditions and decisions made by both the governor and the legislature. As per the press release, bipartisan legislation signed in 2016 bolstered the Rainy Day Fund by $40 million.[70] The press release further highlights that former Governor Hassan (2013-2017) envisions the potential complete restoration of the Rainy Day Fund by the end of the biennium. To advance this objective, she advocated for and successfully obtained legislative approval for a new law that removes the previous cap on single-year transfers into the Rainy Day Fund, which was formerly restricted to 10 percent of the prior year's unrestricted general fund revenues, approximately $140-$150 million.[71]

In 2017, Chapter 156 of the Laws of 2017 set a new statutory limit stating that any surplus, once enough funds were transferred to reach a $100 million balance in the Rainy Day Fund (RDF), should be directed to the Public School Infrastructure Fund. This mandate resulted in the transfer of surplus funds exceeding fiscal year 2017 estimates (excluding a $0.9 million deposit) to the RDF, increasing it to $100 million.[72] A subsequent transfer of $6.1 million from the fiscal year 2017 surplus contributed to this total. In 2018, Chapter 162 required an additional $10 million from FY 2018 excess revenues to be allocated to the RDF, elevating its balance to

[70] Press Release. (2016, September 30). Governor Hassan Announces Surplus of $130 Million for FY 16. An Official New Hampshire Government Website. Retrieved from https://www.nh.gov/news/2016/documents/pr-2016-09-30-surplus-fy16.pdf.
[71] Ibid.
[72] New Hampshire State Treasury. (2018). New Hampshire information statement 2018. Retrieved from https://www.nh.gov/treasury/documents/nh-information-statement-2018.pdf.

$110 million. Furthermore, Chapter 345 in 2019 directed $5 million of FY 2019 excess revenues, bringing the RDF's total to $115.3 million. This chapter also established a cap on RDF transfers, leaving $192.5 million in undesignated General Fund surplus as of June 30, 2019, to be carried forward into the next biennium.

In summary, *New Hampshire enacted a substantial policy change in 2016, removing the restriction on RDF transfers and enabling the state to deposit its entire revenue surplus into the fund. This change, driven by a collaborative effort between the governor and the legislature, resulted in a substantial increase in the RDF balance*. This finding aligns with the results obtained from both the fixed effects and GSCM models, revealing a positive impact of deposit revenue surplus on BSF levels.

### *7.4.2 Nebraska's Cash Reserve Fund*

The state of Nebraska established the Cash Reserve Fund (CRF) within the state treasury in 1983. In Figure 5, Nebraska's Cash Reserve Fund (CRF) saw a notable increase of 14.2 percentage points from FY 2004 to 2007 and an additional 8.3 percentage points from FY 2013 to 2014. The Nebraska case study aims to identify whether this surge from 2003 to 2007 is due to a stringent deposit rule, such as depositing revenue surplus into CRF, or other factors. The Cash Reserve Fund is composed of two primary funding sources. The initial source consists of general funds. By statutory mandate, any revenues exceeding certified forecasts are required to be transferred from the General Fund to the Cash Reserve Fund.[73]

The second funding source originates from federal funds. The 2003 amendment specified that the Cash Reserve Fund is to receive federal funds obtained by the State of Nebraska for

[73] Nebraska Unicameral Legislature. Appropriations Committee Preliminary Report. FY2009-10/FY2010-11 Biennial Budget. February 2009 (p. 5). https://nebraskalegislature.gov/pdf/reports/fiscal/2009prelim.pdf.

general government purposes, federal revenue sharing, or general fiscal relief of the state, in addition to transfers from other funds.[74] For example, Nebraska received $29 million in the late fiscal year 2003 as a part of the "Jobs and Growth Tax Relief Act of 2003," a federal fiscal relief. An additional $29 million was also received in fiscal years 2005-2006.[75] These funds were allocated to the Cash Reserve Fund, serving as a financial support to the state. However, federal funds, being much smaller than general funds as a CRF funding source, sporadically contribute to CRF levels. Therefore, it is challenging to assert that federal funds are crucial for improving CRF levels.

For example, a statutory requirement led to a significant transfer of $262 million from the General Fund cash account—nearly ten times larger than the federal funds received in fiscal year 2005—to the Cash Reserve Fund due to the higher-than-anticipated revenues in 2005.[76] However, this transfer was offset by a $146 million payment made on August 1, 2005, from the Cash Reserve Fund to settle a lawsuit against the State related to a low-level radioactive waste site, according to the 2007 ACFR. In July 2007, a statutory transfer of $191 million was made from the General Fund to the CRF, as required by law. Statutory disbursements of $93 million from the CRF occurred in July 2007, leaving a balance of $614 million as of July 31, 2007.

However, the upward trend in Cash Reserve Fund levels slows down in fiscal years 2008-2009, and it decreases until 2011. The Cash Reserve Fund can be used for legislatively mandated

[74] 2003 Neb. ALS 798, 2003 Neb. Laws 798, 2003 Neb. LB 798 (May 26, 2003). https://advance-lexis-com.proxy.cc.uic.edu/api/document?collection=statutes-legislation&id=urn:contentItem:48SJ-2RY0-0031-30PY-00000-00&context=1516831.

[75] Nebraska Unicameral Legislature. Appropriations Committee Preliminary Report. FY2005-6/FY2006-07 Biennial Budget. February 2005. http://govdocs.nebraska.gov/epubs/L3720/B005-2005.pdf#search=%22appropriations%20committee%20preliminary%20report%22.

[76] State of Nebraska, Annual Comprehensive Financial Report Fiscal Year Ended June 30, 2007 (p. 25). http://govdocs.nebraska.gov/epubs/A2100/A001-2005.pdf#search=%22comprehensive%20annual%20financial%20report%202005%22.

transfers to other funds as specified by law.[77] These discretionary transfers allow the Legislature to allocate funds for specific purposes or projects as needed and within the limits of the law.[78] In other words, while stringent deposit rules contribute to enhancing CRF balance levels, legislative discretion can still diminish the CRF levels augmented by these requirements.

For instance, actual receipts for fiscal years 2007-2008 exceeded the forecast by $116.9 million; however, $109 million (net) was utilized for various transfers during the 2007 session.[79] For fiscal year 2009, there were transfers from the Job Training Cash Fund to the CRF as per Laws 2005, LB 427, § 2; however, the Legislature utilized $109 million of Cash Reserve Funds in the 2007 session and $21 million for various purposes, including water rights, state fair relocation, roads operations, and cultural preservation.

The CRF initially decreased in 2010 and 2011 due to statutory transfers and borrowing for the Ethanol Production Incentive.[80] In 2012, the CRF experienced growth through a combination of net transfers and additional revenues. This increase was facilitated by borrowing a total of $4.46 million in FY2011-12, with repayment reflected in FY2012-13. Additionally, a statutory transfer of $37 million was made from the CRF to the General Fund during this period.[81] There were also other net transfers into the Fund, totaling $144 million, and additional revenues of $9 million. As a result, the Cash Reserve Fund balance increased to $429 million as of June 30, 2012.[82]

---

[77] State of Nebraska, Annual Comprehensive Financial Report Fiscal Year Ended June 30, 2007 (p. 25).
[78] Nebraska Legislature. Appropriations Committee. (2003). Preliminary report of the appropriations committee. http://govdocs.nebraska.gov/epubs/L3720/B005-2003.pdf#search=%22appropriations%20committee%20preliminary%20report%22.
[79] Nebraska Unicameral Legislature. Appropriations Committee Preliminary Report. FY2009-10/FY2010-11 Biennial Budget. February 2009 (p. 5). https://nebraskalegislature.gov/pdf/reports/fiscal/2009prelim.pdf.
[80] Nebraska Unicameral Legislature. Appropriations Committee Preliminary Report. FY2013-14/FY2014-15 Biennial Budget. February 2009. https://nebraskalegislature.gov/pdf/reports/fiscal/2013prelim.pdf.
[81] State of Nebraska, Annual Comprehensive Financial Report Fiscal Year Ended June 30, 2013.
[82] Ibid.

In early 2014, the Cash Reserve Fund stood at $384 million, according to the 2015 ACFR.[83] During that year, a net statutory transfer of $335 million from the General Fund significantly increased the Cash Reserve Fund's balance, resulting in a total of $719 million as of June 30, 2014; in 2015, a statutory transfer of $68 million from the Fund to the General Fund and other net transfers totaling $77 million occurred, maintaining a robust Fund balance of $728 million as of June 30, 2015.[84] This substantiates the hypothesis that a stringent deposit rule contributes to increasing Nebraska's Cash Reserve Fund levels.

In 2018, net statutory transfers to the General Fund were $225 million, while transfers out amounted to $116 million, leaving the Cash Reserve Fund at $340 million by June 30, 2018.[85] Excess General Fund revenue, in accordance with statutory requirements, led to a $62 million transfer to the Cash Reserve Fund, elevating the balance to $397 million by November 30, 2018; however, in FY 2018, $118.23 million was transferred from the Cash Reserve Fund to the Capital Construction Fund, followed by transfers of $10.01 million and $10.43 million in 2019 and 2020, respectively.[86]

In sum, *the notable rise in the CRF can be attributed to an unexpected surge in revenue and a stringent deposit rule that mandate the saving of such revenue surpluses in the CRF*. Nevertheless, this accrued CRF has been consistently tapped into by legislative appropriations for specific purposes (e.g., capital projects) or to offset budget deficits. Consequently, the CRF exhibits substantial fluctuations marked by sizable deposits and frequent withdrawals.

---

[83] State of Nebraska, Annual Comprehensive Financial Report Fiscal Year Ended June 30, 2015. (p. 24).
[84] Ibid.
[85] State of Nebraska, Annual Comprehensive Financial Report Fiscal Year Ended June 30, 2018.
[86] Nebraska Legislature. (2018). Preliminary report on the 2018 fiscal year budget. https://nebraskalegislature.gov/pdf/reports/fiscal/2018prelim.pdf.

### 7.5 Funding Source

The variable "source" demonstrates a negative influence on BSF levels in the fixed effects models. However, this negative effect is mitigated by the interaction term between "source" and the unemployment rate. In contrast, "source" shows a positive impact on BSF levels in the Generalized Synthetic Control Method that supports our initial hypothesis. To understand the mechanism of the effect of the source on BSF levels, I focus on analyzing the Texas Economic Stabilization Fund (ESF) and Hawaii's Emergency and Budget Reserve Fund (EBRF).

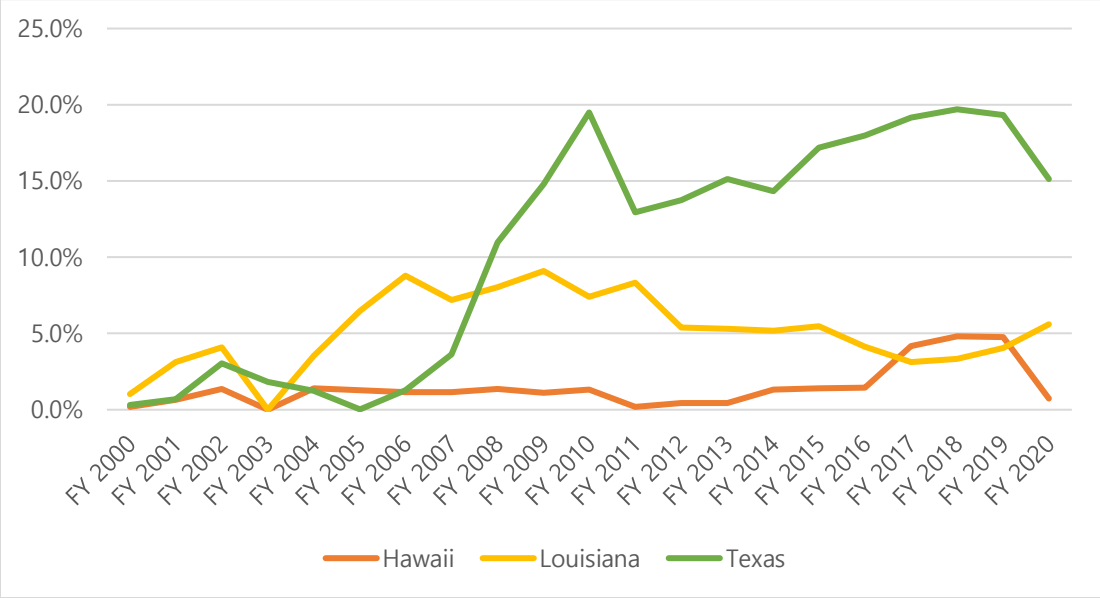
Among the states with BSF funded by special revenues, we have excluded Alabama, Alaska, Oklahoma, and Wyoming, as previously mentioned. In the case of West Virginia, the Revenue Shortfall Reserve Fund-Part B received funding from the Tobacco Settlement Medical Trust Fund in fiscal year 2006, while Part A is funded by a surplus from the general fund.[87] Nebraska's Cash Reserve Fund received federal funds for fiscal years 2004, 2005, and 2006, as discussed in the previous section; otherwise, it is funded by the general fund.[88]

Excluding the previously mentioned states, Hawaii, Louisiana, and Texas stand out as the remaining states relying on special revenue as a funding source for their BSFs. Thus, the study performs a comparative analysis of three key fiscal reserves: Texas' Economic Stabilization Fund (ESF), Hawaii's Emergency and Budget Reserve Fund (EBRF), and Louisiana's Budget Stabilization Fund (BSF). This comparison is especially noteworthy due to the significant growth observed in Texas' ESF since the fiscal year 2008, in stark contrast to Louisiana's BSF, which has exhibited a declining trend since the fiscal year 2009, as illustrated in Figure 13. Notably, Hawaii's BRF has consistently maintained the lowest balance, as portrayed in Figure 13.

[87] State of West Virginia. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 2006.
[88] Nebraska Unicameral Legislature, Ninety-Ninth Legislature, First Session. (2005, February). Appropriations Committee Preliminary Report. http://govdocs.nebraska.gov/epubs/L3720/B005-2005.pdf#search=%22appropriations%20committee%20preliminary%20report%22.

**Figure 13. Trends of Budget Stabilization Funds' Levels:**

**Hawaii, Louisiana, and Texas**




### *7.5.1 Saving Rules for Texas' Economic Stabilization Fund*

The Economic Stabilization Fund (ESF) came into existence through a constitutional amendment passed in 1988. Its formal establishment is outlined in Article III, Section 49-g of the Texas Constitution, and it became operational on September 1, 1989.[89] According to the constitutional amendment establishing the fund, the Comptroller is required to transfer to the ESF 1) half of any unencumbered positive balance of general revenues at the end of each fiscal biennium; 2) an amount of general revenue equal to 75 percent of the increase in oil production tax collections compared to fiscal year 1987; 3) an amount of general revenue equal to 75 percent of the increase in natural gas production tax collections compared to fiscal year 1987; 4) The Legislature may appropriate additional funds with a three-fifths vote.

[89] Sec. 49-g. Economic Stabilization Fund; Allocation of Certain Oil and Gas Production Tax Revenue., Tex. Const. Art. III, § 49-g.

Appropriation of funds requires a three-fifths majority vote from present members under two conditions: when the comptroller certifies that the current biennium's general revenue appropriations surpass the available funds for the remaining period, or when estimated revenues for the upcoming biennium are anticipated to fall short of the current biennium's expected revenues. For any purpose, but with a two-thirds majority vote of members present.[90] If the actual revenue shortfall exceeds the estimated one, the comptroller will transfer necessary funds from general revenue to the ESF to prevent exceeding the estimated shortfall. If changes in tax rates or bases by the legislature contribute to revenue differences between biennium, calculations will adjust to reflect what would have occurred without those changes.

From the mid-1980s until September 2003, the inflation-adjusted cost of a barrel of crude oil on NYMEX consistently remained under $25 in 2008 dollars.[91] However, a significant shift occurred in 2003 when the price started to climb, exceeding $30 per barrel. This upward trajectory continued, reaching $60 by August 11, 2005, marking a substantial increase. The peak of this upward trend was observed in July 2008 when the price of crude oil reached a remarkable $147.30 per barrel.[92] The rise in the price of crude oil had a favorable impact on Texas's budget. The fiscal year 2008 ended on a positive note, with a closing balance of $6.8 billion in general revenue-related funds, following the required constitutional transfers to the ESF.[93] As a result, there was a significant boost in the ESF balance, which reached 19.5% of general fund expenditures. Nevertheless, the U.S. economic recession and a notable slowdown in the Texas economy had an adverse effect on the ESF, leading to a reduction in ESF levels to 12.9% of

[90] Ibid.
[91] Crude Oil EmiNY Weekly Commodity Futures Price Chart : NYMEX. https://futures.tradingcharts.com/chart/QM/W.
[92] Ibid.
[93] The State of Texas. Annual Comprehensive Financial Report Fiscal Year Ending August 31, 2008. (p. 35).

general fund expenditures. However, starting in 2011, Texas' ESF levels experienced consistent growth, culminating in fiscal year 2018 with a remarkable increase to 19.7% of general fund expenditures. The most substantial surge in ESF levels took place in fiscal year 2015, with an impressive increase of about 2.9 percentage points, rising from 14.3% in 2014 to 17.2% in 2015.

The November 2014 constitutional amendment not only directed a portion of oil and gas tax revenue to the State Highway Fund, but also imposed the requirement that the ESF maintain a "sufficient" level of reserves.[94] Nonetheless, neither the state constitution nor state law provides a precise value for this "sufficient fund balance"; to determine the appropriate amount, a Joint Select Committee conducts an assessment and defines the "sufficient fund balance" before each regular legislative session, presenting their recommendation to the Legislature (Costello et al., 2016). As per the Committee Membership History of the Texas Legislature, a Joint Select Committee on the Economic Stabilization Fund Balance, established on August 26, 2014, was comprised of the following members: Rep. Myra Crownover (Cochair), Sen. Jane Nelson (Cochair), Sen. Robert Nichols (Vice Chair, Sen. Brian Birdwell, Sen. Kevin Eltife, Rep. Patricia Harless, Rep. Abel Herrero, Rep. John Otto, Rep. Sylvester Turner, and Sen. John Whitmire.[95] Although the Legislature has the authority to establish a different amount, the committee's proposed value becomes effective by default. During the 2014-2017 biennium, the sufficient fund balance was established at $7 billion, according to the minutes of Joint Select Committee, held on December 11, 2014.[96] For the 2018-2019 biennium, it was increased to $7.5 billion.[97]

---

[94] The Texas Constitution, Article 3. Legislative Department, section 49-g. https://statutes.capitol.texas.gov/Docs/CN/htm/CN.3.htm#3.49-g.

[95] Texas Legislature Online. Committee Membership. Joint Committee on Economic Stabilization Fund Balance, Select (C850), Legislature: 83(3) – 2013. https://capitol.texas.gov/committees/MembershipCmte.aspx?LegSess=833&CmteCode=C850.

[96] Minutes, Joint Select Committee on Economic Stabilization Fund Balance, Select. (2014, December 11). https://capitol.texas.gov/tlodocs/83R/minutes/pdf/C8502014121110001.PDF.

[97] Minutes, Joint Select Committee on Economic Stabilization Fund Balance, Select. (2018, November 30). https://capitol.texas.gov/tlodocs/85R/minutes/pdf/C8502018113010001.PDF.

In 2017, Texas faced a natural disaster with Hurricane Harvey. The Legislature has appropriately allocated funds from the ESF to support Harvey recovery efforts in both the House and Senate versions of the current session's supplemental bill. While most ESF expenditures contribute to the "constitutional spending limit," imposing a high ceiling, it does provide some level of restriction (Ginn & Marquette, 2019). This is due to a constitutional provision outlined in Article VIII, Section 22 (a), which stipulates that appropriations subject to the spending limit cannot increase at a rate exceeding the estimated growth of the state's economy. In simpler terms, money spent from the ESF is counted as part of overall government spending. This means using ESF funds can increase the total government expenditure allowed before reaching the constitutional spending limit. Even if the Legislature intends to use the ESF as a discretionary fund, there are inherent constraints in place (Ginn & Marquette, 2019).

In summary, *the Economic Stabilization Fund (ESF) primarily derives its funding from severance taxes generated from oil and gas production, with occasional contributions from surpluses in the general fund*. The revenue from oil and gas production plays a pivotal role in bolstering the ESF balances in Texas. While the constitutional spending limit can be a factor influencing ESF withdrawals, it is not the most significant factor contributing to ESF growth. A Joint Select Committee plays a crucial role in determining a "sufficient fund balance," while the Comptroller is responsible for depositing a portion of general fund surpluses and revenue generated from oil and gas severance taxes. The notable contribution of revenue generated from severance taxes to the enhancement of ESF balances in Texas is consistent with the findings observed in the GSCM, as depicted in Table 19.

### *7.5.2 Hawaii's Emergency and Budget Reserve Fund*

Hawaii Act 304, Section 3 (a) establishes the emergency budget and reserve fund as a special fund under the director of finance's administration.[98] Subsection (b) of the emergency budget and reserve fund provision states that 40% of the tobacco settlement funds and appropriations authorized by the legislature constitute the fund. Furthermore, any interest accrued from the fund's balance will be allocated to the general fund. This funding source is distinct from the source of severance tax revenues in Texas, even if they are coded as "1" for the variable denoting "source."

The purpose of Hawaii's Emergency and Budget Reserve Fund (EBRF) is to function as a temporary supplemental funding source for the state during emergencies, economic downturns, or unforeseen revenue reductions. This fund is designated for various critical purposes, including sustaining essential public health, safety, and welfare programs, executing counter-cyclical economic and employment initiatives during economic downturns, repairing facilities or services affected by disasters, and responding to other emergencies as declared by the governor or deemed urgent by the legislature, as specified in subsection (d) of Hawaii Act 304, Section 3. Such appropriations necessitate a two-thirds majority vote in both houses of the legislature. However, it is essential to acknowledge that there remains a lack of clarity regarding the specific conditions that must be met for the use of the EBRF in addressing revenue shortfalls.

In 2002, as per Hawaii Session Laws, Act 16, Section 24, which took effect on July 1, 2002, a noteworthy amendment was made. Specifically, the amendment altered subsection (a) by replacing the term "emergency budget and reserve fund" with "emergency and budget reserve fund." Moreover, this amendment involved a substitution where "24.5 %" was introduced in

[98] Hi. Act 304, SB 1034 (July 7, 1999) § 2.

place of the previous "40 %" of the moneys received from the Tobacco Settlement moneys as outlined in section 328L-2(b)(1).[99] Furthermore, a significant amendment in 2009 entailed alterations to the tobacco settlement moneys. These changes involved the replacement of "24.5 percent of the moneys" with "15 percent" in subsection (b)(1) in the 2009 amendment.[100] *These alterations indicate a continual reduction in the funds deposited into the EBRF from the proceeds of the tobacco settlement*.

In accordance with Hawaii Act 138, also known as 2009 Hi. SB 2806, which was signed into law on May 25, 2010, a provision states that if the state's general fund revenues surpass those of the preceding fiscal years for two consecutive fiscal years by a margin of 5%, then 5% of the remaining state general fund balance at the close of the fiscal year will be directed to the EBRF. However, transfers will not take place if the balance of the Emergency and Budget Reserve Fund equals or exceeds 10% of the general fund revenues from the previous fiscal year.

This condition is designed to establish a safeguard for the state, enabling it to save a portion of its revenue surplus when experiencing economic growth or increased revenue. However, *the requirement for a consecutive 5% increase in revenue for two consecutive fiscal years sets a relatively high bar for fund transfers to the EBRF*. As a consequence of this threshold, the balance in the EBRF remained notably low, typically representing only about 0.2-1.5% of general fund expenditure until fiscal year 2017. Indeed, although the general fund maintained balances exceeding 5% of general fund revenues in fiscal years 2014 and 2015, the 2016 Legislature is not obligated to make a deposit into the EBRF; this is because in fiscal year

[99] 2002 Hi. ALS 16, 2002 Hi. Act 16, 2001 Hi. HB 2613 (April 12, 2002).
[100] 2009 Hi. ALS 119, 2009 Hi. Act 119, 2009 Hi. SB 292 (June 15, 2009).

2014, general fund revenues fell below 5% of the prior year's revenues, while in fiscal year 2015, general fund revenues exceeded 5% of the prior year's revenues (p. xv).[101]

Therefore, *the 2009 amendment relaxed the BSF deposit requirement, establishing a high threshold for allocating funds to the EBRF and reducing the contribution from the tobacco settlement as a funding source*. Consequently, despite the economic boom from 2013 to 2016, the EBRF balance remained within the range of 0.2% to 1.5% of general fund expenditures until fiscal year 2016. Following fiscal year 2017, the state of Hawaii experienced a notably modest increase in EBRF levels, ranging from 4.2% to 4.8% of general fund expenditures between 2017 and 2019. However, it should be noted that in comparison to the substantial increases in BSF levels observed in many states during the same period, Hawaii's EBRF increase was relatively small.

### *7.5.3 Louisiana's Budget Stabilization Fund*

The state of Louisiana established the Budget Stabilization Fund during the 1998-99 fiscal year, replacing the Revenue Stabilization and Mineral Trust Fund.[102] In order to establish and maintain the account, legislators are required to allocate a minimum of $25 million annually or 25% of any officially acknowledged state surplus, whichever amount is greater, as described in subsection A(3).[103] Additionally, during periods of increased mineral revenue, a portion of certain oil and gas income must be directed towards the BSF, as described in A(2)(a).

[101] State of Hawaii. (2015, December 21). The FY 2017 Executive Supplemental Budget. Budget in Brief Prepared by the Department of Budget and Finance.
[102] State of Louisiana. Annual Comprehensive Financial Report for the Fiscal Year Ended June 30, 1998 (p. 78).
[103] § 39:94. Budget Stabilization Fund, La. R.S. § 39:94 (Current through the 2023 First Extraordinary and Act 344 of the 2023 Regular Session with exceptions to Act 150 and Act 279).

However, Louisiana's approach to its Budget Stabilization Fund (BSF) differs from that of other states. While many states, such as Alaska and Wyoming, deposit all revenue generated from severance tax into their BSFs, Louisiana has established a distinct threshold known as the "base," set at $950 million for mineral revenues. This means that *only mineral revenues, primarily consisting of severance tax and royalty collections, surpassing this base amount are eligible for deposit into the BSF.* Although this was the case during the initial years following the establishment of the savings account, more recently, *the state has not been able to meet these criteria due to declines in both oil and gas prices as well as production levels*.[104]

Louisiana has only deposited its mineral revenue into the state's BSF for fiscal years 2003-2004 ($38.7 million), 2004-2005 ($206 million), and 2005-2006 ($108.5 million). However, since fiscal year 2007, mineral revenue exceeding the cap had not been allocated to the BSF until fiscal year 2022. This information was obtained from data provided by the Department of Treasury through a Freedom of Information Act (FOIA) request. During its peak in the 2008-09 financial year, for example, the BSF reached an impressive sum of nearly $854 million. Over time, however, governors and lawmakers frequently utilized this account, leading to a significant decrease in its balance, which dwindled to about $287 million by the 2016-17 budget year.[105]

In the fiscal year 2018, the BSF balance experienced an increase, rising from $286.8 million to $321 million.[106] However, it is important to note that these deposits did not originate from mineral revenues. This surplus emerged because the fiscal year 2018 concluded with a surplus of $308 million, indicating an excess of revenues over state government expenditures.[107]

---

[104] Procopio, Steven. (2022). PAR Snapshot. Louisiana Builds Rainy Day Fund. The Public Affairs Research Council of Louisiana. https://parlouisiana.org/wp-content/uploads/2023/02/PAR-Snapshot-10.12.22.pdf.
[105] Procopio, Steven. (2022). PAR Snapshot. Louisiana Builds Rainy Day Fund. The Public Affairs Research Council of Louisiana. https://parlouisiana.org/wp-content/uploads/2023/02/PAR-Snapshot-10.12.22.pdf.
[106] State of Louisiana. Annual Comprehensive Financial Report for the Year Ended June 30, 2018. https://www.doa.la.gov/media/d4cfwjlv/cafr-2018.pdf.
[107] Ibid.

Interest earnings, $7.2 million, was also transferred to the BSF, according to the data obtained the Department of Treasury. However, it should be noted that no allocation or deposit to the fund can occur if such action would result in the fund's balance surpassing four percent (4%) of the total state revenue receipts from the previous fiscal year.[108]

According to the 2018 Annual Comprehensive Financial Report (ACFR), severance taxes totaled $461.0 million in fiscal year 2018 (p. 28).[109] However, the report did not include information concerning the amount of royalty collections for the same fiscal year. According to State economist Greg Albrecht's projections, it was expected that Louisiana's mineral revenue would amount to approximately $528 million for the fiscal year 2018. *This figure fell considerably below the $950 million threshold required for automatic contributions from mineral revenue to the BSF*.[110]

The Revenue Estimating Conference consistently projects that mineral revenues will remain in a range, fluctuating from $678 million in fiscal year 2019 to an estimated $834 million in fiscal year 2023.[111] Again, this projection falls short of the $950 million threshold required for automatic transfer from mineral revenue to the BSF. Thus, revenues generated from severance taxes and royalties have rarely been deposited into the BSF due to the high threshold (base amount) for automatic deposits, which stands in stark contrast to the situation in Texas.

In summary, Texas' Economic Stabilization Fund (ESF) stands apart from Hawaii's Emergency and Budget Reserve Fund (EBRF) and Louisiana's Budget Stabilization Fund (BSF) due to *differences in the mandatory portion of contributions from special revenues and the underlying legislative intent*. Texas benefits significantly from severance tax revenue, which

[108] § 10.3. Budget Stabilization Fund, La. Const. Art. VII, § 10.3.
[109] State of Louisiana. Annual Comprehensive Financial Report for the Year Ended June 30, 2018.
[110] Revenue Estimating Conference. (2017, December 14). State Revenue Outlook. Legislative Fiscal Office.
[111] Revenue Estimating Conference. (2019, April 10). State Revenue Outlook. Legislative Fiscal Office.

serves as a substantial contributor to its ESF. In contrast, Louisiana's BSF does not see the same level of contribution from severance taxes due to the high threshold (base amount) requirement. Furthermore, Hawaii has been reducing its deposits from the tobacco settlement fund by altering the deposit rules pertaining to the mandatory portion of contributions from this fund.

In addition, Texas' Joint Select Committee has demonstrated a willingness to bolster the ESF's balance, resulting in a substantial fund reserve. Conversely, Louisiana's governors and lawmakers have often tapped into the BSF, resulting in a notable decrease in its balance over time, rather than demonstrating a commitment to bolstering the BSF. Similarly, Hawaii has established a high bar for allocating funds to the EBRF, hindering its ability to accumulate savings. These disparities imply that the approaches taken by Hawaii and Louisiana could be a primary factor contributing to the negative coefficients of the funding source in a panel data fixed effects model.

### 7.6 Repayment Provision

The “repayment provision” variable exerts a negative effect on BSF levels in fixed effects models, as shown in Tables 9 and 10, but this effect is moderated during economic downturns. Meanwhile, it is statistically insignificant in the GSCM, as demonstrated in Table 19. This observation diverges from our initial hypothesis, which suggested that the repayment provision improves BSF levels. Consequently, this section delves into an investigation into the reasons behind the insignificant impact of the repayment provision on BSF levels. The repayment provision is adopted by the following states: Illinois, Iowa, Mississippi, Missouri, Rhode Island, Texas, and West Virginia.

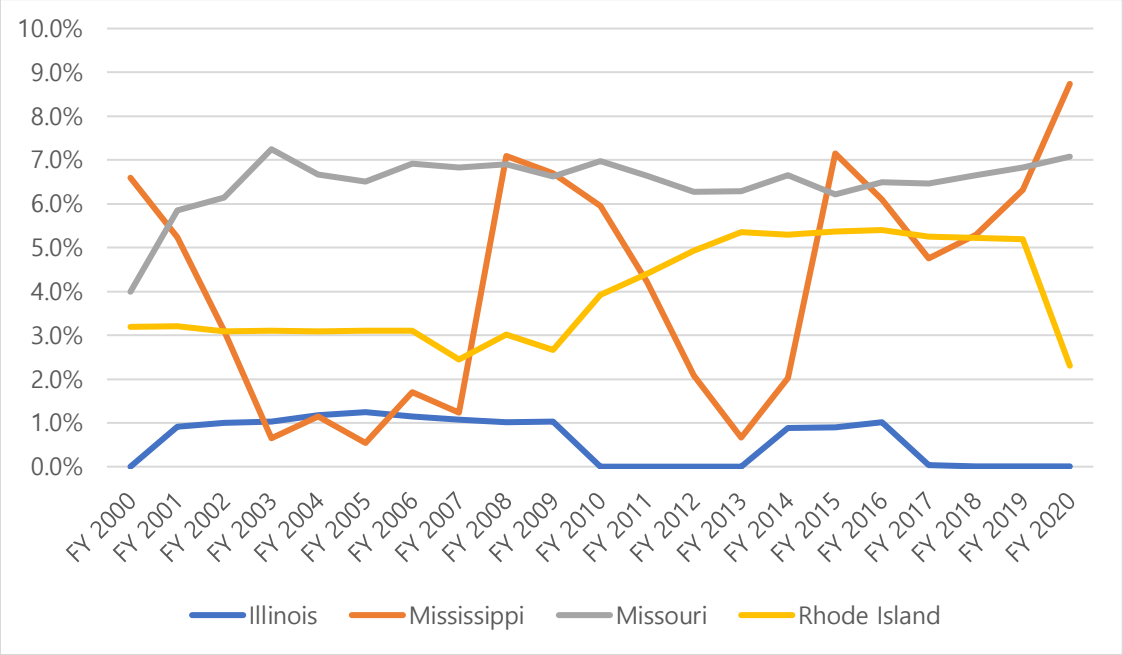
However, both Iowa and West Virginia have established two BSFs each. In Iowa, the Cash Reserve Fund has a stringent repayment provision, while the Economic Emergency Fund does not. Similarly, West Virginia's Revenue Shortfall Reserve Fund-Part A has strict repayment provisions, while Part B lacks such provisions, providing more flexibility. Thus, the situations in these two states differ from those in other states that operate only one BSF. As previously discussed, Texas maintains a larger balance in its Economic Stabilization Fund, thanks to funding derived from severance tax revenue. This sets Texas apart from other states that rely just on the general fund as their primary funding source.

Excluding the states mentioned earlier—namely, Illinois, Mississippi, Missouri, and Rhode Island—this study explicitly focuses on the cases of Mississippi and Illinois for several compelling reasons. In the case of Missouri, the state has retained its Budget Reserve Fund rules without modification since 2000, and its fund balance has consistently hovered around 6-7% for the past two decades. Similarly, Rhode Island has maintained its Budget Reserve Account at relatively stable levels, approximately 3% of general fund expenditures prior to a 2009 amendment.

Following this amendment, there was a modest increase, reaching approximately 5% of general fund expenditures in 2013, and this percentage has been maintained without significant fluctuations until 2019. Stable BSF levels in Missouri and Rhode Island suggest two scenarios: either funds borrowed from the BSF are promptly repaid in compliance with the state's requirement for reimbursement within the same fiscal year, or they have refrained from borrowing from their BSFs to avoid the burden of repayment.

**Figure 14. Trends of Budget Stabilization Funds' Levels:**

**Illinois, Mississippi, Missouri, and Rhode Island**




In contrast, Mississippi's Working Cash Stabilization Reserve Fund (WCSRF) has exhibited substantial fluctuations from 2000 to 2020. Therefore, it is imperative to investigate the factors contributing to these fluctuations and assess the effectiveness of the repayment provision in this context. Furthermore, Mississippi has instituted a withdrawal limit, imposing spending restrictions on its BSF. Specifically, Mississippi can transfer a maximum of "fifty million dollars" from the Reserve Fund to the general funds in order to alleviate deficits (Miss. Code Ann. § 27-103-203). Therefore, Mississippi's WCSRF serves as a suitable case for understanding the impact of the repayment provision and withdrawal limit on WCSRF levels.

The balance in Illinois' BSF has consistently remained within the range of 0-1% over the past two decades, as depicted in Figure 14. This exceptionally low balance stands in contrast to the median BSF balance, which constituted 7.7% of general fund expenditures (equivalent to

$733 million) in 2019. Consequently, Illinois' BSF can be characterized as an outlier, representing an “extreme case” in terms of BSF balance levels. Such extreme cases can offer unique insights not attainable from typical or representative cases, as they exhibit the capacity to “maximize variance on the dimension of interest” (Seawright, 2016). For this reason, we will conduct a case study of Illinois’ BSF to explore any potential relationship between this low balance and the state's repayment provision.

### *7.6.1 Mississippi’s Working Cash Stabilization Reserve Fund*

In 1992, Mississippi's law established the Working Cash-Stabilization Reserve Fund (WCSRF), with annual deposits of 100% of the unencumbered general fund cash balance until reaching $40,000,000. After that, 50% of the unencumbered General Fund cash balance will be deposited annually. Once the account reaches 7.5% of General Fund appropriations, any excess above 50% of the unencumbered cash balance is transferred to the Education Enhancement Account.[112] The WCSRF serves as a resource for addressing cash flow deficiencies in the General Fund, as certified by the Executive Director of the Department of Finance and Administration. A minimum of $4,000,000 remains available, as per Section 27-103-81, Mississippi Code of 1972.

The 1993 amendment introduced the Disaster Assistance Act, allowing limited fund transfers by the executive director. In case of potential revenue deficits, the governor may transfer up to $50,000,000 to the General Fund in one fiscal year. The State Treasurer promptly reimburses the fund for all borrowed sums from General Fund revenues during the fiscal year, and transfers in and out of the fund are immediately reported (p. 48).[113] Following the 1993

[112] Laws, 1992, ch. 484 § 2
[113] State of Mississippi. Annual Comprehensive Financial Report Fiscal Year Ended June 30, 1996.

amendment, subsequent amendments in 2004,[114] 2008,[115] and 2015[116] did not introduce significant changes to the structural characteristics of the WCSRF.

While there is a mandatory requirement to repay the funds borrowed from the WCSRF within the fiscal year, the balance in the WCSRF has experienced a significant decline, dropping from $231.9 million in FY 2000 to just $22.6 million in FY 2003. In fiscal year 2001, a transfer of $50,000,000 from the WCSRF to the General Fund was executed under the authorization of the Governor, aimed at addressing fiscal year 2001 deficits. The Legislature approved an additional transfer of $35,000,000 from the WCSRF (p. 9).[117] In fiscal year 2002, the Governor authorized the maximum transfer of $50,000,000 from the WCSRF to the General Fund to offset the deficit in revenues (p. 27).[118] On December 10, 2003, the General Fund had incurred borrowings totaling $51,860,000 from the Working Cash Stabilization Reserve Account.[119]

To comply with state regulations, the borrowed amount must be completely repaid by the end of the fiscal year. However, *the continuous decline in WCSRF balances from 2000 to 2003 may serve as evidence suggesting that the state did not fully repay the funds borrowed from the WCSRF within the fiscal year*. In fiscal year 2004, a sum of $17,377,000 was transferred from the General Fund to the Account to fulfill the required $40,000,000 balance. Additionally, the entire 50 percent of unencumbered ending cash, amounting to $11,765,000, was deposited into the Account in accordance with the 2003 ACFR (p. 10).

In fiscal year 2004, the Governor authorized a transfer of $20,000,000 from the Working Cash Stabilization Reserve Account Fund to the General Fund to cover a projected deficit in

[114] 2004 Miss. ALS 596, 2004 Miss. Laws 596, 2004 Miss. H.B. 1860 (May 27, 2004).
[115] 2008 Miss. ALS 455, 2008 Miss. Gen. Laws 455, 2008 Miss. H.B. 1244 (April 10, 2008).
[116] 2015 Miss. ALS 471, 2015 Miss. Gen. Laws 471, 2015 Miss. H.B. 434 (April 22, 2015).
[117] State of Mississippi. Annual Comprehensive Financial Report. Fiscal Year Ended June 30, 2001.
[118] State of Mississippi. Annual Comprehensive Financial Report. Fiscal Year Ended June 30, 2002.
[119] State of Mississippi. Annual Comprehensive Financial Report. Fiscal Year Ended June 30, 2003.

revenues that did not occur (p. 26).[120] In fiscal year 2005, a total of $15,924,000 was transferred from the General Fund to the Account for fiscal year 2004, ensuring the Account reached the mandated balance of $40,000,000; furthermore, the entire unencumbered ending cash amounting to $3,280,000, which constituted 50 percent, was also deposited into the Account, according to the 2004 ACFR (p. 8).

Even though the state mandated the reimbursement of borrowed funds from the WCSRF within the same fiscal year, *if the funds are temporarily repaid and immediately withdrawn again, this practice may be perceived as a budgetary gimmick or accounting maneuver rather than a genuine repayment*. Similar to the decline in the WCSRF from 2000 to 2005, the balances in the WCSRF witnessed a decrease, falling from $365 million in FY 2008 to $31.5 million in FY 2013, potentially indicating that a genuine repayment did not occur. By repaying and then quickly withdrawing the fund, it can give the appearance of compliance with fiscal mandates without truly addressing the financial responsibility. This can be misleading about the actual fiscal health.

### *7.6.2 Illinois' Budget Stabilization Funds*

Illinois established the Budget Stabilization Fund (BSF) in 2001 with the primary purpose of serving as a reserve fund to be utilized to address budgetary shortfalls or fiscal emergencies as explicitly stated in section 5 of the Public Act 11.[121] As stated in subsection (a) of Section 15 of the Budget Stabilization Act, when the General Assembly's appropriations and transfers from general funds are below 99.5% of estimated general funds revenues, the

[120] State of Mississippi. Annual Comprehensive Financial Report. Fiscal Year Ended June 30, 2004.
[121] FY2002 Budget Implementation (State Finance) Act, 2001 ILL. ALS 11, 2001 Ill. Laws 11, 2001 ILL. P.A. 11, 2001 ILL. HB 3493 (June 11, 2001).

Comptroller is required to transfer 0.5% of estimated general funds revenues from the General Revenue Fund to the BSF. This provision encourages saving in times of relative fiscal health. Conversely, subsection (b) adopts a more cautious approach to savings in times of heightened fiscal uncertainty: if the General Assembly's appropriations and transfers from general funds dip below 99% of estimated general funds revenues, the Comptroller is required to transfer a higher percentage, specifically 1% of estimated general funds revenues, into the BSF.

In compliance with Section 15(c), the Comptroller transfers 1/12 of the total transfer amount each fiscal year to the BSF on the first day of each month, or promptly thereafter. The Fund balance must not exceed 5% of estimated general funds revenues unless Section 25 of the State Finance Act entails outstanding liabilities. If the balance surpasses 5%, additional transfers are unnecessary unless Section 25 liabilities exist, in which case, the Comptroller continues monthly transfers at 1/12 of the total amount for those liabilities. The Act does not prohibit the General Assembly from allocating more funds to the BSF.

Section 6z-51(b) stipulates that the State Comptroller may direct the State Treasurer to transfer funds from the BSF to the General Revenue Fund to address cash flow deficits. Furthermore, any borrowed funds must be repaid by June 30 of the same fiscal year in accordance with this section. However, this transfer is for the purpose of meeting short-term timing discrepancies within a fiscal year, and it does not imply a direct withdrawal of funds for other purposes. Based on the provided text of the Illinois Budget Stabilization Act, the authority to withdraw money from the BSF lies with the legislative branch, the General Assembly.

Despite the presence of rules governing deposits and withdrawals, it appears that these rules are not effectively implemented or enforced. The state has been wrestling with fiscal challenges, including budget deficits and unfunded pension liabilities (Bunch, 2010). Hence,

appropriations from general funds frequently surpassed 99% or 99.5% of the estimated revenues, rendering the state unable to allocate funds to the BSF. *Since 2001, the state of Illinois had not deposited any money from the general fund into the BSF until 2020*. As of June 30, 2020, there was a balance of $4.15 million in the BSF, according to the 2020 ACFR (p. 5).[122]

The initial contribution to the BSF occurred in 2001, as documented in the 2001 ACFR. In July of that year, a total of $226 million was transferred from the Tobacco Settlement Recovery Fund to the BSF under newly enacted legislation allowing a one-time transfer of remaining funds. In July 2002, however, a withdrawal of $226 million was made from the BSF, and these funds were subsequently transferred to the General Revenue Fund. Simultaneously, an additional $156 million in surplus balances from 28 other state funds was also transferred to the General Revenue Fund on the same day, according to the 2002 ACFR.

As previously mentioned, the $226 million withdrawn from the BSF is subject to repayment by the end of fiscal year 2003, in accordance with Section 6z-51(b) (p. I-7).[123] This amount was indeed repaid on June 30, 2003, as confirmed in the 2003 ACFR (p. I-7). However, it is important to note that, aside from the mandatory repayment, no additional funds from the General Revenue Fund were deposited into the BSF for fiscal year 2003. Thus, the balance in the BSF has remained constant at around 1 percent from 2001 to 2009.

By fiscal year 2009, the BSF had accumulated $275.7 million.[124] During fiscal year 2010, the state transferred $275.704 million from the BSF to the General Revenue Account. By June 30, 2010, the BSF had a balance of zero, as all amounts had been fully transferred to the General Revenue Account, as stated in the 2010 ACFR (p. IX). Following the transfers in fiscal

[122] State of Illinois, Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2009.
[123] State of Illinois, Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2002.
[124] State of Illinois, Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2009.

year 2010, the BSF had no balance until fiscal year 2014. In other word, *the money borrowed from the BSF had not been repaid from 2010 to 2013*. As of June 30, 2014, the balance in the Budget Stabilization Fund was $275.7 million (p. 5), with $275 million transferred according to the Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2014 (p. 264).

Illinois' BSF, as defined in Section 6z-51, underwent an amendment in 2016 through P.A. 99-523. This amendment introduced subsection (c), which exclusively applied to fiscal year 2017. Subsection (c) stipulated that for fiscal year 2017, expenditures from the Budget Stabilization Fund would only be permissible with specific authorization through appropriations. Additionally, *any funds expended as per the appropriation were not subject to the previous repayment requirement*. In other words, the 2016 amendment rendered the repayment provision inoperative.

In summary, both Mississippi and Illinois often fail to adhere to the repayment requirement for their Budget Stabilization Funds. Rather than fulfilling this obligation, they resort to various budgetary maneuvers or render the repayment provision ineffective by amending BSF rules. These actions can undermine the intended purpose of the BSFs to mitigate economic volatility and ensure financial stability.

# 8. FINAL REMARKS

## 8.1 Conclusion

The dissertation examined the impact of Budget Stabilization Fund (BSF) rules' stringency on fiscal slack levels within state governments. Across the United States, states have implemented BSFs to stabilize their budgets during economic downturns. Nonetheless, there exists considerable variation in the stringency of rules governing BSF deposits and withdrawals among states. Drawing upon insights from New Institutional Economics (NIE), the study sought to elucidate how the stringency of these rules influences states' patterns of saving and spending.

The Fixed Effects and Generalized Synthetic Control Method (GSCM) models produce significant insights into states' saving and spending behaviors. Firstly, in line with hypothesis 1, the findings underscore a crucial policy implication concerning the efficacy of strict regulations governing BSF. Specifically, the results indicate that the implementation of stringent deposit rules, such as imposing high caps, tying deposits to revenue volatility, and depositing surplus revenue into BSF, positively influences BSF levels. This underscores the significance of establishing clearly defined saving obligation within BSF frameworks to enhance their size and resilience. Such policies can serve as invaluable instruments for state governments in preparing for economic downturns and alleviating fiscal stress.

While stringent withdrawal rules do not exhibit a significant positive impact on BSF levels, this does not necessarily imply the ineffectiveness of stringent withdrawal rules. Withdrawal rules are inherently related to the use of BSF, which is expected to exert a negative impact on BSF levels. Moreover, these withdrawal rules often exhibit high correlation with specific deposit requirements, thus introducing collinearity concerns. Consequently, I also

implemented regression models, excluding the withdrawal rules with substantial correlations with certain deposit rules. Nonetheless, the outcomes from these reduced models align closely with those derived from the original models, as detailed in Chapter 6.

In the fixed effects models, it is observed that stringent withdrawal rules impact GFB levels, whereas stringent deposit rules do not exhibit a significant impact. The presence of both linking withdrawals to revenue volatility and imposing a withdrawal limit mitigates the negative effect on GFB levels, resulting in higher GFB levels by approximately 6 percentage points compared to only linking withdrawals to revenue volatility without a withdrawal limit. These findings suggest that when a state faces multiple stringent regulations restricting BSF use, it tends to maintain funds in the GFB account, as it represents a more readily accessible and available option than utilizing the BSF.

In sum, the study highlights the importance of stringent deposit rules in enhancing BSF levels for fiscal stabilization. Additionally, the analysis reveals that stringent withdrawal rules have a significant impact on the GFB levels. This finding suggests that the presence of strict withdrawal regulations complicates slack resources and prompts nuanced considerations in devising effective fiscal management strategies for state governments. The analysis findings in this dissertation hold significant theoretical and practical implications, which will be elaborated upon in the subsequent section.

## 8.2 Contributions and Limitations

This section provides an overview of both the significant contributions made by this study as well as the limitations that necessitate careful consideration. First and foremost, the findings contribute to the understanding of how institutional arrangements, such as stringent BSF rules, influence state governments' fiscal behaviors. Grounded in the approaches of NIE, our study introduced a pioneering conceptualization of BSF stringency, incorporating the degree of precision and the degree of obligation. In essence, the study posits that stringent BSF rules, characterized by clearly delineated conditions for both deposit and withdrawal along with substantial saving obligations, serve as guiding parameters that shape and restrict the actions of public officials and politicians. This framework enhances our understanding of the factors influencing BSF size and sheds light on the intricate relationship between BSF and GFB.

This study also offers noteworthy practical implications, by empirically examining the effects of fourteen structural dimensions of BSF, including the number of BSF, voting requirements, repayment provision, and spending limits, on the sizes of BSF and GFB. Policymakers can leverage the insights gleaned from this research to refine their BSF policies, aiming to enhance the effectiveness of these funds in stabilizing budgets during economic downturns. Detailed policy implications will be provided in the subsequent subsection.

Another significant contribution is our mitigation of the issue of "conceptual stretching" in certain variables, by employing numerical continuous variables and conducting case studies. Each state adopts diverse deposit and withdrawal rules, leading to significant variations. Attempting to group dissimilar cases into the same variable to obtain a larger sample size can result in inaccurate results. For instance, the ways in which deposits are tied to revenue volatility

can vary significantly. The methods for imposing spending limits also exhibit substantial divergence.

The nature and origin of funding sources also differ across states, with some relying on severance tax revenues and others utilizing tobacco settlement funds. Funding source from severance tax revenue, may substantially contribute to BSF levels, while others, like federal grants or tobacco settlement funds, may have a relatively modest impact on BSF or GFB levels. Additionally, dummy variables may not capture subtle changes in BSF rules. For instance, when Hawaii reduces the proportion of tobacco settlement funds from 40% to 24.6%, this gradual change cannot be adequately represented by a binary dummy variable.

Therefore, when examining funding sources, we used continuous numerical variables representing the funds from special revenue that were actually deposited into the BSF. Additionally, for deposit revenue surplus, we quantify the percentage of the general fund surplus mandated to be deposited into BSF. Withdrawal by the legislature is likewise measured as the percentage of votes required to utilize BSF.

Our quantitative and qualitative case studies also play a crucial role in mitigating the issue of "conceptual stretching" in specific variables. The application of the Generalized Synthetic Control Method (GSCM) enables us to examine individual states' distinct BSF deposit and withdrawal rules, such as deposit and withdrawal tied to revenue volatility. This approach effectively disentangles the causal relationship between BSF rule stringency and the size of fiscal reserves, such as BSF and GFB, thereby addressing the endogeneity issue. Our qualitative case studies contribute significantly to elucidating the causal mechanisms and identifying the disparities between BSF policy and its practical implementation.

Additionally, we provide a comprehensive analysis of fourteen structural dimensions of BSF, encompassing factors, such as the number of BSF, voting requirements for BSF use (withdrawal by legislature), repayment provision, and spending limits. This thorough examination enables us to assess their impact on BSF balance levels effectively. Our study also breaks new ground, by incorporating interaction terms between various variables, a novel approach that has not been explored in previous research. These insights collectively deepen our comprehension of BSF dynamics and provide a comprehensive perspective on the factors influencing BSF and GFB levels.

Despite its contributions, this dissertation has several limitations. Firstly, the Budget Stabilization Funds of Alaska and Wyoming were excluded from the analysis due to their exceptionally large BSF levels, as they were considered outliers. Kansas and Montana were also excluded due to the recent establishment of their BSFs. Additionally, Oregon was omitted from the dataset because it established its Rainy Day Fund for general purposes in 2007, while Colorado was dropped due to the lack of an official BSF. Consequently, these states remain unexplored within the scope of this dissertation. These exclusions may limit the comprehensive understanding of the entire BSF landscape and its implementation challenges.

Furthermore, it's important to acknowledge that the optimal level of BSF funding can differ based on the unique circumstances of each state, potentially influencing state saving behavior. While our study focuses on identifying factors that enhance BSF levels, I acknowledge the importance of not indiscriminately advocating for increased funding without considering the contextual factors that may affect its appropriateness. Determining the optimal level of BSF funding is contingent upon various factors, including a state's revenue history, revenue mix,

desire for future expenditure growth, and success in generating interest earnings on fund balances (Kriz, 2003).

Indeed, in states with already high BSF balances, there may be a point of diminishing returns or even potential harm to the state's economy by not reinvesting revenues back into essential programs and services. It is essential to strike a balance between maintaining a healthy BSF reserve and ensuring that funds are efficiently utilized to support economic growth and address pressing needs. However, it is important to acknowledge that exploring the varying necessity and optimal level of BSF funding is beyond the scope of our current research and will be pursued in future research endeavors.

Lastly, this dissertation primarily centers on quantitative data analysis, and I did not conduct interviews with key policy actors, such as legislators, governors, and government officials, who may wield influence over BSF policy design and implementation. Understanding the nuances of real-world operations often requires insights from these practitioners. Interviews with policy actors could also serve to validate the findings derived from document analysis and quantitative research. Therefore, future research endeavors should place an emphasis on engaging with these influential stakeholders to gain a more comprehensive perspective on BSF dynamics and their impact on GFB levels.

## 8.3 Policy Implications

Based on the empirical findings of this dissertation, several preliminary policy implications emerge for policymakers to consider when formulating and enacting legislation pertaining to Budget Stabilization Funds (BSF):

***First, policymakers might consider depositing the entire revenue surplus into the BSF while implementing a high "cap" on BSF levels***. The results from both fixed effects and GSCM models suggest that a high cap and depositing the revenue surplus positively influence BSF levels. This approach could enhance the effectiveness and synergy in BSF management, thereby potentially boosting the size of the BSF.

***Second, linking BSF deposits and withdrawals to revenue volatility through a well-defined formula may help minimize political interference and improve BSF levels***. The findings indicate that deposits tied to revenue volatility lead to improvements in BSF levels. However, case studies, such as those of Arizona and Connecticut, show varying results depending on legislative adherence to this rule. This suggests the importance of consistent application of systematic formulas.

***Third, implementing stringent withdrawal rules, such as those tied to revenue volatility and revenue shortfalls, might effectively safeguard the fund's original purpose***. These regulations could incentivize governments to access the BSF only when genuinely necessary. While they do not significantly boost BSF levels, their role in maintaining the fund's purpose is noteworthy.

***Fourth, policymakers might want to avoid overly stringent withdrawal restrictions, which can pose obstacles for states seeking access to the BSF***. The interaction between the "withdrawal limit" and "withdrawal tied to revenue volatility" has shown a positive impact on GFB levels. This finding suggests that overly stringent rules may lead states to retain more funds in their GFB accounts, which offer greater accessibility than the BSF. Further investigation into these dynamics could be beneficial.

***Lastly, promoting transparency in the management of both the BSF and GFB is of paramount importance***. Case studies underscore that some states may resort to budgetary maneuvers rather than adhering to BSF policies. Transparent reporting and effective communication regarding fund balances, deposit and withdrawal regulations, and the intended purposes of each fund can foster public trust and understanding of fiscal choices.

In summary, while stringent deposit and withdrawal rules can encourage responsible fiscal behavior, they should not excessively restrict the state's flexibility to respond to urgent fiscal demands. These implications provide valuable guidance for crafting BSF legislation that can bolster fiscal stability and resilience. Policymakers should thoughtfully consider these suggestions, adapting them to their individual fiscal landscapes and priorities. By doing so, they can tailor their approach to BSF funding levels to best suit the unique needs and circumstances of their jurisdiction, thereby promoting prudent financial management.

## APPENDIX

Table 1. Changes in BSF Rules from 2000 to 2020

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| Alabama | 2008 | General Fund Rainy Day Account[125] (2008) | Number (0 → 1) | Repealed Amendment 709, reestablished the Education Trust Fund Rainy Day Account within the Alabama Trust Fund, and created a General Fund Rainy Day Account within the Alabama Trust Fund. | Acts 2008, No. 08-508 Repeal of Amendment No. 709 and Ala. Const., § 260.01. |
| Alaska | 2013 | Statutory Budget Reserve Fund (2013) | Number (0 → 1) | Alaska established the Statutory Budget Reserve Fund (SBRF). SBRF is appropriated to the general fund by the legislature with a simple majority vote, unlike CBRF that requires a supermajority vote for BSF use. | Alaska Stat. § 37.05.540 |
| Arizona | 2019 | Budget Stabilization Fund (1990) | Cap (7 → 10) | The Budget Stabilization Fund balance shall not exceed ten percent of general fund revenue for the fiscal year. Any surplus monies above ten percent shall be transferred by the state treasurer to the state general fund. | A.R.S. § 35-144; 2019 Ariz. Ch. 54, 2019 Ariz. SB 1091 (April 9, 2019) |
| Arkansas | 2007 | Long Term Reserve Fund (2002) | Withdrawal by legislature (0 → 0.5) | In the event the Chief Fiscal Officer determines that a "revenue shortfall" exist, he or she may then transfer funds from the RDF, as approved by the legislative council or joint budget committee. | 2007 Ark. ALS 1055, 2007 Ark. Acts 1055, 2007 Ark. HB 1066 (April 4, 2007). |
| | | Long Term Reserve Fund (2002) | Repayment provision (0 → 1) | The chief fiscal officer of the state may replenish the Arkansas RDF by transferring no more than 50% if the balance in the General Revenue Allotment Reserve Fund. | 2007 Ark. ALS 1055, 2007 Ark. Acts 1055, 2007 Ark. HB 1066 (April 4, 2007). |
| | 2017 | Long Term Reserve Fund (2002) | Withdrawal by legislature (0.5 → 0.67) | A vote of at least two-thirds (2/3) of the members of the General Assembly is required to use the Long-Term Reserve Fund. | 2017 Ark. ALS 7, 2017 Ark. Acts 7, 2017 Ark. SB 5 (May 4, 2017). |
| California | 2005 | Budget Stabilization Account (2004) | Number (0 → 1) | The Budget Stabilization Account is created in the General Fund. | § 20. Creation of Budget Stabilization Account; Transfer of moneys, Cal Const, Art. XVI § 20 |

[125] Prior to the 2008 constitutional amendment, the state of Alabama did not have a Rainy Day Account for General Fund programs and services, but there was the Education Trust Fund Rainy Day Account to cover Education Trust Fund shortfalls. Nevertheless, Alabama's Education Trust Fund Rainy Day Account has been treated as an important Rainy Day Fund in the existing literature, thus, it is also included in this study.

| *State* | *Year* | *Fund Name* *(Year that BSF enacted)* | *Structure* *(Code)* | *Summary of Change in Structure* | *Reference* |
|---|---|---|---|---|---|
| | 2005 | Budget Stabilization Account (2004) | Deposit tied to revenue volatility (0 → 1) | A deposit equivalent to 1 percent of the projected General Fund revenues into the Budget Stabilization Account (BSA) must be made. | § 20. Creation of Budget Stabilization Account; Transfer of moneys, Cal Const, Art. XVI § 20 |
| | 2006 | Special Fund for Economic Uncertainties (1980)[126] | NA | (5) added "Notwithstanding Section 13340, there is hereby appropriated from the General Fund, without regard to fiscal years, for transfer by the Controller to the Fund as of the end of each fiscal year" to subd (e)(1). | § 20. Creation of Budget Stabilization Account; Transfer of moneys, Cal Const, Art. XVI § 20 |
| | 2014 | Budget Stabilization Account (2004) | Cap (5 → 10) | The amount of a transfer to the BSA for any fiscal year shall not exceed 10 percent of the amount of General Fund proceeds of taxes for the fiscal year estimated pursuant to subdivision (b). | § 20. Creation of Budget Stabilization Account; Transfer of moneys, Cal Const, Art. XVI § 20. |
| | | Budget Stabilization Account (2004) | Withdrawal tied to volatility (0 → 1) | Total General Fund expenditures are adjusted for the following: (i) The annual percentage change in the cost of living for the State, as measured by the California Consumer Price Index. (ii) The annual percentage growth in the population of the State. | § 22. Budget emergency, Cal Const, Art. XVI § 22. |
| | | Budget Stabilization Account (2004) | Withdrawal limit (0 → 1) | In the case of a fiscal budget emergency, the Legislature may only withdraw the lesser of: (1) the amount needed to maintain General Fund spending at the highest level of the past three enacted budget acts, or (2) 50 percent of the BSA balance | § 22. Budget emergency, Cal Const, Art. XVI § 22. |
| | | Budget Stabilization Account (2004) | Other use | General Fund proceeds of taxes would have been transferred to the BSA may be expended only for infrastructure, as defined by Section 13101 of the Government Code, including deferred maintenance thereon. | § 20. Creation of Budget Stabilization Account; Transfer of moneys, Cal Const, Art. XVI § 20. |
| Connecticut | 2002 | Budget Reserve Fund (1978) | Cap (5 → 7.5) | If the amount in the BRF equals 7.5 % of the net General Fund appropriations, no further transfers shall be made to the BRF. | 2002 Ct. ALS 118, 2002 Ct. P.A. 118, 2002 Ct. SB 643 (June 7, 2002). |
| | 2003 | Budget Reserve Fund (1978) | Cap (7.5 → 10) | If the amount in the BRF equals 10 % of the net General Fund appropriations, no further transfers shall be made to the BRF. | 2003 Ct. ALS 2, 2003 Ct. P.A. 2, 2003 Ct. HB 6495 (February 28, 2003). |

[126] The Budget Act of 1980 (AB 1806) created the Reserve for Economic Uncertainties as an account within the General Fund. Chapter 139, Statutes of 1985 renamed it Special Fund for Economic Uncertainties.

| *State* | *Year* | *Fund Name* *(Year that BSF enacted)* | *Structure* *(Code)* | *Summary of Change in Structure* | *Reference* |
|---|---|---|---|---|---|
| | 2017 | Budget Reserve Fund (1978) | Cap (10 → 15) | If the amount in the BRF equals 15 % of the net General Fund appropriations, no further transfers shall be made to the BRF. | 2017 Ct. ALS 2, 2017 Ct. P.A. 2, 2017 Ct. SB 1502 (October 31, 2017). |
| | | Budget Reserve Fund (1978) | Withdrawal tied to volatility (0 → 1) | If any consensus revenue estimate projects a decline in the general fund revenues of 1 % or more, the BRF can be used. | 2017 Ct. ALS 2, 2017 Ct. P.A. 2, 2017 Ct. SB 1502 (October 31, 2017). |
| | | Budget Reserve Fund (1978) | Deposit tied to volatility (0 → 1) | Revenue in excess of $3.15 billion from personal income tax will be deposited in BRF. The threshold amount shall be adjusted annually by the compound annual growth rate of personal income in the state over the preceding five years. | 2018 Ct. ALS 81, 2018 Ct. P.A. 81, 2018 Ct. SB 543 (May 15, 2018). |
| Georgia | 2005 | Revenue Shortfall Reserve (1976) | Deposit by surplus (0 → 1) | The amount of all surplus in state funds existing as of the end of each fiscal year shall be added to the Revenue Shortfall Reserve. | 2005 Ga. ALS 322, 2005 Ga. Act 322, 2005 Ga. HB 509 (May 9, 2005). |
| | | Revenue Shortfall Reserve (1976) | Cap (5 → 10) | The Revenue Shortfall Reserve shall not exceed 10 % of the previous fiscal year's net revenue for any given fiscal year. | 2005 Ga. ALS 322, 2005 Ga. Act 322, 2005 Ga. HB 509 (May 9, 2005). |
| | | Revenue Shortfall Reserve (1976) | Withdrawal by budget shortfall (0 → 1) | An amount shall be transferred from the Reserve to the General Fund to cover deficits in total expenditures by which total expenditures and contractual obligations of state funds authorized by appropriation exceed net revenue in state funds. | 2005 Ga. ALS 322, 2005 Ga. Act 322, 2005 Ga. HB 509 (May 9, 2005). |
| | | Revenue Shortfall Reserve (1976) | Other use[127] | For each existing fiscal year, the General Assembly may appropriate from the Revenue Shortfall Reserve an amount up to 1 percent of the net revenue collections of the preceding fiscal year for funding increased K-12 needs. | 2005 Ga. ALS 322, 2005 Ga. Act 322, 2005 Ga. HB 509 (May 9, 2005) |
| | 2010 | Revenue Shortfall Reserve (1976) | Cap (10 → 15) | The Revenue Shortfall Reserve shall not exceed 15 % of the previous fiscal year's net revenue for any given fiscal year. | 2010 Ga. ALS 387, 2010 Ga. Laws 387, 2010 Ga. Act 387 (May 20, 2010) |
| Hawaii | 2010 | Emergency and budget reserve fund (1999) | Deposit by surplus (0 → 0.05) | General Fund Balance at the close of the fiscal year exceeding by 5 % of revenues shall be transferred to the Emergency and Budget Reserve Fund (BRF). | 2010 Hi. ALS 138, 2010 Hi. Act 138, 2009 Hi. SB 2806 (May 25, 2010) |

[127] The General Assembly of Georgia was authorized to appropriate $ 12.5 million for fiscal year 1985 from the Revenue Shortfall Reserve for the purpose of financing the construction of water and sewer projects, through loans to local governments by the Georgia Development Authority. Thus, the Reserve has been used for miscellaneous purposes (e.g., capital project), so the code for Other Use remains the same.

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| | | Emergency and budget reserve fund (1999) | Cap (5 → 10) | Transfers shall not be made to the Emergency and Budget Reserve Fund if the balance of the Fund is equal to or more than 10 % of General Fund revenues. | 2010 Hi. ALS 138, 2010 Hi. Act 138, 2009 Hi. SB 2806 (May 25, 2010) |
| | 2017 | Emergency and budget reserve fund (1999) | Withdrawal limit (0 → 1) | The legislature shall not appropriate from the Reserve Fund: (1) more than 50 % of the balance in a single fiscal year; (2) to expend for discretionary costs in a fiscal year, an amount that exceeds 10 % of the total fiscal year; and (3) for a succeeding fiscal year, unless the current fiscal year's tax collection is less than the collection for the previous year. | 2017 Hi. ALS 207, 2017 Hi. Act 207, 2017 Hi. HB 471 (July 12, 2017) |
| Idaho | 2015 | Budget stabilization fund (1984) | Deposit by surplus (0.166 → 0.5) | The state controller shall transfer 50 % of any excess cash balance from the general fund to the budget stabilization fund. | ALS 341, 2015 Idaho Sess. Laws 341, 2015 Ida. Ch. 341, 2015 Ida. HB 312 (April 21, 2015) |
| | | Budget stabilization fund (1984) | Cap (5 → 10) | The amount of moneys in the BSF shall not exceed 10 % of the total general fund receipts for the fiscal year just ending. | ALS 341, 2015 Idaho Sess. Laws 341, 2015 Ida. Ch. 341, 2015 Ida. HB 312 (April 21, 2015) |
| | 2021 | Budget stabilization fund (1984) | Cap (10 → 15) | The amount of moneys in the BSF shall not exceed 15 % of the total general fund receipts for the fiscal year just ending. [effective July 2021] | ALS 112, 2020 Idaho Sess. Laws 112, 2020 Ida. Ch. 112, 2020 Ida. HB 449 (March 11, 2020) |
| Illinois | 2010 | Budget stabilization fund (2001) | Repayment provision (4 → 0) | By June 30, 2010, the BSF had a balance of zero, as all amounts had been fully transferred to the General Revenue Account, as stated in the 2010 ACFR (p. IX). The money borrowed from the BSF had not been repaid from 2010 to 2013. | Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2010 |
| | 2014 | Budget stabilization fund (2001) | Repayment provision (0 → 4) | As of June 30, 2014, the balance in the Budget Stabilization Fund was $275.7 million (p. 5), with $275 million transferred according to the Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2014 (p. 264). | Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2014 |
| | 2017 | Budget stabilization fund (2001) | Repayment provision (4 → 0) | The 2016 amendment by P.A. 99-523, effective June 30, 2016, added (c): (c) During Fiscal Year 2017 only, amounts may be expended from the Budget Stabilization Fund only pursuant to specific authorization by appropriation. Any moneys expended pursuant to appropriation shall not be subject to repayment. | FY2017 Stopgap Budget Implementation Act, ALS 523, Laws 523, 2015 ILL. P.A. 523, SB 1810 (June 30, 2016) |

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| Iowa | 2004 | Cash Reserve Fund (1992) | Cap (5 → 7.5) | The cash reserve goal percentage for fiscal years beginning on or after July 1, 2004, is 7.5 % of the adjusted revenue estimate. | 2003 Ia. ALS 179, 2003 Ia. Ch. 179, 2003 Ia. LAWS 179, 2003 Ia. SF 458 (May 30, 2003) |
| Kansas | 2020 | Budget Stabilization Fund (2017) | Deposit by surplus (0.1 → 0.5) | Upon receipt of such certification, or as soon thereafter as moneys are available, the director of accounts and reports shall transfer 50 % of such certified excess amount from the state general fund for the fiscal years ending June 30, 2021. | 2019 Kan. SB 66, 2020 Kan. Sess. Laws 5, 2020 Kan. Ch. 5, 2020 Kan. ALS 5 (March 25, 2020) |
| Maine | 2003 | Budget Stabilization Fund (1985) | Deposit by surplus (0.5 → 0.32) | The State Controller is required to transfer 32 % of the unappropriated surplus of General Fund when the fund is not at its statutory cap. | § 1513. Maine Rainy Day Fund [Repealed]; Annual Comprehensive Financial Report (2003, p. v) |
| | | Budget Stabilization Fund (1985) | Cap (6 → 10) | Amounts in the stabilization fund may not exceed 10 % of total General Fund revenues in the immediately preceding state fiscal year. | § 1513. Maine Rainy Day Fund [Repealed]; Annual Comprehensive Financial Report (2003, p. v) |
| | 2005 | Budget Stabilization Fund (1985) | Cap (10 → 12) | Cap increased from 10% to 12%, but the code of the Cap remains the same. | 2005 Me. ALS 2, 2005 Me. Laws 2, 2005 Me. Ch. 2, 2005 Me. HP 6 (January 21, 2005) |
| | 2015 | Budget Stabilization Fund (1985) | Cap (12 → 18) | Cap increased from 12% to 18%, according to the 2015 amendments. | 2015 Me. ALS 267, 2015 Me. Laws 267, 2015 Me. Ch. 267, 2015 Me. HP 702 (June 18, 2015). |
| Maryland | 2003 | Revenue Stabilization Account (1986) | Deposit tied to BSF balance (0 → 1) | If the account balance is below 3 (or 3-5) % of the revenues, at least $100 million (or $500 million) will be appropriated. | 2003 Md. ALS 203, 2003 Md. Laws 203, 2003 Md. Chap. 203, 2003 Md. HB 935 (May 13, 2003) |
| | 2004 | Revenue Stabilization Account (1986) | NA | The 2004 amendment to 7-311 made the following changes: In Subsection (C), it clarified that the Account is continuous and exempt from Section 7-302.<br>Subsection (E) mandates appropriations to the Account based on its balance and estimated General Fund revenues. It requires a minimum allocation of $100 million if the balance is below 3% of estimated General Fund revenues. If the balance falls between 3% and 5% of estimated General Fund revenues, an allocation of at least $50 million or an amount necessary to surpass 5% of estimated General Fund revenues is required. | 2003 Md. ALS 203, 2003 Md. Laws 203, 2003 Md. Chap. 203, 2003 Md. HB 935 (May 13, 2003) |

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| | 2006 | Revenue Stabilization Account (1986) | Cap (5 → 7.5) | The appropriations required by subsection (e) of the section (f) are not required when the Account balance exceeds 7.5% of the estimated General Fund revenues. | 2006 Md. ALS 52, 2006 Md. Laws 52, 2006 Md. Chap. 52, 2006 Md. HB 1331 (April 8, 2006) |
| Massachusetts | 2001 | Commonwealth Stabilization Fund (1986) | Cap (7.5 → 10) | If the amount remaining in the fund exceeds 10 % of the budgeted revenues and other financial resources, the amounts so in excess shall be transferred to the Tax Reduction Fund established by section 2I. | 2001 Mass. ALS 177, 2001 Mass. Ch. 177, 2001 Mass. H.B. 4800 (December 1, 2001) |
| | 2003 | Commonwealth Stabilization Fund (1986) | Cap (10 → 15) | If the amount remaining in the fund exceeds 15 % of the budgeted revenues and other financial resources, the amounts so in excess shall be transferred to the Tax Reduction Fund established by section 2I. | 2003 Mass. ALS 26, 2003 Mass. Ch. 26, 2003 Mass. H.B. 4004 (November 19, 2003) |
| Michigan | 2018 | Counter-Cyclical Budget and Economic Stabilization Fund (1977) | Cap (10 → 15) | The balance in the fund shall not exceed 15% of the combined level of general fund-general purpose and school aid fund revenues. | 2018 Mi. ALS 613, 2018 Mi. P.A. 613, 2017 Mi. H.B. 4602 (December 28, 2018) |
| | | Counter-Cyclical Budget and Economic Stabilization Fund (1977) | Withdrawal limit (0 → 1) | When the annual growth rate is estimated to be less than 0%, the legislature may appropriate by law for the fiscal year ending in the current calendar year no more than 25% of the prior fiscal year ending balance in the fund. | 2018 Mi. ALS 613, 2018 Mi. P.A. 613, 2017 Mi. H.B. 4602 (December 28, 2018) |
| Minnesota | 2014 | Budget Reserve and Cash Flow Accounts (1983) | Deposit by surplus (0 → 0.33) | If there will be a positive unrestricted general fund balance, the commissioner shall transfer to the budget reserve account in the general fund. The amount of the transfer shall not exceed 33 percent of the positive unrestricted general fund balance. | MSL 2014 c 150 art 6 s 1, 2, and 3 |
| Mississippi | 2017 | Working Cash-Stabilization Reserve Fund (1992) | Withdrawal limit (1 → 0) | Spending limit still exists, but it was significantly relaxed, increasing its limit from $50,000,000 to 100,000,000 for fiscal year 2017. | 2017 Miss. ALS 440, 2017 Miss. Gen. Laws 440, 2017 Miss. S.B. 2649 (April 18, 2017) |
| | 2018 | Working Cash-Stabilization Reserve Fund (1992) | Withdrawal limit (0 → 1) | If a deficit in revenues from all sources may occur, a maximum of $50,000,000 may be transferred to the General Fund. | 2017 Miss. ALS 440, 2017 Miss. Gen. Laws 440, 2017 Miss. S.B. 2649 (April 18, 2017) |
| Nebraska | 2004 | Cash Reserve Fund (1983) | Source (0 → 2.25) | In addition to receiving transfers from other funds, the Cash Reserve Fund receive Federal Funds for undesignated general government purposes, Federal revenue sharing, or general fiscal relief of the state. | 2003 Neb. ALS 798, 2003 Neb. Laws 798, 2003 Neb. LB 798 (May 26, 2003) |

| *State* | *Year* | *Fund Name* *(Year that BSF enacted)* | *Structure* *(Code)* | *Summary of Change in Structure* | *Reference* |
|---|---|---|---|---|---|
| | 2007 | Cash Reserve Fund (1983) | Deposit by surplus (0 → 1) | Any unexpended and unobligated balance remaining within the subaccount for money transferred from the Cash Reserve Fund to the Job Training Cash Fund shall be transferred to the Cash Reserve Fund. | 2005 Neb. ALS 427, 2005 Neb. Laws 427, 2005 Neb. LB 427 (May 24, 2005) |
| | 2011 | Cash Reserve Fund (1983) | Discretionary use | The State Treasurer shall transfer not to exceed twelve million dollars in total between July 1, 2011, and November 30, 2012, from the Cash Reserve Fund to the Ethanol Production Incentive Cash Fund, for ethanol production incentive credits. | 2011 Neb. ALS 379, 2011 Neb. Laws 379, 2011 Neb. LB 379 (May 17, 2011) |
| | 2013 | Cash Reserve Fund (1983) | Discretionary use | The State Treasurer shall transfer not to exceed forty-three million fifteen thousand four hundred fifty-nine dollars in total from the Cash Reserve Fund to the Nebraska Capital Construction Fund between July 1, 2013, and June 30, 2017. | 2013 Neb. ALS 200, 2013 Neb. Laws 200, 2013 Neb. LB 200 (May 25, 2013) |
| Nevada | 2001 | Emergency Account (1991)[128] | Withdrawal limit (1 → 0) | The state board of examiners could not authorize the expenditure of more than $50,000. However, this limit on withdrawal was deleted in 2001. | 2001 Nev. ALS 240, 2001 Nev. Stat. 240, 2001 Nev. Ch. 240, 2001 Nev. AB 556 (May 29, 2001). |
| | 2003 | Account to Stabilize Operation of State Government (1991) | Cap (10 → 15) | The balance in the Fund must not exceed 15 % of the total of all appropriations from the State General Fund. | 2003 Nev. Stat. 20th Special Session, Page 201 (CHAPTER 5, SB 8) |
| | 2009 | Account to Stabilize Operation of State Government (1991) | Cap (15→ 20) | The balance in the Fund must not exceed 20 % of the total of all appropriations from the State General Fund. | 2009 Nev. ALS 322, 2009 Nev. Stat. 322, 2009 Nev. Ch. 322, 2009 Nev. AB 165 (May 29, 2009) |
| New Hampshire | 2016 | Revenue Stabilization Reserve Account (1986) | Deposit by surplus (0.5 → 1) | At the close of each fiscal biennium, any surplus, as determined by the official audit, shall be transferred to a revenue stabilization reserve account. | 2016 NH ALS 237, 2016 NH Ch. 237, 2015 NH HB 1527 (June 10, 2016) |
| New Mexico | 2004 | Tax Stabilization Reserve (1978) | Deposit by surplus (0 → 1) | Any unexpended or unencumbered balance remaining at the end of fiscal year 2004 shall revert to the tax stabilization reserve. | 2002 N.M. ALS 109, 2002 N.M. Laws 109, 2002 N.M. Ch. 109, 2002 N.M. HB 451 (March 6, 2002) |

[128] The emergency fund was created as a trust fund in 1960 (Nev. Rev. Stat. Ann. § 353.263). However, in 1991, it was reestablished within the state General Fund (1991 Nev. ALS 556, Ch. 556, SB 497).

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| New York | 2005 | Tax Stabilization Reserve Fund | Cap (2 → 3) | All surplus funds, up to 0.2 percent of the norm (total general fund disbursements), shall be transferred to the tax stabilization reserve fund. However, if this transfer would cause the reserve fund to exceed three percent of the norm, the transfer will be limited to bring it to that three percent limit. | 2005 N.Y. ALS 666, 2005 N.Y. LAWS 666, 2005 N.Y. S.N. 2 (May 23, 2005). |
| | 2007 | Rainy Day Reserve Fund (2007) | Number (0 → 1) | Rainy Day Reserve Fund was established in 2007. | 2007 N.Y. ALS 1, 2007 N.Y. LAWS 1, 2007 N.Y. A.N. 2755 (January 24, 2007) |
| | 2007 | Rainy Day Reserve Fund (2007) | Cap (3 → 5) | The fund's maximum balance should not exceed five percent of the projected disbursement from the general fund in the upcoming fiscal year. | 2007 N.Y. ALS 1, 2007 N.Y. LAWS 1, 2007 N.Y. A.N. 2755 (January 24, 2007) |
| | 2007 | Rainy Day Reserve Fund (2007) | Deposit tied to revenue volatility (0 → 0.75) | Upon the director of the budget's request, the state comptroller will transfer funds to the rainy day reserve up to 0.75 percent of the projected disbursement for the current fiscal year. | 2007 N.Y. ALS 1, 2007 N.Y. LAWS 1, 2007 N.Y. A.N. 2755 (January 24, 2007) |
| | 2012 | Rainy Day Reserve Fund (2007) | Cap (5 → 3) | The state comptroller shall transfer monies to the RDRF from the general fund, unless such transfer would increase the RDRF to an amount in excess of 3 % of the amount projected to be disbursed from the general fund during the fiscal year. | 2012 N.Y. ALS 59, 2012 N.Y. LAWS 59, 2011 N.Y. A.N. 9059 (March 30, 2012) |
| | 2012 | Rainy Day Reserve Fund (2007) | Deposit tied to revenue volatility (0 .75 → 0.3) | The state comptroller will transfer funds to the rainy day reserve up to 0.3 percent of the projected disbursement from the general fund for the current fiscal year. However, if this transfer would cause the reserve fund to exceed three percent of the projected disbursement for the following fiscal year, the transfer will be limited to maintain the reserve at that level. | 2012 N.Y. ALS 59, 2012 N.Y. LAWS 59, 2011 N.Y. A.N. 9059 (March 30, 2012) |
| | 2015 | Rainy Day Reserve Fund (2007) | Cap (3 → 5) | The state comptroller shall transfer monies to the RDRF from the general fund, unless such transfer would increase the RDRF to an amount in excess of 5 % of the amount projected to be disbursed from the general fund during the fiscal year. | 2015 N.Y. ALS 60, 2015 N.Y. Laws 60, 2015 N.Y. Ch. 60, 2015 N.Y. SB 4610 (April 13, 2015) |
| | 2015 | Rainy Day Reserve Fund (2007) | Deposit tied to revenue volatility (0.3 → 0.75) | Upon the director of the budget's request, the state comptroller will transfer funds to the rainy day reserve up to 0.75 percent of the projected disbursement for the current fiscal year. | 2015 N.Y. ALS 60, 2015 N.Y. Laws 60, 2015 N.Y. Ch. 60, 2015 N.Y. SB 4610 (April 13, 2015) |

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| North Carolina | 2006 | Savings Reserve (1991) | Cap (5 → 8) | A balance in the Savings Reserve Account is maintained at least 8 % of the previous year's General Fund budget. | 2006 N.C. Sess. Laws 203, 2006 N.C. Ch. 203, 2005 N.C. HB 914 (August 7, 2006) |
| | 2016 | Savings Reserve (1991) | Source ($250 million) | During the 2015-2016 fiscal year, Session Law 2015-241 authorized the State Controller to transfer $250 million from the Repairs and Renovations Reserve to the Savings Reserve. | Annual Comprehensive Financial Report for Fiscal Year Ended June 30, 2016 |
| | 2018 | Savings Reserve (1991) | Deposit tied to volatility (0 → 1) | Each Current Operations Appropriations Act enacted by the General Assembly shall include a transfer to the Savings Reserve of 15 % of each fiscal year's estimated growth in State tax revenues that are deposited in the General Fund. | 2017 N.C. ALS 5, 2017 N.C. Sess. Laws 5, 2017 N.C. Ch. 5, 2017 N.C. HB 7 (April 13, 2017) |
| | 2018 | Savings Reserve (1991) | Withdrawal by legislature (0.5 → 0.67) | Funds reserved to the Savings Reserve are available for expenditure upon a 2/3 vote of the Senate and House of Representatives present. | 2017 N.C. ALS 5, 2017 N.C. Sess. Laws 5, 2017 N.C. Ch. 5, 2017 N.C. HB 7 (April 13, 2017) |
| North Dakota | 2007 | Budget Stabilization Fund (1987) | Cap (5 → 10) | Any amounts for deposit in the fund and any interest or earnings of the fund which would bring the balance in the fund to an amount greater than 10 % of the current biennial state general fund budget may not be deposited or retained in the fund but must be deposited instead in the general fund. | 2007 N.D. ALS 26, 2007 N.D. Laws 26, 2007 N.D. Ch. 26, 2007 N.D. HB 1429 (April 12, 2007). |
| | 2017 | Budget Stabilization Fund (1987) | Cap (10 → 15) | Any amounts for deposit in the fund and any interest or earnings of the fund which would bring the balance in the fund to an amount greater than 15 % of the current biennial state general fund budget may not be deposited or retained in the fund but must be deposited instead in the general fund. | 2017 N.D. HB 1155, 2017 N.D. Laws 394, 2017 N.D. Ch. 394, 2017 N.D. ALS 394 (April 18, 2017) |
| | | Budget Stabilization Fund (1987) | Withdrawal limit (0 → 1) | After general fund allotments totaling at least 3% have been made during the biennium, the governor may order a transfer up to an amount equal to the 3 % of general fund appropriations. | 2017 N.D. HB 1155, 2017 N.D. Laws 394, 2017 N.D. Ch. 394, 2017 N.D. ALS 394 (April 18, 2017) |
| Ohio | 2015 | Budget Stabilization Fund (1989) | Cap (5 → 8.5) | It is the intent of the general assembly to maintain an amount of money in the budget stabilization fund that amounts to approximately 8.5 % of the general revenue fund revenues for the preceding fiscal year. | § 131.43 Budget stabilization fund., ORC Ann. 131.43 |
| Oklahoma | 2010 | Constitutional Reserve Fund (1985) | Cap (10 → 15) | All surplus funds or monies accruing to the General Revenue Fund (GRF) shall be placed in a Constitutional Reserve Fund until such time that the amount of said Fund equals 15% of the GRF certification for the preceding fiscal year. | State Question No. 757 |

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| | 2016 | Revenue Stabilization Fund (2016) | Number (0 → 1) | The "Revenue Stabilization Fund" is created in the State Treasury a revolving fund. The fund shall be a continuing fund, not subject to fiscal year limitations. | 2016 OK. ALS 337, 2016 OK. Laws 337, 2016 OK. Ch. 337, 2015 OK. HB 2763 (May 27, 2016) |
| | 2018 | Revenue Stabilization Fund (2016) | Deposit tied to volatility[129] (0 → 1) | The Revenue Stabilization Fund shall consist of 1) 100% of the revenue derived from the gross production tax on oil & natural gas, 2) 75% of the revenue derived from corporate income tax, which are in excess of the five-year average computed, and 3) any amounts appropriated by the Legislature.[130] | 2016 OK. ALS 337, 2016 OK. Laws 337, 2016 OK. Ch. 337, 2015 OK. HB 2763 (May 27, 2016) |
| | | Revenue Stabilization Fund (2016) | Withdrawal tied to volatility (0 → 1) | If one or more of the revenue sources are forecasted to experience a revenue decrease, then the total deposits to the RSF shall be reduced in an amount equal to such revenue decreases. "Revenue decrease" means an identified revenue source derived in an amount less than the five-year average for such revenue source. | 2016 OK. ALS 337, 2016 OK. Laws 337, 2016 OK. Ch. 337, 2015 OK. HB 2763 (May 27, 2016) |
| Oregon | 2007 | Oregon Rainy Day Fund (2007)[131] | Number (0 → 1) | The ORDF was established by the 2007 Legislature as a general purpose reserve fund. | Oregon Rainy Day Fund (§§ 293.144 — 293.160) |
| Pennsylvania | 2002 | Budget Stabilization Reserve Fund (1985) | Deposit by surplus (0.1 → 0.25) | 25% of any General Fund revenue surplus will be deposited into the Rainy Day Fund. However, if the Rainy Day Fund balance reaches or exceeds 6% of total General Fund revenue, and there is a surplus for that fiscal year, only 10% of the surplus will be deposited into the rainy day fund account. | Act of Jun. 29, 2002, P.L. 614, No.91, Section 1702-A (b). |
| | 2002 | Budget Stabilization Reserve Fund (1985) | Cap (3 → 6) | The General Assembly declares its intention and objective to establish a stabilization reserve, ultimately amounting to 6% of the revenues of the Commonwealth's General Fund. | Act of Jun. 29, 2002, P.L. 614, No.91, Section 1702-A (b). |

[129] Although HB 2763 was passed in 2016, Deposit tied to revenue volatility and withdrawal tied to volatility began to be implemented in 2018.

[130] "Moving five-year average amount for oil and gas" means, for purposes of the apportionments prescribed by this section, the amount of gross production tax on natural gas collected for each of the five (5) complete fiscal years, as computed by the State Board of Equalization pursuant to Section 2 of the act.

[131] Before establishing the Oregon Rainy Day Fund (ORDF), the state of Oregon did not have a Rainy Day Account for General Fund programs and services, but there was the Education Stability Fund for public education (Or. Const. art. XV, § 4). Nevertheless, Education Stability Fund has been treated as an important Rainy Day Fund in the existing literature, thus, it is also included in this study.

| *State* | *Year* | *Fund Name* *(Year that BSF enacted)* | *Structure* *(Code)* | *Summary of Change in Structure* | *Reference* |
|---|---|---|---|---|---|
| | 2008 | Budget Stabilization Reserve Fund (1985) | Deposit by surplus (0.25 → 0) | Act 53 of 2008 suspended the transfer of surplus funds to the Budget Stabilization Reserve Fund. | Act of Jul. 4, 2008, P.L. 629, No. 53 |
| | 2018 | Budget Stabilization Reserve Fund (1985) | Deposit by surplus (0 → 0.5) | If the Secretary of the Budget certifies that there is a surplus in the General Fund for the 2017-2018 fiscal year, 50% of the surplus shall be deposited by the end of the next succeeding quarter into the Budget Stabilization Reserve Fund. | Act of Jun. 22, 2018, P.L. 281, No. 42, Session of 2018. |
| | 2019 | Budget Stabilization Reserve Fund (1985) | Deposit by surplus (0.5 → 1) | Act 20 of 2019 provided for a transfer of an amount equal to 100 percent for the fiscal year ending June 30, 2019. Act 20 of 2019 transferred one hundred percent of the 2018-19 General Fund surplus; the amount transferred was $317 million. | Act of Jun. 28, 2019, P.L. 173, No. 20. |
| Rhode Island | 2009 | State budget reserve and cash stabilization account (1985) | Cap (3.4 → 5) | Cap had increased marginally from 3.4 % in 2009 to 5% in 2013. | R.I. Gen. Laws § 35-3-20 |
| | 2010 | State budget reserve and cash stabilization account (1985) | Repayment (4 → 0) | The amount of the transfer (from Budget Reserve and Cash Stabilization Account to General Fund) shall be transferred to the Rhode Island Capital Plan fund from funds payable into the general revenue fund in the fiscal year following the fiscal year in which the transfer was made, except that in fiscal year 2010. | R.I. Gen. Laws § 35-3-20 |
| | 2011 | State budget reserve and cash stabilization account (1985) | Repayment (0 → 4) | There shall be no repayment of the amount transferred in fiscal year 2010, and the repayment shall be made in fiscal year 2011. | R.I. Gen. Laws § 35-3-20 |
| South Carolina | 2013 | General Reserve Fund (1977) | Deposit tied to volatility (0 → 1) | The General Assembly shall provide for a General Reserve Fund of five percent of the general fund revenue of the latest completed fiscal year. | 2012 S.C. Acts 152, 2011 S.C. S.B. 6, 2011 S.C. R. 172 (May 8, 2012) |
| | | General Reserve Fund (1977) | Deposit by legislature (0 → 1) | The General Assembly shall provide for a General Reserve Fund until it reaches 5 % of general fund revenue of the latest completed fiscal year. | 2012 S.C. Acts 152, 2011 S.C. S.B. 6, 2011 S.C. R. 172 (May 8, 2012) |
| | | General Reserve Fund (1977) | Repayment provision (3 → 2) | The amount withdrawn from the reserve fund must be restored to the reserve fund within 5 fiscal years until the 5 %, or the applicable percentage amount required to be transferred to the General Reserve Fund, is again reached and maintained. | 2012 S.C. Acts 152, 2011 S.C. S.B. 6, 2011 S.C. R. 172 (May 8, 2012) |

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| South Dakota | 2002 | General Reserve Fund (1991) | Deposit by executive (0 → 1) | On July first of each fiscal year, the commissioner of the Bureau of Finance and Management shall transfer all prior year unobligated cash into the budget reserve fund. | 2002 S.D. ALS 27, 2002 S.D. Laws 27, 2002 S.D. CH 27, 2002 S.D. HB 1195 (February 27, 2002). |
| | | General Reserve Fund (1991) | Cap (5 → 10) | All unobligated cash up to an amount equal to 10 % of the general fund appropriations is transferred into the reserve fund. | 2002 S.D. ALS 27, 2002 S.D. Laws 27, 2002 S.D. CH 27, 2002 S.D. HB 1195 (February 27, 2002). |
| Tennessee | 2013 | Reserve for Revenue Fluctuations (1972) | Cap (5 → 8) | An amount sufficient to maintain the reserve at 8 % of the estimated state tax revenues to be allocated to the general fund and the education trust fund for that year. | 2013 Tenn. ALS 175, 2013 Tenn. Pub. Acts 175, 2013 Tenn. Pub. Ch. 175, Tenn. SB 994 (April 23, 2013). |
| Utah | 2003 | Budget Reserve Account (1986) | Cap (8 → 6) | Budget Reserve Account may not exceed 6 % of the total of the General Fund appropriation amount for the fiscal year in which the surplus occurred. | 2003 Ut. ALS 88, 2003 Utah Laws 88, 2003 Ut. Ch. 88, 2003 Ut. HB 27 (March 15, 2003). |
| | 2012 | Budget Reserve Account (1986) | Cap (6 → 8) | Budget Reserve Account may not exceed 8 % of the total of the General Fund appropriation amount for the fiscal year in which the surplus occurred. | 2012 Ut. ALS 141, 2012 Utah Laws 141, 2012 Ut. Ch. 141, 2012 Ut. SB 280 (March 16, 2012). |
| | 2015 | Budget Reserve Account (1986) | Cap (8 → 9) | Budget Reserve Account may not exceed 9 % of the total of the General Fund appropriation amount for the fiscal year in which the surplus occurred. | 2015 Ut. HB 333, 2015 Utah Laws 214, 2015 Ut. Ch. 214, 2015 Ut. ALS 214 (March 26, 2015) |
| Virginia | 2010 | Revenue Stabilization Fund (1992) | Cap (10 → 15) | Fund capped at 15 % of the average annual tax revenues derived from income and retail sales for the three fiscal years immediately preceding. | Va. Const. Art. X, § 8 |
| Washington | 2002 | Emergency Reserve Fund (1981) | Withdrawal by legislature (0.67 → 0.5) | The supermajority vote requirement for the Legislature to appropriate money from the Emergency Reserve Fund was suspended for the 2001-03 Biennium.[132] | Wash. Const. Art. VII, § 12 |
| | 2009 | Budget Stabilization Account (1981) | NA | On the effective date of this section, the state treasurer shall transfer all money remaining in the emergency reserve fund to the budget stabilization account.[133] | 2007 Wa. ALS 484, 2007 Wa. Ch. 484, 2007 Wa. SB 5311 (May 15, 2007) |

[132] The Washington State Tax Structure Study Committee. (November, 2002). Tax Alternatives for Washington State: A Report to the Legislature Prepared Pursuant to Chapter 7, Section 138, Laws of 2001, Volume 2, Appendices. https://dor.wa.gov/sites/default/files/legacy/content/aboutus/statisticsandreports/wataxstudy/volume_2.pdf.

[133] In November 2007, Washington state voters ratified Engrossed Substitute Senate Joint Resolution 8206, amending the Washington Constitution and establishing the Budget Stabilization Account (BSA) (ACFR, 2007, p. 33).

| *State* | *Year* | *Fund Name* *(Year that BSF enacted)* | *Structure* *(Code)* | *Summary of Change in Structure* | *Reference* |
|---|---|---|---|---|---|
| | | Budget Stabilization Account (1981) | Deposit tied to volatility (0 → 1) | By June 30th of each fiscal year, the state treasurer shall transfer an amount equal to 1 % of the general state revenues for that fiscal year to the budget stabilization account (BSA). | AMENDMENT 99, 2007 Engrossed Substitute Senate Joint Resolution No. 8206 (November 6, 2007) |
| | | Budget Stabilization Account (1981) | Withdrawal by legislature (0.5 → 0.6) | Any amount may be withdrawn and appropriated from the BSA at any time by the favorable vote of at least 3/5 of the members of each house of the legislature. | AMENDMENT 99, 2007 Engrossed Substitute Senate Joint Resolution No. 8206 (November 6, 2007) |
| | | Budget Stabilization Account (1981) | Withdrawal tied to volatility (0 → 1) | Moneys may be withdrawn and appropriated from the BSA by the favorable vote of a majority of the members elected to each house of the legislature, if the employment growth forecast for any fiscal year is estimated to be less than 1 %. | AMENDMENT 99, 2007 Engrossed Substitute Senate Joint Resolution No. 8206 (November 6, 2007) |
| | 2012 | Budget Stabilization Account (1981) | Cap (5 → 10) | The balance in the budget stabilization account, exceeding 10 % of the general state revenues, can be appropriated. | AMENDMENT 106, 2011 Senate Joint Resolution No. 8206. (November 8, 2011) |
| West Virginia | 2006 | Revenue Shortfall Reserve Fund (1994) | Cap (5 → 10) | The revenue shortfall reserve fund shall be funded up to an aggregate amount not to exceed 10 % of total appropriations from State Fund, General Revenue, for the fiscal year just ended. | 2006 W.V. ALS 194, 2006 W. Va. Acts 194, 2006 W.V. Ch. 194, 2006 W.V. HB 4015 (March 31, 2006) |
| | | Revenue Shortfall Reserve Fund—Part B (2006) | Number (0 → 1) | The state established a Revenue Shortfall Reserve Fund—Part B (Rainy Day Fund—Part B) that began with the cash balance of the West Virginia Tobacco Settlement Medical Trust Fund on June 9, 2006. | W.Va. Code §11B-2-20 (August 5, 2011) |
| | 2011 | Revenue Shortfall Reserve Fund (1994) | Cap (10 → 13) | The revenue shortfall reserve fund shall be funded up to an aggregate amount not to exceed 13 % of total appropriations from State Fund, General Revenue, for the fiscal year just ended. | 2011 W.V. ALS 7;, 2011 W. Va. Acts 7;, 2011 W.V. Ch. 7;, 2011 W.V. SB 617 (March 23, 2011). |
| Wyoming | 2005 | Legislative Stabilization Reserve Account (2005) | Number (0 → 1) | Legislative Stabilization Reserve Account was established in 2005. | 2005 Wyoming Session Laws, Chapter 191, Section 4, Section 301(d). |
| | 2015 | Legislative Stabilization Reserve Account (2005) | Deposit tied to volatility (0 → 1) | Any earnings in excess of 2.5% of the previous 5-year average market value of the trust fund shall be credited to the legislative stabilization reserve account and the strategic investments and projects account created by W.S. 9-4-220 in equal amounts. | 2015 Wy. ALS 195, 2015 Wyo. Sess. Laws 195, Ch. 195, 2015 Wy. SF 146, Wy. EA 91 (March 10, 2015). |

| ***State*** | ***Year*** | ***Fund Name*** *(Year that BSF enacted)* | ***Structure*** *(Code)* | ***Summary of Change in Structure*** | ***Reference*** |
|---|---|---|---|---|---|
| | 2017 | Budget Reserve Account (1982) | Withdrawal by budget shortfall (0 → 1) | In preparing the state budget for legislative distribution, the governor must recommend allocating at least 5% of estimated general fund receipts for the next biennium to the budget reserve account. | Law 2016 ch.18, § 1, effective July 1, 2016 |

Note: BSF structures are defined in Table 3.

## CITED LITERATURE


Abadie, A., Diamond, A., & Hainmueller, A. J. (2010). Synthetic control methods for comparative case studies: Estimating the effect of California's Tobacco control program. *Journal of the American Statistical Association*, *105*(490). https://doi.org/10.1198/jasa.2009.ap08746

Abadie, A., Diamond, A., & Hainmueller, J. (2015). Comparative Politics and the Synthetic Control Method. *American Journal of Political Science*, *59*(2). https://doi.org/10.1111/ajps.12116

Abbott, K. W., Keohane, R. O., Moravcsik, A., Slaughter, A. M., & Snidal, D. (2000). The concept of legalization. *International Organization*, *54*(3). https://doi.org/10.1162/002081800551271

Alesina, A., & Perotti, R. (1996). Fiscal Discipline and the Budget Process. *American Economic Review*, *86*(2), 401–407. https://doi.org/10.2307/2118160

Alesina, A., Perotti, R., & Tavares, J. (1998). The political economy of fiscal adjustments. *Brookings Papers on Economic Activity*, *1*. https://doi.org/10.2307/2534672

Alt, J. E., & Lassen, D. D. (2006). Transparency, political polarization, and political budget cycles in OECD countries. In *American Journal of Political Science* (Vol. 50, Issue 3). https://doi.org/10.1111/j.1540-5907.2006.00200.x

Alt, J. E., & Lowry, R. C. (1994). Divided Government, Fiscal Institutions, and Budget Deficits: Evidence from the States. *American Political Science Review*, *88*(4), 811–828. https://doi.org/10.2307/2082709

Alt, J. E., & Lowry, R. C. (2000). A dynamic model of state budget outcomes under divided partisan government. *Journal of Politics*, *62*(4). https://doi.org/10.1111/0022-3816.00045

Alt, J. E., & Lowry, R. C. (2003). Party differences in state budget outcomes are there after all: Response to "reexamining the dynamic model of divided partisan government." In *Journal of Politics* (Vol. 65, Issue 2). https://doi.org/10.1111/1468-2508.t01-2-00011

Amiel, L., Deller, S., Stallmann, J., & Maher, C. (2014). Does the Restrictiveness of State Tax and Expenditure Limitations Affect State Revenues and Expenditures? *International Journal of Public Administration*, *37*(4). https://doi.org/10.1080/01900692.2013.812113

Angrist, J. D., & Pischke, J.-S. (2009). Mostly Harmless Econometrics. In *Mostly Harmless Econometrics*. https://doi.org/10.2307/j.ctvcm4j72

Bai, J. (2009). Panel Data Models With Interactive Fixed Effects. *Econometrica*, *77*(4), 1229–1279. https://doi.org/10.3982/ECTA6135

Ballotpedia. (2016). Connecticut elections, 2016 . *Ballotpedia*. https://ballotpedia.org/Connecticut_elections,_2016

Barrilleaux, C., Holbrook, T., & Langer, L. (2002). Electoral Competition, Legislative Balance, and American State Welfare Policy. *American Journal of Political Science*, *46*(2). https://doi.org/10.2307/3088385

Besley, T., & Case, A. (1995). Incumbent Behavior: Vote-Seeking, Tax-Setting, and Yardstick Competition. *The American Economic Review*, *85*(1), 25–45.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal*, *9*(2). https://doi.org/10.3316/QRJ0902027

Breton, A., & Wintrobe, R. (1975). The Equilibrium Size of a Budget-maximizing Bureau: A Note on Niskanen's Theory of Bureaucracy. *Journal of Political Economy* , *83*(1), 195–207. https://www.jstor.org/stable/1833280?seq=1#metadata_info_tab_contents

Brooks, L., & Phillips, J. H. (2010). An institutional explanation for the stickiness of federal grants. *Journal of Law, Economics, and Organization*, *26*(2), 243–264. https://doi.org/10.1093/jleo/ewn016

Brown, R. D. (1995). Party Cleavages and Welfare Effort in the American States. *American Political Science Review*, *89*(1), 23–33. https://doi.org/10.2307/2083072

Buchanan, J. M., & Wagner, R. E. (1977). Democracy in deficit. In *The Collected Works of James M. Buchanan volume 8*. Academic Press.

Buerger, C., Reitano, V., & Sorrentino, C. (2022). State fiscal reserves: Supplementation and substitution over economic boom and bust years. *Public Budgeting and Finance*, *42*(1). https://doi.org/10.1111/pbaf.12311

Bunch, B. S. (2010). Budget Deficits in the States: Illinois. *Public Budgeting and Finance*, *30*(1). https://doi.org/10.1111/j.1540-5850.2010.00951.x

Cameron, C. A., Gelbach, J. B., & Miller, D. L. (2011). Robust inference with multiway clustering. *Journal of Business and Economic Statistics*, *29*(2). https://doi.org/10.1198/jbes.2010.07136

Cameron, C. A., & Miller, D. L. (2015). A practitioner's guide to cluster- robust inference. *Journal of Human Resources*, *50*(2). https://doi.org/10.3368/jhr.50.2.317

Carlson, A., Morrison, S., Poulette, J., & Schaefer, S. (2018). *Budget stabilization reserve fund, Part III Recommendations for strengthening state finances*. https://leg.mt.gov/content/Publications/fiscal/interim/May-2018/BSRFIII-final.pdf

Castro, G. Á., & Camarillo, D. B. R. (2014). Determinants of tax revenue in OECD countries over the period 2001-2011. *Contaduria y Administracion*, *59*(3). https://doi.org/10.1016/s0186-1042(14)71265-3

Choi, E. (2022). Do Budget Stabilization Funds Invite Transparent Budget Reporting? Budget Stabilization Funds and Fiscal Behavior of States. *Journal of Policy Studies*, *37*(3), 67–84.

Clark, T. N., & Ferguson, L. C. (1983). *City money: Political processes, fiscal strain, and retrenchment.* Columbia University Press.

Coppedge, M. (1997). How the large n could complement the small in democratization research. *Annual Meeting of the American Political Science Association*.

Corbin, J., & Strauss, A. (2012). Basics of Qualitative Research (3rd ed.): Techniques and Procedures for Developing Grounded Theory. In *Basics of Qualitative Research (3rd ed.): Techniques and Procedures for Developing Grounded Theory*. https://doi.org/10.4135/9781452230153

Costello, T. J., Green, D., & Graves, P. (2016, September). *Fiscal Notes: The Texas Economic Stabilization Fund Saving for Rainy Days*. Texas Comptroller of Public Accounts. https://comptroller.texas.gov/economy/fiscal-notes/2016/september/rainy-day.php

Cyert, R. M. ;, & March, J. G. (1963). A Behavioral Theory of the Firm. In *American Political Science Review* (Issue 3). Prentice-Hall.

Douglas, J. W., & Gaddie, R. K. (2002). State rainy day funds and fiscal crises: Rainy day funds and the 1990–1991 recession revisited. *Public Budgeting and Finance*, *22*(1). https://doi.org/10.1111/1540-5850.00063

Downs, A. (1961). Problems of Majority Voting: In Defense of Majority Voting. *Journal of Political Economy*, *69*(2). https://doi.org/10.1086/258455

Drazen, A., & Eslava, M. (2006). *Pork Barrel Cycles*. http://www.nber.org/papers/w12190

Dye, R. F., Hudspeth, N. W., & Merriman, D. F. (2011). *Transparency in State Budgets*. http://igpa.uillinois.edu/fiscalfutures.

Eichengreen, B., & Bayoumi, T. (1994). The political economy of fiscal restrictions: Implications for Europe from the United States. *European Economic Review*.
Eisner, E. (1991). What Makes a Study Qualitative? In *The enlightented eye: Qualitative inquiry and the enhancement of educational practice*.
GASB. (1999). *Statement No. 34 of the Governmental Accounting Standards Board: Basic Financial Statements—and Management's Discussion and Analysis—for State and Local Governments.*
George, A., & Bennett, A. (2005). Case Study and Theory Development in the Social Science. In *Case Studies and Theory Development in the Social Science* (Vol. 6).
Ginn, V., & Marquette, J. (2019). *Don't Grow Government with Texas' Rainy Day Fund*. Texas Public Policy Foundation. https://www.texaspolicy.com/dont-grow-government-with-texas-rainy-day-fund/
Gold, S. D. (1991). Changes in state government finances in the 1980s. *National Tax Journal*, *44*(1). https://doi.org/10.1086/ntj41788874
Gonzalez, C. Y., & Paqueo, V. (2003). Social sector expenditures and rainy-day funds. *Policy Research Working Paper Series* 3131, The World Bank. https://ssrn.com/abstract=636551
Gore, A. K. (2009). Why do cities hoard cash? determinants and implications of municipal cash holdings. *Accounting Review*, *84*(1), 183–207. https://doi.org/10.2308/accr.2009.84.1.183
Gorina, E., Maher, C., & Park, S. (2019). Toward a Theory of Fiscal Slack. *Public Budgeting and Finance*, *39*(4). https://doi.org/10.1111/pbaf.12240
Gould, J. A. (2009). Divided governments and tough choices: An empirical study of the effect of divided government on state expenditures. *State Politics & Policy Quarterly*, *9*(1), 6–25.
Gramlich, E. M. (1977). A Review of the Theory of Intergovernmental Grants. In W. E. Oates (Ed.), *The Political Economy of Fiscal Federalism*. Heath.
Greene, W. H. (2012). Econometric Analysis. In *Prentice Hall* (Vol. 97).
Hendrick, R. (2006). The Role of Slack in Local Government Finances. *Public Budgeting and Finance*, *26*(1), 14–46. https://doi.org/10.1111/j.1540-5850.2006.00837.x
Hendrick, R., Choi, E., & Kan, M. (2019). The Structural Features of Rainy-Day Fund Enabling Legislation: What Policies Matter? *The 31st annual conference of the Association for Budgeting and Financial Management (ABFM)*, Washington, DC.
Hill, T. D., Davis, A. P., Roos, J. M., & French, M. T. (2020). Limitations of Fixed-Effects Models for Panel Data. *Sociological Perspectives*, *63*(3), 357–369. https://doi.org/10.1177/0731121419863785
Hou, Y. (2003). What Stabilizes State General Fund Expenditures in Downturn Years—Budget Stabilization Fund or General Fund Unreserved Undesignated Balance? *Public Budgeting and Finance*, *23*(3), 64–91. https://doi.org/10.1111/1540-5850.2303004
Hou, Y. (2004). Budget Stabilization Fund: Structural Features of the Enabling Legislation and Balance Levels. *Public Budgeting and Finance*, *24*(3), 38–64. https://doi.org/10.1111/j.0275-1100.2004.02403003.x
Hou, Y., & Brewer, G. A. (2010). Substitution and Supplementation Between Co-Functional Policy Instruments: Evidence from State Budget Stabilization Practices. *Public Administration Review*, *70*(6). https://doi.org/10.1111/j.1540-6210.2010.02223.x
Hou, Y., & Duncombe, W. (2008). State saving behavior: Effects of two fiscal and budgetary institutions. *Public Budgeting and Finance*, *28*(3). https://doi.org/10.1111/j.1540-5850.2008.00910.x

Hou, Y., & Moynihan, D. P. (2008). The case for countercyclical fiscal capacity. *Journal of Public Administration Research and Theory*, *18*(1). https://doi.org/10.1093/jopart/mum006
Hou, Y., Moynihan, D. P., & Ingraham, P. W. (2003). Capacity, Management, and Performance: Exploring the Links. *American Review of Public Administration*, *33*(3). https://doi.org/10.1177/0275074003251651
Hou, Y., & Smith, D. L. (2006). A Framework for Understanding State Balanced Budget Requirement Systems: Reexamining Distinctive Features and an Operational Definition. *Public Budgeting and Finance*, *26*(3). https://doi.org/10.1111/j.1540-5850.2006.00853.x
Hou, Y., & Smith, D. L. (2010). Do state balanced budget requirements matter? Testing two explanatory frameworks. *Public Choice*, *145*(1). https://doi.org/10.1007/s11127-009-9528-6
Ingraham, P. W., & Donahue, A. K. (2000). Dissecting the black box revisited: Characterizing government management capacity. In C. J. Heinrich & L. E. Lynn (Eds.), *Government and performance: New perspectives*. Georgetown University Press.
Inman, R. P. (2011). flypaper effect. In *The New Palgrave Dictionary of Economics*. https://doi.org/10.1057/9780230226203.1901
Ivankova, N., Stick, S., Ivankova, N. v, & Creswell, J. W. (2007). A Sample Mixed Methods Dissertation Proposal. *Field Methods Journal of Research in Education*, *48*(151).
Johnson, C. L., & Kriz, K. A. (2005). Fiscal Institutions, Credit Ratings, and Borrowing Costs. *Public Budgeting and Finance*, *25*(1). https://doi.org/10.1111/j.0275-1100.2005.00356.x
Joyce, P. G. (2001). What's so magical about five percent? A nationwide look at factors that influence the optimal size of state rainy day funds. *Public Budgeting and Finance*, *21*(2). https://doi.org/10.1111/0275-1100.00050
Kallen, C. (2017). *State tax and expenditure limitations and supermajority requirements: New and updated data* (956520).
Kneebone, R. D., & Mckenzie, K. J. (2001). Electoral and partisan cycles in fiscal policy: An examination of Canadian provinces. *International Tax and Public Finance*, *8*(5–6). https://doi.org/10.1023/A:1012895211073
Knight, B., & Levinson, A. (1999). Rainy Day Funds and State Government Savings. *National Tax Journal*, *52*(3). https://doi.org/10.1086/ntj41789735
Kratochwill, T. R., Hitchcock, J., Horner, R. H., Levin, J. R., Odom, S. L., Rindskopf, D. M., & Shadish, W. R. (2010). *What Works Clearinghouse SINGLE-CASE DESIGN TECHNICAL DOCUMENTATION*. http://ies.ed.gov/ncee/wwc/pdf/wwc_scd.pdf.
Kriz, K. (2003). The Optimal Level of Local Government Fund Balances: A Simulation Approach. *State Tax Notes*, *27*(10).
Kriz, K. A. (2015). Is there an optimal size of fiscal reserves for local governments? In *Local Government Budget Stabilization: Explorations and Evidence*. https://doi.org/10.1007/978-3-319-15186-1_9
Kwak, S. (2014). The Dynamics of State Fiscal Behavior Over the Business Cycle: Are State Fiscal Policies Procyclical? *American Review of Public Administration*, *44*(5). https://doi.org/10.1177/0275074012475155
Lauth, T. P. (2003). Budgeting during a recession phase of the business cycle: The georgia experience. *Public Budgeting and Finance*, *23*(2). https://doi.org/10.1111/1540-5850.2302003
Lawrence, P. R., & Lorsch, J. W. (1967). Organization and environment: Managing differentiation and integration. *Harvard Business School Press*.

Lee, S., & Chen, G. (2022). Disaster Experience and Governments' Savings: The Moderating Role of Organizational Capacity. *Journal of Public Administration Research and Theory*, *32*(3). https://doi.org/10.1093/jopart/muab043

Levine, C. H., Rubin, I. S., & Wolohojian, G. G. (1981). The politics of retrenchment: how local governments manage fiscal stress. In *The politics of retrenchment: how local governments manage fiscal stress.* Sage Publications. https://doi.org/10.2307/3323693

Lucas, R. E. (1976). Econometric policy evaluation: A critique. *Carnegie-Rochester Conference Series on Public Policy*, *1*(C), 19–46. https://doi.org/10.1016/S0167-2231(76)80003-6

Lynn, L. E., Heinrich, C. J., & Hill, C. J. (2000). Studying Governance and Public Management: Challenges and Prospects. *Journal of Public Administration Research and Theory*, *10*(2), 233–262. https://doi.org/10.1093/oxfordjournals.jpart.a024269

Maag, E., & Merriman, D. F. (2001). *Understanding States' Fiscal Health During and After the 2001 Recession*. www.coloradobudget.com/rdf_report.cfm.

Maher, C. S., Stallmann, J. I., Deller, S. C., & Park, S. (2017). The effects of tax and expenditure limits on state fiscal reserves. *Public Policy and Administration*, *32*(2). https://doi.org/10.1177/0952076716660607

March, J. G., & Simon, H. A. (1958). Organizations. *Wiley*.

Marlowe, J. (2005). Fiscal Slack and Counter-Cyclical Expenditure Stabilization: A First Look at the Local Level. *Public Budgeting and Finance*, *25*(3). https://doi.org/10.1111/j.1540-5850.2005.00367.x

Martell, C. R., & Smith, B. M. (2004). Grant Levels and Debt Issuance: Is There a Relationship? Is There Symmetry? *Public Budgeting and Finance*, *24*(3). https://doi.org/10.1111/j.0275-1100.2004.02403004.x

McNichol, E. C. (2014). *When and How States Should Strengthen Their Rainy Day Funds*. Center on Budget and Policy Priorities. https://www.cbpp.org/research/state-budget-and-tax/when-and-how-states-should-strengthen-their-rainy-day-funds

Merriam, S. B. (2009). Qualitative research: A guide to design and implementation. In *The JosseyBass higher and adult education series* (Vol. 2nd). https://doi.org/10.1097/NCI.0b013e3181edd9b1

Migué, J.-L., & Bélanger, G. (1974). Toward a General Theory of Managerial Discretion. *Public Choice Vol. 17 (Spring)*, 27–51. https://www.jstor.org/stable/30023151?seq=1#metadata_info_tab_contents

Mullins, D. R., & Joyce, P. G. (1996). Tax and expenditure limitations and state and local fiscal structure: An empirical assessment. *Public Budgeting and Finance*, *16*(1). https://doi.org/10.1111/1540-5850.01061

National Association of State Budget Officers. (2018). *The fiscal survey of states: Fall 2018*. https://higherlogicdownload.s3.amazonaws.com/NASBO/9d2d2db1-c943-4f1b-b750-0fca152d64c2/UploadedImages/Fiscal%20Survey/NASBO_Fall_2018_Fiscal_Survey_of_States_S.pdf

National Conference of State Legislatures. (2018). *Rainy Day Fund Structures*. https://www.ncsl.org/research/fiscal-policy/rainy-day-funds.aspx

Navin, J. C., & Navin, L. J. (2003). *The Optimal Size of Countercyclical Budget Stabilization Funds: A Case Study of Ohio*. https://papers.ssrn.com/abstract=465698

Nebraska Unicameral Legislature. (2005). Appropriations Committee Preliminary Report for FY 2005-06/ FY 2006-07 Biennial Budget.

Nevada Legislature. (2003). *Economic Forum*. Nevada Legislature. https://www.leg.state.nv.us/division/fiscal/economic%20forum/index.html
Niskanen, W. (2003). *A case for divided government*. Cato Policy Report, Washington DC: Cato Institute. https://www.cato.org/sites/cato.org/files/serials/files/policy-report/2003/3/niskanen.pdf
Nordhaus, W. D. (1975). The Political Business Cycle. *The Review of Economic Studies*, *42*(2), 169–190.
O'Toole, L. J., & Meier, K. J. (1999). Modeling the Impact of Public Management: Implications of Structural Context. *Journal of Public Administration Research and Theory*, *9*(4). https://doi.org/10.1093/oxfordjournals.jpart.a024421
Pallay, G. (2013). Who runs the states? *Ballotpedia*. Retrieved from https://ballotpedia.org/Ballotpedia:Who_Runs_the_States
Pammer, W. J. (1990). Managing fiscal strain in major American cities: understanding retrenchment in the public sector. *Choice Reviews Online*, *27*(11). https://doi.org/10.5860/choice.27-6445
Persson, T., & Tabellini, G. (2003). The economic effects of constitutions: What do the data say? MIT Press.
Pierson, K., Hand, M. L., & Thompson, F. (2015). The government finance database: A common resource for quantitative research in public financial analysis. *PLoS ONE*, *10*(6). https://doi.org/10.1371/journal.pone.0130119
Poterba, J. M. (1994). State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Politics. *Journal of Political Economy*, *102*(4), 799–821. https://doi.org/10.1086/261955
Reuters. (2017, February 21). Virginia governor vetoes bill defunding Planned Parenthood. *Reuters*. https://www.reuters.com/article/virginia-plannedparenthood-idUSL1N1G61KJ
Rodríguez-Tejedo, I. (2012). The Determinants of the Structure of Rainy Day Funds. In *Public Administration Review* (Vol. 72, Issue 3). https://doi.org/10.1111/j.1540-6210.2011.02523.x
Rogoff, K. (1990). Equilibrium Political Budget. *American Economic Review*, *80*(1).
Roller, M. R., & Lavrakas, P. J. (2015). Applied qualitative research design: A total quality framework approach. In *Applied qualitative research design: A total quality framework approach*.
Rose, S. (2006). Do fiscal rules dampen the political business cycle? *Public Choice*, *128*(3–4). https://doi.org/10.1007/s11127-005-9007-7
Rose, S. (2008). The Political Manipulation of U.S. State Rainy Day Funds Under Rules Versus Discretion. *State Politics and Policy Quarterly*, *8*(2). https://doi.org/10.1177/153244000800800203
Ryu, S., Cho, I., & Kim, J. (2020). Does the Stringency of State Tax and Expenditure Limitations Discourage Political Manipulation in Fiscal Reserves? *Public Administration Review*. https://doi.org/10.1111/puar.13306
Salmon, P. (1987). Decentralisation as an incentive scheme. *Oxford Review of Economic Policy*, *3*(2). https://doi.org/10.1093/oxrep/3.2.24
Schein, E. H. (1993). On dialogue, culture, and organizational learning. *Organizational Dynamics*, *22*(2). https://doi.org/10.1016/0090-2616(93)90052-3
Schneider, G. S. (2017, March 23). McAuliffe breaks record for most vetoes by a Virgnia governor. *Washington Post*. https://www.washingtonpost.com/local/virginia-

politics/mcauliffe-poised-to-set-the-record-most-vetoes-by-a-virginia-governor/2017/03/22/6141e204-0e6b-11e7-9d5a-a83e627dc120_story.html
Seawright, J. (2016). Multi-Method Social Science: Combining Qualitative and Quantitative Tools. *Strategies for Social Inquiry*.
Shadbegian, R. J. (1996). Do Tax and Expenditure Limitations affect the size and growth of state government? *Contemporary Economic Policy*, *14*(1). https://doi.org/10.1111/j.1465-7287.1996.tb00600.x
Shleifer, A. (1985). A Theory of Yardstick Competition. *The RAND Journal of Economics*, *16*(3). https://doi.org/10.2307/2555560
Simon, H. A. (1947). *Administrative Behavior*. Macmillan.
Smallman, C. (1996). Risk and organizational behaviour: A research model. *Disaster Prevention and Management: An International Journal*, *5*(2). https://doi.org/10.1108/09653569610112880
Sobel, R. S., & Holcombe, R. G. (1996). The Impact of State Rainy Day Funds in Easing State Fiscal Crises During the 1990-1991 Recession. *Public Budgeting & Finance*, *16*(3), 28–48. https://doi.org/10.1111/1540-5850.01075
Spears, M. (2020). State Budget Surpluses, Deficits, and Rainy Day Funds. In *The Sycamore Institute*. https://www.sycamoreinstitutetn.org/state-budget-surpluses-rainy-day-funds-deficits/.
Starman, A. B. (2013). The case study as a type of qual research. *Journal of Contemporary Educational Studies*, *1*.
Su, M. (2019). Understanding the Accumulation of Local Government Savings: A Dynamic Analysis. *International Journal of Public Administration*, *42*(11). https://doi.org/10.1080/01900692.2018.1522506
Su, M., & Hildreth, W. B. (2018). Does Financial Slack Reduce Municipal Short-Term Borrowing? *Public Budgeting and Finance*, *38*(1), 95–113. https://doi.org/10.1111/pbaf.12189
Sun, R. (2014). Reevaluating the Effect of Tax and Expenditure Limitations: An Instrumental Variable Approach. *Public Finance Review*, *42*(1). https://doi.org/10.1177/1091142112459210
Tausanovitch, C., & Warshaw, C. (2014). Representation in municipal government. In *American Political Science Review* (Vol. 108, Issue 3). https://doi.org/10.1017/S0003055414000318
Thatcher, D. (2008). *State Budget Stabilization Funds*. National Conference of State Legislatures. https://www.ncsl.org/research/fiscal-policy/state-budget-stabilization-funds-spring-2008.aspx
The Pew Charitable Trust. (2017). Rainy Day Funds and State Credit Ratings How well-designed policies and timely use can protect against downgrades. https://www.pewtrusts.org/en/research-and-analysis/reports/2017/05/rainy-day-funds-and-state-credit-ratings
The Pew Charitable Trusts. (2014). Managing Uncertainty How State Budgeting Can Smooth Revenue Volatility. https://www.pewtrusts.org/en/research-and-analysis/reports/2014/02/04/managing-uncertainty
The Pew Charitable Trusts. (2017). When to Use State Rainy Day Funds. https://www.pewtrusts.org/en/research-and-analysis/reports/2017/04/when-to-use-state-rainy-day-funds

The Pew Charitable Trusts. (2022). *States build their reserves amid growing uncertainties*. https://www.pewtrusts.org/en/research-and-analysis/articles/2022/10/18/states-build-their-reserves-amid-growing-uncertainties

The Volcker Alliance. (2021). *Rainy Day Fund Strategies - A Call to Action.* https://www.volckeralliance.org/resources/rainy-day-fund-strategies-call-action-0

Tiebout, C. M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy*, *64*(5). https://doi.org/10.1086/257839

Toft, B., & Reynolds, S. (2005). Learning from disasters: A management approach. *Palgrave* Macmillan.

Torres-Reyna, O. (2014). Panel Data Analysis Fixed & Random Effects. *Princeton University*, *http://www.princeton.edu/~otorres/*.

von Hagen, J. (2008). Political Economy of Fiscal Institutions. In *The Oxford Handbook of Political Economy*. https://doi.org/10.1093/oxfordhb/9780199548477.003.0026

von Hagen, J., & Harden, I. J. (2019). Budget processes and commitment to fiscal discipline. *Credit and Capital Markets*, *52*(4). https://doi.org/10.3790/ccm.52.4.527

Wagner, G. A. (2003). Are state budget stabilization funds only the illusion of savings? Evidence from stationary panel data. *Quarterly Review of Economics and Finance*, *43*(2), 213–238. https://doi.org/10.1016/S1062-9769(01)00132-6

Wagner, G. A. (2004). The Bond Market and Fiscal Institutions: Have Budget Stabilization Funds Reduced State Borrowing. In *National Tax Journal* (Vol. 57).

Wagner, G. A., & Elder, E. M. (2005). The role of budget stabilization funds in smoothing government expenditures over the business cycle. In *Public Finance Review* (Vol. 33, Issue 4, pp. 439–465). https://doi.org/10.1177/1091142105276442

Wagner, G. A., & Sobel, R. S. (2006). State Budget Stabilization Fund Adoption: Preparing for the Next Recession or Circumventing Fiscal Constraints? *Choice*, *126*(1), 177–199. https://doi.org/10.1007/s

Wang, W., & Hou, Y. (2012). Do local governments save and spend across budget cycles? evidence from North Carolina. *American Review of Public Administration*, *42*(2). https://doi.org/10.1177/0275074011398387

Wooldridge, J. M. (2013). Introductory econometrics : a modern approach. 5th. In *South-Western Cengange learning*.

Wu, Y., & Shi, Y. (2021). Does General Fund Balance Stabilize Municipal Expenditure? Evidence from Large American Cities. *International Journal of Public Administration*, *44*(5). https://doi.org/10.1080/01900692.2020.1728772

Xu, Y. (2017a). Generalized synthetic control method: Causal inference with interactive fixed effects models. *Political Analysis*, *25*(1). https://doi.org/10.1017/pan.2016.2

Xu, Y. (2017b). *Package "gsynth" Type Package Title Generalized Synthetic Control Method*. https://doi.org/10.1017/pan.2016.2

Zeldow, B., & Hatfield, L. (2019). Difference-in-Differences. Retrieved from https://diff.healthpolicydatascience.org/

Zhang, F., Welch, E. W., & Miao, Q. (2018). Public organization adaptation to extreme events: Mediating role of risk perception. *Journal of Public Administration Research and Theory*, *28*(3). https://doi.org/10.1093/jopart/muy004

# VITA

EUNJOO CHOI

## EDUCATION

| | |
|---|---|
| 2024 | **University of Illinois Chicago** (Chicago, Illinois)<br>Ph.D. in Public Policy, Management, & Analytics |
| 2019 | **University of Michigan** (Ann Arbor, MI)<br>Inter-University Consortium for Political and Social Research (ICPSR),<br>Summer Program in Quantitative Methods of Social Research |
| 2011 – 2013 | **Georgetown University** (Washington D.C.)<br>Master of Arts in Government |
| 2000 – 2005 | **Sogang University** (Seoul, S. Korea)<br>Bachelor of Arts in Political Science and English Literature |

## PROFESSIONAL EXPERIENCE

### Teaching and Research Experience

| | |
|---|---|
| 2023 – 2024 | *Adjunct Faculty*, Illinois Institute of Technology (Chicago, Illinois) |
| 2016 – 2021 | *Teaching Assistant*, Department of Public Policy, Management, & Analytics, University of Illinois Chicago |
| 2016 – 2021 | *Research Assistant*, Department of Public Policy, Management, & Analytics, University of Illinois Chicago |

### Other Professional Experience

| | |
|---|---|
| 2013 | *Research Specialist*, Korean Trade-Investment Promotion Agency (KOTRA), Washington D.C., USA |
| 2005 – 2009 | *Journalist and Singapore Correspondent*, The Hankyoreh newspaper and Hankyoreh 21 (Seoul, S. Korea and Singapore) |

## ACADEMIC PUBLICATIONS

### Publications (peer-reviewed journals)

Choi, Eunjoo. (2022). Do Budget Stabilization Funds Invite Transparent Budget Reporting? Budget Stabilization Funds and Fiscal Behavior of States. Journal of Policy Studies, 37(3), 65-82.

### Conference Presentations

Eunjoo Choi, Seeun Ryu, and Yonghong Wu (2023). The Impact of Fiscal Rules and Cutback Strategies on State Pension Funding in the U.S. Paper presented at the 35th annual conference of the Association for Budgeting and Financial Management (ABFM), October 26-28, 2023; Denver, CO.

Ryu, Seeun and Eunjoo Choi (2023). Fiscal Slack, Rules, and Resilience. Paper presented at the 35th annual conference of the Association for Budgeting and Financial Management (ABFM), October 26-28, 2023; Denver, CO.

Choi, Eunjoo. (2022). Fiscal Condition, State Savings, and Pension Funding in the U.S. States: A panel vector autoregressive analysis. Paper presented at the Association for Public Policy Analysis & Management (APPAM) Fall Research Conference, Washington D.C.

Choi, Eunjoo. (2022). Budget Stabilization Funds and Fiscal Behavior of State in Times of Fiscal Stress. Paper presented at the Midwest Political Science Association (MPSA) Conference, Chicago, IL, 2022.

Choi, Eunjoo and Rebecca Hendrick. (2022). What Rainy Day Fund Policies Matter? Indicators of RDF Stringency and Their Impact on State Fiscal Performance. Paper presented at the Association for Budgeting & Financial Management (ABFM) Job-market showcase, 2020.

Choi, Eunjoo. (2019). Does the Stringency of Rainy-Day Fund Rules Matter? Principal Component Regression Analyses of RDF Policies. Paper presented at the Midwest Public Affairs Conference (MPAC), Indianapolis, IN, 2019.

Hendrick, Rebecca, Eunjoo Choi, and Mingyue Kan. (2019). The Structural Features of Rainy-Day Fund Enabling Legislation." Paper presented at the 31st annual conference of the Association for Budgeting and Financial Management (ABFM), September 26-28, 2019; Washington, DC.

## AWARDS, GRANTS, AND FELLOWSHIPS

Best Student Paper Award at the 2019 Midwest Public Affairs Conference (MPAC)

Inter-university Consortium for Political and Social Research (ICPSR) Scholarship (Summer 2019), University of Illinois Chicago

Department of Public Administration Scholar Award (DPASA) (2016 – 2021), Tuition and Stipend, University of Illinois Chicago

Academic Excellence Scholarship (Fall 2004), Sogang University (GPA 4.10/4.3)

Travel Grant for the 2022 APPAM conference, Association for Public Policy Analysis & Management

Travel Grant for the 2019 ABFM conference, University of Illinois Chicago

Travel Grant for the 2019 MPAC conference, University of Illinois Chicago

## PROFESSIONAL MEMBERSHIPS, CERTIFICATIONS AND OTHER ACTIVITIES

Manuscript Reviewer, International Review of Public Administration (IRPA)

Member, Association for Budgeting and Financial Management (ABFM)

Member, Association for Public Policy Analysis & Management (APPAM)

Member, Midwest Political Science Association (MPSA)