8-2016

American Cities in Turbulent Economic Times: An Exploration of Financial Slack in Municipal Finance

Min Su
Georgia State University

AMERICAN CITIES IN TURBULENT ECONOMIC TIMES: AN EXPLORATION OF FINANCIAL SLACK IN MUNICIPAL FINANCE

A Dissertation
Presented to
The Academic Faculty

By

Min Su

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

Georgia State University and Georgia Institute of Technology

August 2016

AMERICAN CITIES IN TURBULENT ECONOMIC TIMES:
AN EXPLORATION OF FINANCIAL SLACK IN MUNICIPAL FINANCE

Approved by:

Dr. W. Bartley Hildreth, Advisor
Andrew Young School of Policy Studies
Georgia State University

Dr. John C. Thomas
Andrew Young School of Policy Studies
Georgia State University

Dr. Dennis R. Young
Andrew Young School of Policy Studies
Georgia State University

Dr. Justin Marlowe
Daniel J. Evans School of Public Policy & Governance
University of Washington

Dr. Benjamin A. Chupp,
School of Public Policy
Georgia Institute of Technology

Date Approved: June 1, 2016

ACKNOWLEDGEMENTS

The journey towards attaining a doctorate has been challenging, exciting, and life-changing. I wish to express my deepest gratitude to the individuals and institutions that have aided me in my progress to this point. First and foremost, I would like to thank my mentor and dissertation chair, Dr. W. Bartley Hildreth. He became my academic advisor the first day I entered the doctoral program and introduced me to the field of government budgeting and public financial management. He saw my potential and has helped me nurture my raw talent with patience and dedication. He never neglects my random and preliminary research ideas and always shows his genuine curiosity. His knowledge, scholarly integrity, passion for research and teaching, and insightful career advice have shaped me as a young scholar. I wholly attribute any current and future success to my wonderful mentor.

Dr. Justin Marlowe also plays an instrumental role in my academic achievements. His work inspired me to choose municipal financial slack as the dissertation topic. Throughout my entire dissertation research, he offered tremendous help. In addition to helping me complete the dissertation, Dr. Marlowe provided invaluable advice on research strategies, future research agenda, and career development. His advice enables me to look a few steps further and gives me confidence to establish an academic career. I genuinely enjoy our friendship and feel thrilled being guided by my own role model.

I am truly grateful to have Dr. John Thomas and Dr. Dennis Young in my dissertation committee. The two of them, both as highly regarded scholars in the fields of public administration and nonprofit research respectively, pushed me to think out of the box. Their advice has not only encouraged me to explore related literature from various

fields of disciplines for the dissertation, but also motivated me to extend my research endeavor.

I offer a heartfelt thank you to Tracy Arner, the financial management program manager of the Carl Vinson Institute of Government at the University of Georgia. At the initial stage of my dissertation research, I had several interviews with her. She supported my research wholeheartedly. She generously shared data sources, books, and training materials. She invited me to her governmental accounting courses and introduced me to state and local government officials in Georgia, from whom I gained valuable views on fund balances from practitioners' perspectives.

I greatly appreciate the financial support from the Society for Political Methodology and the Inter-University Consortium for Political and Social Research (ICPSR) that covered my tuition for the ICPSR Summer Program in Quantitative Methods of Social Research. The ICPSR training courses substantially improved my quantitative research skills. It was during that summer at the University of Michigan Law Library that I drafted the framework and the first chapter of this dissertation. I am also grateful for the Andrew Young School of Policy Studies and the Georgia Fiscal Management Council which provided crucial financial support for my dissertation research.

Much is owed to Dr. Gregory Lewis, who orchestrated my recruitment to the joint doctoral program, and has provided constant support ever since. He is very generous in his time reading my draft papers and answering numerous "five-minute statistic questions." He is a most trustworthy professor that I always count on for honest advice. I am also thankful to Dr. Rose Zheng at the University of International Business and

Economics in Beijing, China. Without her advice and encouragement, I would not have pursued a doctorate.

I also want to thank the staff members, Elsa Gebremedhin, Abena Otudor, Lisa Sherpard for the love and care, and Matt Arp for the professional support which ensures a smooth path to graduation. I am fortunate to have a wonderful peer group who helped make the past few years a joyful life experience: Kelechi Uzochukwu, Xiaojing Sun, Christian King, Xi Huang, Rosalyn Washington, Obed Pasha, and Komla Dzigbede.

Last but not least, I want to express my special gratitude to my parents who worked so hard to give me a wonderful childhood and life. I am grateful that they instilled in me a lifelong desire to learn at my early age. They have never imposed any shackle that restrains my freedom of thinking. I will keep this free spirit to continue exploring the whys and hows.

In all, the journey to attaining a Ph.D. has been an amazing experience: guided by great minds, supported by generous institutions, surrounded by inspiring peers, and cared by family members. I am cheerfully looking forward to the next chapter of life.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

SUMMARY

This dissertation is a comprehensive study of financial slack's roles in municipal finance. Drawing theories and hypotheses in various fields of disciplines, the dissertation explores both the causes and impacts of financial slack accumulation in municipal government. Based on organization theory's risk-slack hypothesis, I first examine whether tax revenue volatility along with other risk factors in a city's fiscal structure increase municipal financial slack accumulation. Using the generalized method-of-moment estimation, I analyze a panel dataset composed of 2,160 individual American cities in 50 states from years 2003 to 2011. The findings that tax revenue volatility and other risk factors increase municipal financial slack accumulation provide evidence to support organization theorists' argument that cities that face more risk factors need more financial slack to hedge against the risks.

I then examine financial slack's impact on municipal expenditure stabilization. Using the first-differenced equation model to analyze the same dataset used in the previous chapter, I find that the change of a city's accumulated financial slack always counteracts the change of its expenditures, suggesting that financial slack stabilizes municipal expenditures when revenues fluctuate—it provides fungible financial resources when a city faces a revenue shortfall and it absorbs additional revenues when a city experiences a revenue surplus. Further, the findings indicate that financial slack's expenditure stabilization role is more important when a city experiences revenue shortfalls. These findings support organization theory's view on financial slack that it works as an effective tool to manage risks and fluctuations in municipal finance.

Lastly, I examine financial slack's role in managing municipal cash flows. Municipal governments often use internal financial resources (i.e. accumulated financial slack) and external financial resources (i.e. short-term debt) to manage cash flow fluctuations. The pecking order theory posits that firms have a preference order over financial resources: internal funds come first, followed by debt, and then equity. I extend the application of pecking order theory from firms to local governments and test whether municipal governments also have this preference order. I use the Heckman Selection Model to analyze 478 California cities between 2003 and 2011. I find that financial slack reduces both the probability and the amount of municipal short-term debt. This finding suggests that municipal governments prefer internal financing over external financing.

In all, this dissertation goes beyond the conventional research focus on financial slack—its expenditure stabilization role. The dissertation examines both the causes and impacts of financial slack in municipal finance. Findings from this dissertation provide evidence to support organization theory's risk-slack hypothesis, improving our understanding of government financial resources allocation between spending and saving. Findings from this dissertation also indicate that financial slack is an effective management tool to smooth expenditure volatility and cash flow fluctuations.

CHAPTER 1

INTRODUCTION: FINANCIAL SLACK IN MUNICIPAL FINANCE

1.1 Managing Municipal Finance in Turbulent Economic Times

In the United States, there are over 19,000 municipalities hosting over 80 percent of the total population.[1] These municipal governments provide local residents with essential public goods and services such as police and fire protection, electricity, water and sewage, garbage and sanitation services, public transit systems, and public recreational facilities. They also serve as local economic engines providing the necessary infrastructure, safe environment, and educated workforce upon which business flourishes. Due to the important roles municipal governments, especially cities have played and are expected to continue playing in the economy, this dissertation is devoted to the study of American cities.

Financial resources are the lifeblood of public goods and services provisions by city governments. The availability and stability of public financial resources directly shape many of the outcomes that matter to the public. Over the past hundred years, as many American cities have gradually changed their dependence on stable revenue sources such as the property tax to more volatile revenue sources such as the income and sales taxes, these cities' revenues became less predictable. The volatile tax revenues pose a big challenge to city officials in maintaining the provision and quality of public goods

[1] Sources: "Census Bureau Reports There Are 89,004 Local Governments in the United States." United States Census Bureau. Last modified August 30, 2012. https://www.census.gov/newsroom/releases/archives/governments/cb12-161.html. (Accessed on February 1, 2016). "2010 Census Urban Area Facts." United States Census Bureau. http://www.census.gov/geo/reference/ua/uafacts.html. (Accessed on February 1, 2016).

and services without disruption. This challenge is greater during turbulent economic times, especially when the overall economy experiences a recession. During the Great Recession of 2007-2009, many municipalities experienced increasingly financial stress. Some cities that experienced extremely severe financial hardship came close to financial collapse, as illustrated by City of Detroit. To manage municipal finance under fiscal stress, municipal government managers respond in the following ways: (1) reducing local services, furloughing or laying off employees; (2) raising taxes, service charges and/or fees; (3) canceling or delaying infrastructure projects; and/or (4) using accumulated financial slack to fill in the budget gap (Hoene and Pagano 2011). Reducing local services and increasing revenues by raising taxes can be politically costly and cause public dissatisfaction. Canceling or delaying infrastructure projects is simply postponing the current problems to the future. Financial slack is an alternative tool for city officials to manage municipal finance in turbulent economic times. Researchers have quite different views on the accumulation and usage of financial slack by government. In general, public choice economists portray governments as slack-maximizing and leviathan-like bureaucracies. They are concerned that accumulated slack might encourage inefficiency, satisficing, political rent seeking, and agency problems. In contrast, organization theorists view slack as a crucial buffer against risks. They believe that slack could increase an organization's capacity in absorbing shocks and reducing the disruptions of service delivery or the need for core structural changes.

What roles does financial slack play in municipal finance? What factors affect a city's financial slack accumulation? Is slack accumulation driven by governments' slack-maximizing nature assumed by the public choice theory or a precautionary financial

management behavior explained by the organization theory? How does accumulated slack influence a city's financial performance regarding expenditure stabilization and borrowing decisions? This dissertation explores the roles of financial slack in municipal finance, especially how it works as a financial management tool to help municipal officials manage their cities' finances.

1.2 Municipal Financial Slack and Its Measures

1.2.1 Organizational Slack and the Debates

Slack is a concept that appears in various fields of disciplines and has been developed with reference to firms, governments, nonprofit organizations, and other institutions. In general, slack is defined as the excess resources available to an organization, which may include excess liquidity, redundant employees, unused capacities, discretionary capital expenditures, and public services provided in excess of those required (Cyert and March 1963). In his book *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States,* Hirschman (1970, 15) argues that slack exists in any organization such as family, firm, political party, or nation. The human society has a natural tendency to accumulate slack—slack "is continuously being generated as a result of some sort of entropy characteristic of human, surplus-producing societies".

Organizational slack is anathema to the conventional economic theory. Within this paradigm, scholars believe that slack represents waste and ideally there should be no slack. Slack causes price increase with given quality or a quality decline with given price. This market inefficiency could be corrected through dissatisfied customers' "exit" that

forces firms to reduce slack or through "voice" that attempts to influence management and/or public opinions (Hirschman 1970). Regarding slack in the public sector, since Niskanen (1971) published the book *Bureaucracy and Representative Government*, a group of public choice economists portray governments as slack-maximizing bureaucracies. They believe that bureaucrats have the incentive to maximize the difference between revenue and the minimum cost of production. The difference becomes slack and it is then turned into over-supply of public goods or non-productive expenditures that the bureaucrats desire, such as increased salary and benefits, more administrative expenses, and extra personnel (Breton and Wintrobe 1975; McGuire, Coiner, and Spancake 1979; Blais and Dion 1990; Wyckoff 1990; Duncombe, Miner, and Ruggiero, 1997; Garrett 2001). Therefore, taxpayers need to use institutions to constrain the growth of the "Leviathans" (Brennan and Buchanan 1980; Oates 1985; Caplan 2001) or to introduce competition into the public sector to reduce agency problems (Miranda 1994; Boyne 1998).

The organizational theorists have quite different views compared to the public choice economists. They argue that when making resource-allocation decisions, short-term efficiency should not be made without considering the long-term effectiveness. Organizational slack is a crucial buffer that allows an organization to adapt to internal pressure for adjustment and external pressure for changes in policies and environment (Bourgeois 1981). Slack reduces the potential disruptions of services delivery or the need for core structural changes (Cyert and March 1963; Bourgeois 1981; Sharfman et al. 1988). Slack facilitates innovation by relaxing organizational control and allowing organizations to experiment with new strategies (Levinthal and March 1981; Singh 1986;

Bromiley 1991; Nohria and Gulati 1996). Moreover, slack helps organizations to take advantage of unexpected opportunities (Levinthal and March 1981; Moe 1984).

In this dissertation, I draw theories and studies on slack from various fields of disciplines and apply them in the context of municipal government. Taking an organizational perspective, I attempt to explore the effectiveness of financial slack as a management tool that facilitates municipal government officials in managing their cities' finances. I am particularly interested in the roles of *financial* slack (as opposed to *non-financial* slack) which refers to slack resources that are accounting based and can be measured objectively (Mishina, Pollock, and Porac 2004; Bradley, Shepherd, and Wiklund 2011) because it is visible, manageable, measurable, and accessible.

1.2.2 Municipal Financial Slack and Its Measures

Financial slack occurs quite often in sub-national governments. For the majority of the sub-national governments in the United States, one primary feature of their budgeting and financial management is the balanced budget requirement. Some state governments require that the governor's proposed budget must be balanced; some require the budget that the legislature passes must be balanced; and some require the budget must be balanced at the end of a fiscal year or biennium, and no deficit should be carried forward.[2] In reality, governments' actual revenues and expenditures rarely equal their

[2]Source: "Executive Summary on State Balanced Budget Requirements" National Conference of State Legislature. Updated 12 April, 1999. http://www.ncsl.org/research/fiscal-policy/state-balanced-budget-requirements.aspx (accessed on March 14, 2015).

In the United States, local government's authority is granted by its state government. State government allows certain local discretionary authority, regarding its structure, functions, finances, and personnel management. The narrowest discretionary powers are given to finances. (See: "Local Government Authority" National League of Cities http://www.nlc.org/build-skills-and-networks/resources/cities-101/city-powers/local-government-authority). So far, there is no national survey on municipal adoption of

estimated numbers in the budgets. In a particular fiscal period (for example a fiscal year), if a government's actual revenues exceed actual expenditures, the excess of revenues over expenditures becomes financial slack. Many governments begin their budget preparation six months before the start of a new fiscal year; some even earlier (e.g., twelve months). Due to the long period between budget preparation and budget implementation, there inevitably involves some degree of errors in budget estimates. For example, revenue collections depend on a number of factors such as economic condition, population growth, employment, intergovernmental aid policies, to name just a few. Each of these factors is subject to change and can be difficult to estimate accurately. Expenditure estimation is also based on many factors out of the control of management. Activities that were planned may not take place. A natural disaster may cause a large increase in unexpected spending. Whatever the reason, they cause the actual revenues or expenditures deviate from the estimated numbers. These estimation errors are *random* and *unintentional*.

Budgeters and government officials sometimes build slack into budget estimates *intentionally*. Regarding revenue forecasting, researchers find evidence of systematic underestimation of revenue. For example, Beckett-Camarata (2006) finds that the City of Canton, Ohio underestimated its tax revenues by an average of 4.7 percent over the period of 1993 and 1999. The tendency toward underestimating revenues in Canton, Ohio is not a unique case. A number of studies have found similar evidence of systematic revenue underestimation in state and local governments (Bretschneider, Bunch, and Gorr

the balanced budget requirement. Given that municipal governments are allowed the narrowest discretionary powers in their finances, it is reasonable to assume that most of the municipal governments follow the balanced budget requirement as their state governments do.

1992; Rodgers and Joyce 1996; Voorhees 2006). This tendency is probably motivated by a concern of potential shortfalls in actual revenue collection. In terms of expenditure estimation, budgeters and government officials tend to overestimate expenditures to an acceptable degree so that once the actual expenditures exceed the budget, they could use financial slack created by expenditure overestimation to make adjustment instead of implementing a mid-year cutback or raising taxes which is undesirable both fiscally and politically. Researchers have found evidence that local governments use the expenditure overestimation strategy in their budgets. For example, Hulpke and others find that many school districts in the San Francisco Bay Area overestimated expenditures (Hulpke, Watne, and Waldo 1976). Larkey and Smith (1989) study budget forecasting in San Diego, Pittsburgh, and the Pittsburgh School District. They reveal a similar tendency that on average, these local governments overestimated expenditures by 2 to 3 percent between the 1940s and the 1980s. Estimation errors caused by intentional revenue underestimation and expenditure overestimation are called "conservative forecasting bias" (Mushkin and Lupo 1967; Rose and Smith 2012). The conservative forecasting biases together with the random estimating errors explain why financial slack often occurs in municipal government finance.

When financial slack occurs, some governments establish formal funds, such as rainy day funds, budget stabilization funds, or other types of reserve funds to keep their financial slack. Almost all state governments have established at least one of such funds to keep all or a proportion of their financial slack (Thatcher 2008). Unlike state government, the majority of municipal governments in the U.S. do not have formally established reserve funds. They seem to prefer keeping financial slack in fund balances

(Allan 1990). Wolkoff (1987) surveyed 27 largest cities (based on populations) and found that only 7 of them had a formal rainy day fund during the time of his survey. Marlowe (2012) updated Wolkoff's survey in a recent study, and found that in 2009, 11 of these 27 cities had a formal rainy fund. However, lacking a formally established rainy day fund or stabilization fund does not mean that these governments have no financial slack. Researchers find that many local governments maintain considerable amount of slack in their fund balances (Marlowe 2005; Hendrick 2006; Stewart 2009; Wang and Hou 2012; Wang 2015).

Fund balance is the difference between a government's current assets and current liabilities at the end of a fiscal year, reflecting what is left over after the fund's assets have been used to meet its liabilities. Traditionally, state and local governments report financial statements arranged around a series of funds in their Comprehensive Annual Financial Reports (CAFRs). Each fund is a self-balancing account that records specific aspects of a government's financial activities. The number of funds a government operates varies. In general, there are three major categories of funds: governmental funds, proprietary funds, and fiduciary funds. *Proprietary funds* are used to account for activities that are run on a business-like basis, such as an airport owned by a government. *Fiduciary funds* contain resources that the government holds for others. Thus money in fiduciary funds belongs to the ultimate recipient, not the government holding it. Funds in the fiduciary funds category often include: private purpose trust funds, investment trust funds, pension funds, and agency funds. *Governmental funds* account for everything else, and they are the typical funds operated by most governments. Five funds are included in the governmental fund types: general fund, special revenue funds, capital projects funds,

debt service funds, and permanent funds. Among them, the *general fund* is often the largest among governmental funds, and it is also where most basic and important public services can be found, such as police and fire, sanitation, social services, and so on. Some small municipal governments report most or all transactions in the general fund. Due to the importance of the general fund in municipal finance, it receives the most attention and scrutiny from elected officials, citizens, credit rating agencies, and capital market analysts. The structure of major funds operated by state and local governments is demonstrated in Figure 1.

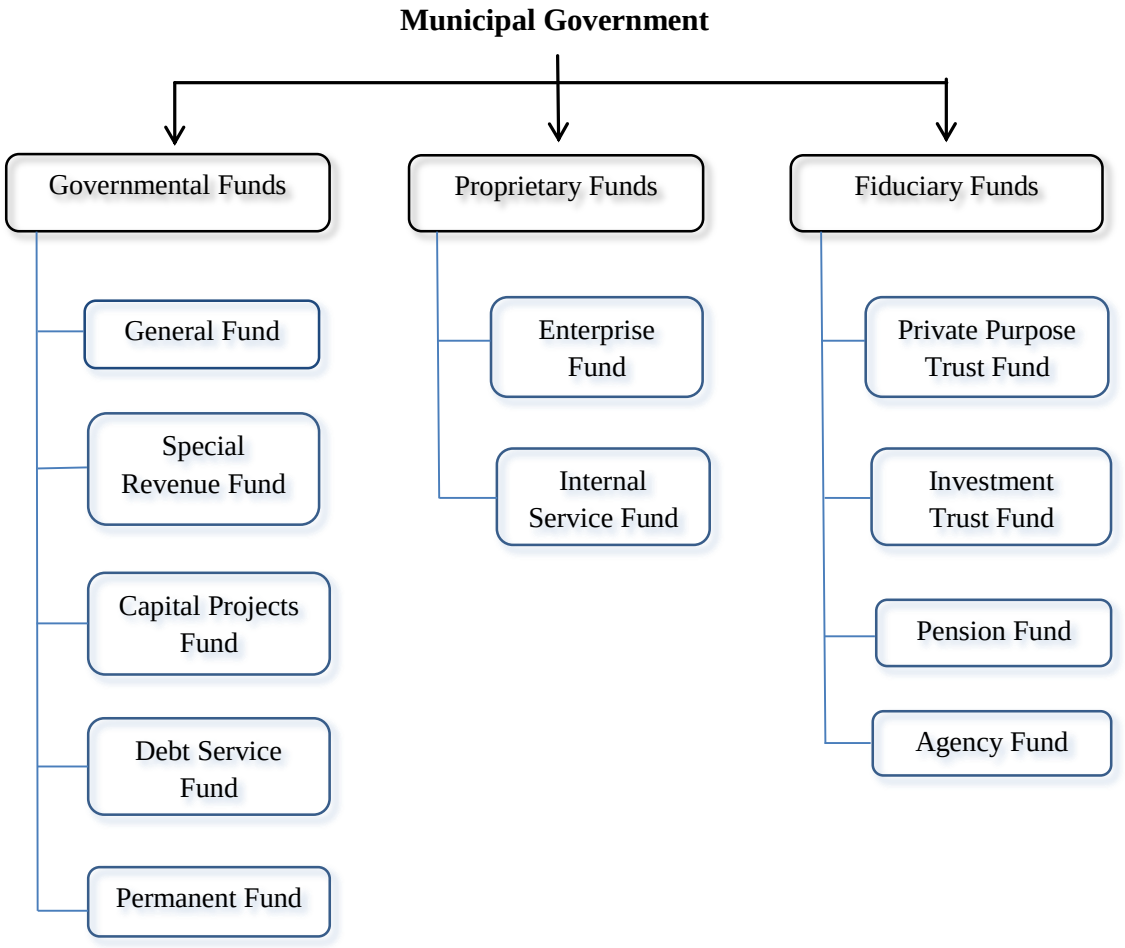


Figure 1. The Structure of Major Funds Operated by State and Local Governments

Researchers have used various measures of financial slack in their studies, including cash balance (Gianakis and Snow 2007; Gore 2009), stabilization funds (Gianakis and Snow 2007; Snow, Gianakis, and Haughton 2015), fund balance (Hembree, Shelton, and Tyer 1999; Hendrick and Crawford 2014), unreserved general fund balance (Marlowe 2005; Hendrick 2006), and unrestricted net assets (Marlowe 2011). *Cash balance* is the end-of-year cash and market securities a government maintains. Even though cash and market securities represent the most liquid form of governmental assets, they are not a good measure of a government's financial slack. Governments often impose restrictions on their financial resources. A considerable proportion of cash and securities may be reserved to debt service funds, pension trust funds, or other types of reserve funds which government managers have no discretionary authority other than their dedicated purposes. Therefore, if cash and securities carry legal restrictions, they cannot be considered as slack. In addition, the end-of-year cash and market securities reported by the Census Bureau include cash balances in the general fund and all other funds. Using that definition of cash balance as a measure of financial slack tends to overestimate a government's discretionary financial capacity in managing the general fund.

The *stabilization fund* is not a good measure of municipal financial slack either. As previously discussed, state governments generally establish formal stabilization funds or rainy day funds to keep their financial slack; however, very few cities do so. Many city governments maintain a considerable amount of slack in their fund balances. Therefore, using stabilization funds or rainy funds may underestimate municipal governments' financial slack level. In addition, since state laws that regulate local stabilization funds or

rainy day funds vary tremendously, and more than half of the states have no explicit laws in this area (Ványolós 2009), these local stabilization funds have different names, dedications, and deposit/withdrawal rules. The lack of uniformity of local stabilization funds creates a challenge for conducting a nationwide study.

An alternative measure of financial slack is *fund balance*, which is the difference between assets and liabilities of various funds (see Figure 1) reported in the government's Comprehensive Annual Financial Reports (CAFRs). CAFRs are end-of-year financial documents that consist of a set of thorough and detailed financial statements of a state, municipal, or other governmental entities. Information reported in individual CAFRs is audited by an independent public accounting firm or a state audit elected or appointed by the state government, usually on an annual basis. The auditing firm or state office certifies that the financial statements are presented fairly in conformity with the Generally Accepted Accounting Principles (GAAP) and are free from material misstatement. Therefore, financial information reported in CAFRs is generally considered to be accurate, consistent, comprehensive, and relatively comparable.

Among the various funds governments operate, the general fund is most important because it is usually the largest fund and includes most of the essential public services. The *general fund balance* is often reported as reserved and unreserved fund balance, as required by the GAAP set by the Governmental Accounting Standards Board (GASB). When the general fund balance is *reserved*, it means that the resources are legally limited for particular purposes such as debt service and capital replacement. The reserved general fund balance should not be considered as a government's financial slack. If the general fund balance carries no restrictions on its future use, it is called *unreserved* general fund

balance. The unreserved general fund balance (UFB) thus is an appropriate measure of a government's available resources under government officials' management discretion. Further, the general fund balance is reported on a modified-accrual basis of accounting that focuses on short-term or in other words, liquid financial resources. Therefore, the UFB reflects a government's available and liquid financial resources for operations.

CAFRs also report the *net assets* of governmental activities in the government-wide financial statements.[3] The net assets are the difference between a government's total assets and total liabilities.[4] Like the general fund balance, part of the net assets may be subject to restrictions beyond government managers' control. Net assets that carry no restrictions are call *unrestricted* net assets (UNA), which researchers sometimes use as a financial slack measure. The UNA reflects a government's overall available resources, both liquid and those inherent in a government's long-term condition. UNA includes long-term assets such as land, improvements, and constructions in process that are not easily converted to liquid financial resources quickly. Using UNA as a financial slack

[3]The funds financial statements could barely provide a complete picture of the financial activities and financial condition of a government. First, these funds use different accounting methods. For example, the proprietary and fiduciary funds use accrual basis accounting, whereas the governmental funds use the modified accrual accounting. Second, some financial activities occur between funds. Simply adding funds together may double-count these activities. To compensate the missing information from the separate funds financial statements, the GASB Statement 34 requires state and local governments to report the government-wide statements that bring all financial activities together in one place using one type of information—information reported under the accrual-based accounting. The government-wide statements organize information by whether it relates to governmental activities or business-type activities. Generally speaking, the governmental activities are those accounted for in the governmental funds and the internal services. The business-type activities are typically synonymous with the enterprise funds. The governmental and business-type activities combine to represent the total primary government.

[4]In June 2011, the GASB renamed "net assets" as "net position" in its Statement No. 65. The Statement No. 65 amends the net assets reporting requirements in the Statement No. 34 by standardizing the presentation of deferred inflows and outflows of resources. The GASB Statement No. 65 took effect after December 15, 2011. Since the purpose of this section is to review and assess financial slack measures used in prior studies, I use "net assets" in the discussion to keep consistent. (See "Summary of Statement No. 63", the Governmental Accounting Standards Board http://gasb.org/cs/ContentServer?site=GASB&c=Pronouncement_C&pagename=GASB%2FPronouncement_C%2FGASBSummaryPage&cid=1176158736800).

measure may overestimate a government's *immediately available* financial resources that allow government officials' management discretion in their daily operations. In addition, UNA is reported based on the accrual basis of accounting. Under the accrual accounting, revenue is recognized when it is earned, realized or realizable. For example, governments can report revenues before they receive the cash if they reasonably expect the cash will be received in the near future. This also suggests that using UNA as a measure tends to overestimate a government's liquid and immediately available financial slack. In this dissertation, I explore how financial slack works as a management tool that offers government officials discretionary power and the flexibility when managing their cities' finances in turbulent economic times. For such a study, a financial slack measure that reflects a government's liquid and immediately available financial resources is more appropriate. Therefore, I use unreserved general fund balance (UFB) as the financial slack measure in this dissertation.

1.3 Research Questions

In the corporate finance and financial management literature, researchers address why firms accumulate slack and whether slack resources promote or hinder firms' successful performance (Levinthal and March 1981; Moe 1984, Jensen 1986; Sharfman et al. 1988; Pasour Jr 1989; Blanchard, Lopez-de-Silanes, and Shleifer 1994; Phan and Hill 1995; Harford 1999). In the public finance and government financial management literature, studies on how slack resources influence government finance and financial management blossomed in the 1990s and early 2000s. These studies almost exclusively focus on state government (Poterba 1994; Sobel and Holcombe 1996; Knight and Levinson 1999; Joyce 2001; Hou 2003, 2004; Wagner and Elder 2005; Hou and

Duncombe 2008), with a few exceptions on local government, and even fewer on municipal government (Tyer 1993; Hembree, Shelton, and Tyer 1999; Marlowe 2005; Hendrick 2006; Gianakis and Snow 2007; Gore 2009; Marlowe 2011; Hendrick and Crawford 2014; Snow, Gianakis, and Haughton 2015). Table 1 summarizes the empirical studies on municipal financial slack in last three decades. This table suggests that most of these studies use samples of cities in one state or a particular metropolitan area, raising a concern of external validity of the findings. So far, we know relatively little about slack accumulation by American cities across the nation: what is the national average level of financial slack accumulated by American cities? Are there any general patterns of financial slack accumulation among cities in different regions? What are the determinants of municipal financial slack accumulation? How does financial slack affect municipal financial management with respect to spending and borrowing? Does financial slack act as a balancing device that helps stabilize municipal expenditures? Does the accumulated slack reduce a government's short-term debt issuance? This dissertation attempts to address these questions. Drawing from theories and literature in public finance, public and corporate financial management, economics, and organization and strategic management, this dissertation explores the roles of financial slack in municipal finance in two primary perspectives: the determinants of financial slack accumulation and the impacts of financial slack in municipal finance. I examine these two perspectives in three chapters that cover municipal revenues (Chapter Two), municipal expenditures (Chapter Three), and municipal securities (Chapter Four).

Table 1. Summary of Previous Findings in Municipal Financial Slack

Author	Sample	Period	Financial Slack Measures	Mean	Standard Deviation	Min	Max
Hembree et al. (1999)	514 cities in North Carolina	1997	Average fund balance/General fund expenditures	n/a	n/a	27.0%	266.0%[a]
	89 cities in South Carolina			n/a	n/a	26.0%	151.0%
Marlowe (2005)	103 cities in Minnesota	1990-2000	Unreserved general fund balance/Total current expenditures	24.5%	42.2%	-68.5%	576.9%
			Total general fund balance/Total current expenditures	53.1%	56.1%	-44.2%	689.0%
Hendrick (2006)	264 municipal governments in the Chicago Metropolitan area	1997-2003	Unreserved general fund balance/Total noncapital spending	59.8%	79.6%	n/a	n/a
Gianakis and Snow (2007)	351 municipal governments in Massachusetts	1995-2002	Stabilization fund/Total revenues	6.4%	8.4%	n/a	n/a
			Free cash balance/Total revenue	5.9%	5.3%	n/a	n/a
Gore (2009)	9413 municipalities in the U.S.	1997-2003	Year-end cash balance/Monthly operating and interest expenditures	10.4	8.4	n/a	n/a
Hendrick and Crawford (2014)	265 municipal governments in the Chicago Metropolitan area	1997-2009	Fund balance/Total Operating Spending	82%	88%	-98%	1,564%
Snow et al. (2015)	239 municipal governments in Massachusetts	1993-2010	Log of real stabilization fund balance per capita	147.0	206.0	n/a	n/a

Note: a. For cities that operate their own electric utilities, the minimum and maximum fund-balance-to-expenditure ratios are: 25% and 71%.
b. This table only includes empirical studies on financial slack in municipal governments, excluding studies that focus on other types of local governments such as counties, school districts, and special districts governments.

Why do municipal governments accumulate financial slack? Is slack accumulation driven by governments' slack-maximizing nature assumed by the public choice theory or a precautionary financial management behavior explained by the organization theory? Chapter Two takes an organizational perspective to examine how risk factors, particularly tax revenue volatility affect a city's financial slack accumulation. This chapter first presents an overall picture of municipal financial slack accumulation in the United States. It then proceeds to explore the determinants of a city's financial slack level. In organization theory, slack is viewed as a cushion against risks. An organization exposed to more risk factors needs more cushion. In municipal governments, the volatility of tax revenues is a risk factor because it threatens government operations and the consistency of service provision. According to this theory, municipal governments with volatile tax revenue streams should accumulate more financial slack. Chapter two examines how tax revenue volatility and other risk factors in municipal finance affect a city's financial slack accumulation.

The next two chapters are devoted to exploring the potential impacts of the accumulated financial slack on municipal financial performance and management. For most municipal governments, the primary goal is to provide citizens with essential public goods and services with good quality that commensurate with the taxes they paid. This goal is often interrupted by expenditure instability caused by the volatile tax revenues and/or the business cycles. Due to limited fiscal authority, municipal governments cannot implement monetary policies or certain types of fiscal policies as the federal government does. To stabilize expenditures in face of volatile revenues, governments often use financial slack or issue short-term debt as budget-balancing devices. Most state

governments have established formal funds for the purpose of expenditure stabilization. Unlike state governments, municipal governments more often rely on financial slack stored in the form of unreserved general fund balance (UFB) to manage expenditure fluctuations. Chapter Three examines financial slack's expenditure stabilization role in municipal finance.

Chapter Four explores the other budget-balancing and cash flow management device—short-term debt. All governments face the challenge of day-to-day cash flow problem. A mismatch between cash flow-ins and flow-outs can cause temporary cash shortfalls in a government's daily operations. To smooth the temporary deficit, municipal governments can use either internal resources such as financial slack or external resources such as short-term borrowing if their state governments do not prohibit local short-term debt financing. If a municipal government has the option to use either tool, which one will it prefer? Chapter Four applies the pecking order theory in the management and corporate finance literature and examines whether municipal governments also have a pecking order preference when choosing between internal financing (using financial slack) and external financing (using short-term debt) in their financial management. The primary research question is: does financial slack reduce municipal short-term borrowing? Using the Heckman selection model, this chapter tests the following hypotheses: (1) financial slack reduces a municipal government's probability to issue short-term debt; and (2) municipal governments with more financial slack tend to issue less short-term debt.

1.4 Potential Contributions

This dissertation is a comprehensive study of financial slack in municipal finance. Drawing literature broadly from different disciplines, this dissertation examines both the factors that affect municipal financial slack accumulation and the impacts of accumulated slack on municipal expenditures and short-term borrowing. The research is designed to cover three key areas of municipal finance: municipal revenues; municipal expenditures; and, municipal securities. This dissertation extends the scope of studies on slack accumulation from U.S. state governments to local governments, specifically, municipal governments. The empirical analysis is based on data from multiple sources. The sample includes cities of fifty states over periods of economic upturns and downturns. Results are thus expected to have greater external validity. This dissertation contributes to the increasing literature on municipal financial slack accumulation, local counter-cyclical expenditure stabilization, and municipal short-term debt financing. Findings from this study will shed light on the roles of financial slack in municipal finance and financial management. This dissertation is expected to improve our understanding of managing financial slack accumulation and using financial slack as a management tool to achieve better outcomes.

1.5 References

Allan, Ian J. 1990. "Unreserved Fund Balance and Local Government Finance." *Government Finance Officers Association Research Bulletin*:1-8. Accessed on Feburary 1, 2016. http://budgetfinance.lgawiki.wikispaces.net/file/view/GFOA+Research+Bulletin+Fund+Balance+1990.pdf.

Beckett-Camarata, Jane. 2006. "Revenue Forecasting Accuracy in Ohio Local Governments." *Journal of Public Budgeting, Accounting & Financial Management* 18 (1): 77-99.

Blais, André, and Stéphane Dion. 1990. "Are Bureaucrats Budget Maximizers? The Niskanen Model & Its Critics." *Polity* 22 no. 4 (Summer): 655-74.

Blanchard, Olivier Jean, Florencio Lopez-de-Silanes, and Andrei Shleifer. 1994. "What Do Firms Do With Cash Windfalls?" *Journal of Financial Economics* 36 (3): 337-60.

Bourgeois, L Jay. 1981. "On the Measurement of Organizational Slack." *The Academy of Management Review* 6 no. 1 (January): 29-39.

Boyne, George A. 1998. "Competitive Tendering in Local Government: A Review of Theory and Evidence." *Public Administration* 76 no. 4 (Winter): 695-712.

Bradley, Steven W, Dean A Shepherd, and Johan Wiklund. 2011. "The Importance of Slack for New Organizations Facing 'Tough' Environments." *Journal of Management Studies* 48 (5): 1071-97.

Brennan, Geoffrey, and James M. Buchanan. 1980. *The Power to Tax: Analytic Foundations of a Fiscal Constitution*. Cambridge, United Kingdom: Cambridge University Press.

Breton, Albert, and Ronald Wintrobe. 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.

Bretschneider, Stuart, Beverly Bunch, and Wilpen Gorr. 1992. "Revenue Forecast Errors in Pennsylvania Local Government Budgeting: Sources and Remedies." *Public Budgeting and Financial Management* 4 (3): 721-43.

Bromiley, Philip. 1991. "Testing a Causal Model of Corporate Risk Taking and Performance." *Academy of Management Journal* 34 no. 1 (March): 37-59.

Caplan, Bryan. 2001. "Has Leviathan Been Bound? A Theory of Imperfectly Constrained Government with Evidence from the States." *Southern Economic Journal* 67 no. 4 (April): 825-47.

Cyert, Richard M, and James G March. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

Duncombe, William, Jerry Miner, and John Ruggiero. 1997. "Empirical Evaluation of Bureaucratic Models of Inefficiency." *Public Choice* 93: 1-18.

Garrett, Thomas A. 2001. "The Leviathan Lottery? Testing the Revenue Maximization Objective of State Lotteries as Evidence for Leviathan." *Public Choice* 109: 101-17.

Gianakis, Gerasimos Jerry , and Douglas Snow. 2007. "The Implementation and Utilization of Stabilization Funds by Local Governments in Massachusetts." *Public Budgeting & Finance* 27 (1): 86-103.

Gore, Angela K. 2009. "Why Do Cities Hoard Cash? Determinants and Implications of Municipal Cash Holdings." *The Accounting Review* 84 (1): 183-207.

Harford, Jarrad. 1999. "Corporate Cash Reserves and Acquisitions." *The Journal of Finance* 54 (6): 1969-97.

Hembree, Holly, Michael Shelton, and Charlie Tyer. 1999. "Benchmarking and Local Government Reserve Funds: Theory versus Practice." *Public Management Review* 81: 16-21.

Hendrick, Rebecca, and Jared Crawford. 2014. "Municipal Fiscal Policy Space and Fiscal Structure: Tools for Managing Spending Volatility." *Public Budgeting & Finance* 34 (3): 24-50.

Hendrick, Rebecca. 2006. "The Role of Slack in Local Government Finances." *Public Budgeting & Finance* 26 (1): 14-46.

Hirschman, Albert O. 1970. *Exit, Voice, and Loyalty: Responses to Decline in Firms, Organizations, and States*. Cambridge, MA: Harvard University Press.

Hoene, Christopher W., and Michael A. Pagano. 2011, October. *Research Brief on America's Cities*. Washinton, D.C.: National League of Cities.

Hou, Yilin, and William Duncombe. 2008. "State Saving Behavior: Effects of Two Fiscal and Budgetary Institutions." *Public Budgeting & Finance* 28 (3): 48-67.

Hou, Yilin. 2003. "What Stabilizes State General Fund Expenditures in Downturn Years—Budget Stabilization Fund or General Fund Unreserved Undesignated Balance?" *Public Budgeting & Finance* 23 (3): 64-91.

Hou, Yilin. 2004. "Budget Stabilization Fund: Structural Features of the Enabling Legislation and Balance Levels." *Public Budgeting & Finance* 24 (3): 38-64.

Hulpke, John F, Donald A Watne, and Dwight Waldo. 1976. "Budgeting Behavior: If, When, and How Selected School Districts Hide Money." *Public Administration Review* 36 no. 6 (Nov. - Dec.): 667-74.

Jensen, Michael C. 1986. "Agency Cost of Free Cash Flow, Corporate Finance, and Takeovers." *American Economic Review* 76 (2): 323-29.

Joyce, Philip 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 & Finance* 21 (2): 62-87.

Knight, Brian, and Arik Levinson. 1999. "Rainy Day Funds and State Government Savings." *National Tax Journal* 52 (3): 459-72.

Larkey, Patrick D, and Richard A Smith. 1989. "Bias in the Formulation of Local Government Budget Problems." *Policy Sciences* 22 (2): 123-66.

Levinthal, Daniel, and James G March. 1981. "A Model of Adaptive Organizational Search." *Journal of Economic Behavior and Organization* 2 (4): 307-33.

Marlowe, Justin. 2005. "Fiscal Slack and Counter-Cyclical Expenditure Stabilization: A First Look at the Local Level." *Public Budgeting & Finance* 25 (3): 48-72.

Marlowe, Justin. 2011. "Beyond 5 Percent: Optimal Municipal Slack Resources and Credit Ratings." *Public Budgeting & Finance* 31 (4): 93-108.

Marlowe, Justin. 2012. "Fiscal Slack, Reserves, and Rainy-Day Funds". In *Handbook of Local Government Fiscal Health*, edited by Helisse Levine, Jonathan B Justice and Eric A Scorsone, 321-41. Burlington, MA: Jones & Bartlett Learning.

McGuire, Thomas, Michael Coiner, and Larry Spancake. 1979. "Budget-Maximizing Agencies and Efficiency in Government." *Public Choice* 34 (3): 333-57.

Miranda, Rowan. 1994. "Privatization and the Budget-Maximizing Bureaucrat." *Public Productivity & Management Review* 17 no. 4 (Summer): 355-69.

Mishina, Yuri, Timothy G Pollock, and Joseph F Porac. 2004. "Are More Resources Always Better for Growth? Resource Stickiness in Market and Product Expansion." *Strategic Management Journal* 25 (12): 1179-97.

Moe, Terry M. 1984. "The New Economics of Organization." *American Journal of Political Science* 28 no. 4 (November):739-77.

Mushkin, Selma J, and Gabrielle C Lupo. 1967. "Is There a Conservative Bias in State-Local Sector Expenditure Projections?" *National Tax Journal* 20 (3): 282-91.

Niskanen, William A. 1971. *Bureaucracy and Representative Government*. Piscataway, NJ: Transaction Publishers.

Nohria, Nitin, and Ranjay Gulati. 1996. "Is Slack Good or Bad for Innovation?" *Academy of Management Journal* 39 (5):1245-64.

Oates, Wallace E. 1985. "Searching for Leviathan: An Empirical Study." *The American Economic Review* 75 no. 4 (September): 748-57.

Pasour Jr, EC. 1989. "Nonconventional Costs of Rent-Seeking: X-Inefficiency in the Political Process." *Public Choice* 63 (1): 87-91.

Phan, Phillip H, and Charles WL Hill. 1995. "Organizational Restructuring and Economic Performance in Leveraged Buyouts: An Ex Post Study." *Academy of Management Journal* 38 (3): 704-39.

Poterba, James M. 1994. "State Responses to Fiscal Crises: The Effects of Budgetary Institutions and Politics." *Journal of Political Economy* 102 no. 4 (August): 799-821.

Rodgers, Robert, and Philip Joyce. 1996. "The Effect of Underforecasting on the Accuracy of Revenue Forecasts by State Governments." *Public Administration Review* 56 no. 1 (Jan. - Feb.): 48-56.

Rose, Shanna, and Daniel L Smith. 2012. "Budget Slack, Institutions, and Transparency." *Public Administration Review* 72 (2): 187-95.

Sharfman, Mark P, Gerrit Wolf, Richard B Chase, and David A Tansik. 1988. "Antecedents of Organizational Slack." *Academy of Management Review* 13 no. 4 (October): 601-14.

Singh, Jitendra V. 1986. "Performance, Slack, and Risk Taking in Organizational Decision Making." *Academy of management Journal* 29 no. 3(September): 562-85.

Snow, Douglas, Gerasimos A Gianakis, and Jonathan Haughton. 2015. "The Politics of Local Government Stabilization Funds." *Public Administration Review* 75 (2): 304-14.

Sobel, Russell S, and Randall G Holcombe. 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.

Stewart, La Shonda M. 2009. "Examining Factors that Impact Mississippi Counties' Unreserved Fund Balance during Relative Resource Abundance and Relative Resource Scarcity." *Public Budgeting & Finance* 29 (4): 45-73.

Thatcher, Daniel G. *State Budget Stabilization Funds*. Washington D.C.: National Conference of State Legislatures. Revised on September 26, 2008. Accessed on March 15, 2016 http://www.ncsl.org/research/fiscal-policy/state-budget-stabilization-funds-spring-2008.aspx.

Tyer, Charlie B. 1993. "Local Government Reserve Funds: Policy Alternatives and Political Strategies." *Public Budgeting & Finance* 13 (2): 75-84.

Ványolós, István 2009. "State Regulations on Local Government Fund Balances: Survey and Evidence." Working Paper. Florida Atlantic University.

Voorhees, William R. 2006. "Consistent Underestimation Bias, the Asymmetrical Loss Function, and Homogeneous Sources of Bias in State Revenue Forecasts." *Journal of Public Budgeting, Accounting & Financial Management* 18 (1): 61-76.

Wagner, Gary A, and Erick M Elder. 2005. "The Role of Budget Stabilization Funds in Smoothing Government Expenditures over the Business Cycle." *Public Finance Review* 33 (4): 439-65.

Wang, Wen, and Yilin Hou. 2012. "Do Local Governments Save and Spend across Budget Cycles? Evidence from North Carolina." *The American Review of Public Administration* 42 (2): 152-69.

Wang, Wen. 2015. "The Great Recession and the Use of Fund Balances in North Carolina Counties." In *Local Government Budget Stabilization*, edited by Yilin Hou, 17-32. New York, NY: Springer.

Wolkoff, Michael. 1987. "An Evaluation of Municipal Rainy Day Funds." *Public Budgeting & Finance* 7 (2): 52-63.

Wyckoff, Paul Gary. 1990. *The Simple Analytics of Slack-Maximizing Bureaucracy*. *Public Choice* 67 no. 1 (July): 35-47.

CHAPTER 2

TAX REVENUE VOLATILITY AND MUNICIPAL FINANCIAL SLACK ACCUMULATION

2.1 Introduction

How much money municipal governments have saved may concern taxpayers. Excessive slack accumulation may indicate that taxpayers are either paying unnecessarily high taxes or other charges, or they are not receiving an adequate return on their tax dollars in service and facilities. Insufficient savings on the other hand, may leave government managers too little financial flexibility to respond to unanticipated events, leading to possible disruptions of service delivery or frequent changes of tax rates. So far, there is no universally accepted optimal financial slack level. Many government officials follow rules of thumb to manage and evaluate their governments' financial slack accumulation. A commonly cited standard recommends that governments should maintain rainy day funds approximately five percent of general fund expenditures. Although there is no clear indication of the original source of this recommendation, the 'five-percent rule' is often cited as the adequate size of the rainy day funds (Joyce 2001). Credit rating firms also seem to support this 'five-percent rule' by citing it in the rating criteria (Seymour 2014). The Government Finance Officers Association (GFOA) does not agree that the 'five-percent rule' should apply to all municipal governments. In their recommended 'best practices', the 'five-percent rule' fits only the needs of very large municipalities while for the majority of municipal governments, the appropriate benchmark is an unrestricted general fund balance of no less than fifteen percent (or two months) of regular general fund operating revenues or expenditures (Gauthier 2009).

Empirical research on municipal financial slack accumulation reveals that cities in the United States maintain financial slack at much higher levels than the recommended benchmarks. In addition, the financial slack levels vary considerably among these cities (see Table 1). What contributes to the variations of municipal financial slack levels? What determines a city's financial slack accumulation? Kriz (2002, 2003) identifies four major drivers of financial slack accumulation: revenue growth, revenue volatility, desired expenditure growth, and the interest earned on invested fund balances. In the economic and management literature, volatility is analogous to the concept of risk. Organization theorists, following Herbert Simon's bounded rationality concept (1947) and Cyert and March's seminal work *A Behavioral Theory of the Firm* (1963), argue that risk can be hedged against by organizational slack. Slack provides an organization the flexibility to respond to uncertainties. It increases an organization's capacity in absorbing fluctuations and reduces the potential disruptions of service delivery or the need for core structural changes (Cyert and March 1963; Bourgeois 1981; Sharfman et al. 1988). If their argument holds, organizations that face more risk factors should accumulate more slack. This chapter of the dissertation tests this argument by examining how risk factors, especially tax revenue volatility affect a city's financial slack level. It is one of the few studies that use a nationwide sample of cities to study the determinants of municipal savings. Findings from this chapter offer a new perspective to view municipal tax portfolios and their impact on municipal finance. This chapter also sheds light on the determinants of municipal financial slack accumulation, providing empirical evidence to move the current understanding of slack accumulation beyond the simple rules of thumb, such as the 'five-percent' rule.

This chapter proceeds in six sections: following the first section of introduction, section two analyzes the causes and costs of tax revenue volatility, ways to management volatility, and its measures. Section three introduces data sources, describes the national sample, and presents an overview of financial slack accumulation by American cities. Section four introduces the variables, presents a model of municipal financial slack accumulation, and explains the appropriate methods for the analysis. The last two sections interpret empirical results and outline the implication of this work for the theory and practices of municipal financial management.

2.2 Managing and Measuring Tax Revenue Volatility

2.2.1 The Causes and Costs of Tax Revenue Volatility

Governments generally arrange their activities based on the amount of revenues they expect to receive. In most municipal governments, the primary own-source revenues that support general government activities are taxes. Municipal governments draw tax revenues from a variety of local economic activities. Therefore, tax revenues are largely driven by economic growth. Researchers use *volatility* to describe the extent to which tax revenues fluctuate over the course of business cycles (Felix 2008). The traditional view of tax specialists argues that there is an inherent trade-off between revenue growth and volatility (Groves and Kahn 1952). According to this view, some taxes are more sensitive to economic changes, such as corporate income tax, personal income tax, and sales taxes. These taxes tend to grow faster than the economy but fluctuate more over the business cycles, causing tax revenues to be unstable (Groves and Kahn 1952; Wilford 1965; White 1983; Felix 2008). Nevertheless, recent studies show that the trade-off between growth

and volatility is not as acute as was once thought. Bruce, Fox, and Tuttle (2006) find that the combination of tax base, rate structures, and policies have a bigger impact on tax revenue volatility than tax types.

Tax revenue volatility causes undesirable consequences in government and the overall economy. From a government management perspective, unstable tax revenues lead to unsustainable expenditures and/or frequent changes in tax rates, which adds to the challenge of governmental budgeting and financial management. From the macroeconomic perspective, volatile tax revenues intensify the business cycles. During economic growth, spending increase and tax cuts add force to booms; whereas during economic downturn, spending cuts and tax increase deepen cyclical busts (Poterba 1995; Levinson 1998; Thompson and Gates 2007). Economists also use the 'feedback loop' to describe the interaction of tax revenue volatility and the business cycles. On one hand, economic shocks lead to tax revenue volatility through the impacts on wages, profits, and consumption; on the other hand, volatile tax revenues increase the uncertainty of government expenditures and tax policies, leading to increased uncertainty for firms and consumers.

2.2.2 Managing Tax Revenue Volatility

Local governments face more challenges to soften revenue volatility in the business cycles, because they have relatively limited fiscal authority compared to the federal government and they are restricted from implementing monetary policy or certain kinds of fiscal policies as the federal government does. Nevertheless, modern financial and management theories provide some tools for local government to manage tax revenue

volatility. Researchers decompose volatility into *unsystematic* volatility and *systematic* volatility (Thompson and Gates 2007). The former refers to random volatility which can be partially managed through revenue diversification; the latter reflects changes in accordance with the economic conditions which can be managed through hedging and buffering strategies.

Effective revenue diversification is widely accepted as a way of reducing revenue volatility. This idea originates from the modern portfolio theory proposed by Harry Markowitz (1952). The insight of this theory is that portfolio volatility is determined by the covariance of individual securities' risks (also called volatility). An investor can reduce portfolio risk by holding the combination of securities that are not perfectly positively correlated. The modern portfolio theory encourages scholars in public finance to shift their focus from the volatility of individual taxes to the appropriate tax structure or tax portfolio—the mix of taxes within a governmental jurisdiction. They find that the volatility of a tax portfolio depends on how each tax co-varies with each other in a tax structure (White 1983; Gentry and Ladd 1994). A government can reduce the overall tax revenue volatility or even diversify away volatility by carefully selecting a combination of taxes with varying degrees of volatility. Such an overall tax structure would have to include taxes that were not perfectly correlated, so that the impact of revenue decline from one tax on the overall tax revenues is minimized because other taxes would not change in the same direction. This view differs substantially from the traditional view that greater revenue growth is inherently associated with greater volatility in tax revenues. It provides a strong theoretical foundation for the revenue diversification practice in government.

Tools to manage the second component of volatility—the systematic volatility—include hedging and buffering strategies. The *hedging* strategies refer to using revenue flows of the same size and opposite volatility to offset the loss the other revenue. This strategy is conceptually similar to the use of futures and options contracts. Currently, a number of states, municipalities, and public retirement systems have used financial derivatives to hedge against budgetary risk, such as Texas' government hedging program on natural gas revenues (Bowsher 1994; Swidler, Buttimer, and Shaw 1999; Thompson and Gates 2007).

The *buffering* strategies refer to using accumulated financial slack as a financial management tool. When tax revenue growth exceeds economic growth, the excess of revenues are kept as financial slack, preventing excessive expenditure growth in economic boom years; when a revenue shortfall occurs, the accumulated financial slack fills in the gap, buffering against the need of spending cuts or tax increase. As argued by O'Toole and Meier, financial slack "protect(s) their organizational systems from unanticipated and unpleasant disruptions to maintain performance in the face of adversity" (2010, 342). Compared to those hedging strategies such as using financial derivatives, using financial slack to manage budgetary risk is more common among U.S. local governments and has a longer history.

2.2.3 Measuring Tax Revenue Volatility

Conceptually, tax revenue volatility is similar to the variance of revenues over time. Groves and Kahn (1952) estimate tax revenue volatility by regressing log tax on log income. The coefficient on log income measures revenue-income elasticity. Larger values

of the elasticity coefficient indicate greater volatility. Researchers later pointed out that Groves and Kahn's coefficient is more of a measure of long-run growth rather than volatility which refers to short-run behavior (Williams et al. 1973; Dye and Merriman 2004). For example, a government with a rapidly growing population will have a large revenue-income elasticity coefficient suggesting large over-time revenue volatility, even though its year-to-year tax yields have little fluctuation. To capture the year-to-year revenue fluctuation, White (1983) measures volatility by the degree to which the actual revenue differs from the predicted revenue. The predicted revenue is assumed to follow a linear trend and can be estimated with simple econometric forecast by regressing revenue on time. Although these forecasts may not be unbiased estimates of actual municipal tax revenues, they may be reasonable proxies (Dye and Merriman 2004). In practice, budgeters and legislators usually base their revenue estimation on typical growth patterns in tax revenues. In other words, local government budgeting is based on the assumption of predicable and steady growth over time, which is also called budget incrementalism. Furthermore, the underlying economic conditions (generally measured by gross state product or gross regional product) where tax revenues are based on tend to grow at a close to constant rate. Therefore, the predicated tax revenues could be considered as a function of time trend, and estimated from the following regression:

$$\widehat{R_{i,t}} = \alpha_i + \beta_i t + e_{i,t} \qquad (1)$$

Due to the concern of negatively skewed distribution of tax revenues in the dataset and for the convenience of interpretation, I convert tax revenues into the natural logarithmic form before running the regression. $\widehat{R_{i,t}}$ is therefore the predicated natural logarithm of total tax revenues for city i in year t; α_i is the constant for city i; β_i is the

linear trend parameter for city i; t is the time variable indicating year; and $e_{i,t}$ is the random error term. The regression is estimated using city and year fixed effects with state dummy variables to control for unobservable across-city and across-state differences and time-invariant factors.

Tax revenue volatility is then calculated from the absolute deviations between the actual and predicated log of total tax revenues divided by the predicated log of total tax revenues expressed in the following model:

$$Volatility_{i,t} = \frac{\left|\widehat{R_{\iota,t}} - R_{i,t}\right|}{\widehat{R_{\iota,t}}} \times 100 \qquad (2)$$

As such, this volatility measure captures the short-run variability of the tax revenues for city i in year t around its own growth trend in revenues. Greater value indicates greater volatility. This volatility measure is well accepted and often used in studies on revenue or expenditure volatility (Marlowe 2005; Carroll 2009; Wang and Hou 2009). I use short-run volatility measure to study the impacts of tax revenue volatility on municipal financial slack accumulation for two reasons: first, the dissertation focuses on liquid and immediately available financial slack, which provides municipal government officials' flexibility to cope with challenges when managing their cities' finances. The research questions addressed are mostly management issues that are short-run focused. Second, the time span of the dataset is nine years. It is not appropriate to calculate long-run volatility measures based on this relatively short time period. In the next section, I introduce the data sources for this study, basic descriptions of the sample, and some statistics of municipal financial slack accumulation.

2.3 Data Sources, Sample Descriptions, and an Overview of Financial Slack Accumulation by American Cities

2.3.1 Data Sources

Most studies on municipal financial slack use samples of cities in one or two states or in a particular metropolitan area as shown in Table 1. One possible obstacle that prevents researchers from conducting a nationwide study on municipal financial slack is data availability. The unreserved general fund balance (UFB) is reported in municipal governments' Comprehensive Annual Financial Reports (CAFRs). Not every state requires their local governments to prepare and report audited CAFRs that comply with GAAP; and not every city that prepares CAFRs makes them publicly accessible. Therefore, it is difficult for researchers to compile the CAFR-based information of local governments across the nation.

Luckily, the Government Finance Officers Association (GFOA) has been collecting key data elements from CAFRs submitted by governmental entities for its Certificate of Achievement for Excellence in Financial Reporting Award Program (CAFR Program) in its Financial Indicators database since 1995. A governmental entity is eligible for the CAFR Program if its CAFR complies with the GAAP and includes all funds and component units, regardless of the entity's size and financial condition. Therefore, governmental entities included in the GFOA's Financial Indicators database are not necessarily in better financial positions or larger in size because the eligibility requirements of this award program focus on the quality of CAFR reporting. Since all governmental entities in the Financial Indicators database use the same accounting basis, financial information in this database is more consistent and comparable than any other

publicly available source. The average number of award-winning municipal governments included in this database is over 1,900 in the recent three fiscal years (fiscal years 2012 to 2014).[5]

The GFOA's Financial Indicators database provides key information on municipal financial slack and total revenues and expenditures in the general fund. It does not report detailed revenues by source, expenditures by functions, debt outstanding, and cash and investment positions. The U.S. Census Bureau collects and reports such information in its State & Local Government Finances database. The Census Bureau has surveyed state and local governments annually since 1967. The Census Bureau conducts a census every five years (years ending in '2' and '7'), and surveys a sample of state and local governments in the intervening years. The financial information reported in the Census Bureau's State & Local Government Finances database reflects all governmental activities. This is different from the fund financial statements in CAFRs that only report financial activities within each fund (e.g. the general fund).

2.3.2 Sample Descriptions

In order to create a panel dataset that includes both the financial slack information and details of revenues, expenditures, and debt, I merge the GFOA's Financial Indicator database with the Census State & Local Government Finances database. I use 'municipal name' in the same state as the identifier and 'population' as the verifier to match cities in the two databases. The time span of this study is from fiscal year 2003 to fiscal year 2011

[5] Source: Government Finance Officers Association. "Certificate of Achievement for Excellence in Financial Reporting Program (CAFR Program)." http://www.gfoa.org/coa (accessed on February 5, 2016).

in order to avoid potential inconsistency of the financial slack measure.[6] The combined dataset includes 15,980 observations of cities in all fifty states of nine fiscal years. I check for missing observations and obvious data entry errors for those variables which will be used in later analysis. Instead of excluding missing observations in the analysis, I obtain information from available sources to fill in the missing values. For example, for the 17 cities with missing population, I am able to find the population information for 10 of them from the statistical sections in their CAFRs or from the Census' or their governments' websites. For the rest of the 7 observations, I fill in the missing cells with the average population of the prior and the following years.

To check for potential data entry errors, I examine those observations whose total general fund revenues, total general fund expenditures, unreserved general fund balances, and populations have changed by over 100 percent from year t-1 to year t. I identify over 200 of such observations. I then compare the values of the above four variables reported in the Financial Indicators database and the numbers reported in the CAFRs that I obtain from those cities' websites. Except for a few cities that actually experienced significant changes in revenues, expenditures, UFB, and population due to fund balance transfers, municipal consolidation, and many other reasons, most of the identified cases involve data entry errors. The primary cause of data entry errors is mistreating dollar value with

[6] GASB Statement No. 54 changed the reporting requirements on general fund balance, effective from 2012. Prior to this change, the general fund was reported 'as reserved', 'designated', and 'unreserved.' The Statement No. 54 requires that fund balance should be reported as 'non-spendable', 'restricted', 'committed', 'assigned', and 'unassigned.' The new fund balance categories are not directly compatible with the old categories. For example, the sum of committed, assigned, and unassigned fund balances under the new reporting system does not necessarily equal the unreserved fund balance under the old reporting system, because some proportion of the committed or the assigned fund balances might be reserved depending on different accounting treatments. To keep the UFB measures consistent, I restrict the time period between fiscal years 2003 and 2011.

thousands of dollar value, or vice versa. I replace the wrong data entries with correct information reported in their CAFRs, rather than to exclude these observations as some researchers did (Marudas 2004; Gore 2009; Calabrese 2011). I delete 22 observations with missing values or data entry errors that I could not obtain information to correct them. After data cleaning, the combined dataset comprises an unbalanced panel of 15,958 observations for 2,160 individual cities with an average 7.4 years of data points.

The combined dataset biases towards larger cities. As is shown in Table 2, my GFOA and Census combined dataset includes almost exclusively urban cities. Therefore, findings from this chapter should not be generalized to all cities, but larger urban cities in the United States. This fact does not devalue this combined dataset and this study because larger cities serve larger populations, and research findings from samples of larger urban cities may potentially inform fiscal decision making that affect more people.

Table 2. Comparing the Sizes of Cities in the Databases (Fiscal Year 2010)

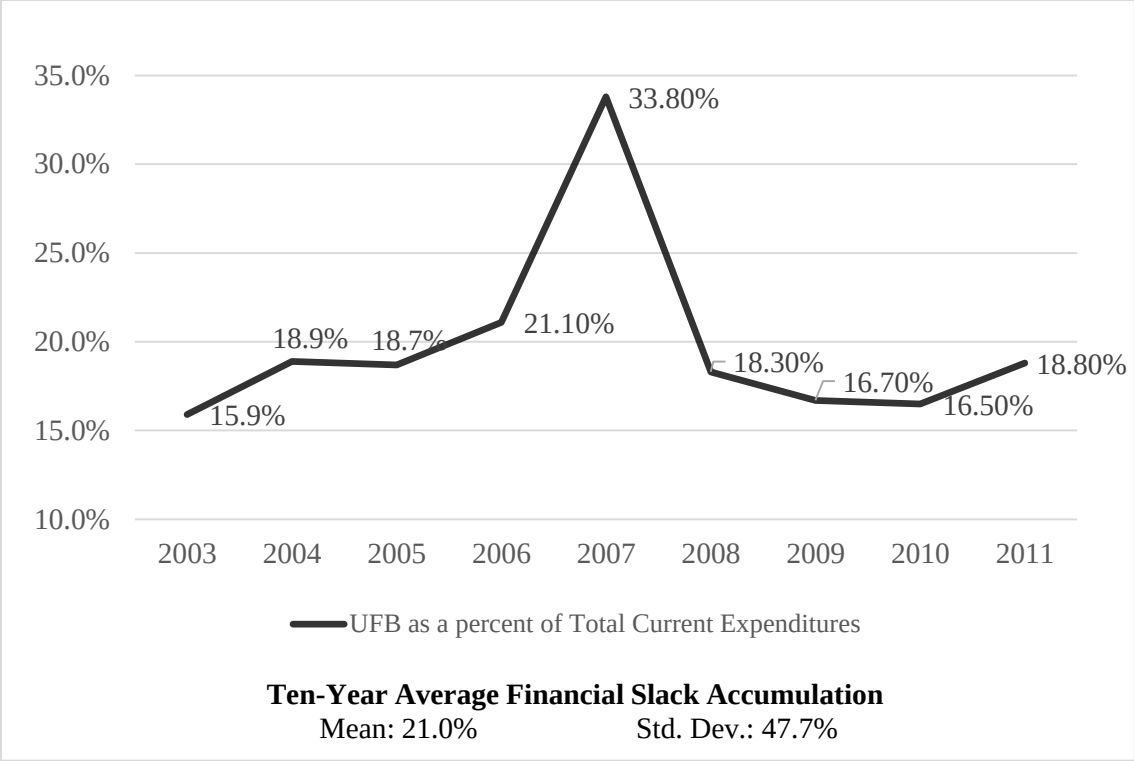
	GFOA Database	Census Database	GFOA & Census Combined
Total Observations	1,863	3,512	1,861
Population Range	Min: 58 Max: 8,391,881	Min: 1 Max: 8,274,527	Min: 58 Max: 8,391,881
% of Rural Towns[a] (Popu<2,500)	1%	20%	1%
% of Urban Cities[b] (Popu>=2,500)	99%	80%	99%
% of Urban Clusters[a] (Popu: 2,500 ~50,000)	67%	62%	67%
% of Urbanized Areas[a] (Popu>=50,000)	32%	18%	32%
Mean Population of All Cities	71,575	41,136	71,798
Mean Population of Urban Cities	72,596	51,222	72,638

a. U.S. Census Bureau's definition. Source: http://www.census.gov/geo/reference/gtc/gtc_urbanrural.html. Accessed on March 7, 2015.
b. U.S. Department of Agriculture's definition. Source: Source: http://ric.nal.usda.gov/what-is-rural. Accessed on March 7, 2015.

2.3.3 An Overview of Financial Slack Accumulation by American Cities

Before proceeding to explore the factors that affect a city's financial slack accumulation, I first present some descriptive statistics to show an overall picture of financial slack accumulation by American cities. I use unreserved general fund balance (UFB) as a percentage of total current expenditures to measure a city's financial slack level. Figure 2 illustrates the trend of financial slack accumulation by the 2,160 cities of fifty states throughout the study period in my sample. The trend demonstrates a clear pro-cyclical pattern: during economic expansion (fiscal years 2003 - 2007),[7] cities increased their financial slack levels, and the accumulated UFB peaked when the economy reached its summit in 2007. The UFB drained away quickly in the Great Recession of 2007-2009. When the U.S. economy recovered from recession, the UFB accumulation slowly recovered as well. On average, during the nine years of economic ups and downs, American cities in the sample maintained UFB about 21 percent of their total current expenditures (or equal to 2.5 months of total current expenditures). This national average financial slack level is close to but slightly above the GFOA's recommended benchmarks (i.e. 15 percent or two months of operating expenditures). This finding is comparable to Marlowe (2005)'s finding of 24.5 percent based on a sample of Minnesota cities.

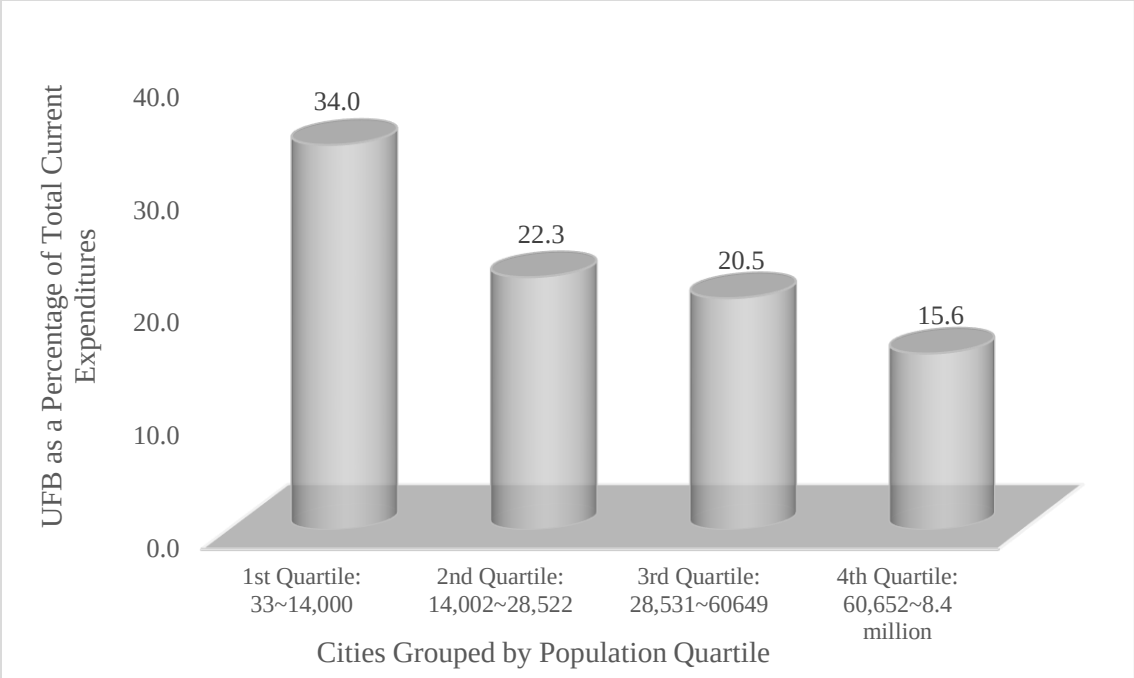
[7] Source: The National Bureau of Economic Research. "US Business Cycle Expansions and Contractions." http://www.nber.org/cycles.html.Accessed on January 15, 2015.



Source: the combined GFOA and Census dataset (author's calculation)

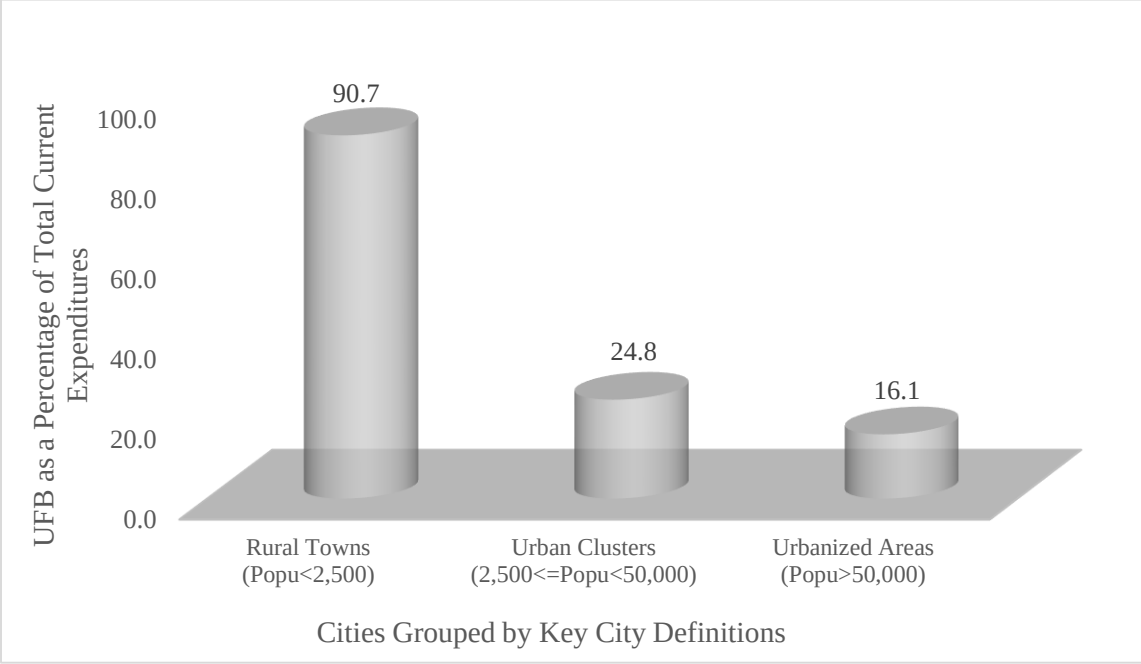
Figure 2. Overall Trend of Municipal Financial Slack Accumulation by American Cities (UFB%)

Prior studies have found that smaller cities tend to have higher financial slack levels (Hendrick 2006; Marlowe 2012). To examine the relationship between city size (measured by population) and financial slack levels, I group cities by population quartiles and by key city definitions according to the Census Bureau and the United States Department of Agriculture. Results in Figure 3 and Figure 4 are consistent with findings in prior studies: on average during the study period, small cities (cities that fall into the first quartile) maintained financial slack level over twice as high as the financial slack levels in large cities (cities that fall into the fourth quartile); rural towns kept financial slack levels over five times higher than those in urbanized areas.



Source: the combined GFOA and Census dataset (author's calculation)

Figure 3. Municipal Financial Slack (UFB%) and City Size (by Population Quartile)

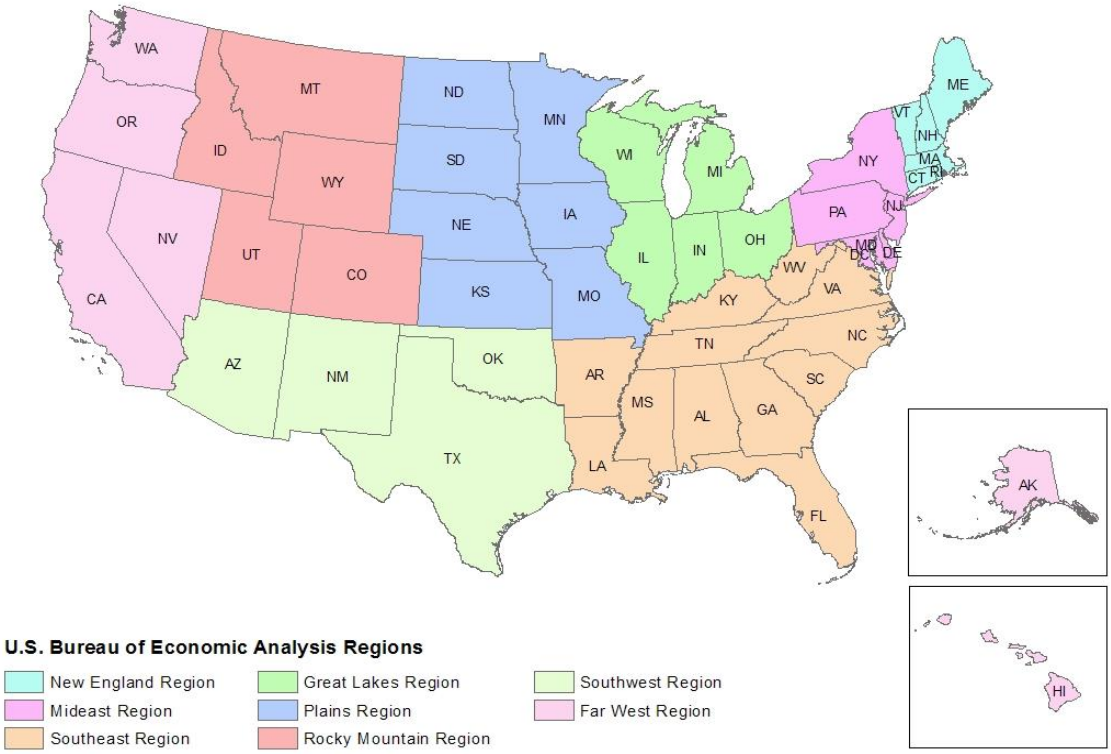


Source: the combined GFOA and Census dataset (author's calculation)

Figure 4. Municipal Financial Slack (UFB%) and City Size (by City Definition)

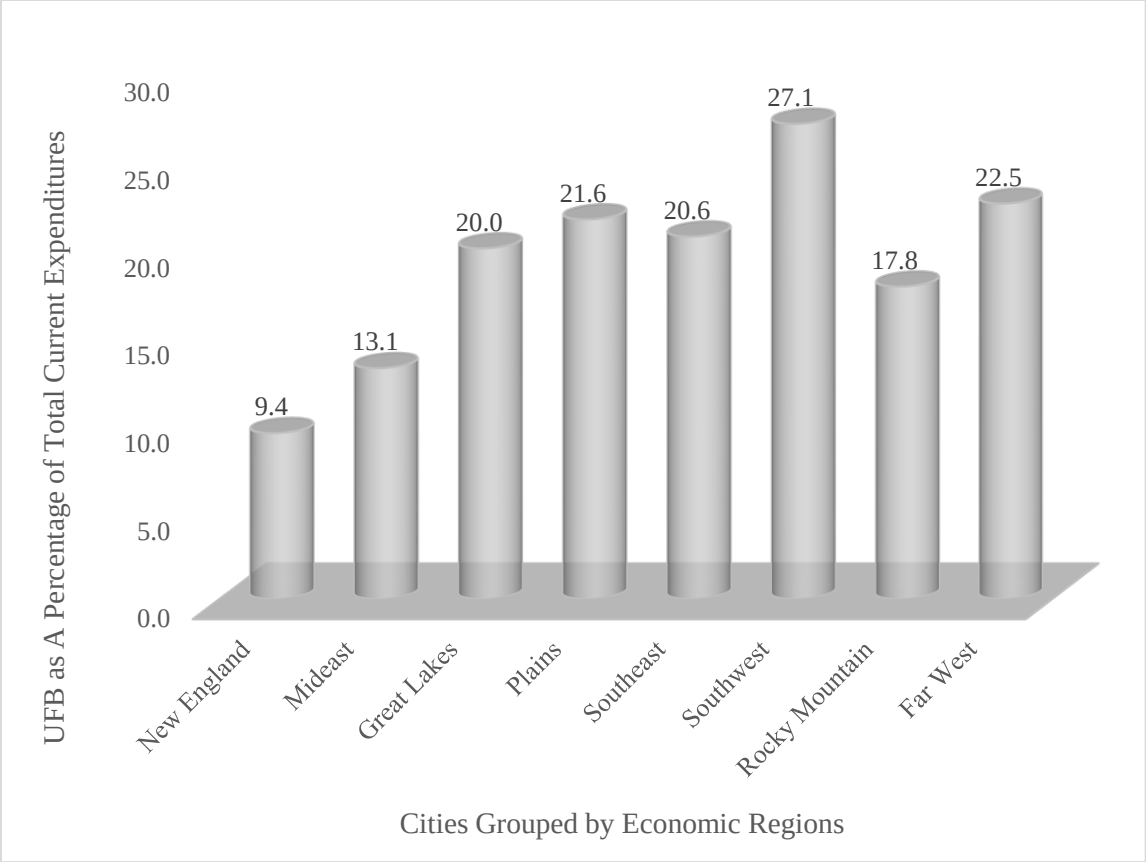
Geography matters for economic activities, which is the central idea of economic geography. Cities in the same region may have similar climate, natural resources, economic activities, industries, political and fiscal institutions, and population density, to name a few. The shared similarities in the above factors may lead to commonly shared municipal financial management practices in the same regions. To examine whether cities in the same region show any pattern in slack accumulation, I segment the United States into eight economic regions following the Bureau of Economic Analysis (BEA)'s definition. The BEA's definition of regions is primarily based on cross-sectional similarities in their socioeconomic characteristics, and thus is appropriate for this study. Figure 5 illustrates the eight major economic regions in the United States. Analysis of municipal financial slack accumulation and economic regions reveals some interesting patterns. Figure 6 shows that cities in the New England (CT, ME, MA, NH, RI, and VT) and the Mideast (DE, DC, MD, NJ, NY, and PA) regions[8] accumulate far less financial slack than cities in the rest of the United States. On average, cities in the Southwest region (AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, and WV) have the highest financial slack levels, almost three times as much as those in the New England region.

[8] Altogether, the two regions are called the Northeast Region by the Census Bureau.



Source: "Bureau of Economic Analysis Regions" Iowa State University's website http://www.icip.iastate.edu/maps/refmaps/bea (accessed on April 7, 2016).

Figure 5. Eight Major Economic Regions in the United States



Source: the combined GFOA and Census dataset (author's calculation)

Figure 6. Municipal Financial Slack (UFB%) and Economic Regions

The above descriptive information suggests that municipal financial slack levels are affected by the overall economic condition, city size, and some observable and unobservable regional factors. Besides these, what else contribute to the variation of municipal financial slack accumulation? In the next section, I present a model of municipal financial slack accumulation, and discuss the appropriate methods for the regression analysis.

2.4 Variables and Model Specification

Organization theorists view slack resources as a crucial buffer against risks. Slack increases an organization's capacity in absorbing fluctuations. It gives managers more administrative flexibility to respond to uncertainties, risks, and goal conflicts among political coalitions (Cyert and March 1963; Levinthal and March 1981; Moe 1984; Sharfman et al. 1988). This view explains the rationale that organizations accumulate financial slack. Organizations that face more risk factors need to accumulate more financial slack in order to have the capacity to respond to potential uncertainties and risks. Managers in such organizations are motivated to accumulate financial slack to increase their management flexibility. Built on this risk-slack hypothesis, the model of municipal financial slack accumulation incorporates tax revenue volatility as the independent variable and several control variables that are hypothesized to affect a city's financial slack accumulation. The primary research question is: does greater tax revenue volatility lead to more financial slack accumulation in American cities?

2.4.1 Variables

The dependent variable is UFB as a percentage of total current expenditures, labeled as "$Slack_{i,t}$." This variable reflects the amount of immediately available and fungible financial resources of an individual city i in year t. These financial resources are under municipal government officials' discretionary power when they manage their cities' finances. The independent variable—tax revenue volatility—is calculated from equation (2) which reflects a city's short-run variability of the total tax revenues in a particular year. This variable is labeled as "$Volatility_{i,t}$."

In addition to tax revenue volatility which is expected to increase a city's financial slack accumulation, risk (or protective) factors inherent in a city's fiscal structure are also taken into account in the model. On the revenue side, over dependence on intergovernmental revenues is a risk factor because the amount of aid and the time of aid disbursements are not under the control of municipal government officials (Reschovsky 2004; Hendrick 2006). To make things worse, state and county governments often reduce the amount of aid or delay aid disbursements to deal with their own fiscal stress during economic recessions when municipal governments are in greater need of such revenues (Hoene 2009). I use the percentage of revenues received from state and county governments out of total municipal revenues to measure this factor. I hypothesize that cities with greater dependence on intergovernmental revenues are likely to accumulate more financial slack. This variable is labeled as "IG Revenue$_{i,t.}$"

In contrast, revenue diversification is often advocated as a risk-reduction financial management strategy. The common approach to measuring revenue diversification is to use a reversed Herfindahl-Hirschman Index (Hendrick 2002; Carroll 2005, 2009; Yan 2012). I calculate this index based on three major revenue sources: total tax revenues, total intergovernmental revenues, and total charges and miscellaneous revenues. R_j represents the proportion of each of the three major revenue sources in total revenues. Calculation of revenue diversification is shown in equation (3). The value of this index ranges from 0 to 1 with increasing values indicating greater revenue diversification.

$$RD = \frac{1-\sum_{j=1}^{3} R_j^2}{1-\frac{1}{3}} \qquad (3)$$

Non-discretionary expenditure categories may motivate government officials to save slack, because these spending items constrain their management flexibility in coping with unanticipated events. For example, if a city's expenditure structure comprises largely non-discretionary expenditure categories, government officials would be restrained from using spending cuts to respond to revenue shortfalls. In such cases, they may turn to alternative management options such as using accumulated financial slack to fill in the budget gap. According to organization theory, non-discretionary expenditure categories should be viewed as risk factors inherent in a city's fiscal structure, and are expected to have a positive impact on municipal financial slack accumulation. I identify two non-discretionary expenditure categories: debt service expenditures and salary expenditures. Debt service expenditures include principal retirement, interest and other financial charges. Government officials have no administrative authority to change, especially to reduce, debt service spending because the amount of this expenditure category was pre-set at the point when the bonds were issued. I use debt service expenditures as a percentage of total expenditures to measure this variable, and label it as "Debt Service$_{i,t}$." Compared to debt service expenditures, salary expenditures are a little more discretionary. When a municipal government experiences extreme financial stress, it can choose furloughs, pay freeze, pay cut, and a few other options as many state and local governments did in the Great Recession of 2007-2009. Nevertheless, compared to those discretionary expenditure categories such as parks and recreation spending, the money saved from these salary reduction options might be limited. The furloughs are mostly applied to non-essential workers, and the pay freeze or pay cut should not violate the laws. The layoff procedures for public sector employers are often more complex than

the private sector employers whose employment is purely contractual. A report shows that in several states, the state courts upheld the right of a city to lay off personnel for fiscal reasons.[9] I hypothesize the share of salary expenditures of total expenditures may increase a city's financial slack accumulation. But since salary expenditures are a bit more discretionary than debt service expenditures, I expect to see its impact on slack accumulation is smaller compared to the impact of debt service spending. I use salaries and wages paid to city employees as a percentage of total expenditures to measure this variable, and label it as "$Salary_{i,t}$."

The impact of capital expenditures on financial slack accumulation can be explained through two relationships: the relationship between capital expenditures and current expenditures, and the relationship between current expenditures and fund balance. Total expenditures equal the sum of capital expenditures and current expenditures, as expressed in equation (4). When the total expenditures level is set, there is a direct trade-off between capital expenditures and current expenditures: an increase in capital expenditures results in a decrease in current expenditures.

$$\text{Total Expenditures} = \text{Capital Expenditures} + \text{Current Expenditures} \qquad (4)$$

Fund balance is the difference between total revenue and current expenditures, as shown in equation (5). When this equation is rearranged, equation (6) demonstrates that total revenue is the sum of current expenditures and fund balance. When the total revenues level is held constant, there is a direct trade-off between current expenditures

[9] Source: "Public Sector Layoffs" AELE Monthly Law Journal. June 2009. http://www.aele.org/law/2009all06/2009-06MLJ201.pdf (accessed on April 8, 2016).

and fund balance: a decrease in current expenditures leads to an increase in the UFB (i.e. the unreserved proportion of fund balance).

$$\text{Fund Balance} = \text{Total Revenues} - \text{Current Expenditures} \quad (5)$$

$$\text{Total Revenues} = \text{Current Expenditures} + \text{Fund Balance} \quad (6)$$

Under the balanced budget requirement where total expenditures equal total revenues, the right hand side of equation (4) equals the right hand side of equation (6). The current expenditures thus links the relationship between capital expenditures and financial slack. When total expenditures and total revenues are held constant, an increase in capital expenditures results in a decrease in current expenditures (expressed in equation (4)); a decrease in current expenditures leads to an increase in UFB (expressed in equation (6)). Based on the above analysis, I expect a positive impact of capital expenditures on financial slack accumulation. I use capital expenditures as a percentage of total expenditures to measure this variable, and label it as "$Capital_{i,t.}$"

Prior studies have found that smaller cities tend to maintain higher level of financial slack (Hendrick 2006; Marlowe 2012). Figures 3 and 4 of this chapter also show the negative relationship between city size and financial slack level. One possible explanation is larger organizations have more connections that allow managers to have more options and opportunities in their management when circumstances change (Thompson 1967). For example, larger governments often involve greater volume of activities that government officials can make trade-offs among one another. Also, smaller cities may face more restrictions in raising money through the issuance of debt. I include the natural logarithm of population to control the impact of city size in the model.

The overall economic condition may affect a city's finance and its financial slack accumulation. Researchers often use unemployment rate as an indicator of economic condition. The Bureau of Labor Statistics (BLS) does not report unemployment rates for individual municipality. At the local level, it reports unemployment rates for counties, and cities of 25,000 populations or more, and for metropolitan statistical areas (MSAs). In my sample, about 45 percent of the cities have less than 25,000 populations. And the complicated overlaps of jurisdictional boundaries among MSAs, counties, and cities make it extremely challenging to identify unemployment rate for individual cities. Therefore, I choose the state level unemployment rate in the model, and expect to see that as unemployment rates rise, municipal financial slack would decrease. Table 3 reports a summary of descriptive statistics of variables.

Table 3. Descriptive Statistics of Variables

	Mean	**Std. Dev.**	**Min**	**Max**
Dependent Variable				
Slack	20.968	47.689	-19.350	3064.748
Independent Variables				
Volatility	5.885	4.736	0	41.806
IG Revenue	16.235	11.932	0	90.051
Revenue Diversification	0.857	0.116	0.078	1.000
Debt Service	4.736	4.262	0	77.732
Salary	29.175	10.759	0	75.580
Capital	18.689	11.549	0	83.495
Control Variable				
Log of Population	10.316	1.146	3.497	15.943
Unemployment Rate	6.794	2.381	2.6	13.8

Number of Observations: 15,958
Number of Cities: 2,160
Average Time Span: 7.4 years

2.4.2 Model Specification

Based on the previous discussion, the model of municipal financial slack accumulation can be expressed:

$$Slack_{i,t} = \beta_0 + \beta_1 Volatility_{i,t} + \beta_2 IG\ Revenue_{i,t} + \beta_3 Revenue\ Diversification_{i,t} + \beta_4 Debt\ Service_{i,t} + \beta_5 Salary_{i,t} + \beta_6 Capital_{i,t} + \beta_7 Log\ Population_{i,t} + \beta_8 Unemployment\ Rate_{m,t} + Year_t + \theta_i + \delta_t + \mu_{i,t} \quad (7)$$

Where θ_i are city fixed effects, δ_t are year fixed effects, and $\mu_{i,t}$ is the idiosyncratic error term not correlated with the explanatory variables of all past, current, and future time periods of the same city. One immediate problem in applying the fixed effects to this empirical problem is that the dependent variable $Slack_{i,t}$ by nature is strongly persistent (Wooldridge 2012, 391-395). As demonstrated in equation (8), the current year unreserved general fund balance is equal to the amount of fund balance accumulated in prior years plus any surplus or deficit in the current year; thus $Slack_{i,t-1}$ is highly correlated with the fixed effects in the error term, which gives rise to 'dynamic panel bias' problem (Nickell 1981).

$$Slack_{i,t} = Slack_{i,t-1} + \Delta Slack_{i,t} \quad (8)$$

Some researchers address this dependent variable persistence problem by including a lagged dependent variable as an instrumental variable on the right-hand side of the equation. However, this causes a new problem. It inflates the coefficient estimate for the lagged dependent variable significantly by attributing predictive power to it that

actually belongs to the city's fixed effects. If the time range were large (large T), the impact of one year's shock on the city's fixed effect would dwindle. In this study, the panel consists of only nine years but many cross-sections, that is, 'small T, large N.' Using the above technique on panel data with such a structure inevitably results in sizable estimate bias. An additional issue with this model is that some of the independent variables may not be strictly exogenous; that is, independent of current disturbances, they are correlated with past and possibly current realizations of the error term $\mu_{i,t}$, meaning that these independent variables may be determined simultaneously with municipal financial slack accumulation.

The generalized method-of-moments (GMM) estimators are increasingly popular to address the above problems in dynamic panel data analysis. This method was first proposed by Holtz-Eakin, Newey, and Rosen (1988), and later developed by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). Roodman (2009) introduces how to implement GMM analysis in Stata. The GMM estimators are designed for situations with 1) 'small T, large N' panels; 2) a linear functional relationship; 3) dynamic dependent variable; 3) independent variables that are not strictly exogenous; 5) fixed effects; and 6) heteroskedasticity and auto correlation within individuals but not across them. This method removes the individual fixed effects as well as any associated omitted variable bias by differencing the equation. To overcome the correlation between the regressors (including the lagged dependent variable), the GMM estimation uses lags of all endogenous variables as instrumental variables. Thus the GMM estimators do not require good instruments. They assume the lags are good internal instruments; nevertheless they do allow the inclusion of external instruments (Roodman

2009). This assumption is especially valuable when potential instruments are difficult or impossible to determine. In this case, I treat all independent variables as endogenous variables except state unemployment rate, log of population, and year dummies. I lag them by two years because the standard treatment in the GMM is lags 2 or longer if variables are endogenous.

Two GMM estimations are commonly used. One is the difference GMM, and the other is the system GMM. The difference GMM tends to magnify gaps in unbalanced panels, causing large data loss. The system GMM developed by Arellano and Bover (1995) preserves sample size in panels with gaps: instead of subtracting the previous observation from the contemporaneous one, it subtracts the average of all *future available* observations of a variable (Roodman 2009). Since the panel structure in this study is unbalanced, I use the system GMM for estimation based on the orthogonal deviations. The model includes year dummies to prevent the most likely form of cross-individual correlations—the contemporaneous correlations. This model reports robust standard errors adjusted by the Windmeijer (2005) finite-sample correction without which those standard errors tend to be severely downward biased.

2.5 Results

Table 4 reports the Arellano-Bover/Blundell-Bond estimators and some essential statistical tests results. The F-test assesses the overall significance of the model. The F-statistics of 14.43, significant at the .000 level suggests the overall fit is highly significant. The Arellano-Bond tests examine autocorrelation in the panel. As expected, the AR (1) z-score of -2.26 is significant at the .05 level, presenting strong evidence that there is first-order serial autocorrelation. The AR (2) z-score of 1.40 is not statistically

significant, suggesting there is no second-order serial correlation in the panel. These results confirm that the moment condition assumed by the system GMM is valid, and the second-order serial correlation does not bias the standard errors. The Hansen test checks for joint validity of the instruments. Significant Hansen J statistics indicates the model is mis-specified.[10] In this case, the Hansen J statistics is insignificant, suggesting the instruments set in the model is appropriate.

Table 4. Estimates of Municipal Financial Slack Accumulation, 2003-2011

	Coefficient	**Robust Std. Err.**	**t Statistics**
$Slack_{t-1}$	0.148***	0.035	4.19
Volatility	5.279**	2.317	2.28
IG Revenue	0.276*	0.166	1.66
Revenue Diversification	4.787	23.289	0.21
Debt Service	0.987**	0.466	2.12
Salary	0.248*	0.136	1.82
Capital	0.563***	0.102	5.52
Log of Population	-8.423***	1.457	-5.78
Unemployment Rate	1.418	1.249	1.13

(Results on year dummies omitted)

Number of observations: 5,468
Number of groups: 1,199
Number of instruments: 250
F(26,1198) = 14.43***
Arellano-Bond test for AR(1) in first differences: z = -2.26**
Arellano-Bond test for AR(2) in first differences: z = 1.40
Hansen tests of overidentifying restrictions: chi2(223) = 247.86

Note: * significant at 0.10 level ** significant at 0.05 level *** significant at 0.01 level

[10] Source: StataCorp. 2013. Stata 13 base reference manual. http://www.stata.com/manuals13/rgmmpostestimation.pdf (accessed on March 7, 2016).

The Arellano-Bover/Blundell-Bond estimators provide useful information to understand factors that contribute to municipal financial slack accumulation. The regression coefficient on one-year lag of financial slack is highly significant but relative small in size. Recall equation (8) to interpret this coefficient: the end-of-year financial slack equals the beginning-of-year financial slack plus any surplus or deficits that occur during the current year. The one-year-lag of financial slack is actually the beginning-of-year slack, which represents the amount of financial slack accumulated in prior years. The surplus or deficits that occur during the current year are the change of financial slack. The coefficient of .148 is thus interpreted in the following way: holding all other variables constant, if financial slack increases by 10 percentage points during the year, the end-of-year financial slack will increase by 1.48 percentage points. This means that municipal governments only keep less than 15 percent of the newly generated surplus in unreserved general fund balance. The majority of the surplus are either reserved for specific purposes (e.g. debt service spending, capital improvements, etc.) in future years or spent in the current year. This finding goes against the public choice's argument that governments by nature are slack-maximizing bureaucracies (Niskanen 1971; Brennan and Buchanan 1980; Oates 1985).

As expected, volatile tax revenues as a risk factor imposes a positive impact on a city's financial slack level. Holding other variables constant, 1 percentage point increase of tax revenue volatility raises a city's financial slack level by 5.3 percentage points. This finding is consistent with what Gore (2009) finds using a different revenue volatility measure (i.e. coefficient of variation) and a different financial slack measure (i.e. the end-of-year cash and market securities). In Gore (2009)'s study, the coefficient of variation is

the ratio of standard deviation of total revenues divided by the total average revenues over the prior four years. She reveals a significant positive impact of revenue volatility on a city's cash holdings. The Arellano-Bover/Blundell-Bond coefficient on tax revenue volatility in this study together with Gore's finding confirm the hypothesis that cities with more volatile tax revenues tend to accumulate more financial slack.

The coefficient on IG Revenue is positive, suggesting a possible relationship that dependence on intergovernmental revenues, as a risk factor in a city's revenue structure, may lead to increased financial slack accumulation. This coefficient is at the .10 level. In Hendrick (2006)'s study, she uses pooled OLS regression and finds that dependence on intergovernmental revenues reduces a city's financial slack. Hendrick's finding contradicts her hypothesis that the share of intergovernmental revenues and financial slack level should have a positive relationship. She explains that it is possible that municipalities do not recognize dependence on intergovernmental revenues as a risky condition. Her estimates based on pooled OLS might be biased. As discussed in section 2.4.2 "Model Specification", using OLS regression to analyze a dataset with a dynamic panel structure will produce bias estimates. How intergovernmental revenues affect a city's savings needs further exploration. The other revenue factor—Revenue Diversification—which is often considered as a risk-averse management strategy, does not show any significant impact in the model. This factor also needs further investigations in future studies.

Non-discretionary expenditure categories are considered as risk factors in a city's expenditure structure. According to the risk-slack hypothesis, they are expected to impose positive influence on municipal financial slack accumulation. The statistically

significant and positive coefficients on the two non-discretionary expenditure categories—Debt Service and Salary—confirm the hypothesis. As expected, since debt service expenditures were pre-set which offers government officials little room to implement spending discretion, government officials tend to accumulate more financial slack if their municipal governments have heavier debt service spending burden. Holding other variables constant, 10 percentage points increase in the share of debt service expenditures raises financial slack accumulation by 9.9 percentage points. Salary expenditures though considered as a non-discretionary expenditure category, still allows government officials some management flexibility. When a government experiences extreme fiscal stress, government officials can exercise their discretion to change the amount of expenditures on salaries and benefits in response to severe financial challenges through ways such as furloughs, lay-offs, pay cut, pay freeze, benefit changes, and other methods. Because salary expenditures' non-discretion feature is not as strong as debt service expenditures, the coefficient on Salary is smaller. A 10-percentage-points increase in the share of salary expenditures raises financial slack by 2.5 percentage points.

The coefficient on Capital indicates a positive relationship between capital expenditures and municipal financial slack accumulation, consistent with my hypothesis. Holding other variables constant, a 10-percentage-points increase in capital expenditures is associated with a 5.6-percentage-points increase in financial slack accumulation. The impact of capital expenditures on financial slack accumulation is linked through current expenditures. The relationships of the three variables are expressed in equations (4), (5), and (6) in section 2.4.2.

The last variable in the model that demonstrates a significant impact on municipal financial slack accumulation is city size measured by log of total population. Consistent with my hypothesis and findings in prior studies (Hendrick 2006; Gore 2009), larger cities accumulate less financial slack. The coefficient on log of population shows that all else equal, as total population increases by 10 percent, UFB as a percent of total current expenditures decreases by 8.4 percent.

2.6 Conclusion

This chapter of the dissertation addresses an important question in municipal finance: what factors affect municipal financial slack accumulation? Built on organization theory's risk-slack hypothesis, this chapter examines whether tax revenue volatility leads to an increase in financial slack accumulation. To test this hypothesis, I create a combined dataset that include municipal financial slack information and details in municipal revenues, expenditures, and debt positions. This dataset provides an avenue to study how factors, especially those risk factors inherent in a city's fiscal structure, affect its financial slack level. This dataset includes cities in fifty states over a period of time before and after the Great Recession. Findings from this study have greater external validity than studies that use samples of cities in one state or one metropolitan area. The use of proper method—the system GMM for small T, large N dynamic panel—also guarantees that findings from this study are reliable and robust.

The findings that tax revenue volatility and other risk factors in a city's fiscal structure such as dependence on intergovernmental revenues and non-discretionary expenditure categories increase municipal financial slack accumulation support organization theory's risk-slack hypothesis that organizations with more risk factors need

more financial slack to hedge against them. The finding that municipal governments only keep 15 percent of newly generated surplus as financial slack provides evidence against public choice scholars' argument that governments are slack-maximizing bureaucracies. These findings suggest that municipal financial slack accumulation is not primarily driven by governments' slack-maximizing nature, but rather more of a precautionary financial management strategy to react to the risk factors inherent in their fiscal structures.

This chapter provides a basis for further assessing why governments accumulate financial slack. Yet there is still a tremendous gap in the understanding of local government slack accumulation, regarding the rationales, the motivation, the optimal level, and the impacts (both intentional and unanticipated). Such research is necessary if our current understanding on appropriate level of financial slack needs to move beyond the simple rules, such as the conventional 'five-percent' rule or the GFOA recommended benchmarks on local financial slack accumulation.

2.7 References

Arellano, Manuel, and Stephen Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *The Review of Economic Studies* 58 (2): 277-97.

Arellano, Manuel, and Olympia Bover. 1995. "Another Look at the Instrumental Variable Estimation of Error-Components Models." *Journal of Econometrics* 68 (1): 29-51.

Blundell, Richard, and Stephen Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87 (1): 115-43.

Bourgeois, L Jay. 1981. "On the Measurement of Organizational Slack." *The Academy of Management Review* 6 no. 1 (January): 29-39.

Bowsher, Charles A. 1994. Financial Derivatives: Actions Needed to Protect the Financial System. In *GAO/GGD-94-133 Financial Derivatives*: U.S. General Accounting Office (GAO).

Brennan, Geoffrey, and James M Buchanan. 1980. *The Power to Tax: Analytic Foundations of a Fiscal Constitution.* Cambridge, United Kingdom: Cambridge University Press.

Bruce, Donald, William F. Fox, and Mark H. Tuttle. 2006. "Tax Base Elasticities: A Multi-State Analysis of Long-Run and Short-Run Dynamics." *Southern Economic Journal* 73 (2): 315-41.

Calabrese, Thad D. 2011. "Do Donors Penalize Nonprofit Organizations with Accumulated Wealth?" *Public Administration Review* 71 (6): 859-69.

Carroll, Deborah A. 2005. "Are State Governments Prepared for Fiscal Crises? A Look at Revenue Diversification during the 1990s." *Public Finance Review* 33 (5): 603-33.

Carroll, Deborah A. 2009. "Diversifying Municipal Government Revenue Structures: Fiscal Illusion or Instability?" *Public Budgeting & Finance* 29 (1): 27-48.

Cyert, Richard M, and James G March. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

Dye, Richard F, and David F Merriman. 2004. "State Revenue Stability: Alternative Conceptualizations." *Proceedings. Annual Conference on Taxation and the Minutes of the Annual Meeting of the National Tax Association*.

Felix, R Alison. 2008. "The Growth and Volatility of State Tax Revenue Sources in the Tenth District." *Federal Reserve Bank of Kansas City Economic Review* 93 (3): 63-88.

Gauthier, Stephen J. *GFOA Updates Best Practice on Fund Balance*. 2009, December. Chicago, IL: The Government Finance Officers Association.

Gentry, William M, and Helen F Ladd. 1994. "State Tax Structure and Multiple Policy Objectives." *National Tax Journal* 47 (4): 747-72.

Gore, Angela K. 2009. "Why Do Cities Hoard Cash? Determinants and Implications of Municipal Cash Holdings." *The Accounting Review* 84 (1): 183-207.

Groves, Harold M, and C Harry Kahn. 1952. "The Stability of State and Local Tax Yields." *The American Economic Review* 42 (1): 87-102.

Hendrick, Rebecca. 2002. "Revenue Diversification: Fiscal Illusion or Flexible Financial Management." *Public Budgeting & Finance* 22 (4): 52-72.

Hendrick, Rebecca. 2006. "The Role of Slack in Local Government Finances." *Public Budgeting & Finance* 26 (1): 14-46.

Hoene, Christopher W. 2009, December. *City Budget Shortfalls and Responses: Projections for 2010-2012*. Washington D.C.: National League of Cities. Washington, DC: National League of Cities. *http://www.awcnet.org/documents/NLCBudgetShortFallsResponsesResearchBrief.pdf*.

Holtz-Eakin, Douglas, Whitney Newey, and Harvey S Rosen. 1988. "Estimating Vector Autoregressions with Panel Data." *Econometrica* 56 (6)*: Journal of the Econometric Society*: 1371-95.

Joyce, Philip 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 & Finance* 21 (2): 62-87.

Kriz, Kenneth A. 2002. "The Optimal Level of Local Government Fund Balances: A Simulation Approach." *Proceedings. Annual Conference on Taxation and the Minutes of the Annual Meeting of the National Tax Association*.

Kriz, Kenneth A. 2003. "The Optimal Size of Local Governemnt Budget Reserves: A Simulation Approach." *State Tax Notes* 27: 887-92.

Levinson, Arik. 1998. "Balanced Budgets and Business Cycles: Evidence from the States." *National Tax Journal* 51 (4): 715-32.

Levinthal, Daniel, and James G March. 1981. "A Model of Adaptive Organizational Search." *Journal of Economic Behavior and Organization* 2 (4): 307-33.

Markowitz, Harry. 1952. "Portfolio Selection." *The Journal of Finance* 7 (1): 77-91.

Marlowe, Justin. 2005. "Fiscal Slack and Counter-Cyclical Expenditure Stabilization: A First Look at the Local Level." *Public Budgeting & Finance* 25 (3): 48-72.

Marlowe, Justin. 2012. "Fiscal Slack, Reserves, and Rainy-Day Funds". In *Handbook of Local Government Fiscal Health*, edited by Helisse Levine, Jonathan B Justice and Eric A Scorsone, 321-41. Burlington, MA: Jones & Bartlett Learning.

Marudas, Nicholas P. 2004. "Effects of Nonprofit Organization Wealth and Efficiency on Private Donations to Large Nonprofit Organizations." *Research in Governmental and Nonprofit Accounting* 11: 71-92.

Moe, Terry M. 1984. "The New Economics of Organization." *American Journal of Political Science* 28 no. 4 (November):739-77.

Nickell, Stephen. 1981. "Biases in Dynamic Models with Fixed Effects." *Econometrica: Journal of the Econometric Society* 49 (6): 1417-1426.

Niskanen, William A. 1971. *Bureaucracy and Representative Government*. Piscataway, NJ: Transaction Publishers.

Oates, Wallace E. 1985. "Searching for Leviathan: An Empirical Study." *The American Economic Review* 75 (4): 748-57.

O'Toole Jr, Laurence J., and Kenneth J. Meier. 2010. "In Defense of Bureaucracy: Public Managerial Capacity, Slack and the Dampening of Environmental Shocks." *Public Management Review* 12 (3): 341-61.

Poterba, James M. 1995. "Balanced Budget Rules and Fiscal Policy: Evidence from the States." *National Tax Journal* 48 (3): 329-36.

Reschovsky, Andrew. 2004. "The Impact of State Government Fiscal Crises on Local Governments and Schools." *State & Local Government Review* 36 (2): 86-102.

Roodman, David. 2009. "How to Do xtabond2: An Introduction to Difference and System GMM in Stata." *The Stata Journal* 9 (1): 86-136.

Seymour, Dan. 2014, January. *US Local Government General Obligation Debt*. New York City, NY: Moody's Investors Service. Accessed on January 14, 2016. http://www.rigfoa.org/media/presentations/wintertraining2014/go-us-local-govts-methodology-1-2014-moodys.pdf.

Sharfman, Mark P, Gerrit Wolf, Richard B Chase, and David A Tansik. 1988. "Antecedents of Organizational Slack." *The Academy of Management Review* 13 no. 4 (October): 601-14.

Simon, Herbert A. 1947. *Administrative Behavior*. New York, NY: Macmillan.

Swidler, Steve, Richard J Buttimer, and Ron Shaw. 1999. "Government Hedging: Motivation, Implementation, and Evaluation." *Public Budgeting & Finance* 19 (4): 75-90.

Thompson, James D. 1967. *Organizations in Action: Social Science Bases of Administrative Theory*. New York: McGraw-Hill.

Thompson, Fred, and Bruce L Gates. 2007. "Betting on the Future with a Cloudy Crystal Ball? How Financial Theory Can Improve Revenue Forecasting and Budgets in the States." *Public Administration Review* 67 (5): 825-36.

Wang, Wen, and Yilin Hou. 2009. "Pay-as-You-Go Financing and Capital Outlay Volatility: Evidence from the States over Two Recent Economic Cycles." *Public Budgeting & Finance* 29 (4): 90-107.

White, Fred C. 1983. "Trade-Off in Growth and Stability in State Taxes." *National Tax Journal* 36 (1): 103-14.

Wilford, Walton Terry. 1965. "State Tax Stability Criteria and the Revenue-Income Elasticity Coefficient Reconsidered." *National Tax Journal* 18 (3): 304-12.

Williams, William V, Robert M Anderson, David O Froehle, and Kaye L Lamb. 1973. "The Stability, Growth and Stabilizing Influence of State Taxes." *National Tax Journal* 26 (2): 267-74.

Windmeijer, Frank. 2005. "A Finite Sample Correction for the Variance of Linear Efficient Two-Step GMM Estimators." *Journal of Econometrics* 126 (1): 25-51.

Wooldridge, Jeffrey M. 2012. *Introductory Econometrics: A Modern Approach, Upper Level Economics*. Mason, OH: South-Western Cengage Learning.

Yan, Wenli. 2012. "The Impact of Revenue Diversification and Economic Base on State Revenue Stability." *Journal of Public Budgeting, Accounting & Financial Management* 24 (1): 58-81.

CHAPTER 3

FINANCIAL SLACK AND MUNICIPAL EXPENDITURE STABILIZATION

3.1 Introduction

In the United States, municipal governments are on the frontline to provide vital public goods and services that affect people's daily life, from police and fire to sanitation, road maintenance, public recreation facilities, and community centers for the elders. They also provide the necessary infrastructure, safe environment, and civilized work force upon which business flourishes. Financial resources are the lifeblood of these public goods and services. The availability and stability of public expenditures directly shape many of the outcomes that matter to citizens and local economy.

Municipal governments generally decide how much they spend based on the amount of revenues they expect to collect. Thus stable and predictable revenues help achieve the expenditure stabilization goal. The property tax has the feature of relatively stable yield and resistance to the business cycles. Mikesell and Liu (2013) find that during the Great Recession of 2007-2009, property tax collections remained surprisingly stable while collections from other major local taxes declined significantly. Despite the property tax's stable yield nature, American cities have gradually changed their dependence on property tax to more volatile revenue sources such as income and sales taxes over the past hundred years. This change in municipal tax structure causes greater revenue volatility which further leads to increasing expenditure fluctuations. The business cycles intensify revenue and expenditure volatility. Without any counter-cyclical fiscal policy, expenditures drop dramatically in economic downturns due to revenue

shortfalls and grow excessively in economic upturns due to revenue prosperity. Frequent expenditure changes inevitably affect the sustainability and quality of public service provisions. Spending cuts during economic downturns (often called cutback or pullback policies) may cause disruption or termination of some public services (Bourdeaux and Hildreth 2012). This hurts those (primarily socially disadvantaged groups) who have greater dependence on public goods and services as they have less money available to pay for alternative options. The pro-cyclical expenditure fluctuations also create a so-called 'negative feedback loop': spending increase and tax cuts during economic expansion add force to the booms; whereas spending cuts and tax increase during economic recession deepen cyclical busts (Poterba 1995; Levinson 1998; Thompson and Gates 2007; Plerhoples and Scorsone 2012). To sum up, unstable municipal expenditures affect not only the continuity of local public service provisions but also the health of local economy. Therefore, municipal governments need strategic fiscal policies or financial management tools to stabilize expenditures.

In the management literature, instability or volatility is analogous to risk. Organization theorists argue that financial slack serves as a cushion protecting organizations from internal and external shocks (Cyert and March 1963; Levinthal and March 1981; Moe 1984). I test this proposition in Chapter Two and find that municipal governments with greater tax revenue volatility and other risk factors inherent in the fiscal system accumulate more financial slack. This finding indicates that municipal government officials may accumulate financial slack to buffer against risks. Do they use the accumulated financial slack to stabilize expenditures? This chapter examines the role of financial slack on municipal expenditures stabilization. The discussion proceeds in five

sections: following the introduction section, section two explains the role of financial slack in balancing the budget and stabilizing expenditures in municipal finance, as well as empirical findings of financial slack's expenditure stabilization effects in subnational government. Section three develops a theoretical model and discusses the appropriate methods for the analysis. Section four introduces data sources, describes the national sample, and interprets the regression results. The final section implies findings of this study for the theories and practices of municipal fiscal administration.

3.2 Financial Slack as an Expenditure Stabilization Tool

The study of municipal expenditure stabilization is rooted in the theoretical development of subnational government counter-cyclical fiscal policies. In the mid-1930s, Keynes published *The Theory of Employment, Interest, and Money* where he posited that central government could implement counter-cyclical fiscal policies to stabilize the economy over the business cycles—government uses large-scale deficit spending in economic downturns to pull up aggregated demand to stimulate the sluggish economy. Musgrave (1959) later theorized the above government role posited by Keynes as one of the three basic government functions—the economic stabilization function (Oates 1972). The standard Musgrave theory assumes the stabilization function of government is exclusively a role of the central government. This view was challenged by Gramlich (1987) who argued that subnational governments also play a stabilization role to counteract the business cycles. Given that subnational governments have limited fiscal capacity and are constrained by fiscal and budgetary rules, subnational governments' stabilization role often refers to budget or expenditure stabilization rather than economic stabilization (Wang and Hou 2012). The expenditure stabilization role of local

governments is no less important than the economic stabilization role. Stable expenditures are the foundation of municipal service provisions. Stable expenditures also mitigate the effect of 'negative feedback loop' which hurts the local economy.

As the understanding of subnational governments' expenditure stabilization role evolved, subnational governments realized the value of financial slack as an expenditure stabilization tool. Financial slack accumulation counteracts revenue ups and downs: it absorbs extra revenues during the boom years and provides money to offset revenue shortfalls in the lean years. It is a form of self-insurance on expenditures against revenue volatility. Some governments establish formal saving device, such as budget stabilization funds, rainy day funds, or other types of reserve funds. So far, almost all state governments have established at least one of such funds (Thatcher 2008). Local governments rarely establish a formal or separate budget stabilization fund. Some local governments are even prohibited by their state governments from having such a fund (Hou 2008). Instead, local governments often rely on an informal saving device—the general fund balance—to accumulate financial slack (Wolkoff 1987; Marlowe 2005).

Researchers have produced a rich literature on state government expenditure stabilization, including the creation, use, and impacts of the rainy funds, the budget stabilization funds, reserve funds, the general fund balance, and other stabilization tools. Hou (2003) studied the expenditure stabilization effects of the budget stabilization funds (BSFs) and the general fund unreserved undesignated fund balances (UUBs) in state governments. He found that BSFs exert significant counter-cyclical stabilization effects on state expenditures—they bolster state spending levels during economic downturn years. UUBs, however, do not show observable stabilization effects. Hou concluded that

the BSFs' role in expenditure stabilization overshadowed the UUBs' role since state governments increasingly rely on formal counter-cyclical fiscal tools—the BSFs—to balance their budgets as well as to smooth expenditures. Along with Hou's study, a series of studies were conducted to examine the expenditure stabilization effects of formal and informal savings in state governments (Pollock and Suyderhoud 1986; Gramlich 1987; Navin and Navin 1997; Joyce 2001; Hou 2003, 2005; Wagner 2003; Wagner and Elder 2005, 2007). These studies have reached relatively consistent conclusions that state savings (i.e. financial slack) serve as stabilization device that smooth expenditures over the business cycles, although the stabilization effect can be limited in some cases.

Studies on local expenditure stabilization are scarce, and findings from these studies are not conclusive. Marlowe (2005) first examined financial slack's counter-cyclical expenditure stabilization effect at the local level. Using a sample of 103 Minnesota cities from 1990 to 2000, he analyzed the effects of three types of financial slack—unreserved general fund balance, designated general fund balance, and reserved general fund balance. He found that unreserved general fund balance has a marginal nevertheless important counter-cyclical stabilization effect as it boosts expenditures during downturn years; designated general fund balance has a pro-cyclical effects; and reserved general fund balance has a "siphoning" effect as it decreases positive expenditure gaps during economic boom years.

Hendrick (2006) used a sample of 264 cities in the Chicago metropolitan area from 1997 to 2003 to study the determinants of unreserved general fund balance and its impacts on municipal governments' fiscal conditions. She found a significant and positive relationship between unreserved general fund balance and municipal

expenditures, although the findings only showed significance in the full model, not for individual years. Even if the findings were significant for each year, a mere positive relationship between the two variables is not direct evidence that unreserved general fund balance smooths expenditure fluctuations.

Wang and Hou (2012) examined the impact of fund balance on expenditure stabilization using a sample of 100 North Carolina counties for the period of 1990 and 2007. They did not find evidence that fund balance exerts a counter-cyclical stabilization effect on local expenditures. Wang (2015) later extended the time span of the same dataset to 2011. Based on the updated dataset, he re-examined fund balance's expenditure stabilization roles in the Great Recession and earlier recessions. He found that fund balance played a counter-cyclical stabilization role in 2005-2011, but not in 1994-2004.

The above literature review reveals some common issues in prior studies on local expenditure stabilization. First, whether financial slack plays an expenditure stabilization role in local government finance remains an open question, as these studies show mixed findings. Second, external validity can be an issue since all of these studies use samples of cities in one state or a particular metropolitan area. For example, North Carolina has a conservative fiscal administration system and the state government exerts strong control overall the fiscal practices of its local governments, whereas Illinois state government gives its local governments more discretionary fiscal authority. Results from North Carolina counties should not be simply generalized to cities in the Chicago metropolitan area. Third, the time spans of these studies mostly cover periods from post-1990s to pre-Great Recession. As Wang (2015)'s study suggests, the choice of time span may affect estimations.

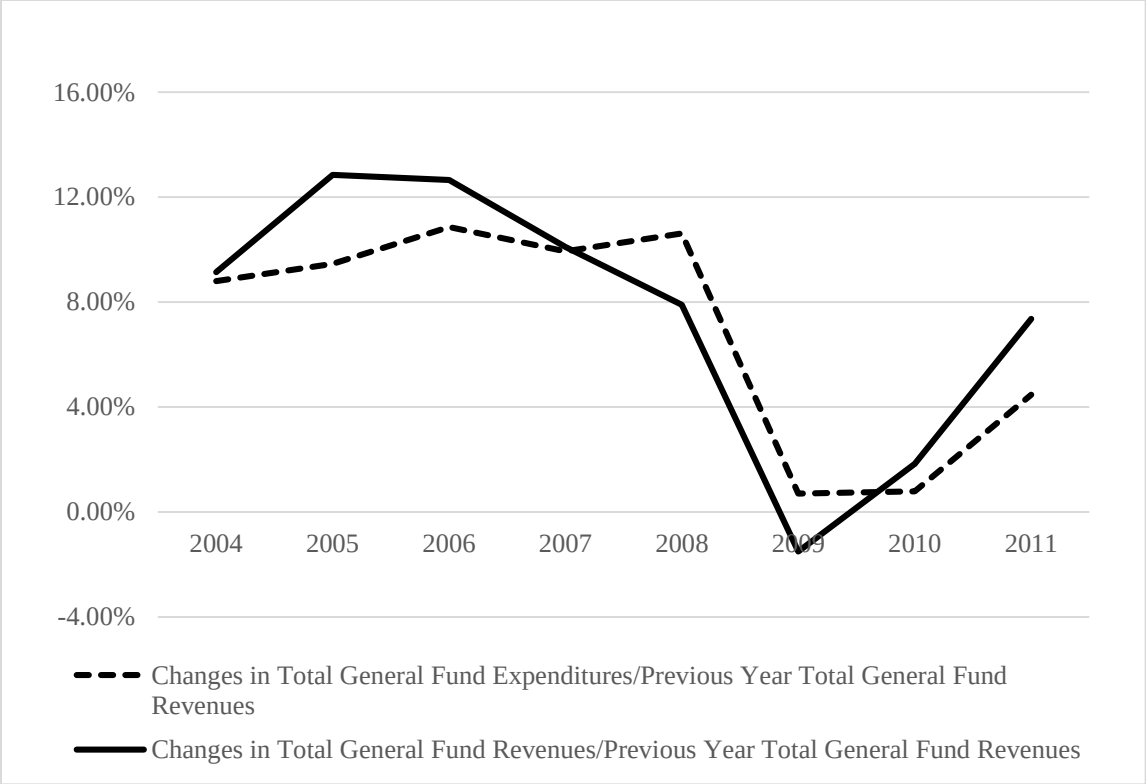
In this chapter of the dissertation, I use a dataset that consists of a sample of cities nationwide from 2003 to 2011 to study the roles of financial slack in municipal expenditure stabilization. Different from prior studies that focus on the effect of financial slack on local counter-cyclical stabilization through the business cycles, this study shifts the focus from a macro perspective of expenditure fluctuations in the economic booms and busts to a relatively micro perspective of the year-to-year expenditure adjustments: how does a municipal government adjust its expenditures to respond to a revenue change within a fiscal year? And what roles does financial slack play during this expenditure adjustment process? By focusing on the role of financial slack in the annual expenditure changes, this study dissects the mechanism of financial slack's expenditure stabilization effects. Further, this study also provides an opportunity to observe municipal government officials' management decisions when circumstances change.

3.3 Methodology and Model Specification

Municipal governments generally make their expenditure decisions based on the amount of revenues they expect to collect. Under the balanced budget requirements which apply to most state and local governments,[11] estimated expenditures should not exceed estimated revenues in the budget. As discussed in Chapter One, many governments begin their budget preparations several months before the start of a new fiscal year. During the long time between budget preparation and budget implementation, estimation errors are inevitable due to the complexity of economic and social activities so that the actual revenues rarely equal the estimated revenues. If actual revenues deviate

[11] Source: "Achieving a Structurally Balanced Budget" The Government Finance Officers Association. Updated February 2012. http://www.gfoa.org/achieving-structurally-balanced-budget (Accessed on March 17, 2016).

from budget estimates, municipal government officials have to adjust expenditures in order to keep their budgets balanced. Without any expenditure stabilization tool, the expenditure adjustment should equal to the revenue change; that is to say, if revenues drop (increase) by ten percent, spending has to be cut (raised) by ten percent. Figure 7 presents a picture of the annual changes of total revenues and expenditures in the general fund of 2,160 U.S. cities between fiscal years 2003 and 2011. Each data point represents the difference of current year general fund revenues or expenditures of these cities compared to their previous year values divided by previous year total general fund revenues. The figure shows that except during the Great Recession when the general fund revenues and expenditures declined to the same extent, the overall expenditure fluctuation is a little smoother than the overall revenue changes, suggesting that these cities might have used some fiscal policies or financial management strategies to stabilize their expenditures.



Source: the combined GFOA and Census dataset (author's calculation)

Figure 7. Overall Total General Fund Expenditure and Revenue Fluctuations (2003-2011)

State governments generally establish a separate budget stabilization fund or rainy day fund to manage expenditure fluctuations. Unlike state governments, municipal governments more often use the general fund balance, especially the unreserved general fund balance (UFB), as an expenditure stabilization tool. Although scholars have found mixed results regarding UFB's expenditure stabilization effect in local governments, some do find that UFB plays a significant role in stabilizing local expenditures over the course of business cycles (Marlowe 2005; Wang 2015). As a financial management tool, UFB absorbs additional revenues when there is a budget surplus, avoiding expenditure expansion caused by excessive revenue growth during the boom years; when there is a

revenue shortfall, UFB fills in the budget gap, diminishing a dramatic spending cut during the lean years. UFB also works as a form of self-insurance against unanticipated events. For example, there might be a natural disaster or a crime wave that calls for a spending spike. When encountering such an event, local government officials could use cash or convert fungible resources such as market securities and receivables stored in the UFB into cash to provide additional financial resources to respond to these emergencies promptly and effectively. In the following part of this section, I specify a model that examines how the UFB serves as an expenditure stabilization tool when municipal governments need to adjustment expenditures in response to revenue changes.

3.3.1 Methodology

A city's expenditures are primarily determined by its revenues, and also affected by the unreserved general fund balance. Equation (9) expresses this relationship:

$$TE_{i,t} = \beta_0 + \beta_1 TR_{i,t} + \beta_2 UBF_{i,t} + X_{i,t} + a_i + \mu_{i,t} \quad (9)$$

where $TE_{i,t}$ is the total general fund expenditures for city i in year t; $TR_{i,t}$ is the total general fund revenues for city i in year t; $UBF_{i,t}$ is the amount of unreserved general fund balance for city i in year t; $X_{i,t}$ represents a group of observable and measurable control variables that affect a city's expenditures; a_i represents the unobserved time-invariant factors (at least constant within the time span of the study period) that affect a city's expenditures, such as a city's economic base, industrial mix, form of government, political conservatism, the presence of certain fiscal rules and policies (e.g. balanced budget policy, fund balance policy, debt limit policy, etc.), and so on. The a_i is commonly called a "fixed effect" (Wooldridge 2012, 460). The error $\mu_{i,t}$ is called the

idiosyncractic error, referring to those unobserved time-variant factors that affect a city's expenditures.

Differencing all the variables in equation (9) over time gets the following equation:

$$\Delta TE_{i,t} = \beta_1 \Delta TR_{i,t} + \beta_2 \Delta UBF_{i,t} + \Delta X_{i,t} + \Delta \mu_{i,t} \quad (10)$$

where $\Delta TE_{i,t}$ denotes the change of total general fund expenditures of city i from year t-1 to year t; $\Delta TR_{i,t}$ denotes the change of total general fund revenues of city i from year t-1 to year t; $\Delta UBF_{i,t}$ denotes the change of total unreserved general fund balance of city i from year t-1 to year t; and $\Delta X_{i,t}$ denotes changes of each observable and measurable control variables in the model from year t-1 to year t. The unobserved time-invariant individual fixed effect a_i is differenced away. Equation (10) is called the *first-differenced equation*, and the OLS estimators of βs in this equation are called the *first-differenced estimators* (Wooldridge 2012, 461). The first-differenced equation model not only controls for omitted time-invariant variables as the fixed effects model does, but also addresses the serial correlation problems. The government revenue and expenditure time series by nature are highly persistent (or strongly dependent), meaning that the value of current year expenditures or revenues is highly correlated with the previous year's value. This is a reasonable concern considering that incrementalism is a traditional and common budget making approach among local governments. In addition, the variable UFB is also of high persistence because the current year UFB reflects the sum of UFB accumulated in all prior years and the newly generated UFB from the current year. The first-differenced equation model addresses serial correlation by subtracting the value of previous

observation from the value of current observation. After the differencing process, the first-differenced series is considered an independent and identically distributed sequence. In addition to addressing the problems of omitted time-invariant variable bias and serial correlation, differencing time series also removes any linear time trend in the dependent and explanatory variables which may bias the regression estimates (Wooldridge 2012, 395-96). To further control the time serial effect and to capture the secular trend, I add year dummies in the model.

The first-differenced equation model has another advantage for this study—it explicitly examines how changes in the explanatory variables affect the changes in the dependent variable over the same time period. This serves well to investigate the proposed research questions in this chapter: how do municipal governments adjust expenditures when facing a revenue change and how does the change in financial slack help stabilize municipal expenditures during this process?

3.3.2 Model Specification

Based on equation (10), I develop a first-differenced equation model that tests the above research questions. The model is expressed as:

$$\begin{aligned}\Delta TE_{i,t} = \alpha_0 &+ \alpha_1 \Delta TR_{i,t} + \alpha_2 \Delta UFB_{i,t} + \alpha_3 \Delta Debt\ Service_{i,t} + \alpha_4 \Delta Salary_{i,t} \\ &+ \alpha_5 \Delta Property\ Tax_{i,t} + \alpha_6 \Delta Intergovt'l\ Revenue_{i,t} \\ &+ \alpha_7 \Delta Population_{\ i,t} + \alpha_8 Unemployment\ Rate_{\ m,t} + Year_t + \mu_{i,t}\end{aligned} \tag{12}$$

where $\Delta TE_{i,t}$, $\Delta TR_{i,t}$, $\Delta UFB_{i,t}$ are changes in individual municipal government's total general fund expenditures, total general fund revenues, and unreserved general fund

balances from year t-1 to year t, respectively. These changes are then divided by each city's previous year total revenues to address heteroscedasticity or in other words, to make them more comparable. $\Delta Debt\ Service_{i,t}$ and $\Delta Salary_{i,t}$ denote the change of debt service expenditures as a proportion of total expenditures and the change of salary and wages paid to city public employees as a proportion of total expenditures from year t-1 to year t, respectively. $\Delta Property\ Tax_{i,t}$ and $\Delta Intergovt'l\ Revenue_{i,t}$ denote the change of property tax revenues as a share of total revenues and the change of intergovernmental revenues as a share of total revenues from year t-1 to year t, respectively. $\Delta Population\ _{i,t}$ represents a city's population growth, which is measured as the change of total population of city i from year t-1 to year t divided by this city's previous year population. $Unemployment\ Rate\ _{m,t}$ denotes the unemployment rate for state m in year t. As introduced in Chapter Two, due to the fact that the Bureau of Labor Statistics does not report unemployment rates for individual municipalities, and the complexity of jurisdictional boundaries among MSAs, counties, and cities, it is very challenging to identify unemployment rate for individual cities based on currently available information. Therefore, I use the state level unemployment rate to control for the overall economic condition. Lastly, I include year dummies denoted as $Year_t$ in the model to control for temporal variation in the dependent variable.

The primary variables of interest are $\Delta TR_{i,t}$ and $\Delta UFB_{i,t}$. Based on municipal governments' budget making process and financial management practice, changes in revenues ($\Delta TR_{i,t}$) should be the primary driver of expenditure changes. I expect $\alpha_1$to have a positive sign with a value between 0 (where there is no expenditure adjustment)

and 1 (where expenditures adjust as much as the revenue change, indicating that the expected stabilization tool—UFB—does not have any impact on expenditure changes).

I expect changes in UFB ($\Delta UFB_{i,t}$) is an important player in the expenditure adjustment process, although its effect may not be as strong as changes in revenues. If UFB plays an expenditure stabilization role in this adjustment process, $\Delta UFB_{i,t}$ should counteract expenditure changes ($\Delta TE_{i,t}$): an increase in $\Delta UFB_{i,t}$ indicates that it absorbs revenue surplus, and this holds back expenditure growth, leading to a decrease in $\Delta TE_{i,t}$. A decrease in $\Delta UFB_{i,t}$ means it releases financial slack to support expenditures, and this boosts up expenditure growth, leading to an increase in $\Delta TE_{i,t}$. The coefficient α_2 thus measures UFB's effect on municipal expenditure adjustments. A negative sign of α_2 indicates that UFB has an expenditure stabilization effect. Indirectly, α_2 also suggests the tradeoff government officials have made between spending and saving. If a municipal government experiences a revenue increase in the current year, the change in revenues ($\Delta TR_{i,t}$) indicates a revenue surplus. Municipal government officials can decide to spend the surplus in the current year or to save it for future use either in the form of financial slack or as reserves for specific purposes. The coefficient α_2 thus indicates the proportion of the current year surplus kept as savings. A large size of α_2 provides evidence that governments are slack-maximizing bureaucracies.

Municipal government officials may feel different pressures when they face a revenue surplus or a revenue shortfall. When a city experiences a revenue increase, city officials need to decide whether to spend the revenue surplus in the current year or to keep it as savings for the future. If they decide to spend it, they may face the challenge of

allocating the extra money fairly among various programs and interest groups. When a city experiences a revenue decline, city officials have to cope with the budget deficit by either increasing taxes or cutting expenditures. To fill in a budget gap is often more challenging than to allocate extra money because raising taxes is very likely to receive opposition from tax payers and cutting expenditures is likely to interrupt public service provision which may cause citizen dissatisfaction. It is politically costly for local elected officials. Therefore, city officials may invest greater effort in keeping expenditures stable during a revenue shortfall. I hypothesize that the UFB plays a more important role in stabilizing municipal expenditures when a city's revenues decline. To capture this possible nuance of the UFB's expenditure stabilization effects in different situations, I separate the regressions in scenarios of revenue increase and decrease.

Spending flexibility determines to what extent government officials can adjust expenditures to cope with revenue changes. Less discretionary expenditure categories offer government officials very little room to do so. I identify two less discretionary expenditure categories: the share of debt service expenditures in total expenditures and the share of salary expenditures in total expenditures. Debt service expenditures include principal retirement, interest and other financial charges. The amount of debt service expenditures was set at the time when the bonds were issued. Government officials have no administrative authority to change or reduce debt service expenditures even if in face of fiscal stress. If a city's debt service expenditure burden increases, government officials' management discretion in adjusting expenditures to cope with revenue changes would decrease. I expect the sign of $\Delta Debt\ Service_{i,t}$ is negative, and the effect of this variable is greater in the scenario of a revenue shortfall.

Salaries and wages paid to city employees are another less discretionary expenditure category. Though government officials can choose furloughs, pay freeze, pay cut, and other options when their cities experience extreme fiscal stress as many state and local governments did in the Great Recession of 2007-2009, it is probably not wise to use these salary control strategies as a regular response to revenue changes, especially small revenue changes. After all, recruiting new workers and job training are time consuming and administratively costly. I hypothesize the salary expenditure category has the same effect on municipal expenditure adjustments as the debt service expenditures do. Because salary expenditures are a little more discretionary than debt service expenditures, I expect the effect of salary expenditures on municipal expenditure stabilization to be smaller than the effect of debt service expenditures.

The volatility of a city's revenues directly affects its need for expenditure adjustments. I identify two major revenue sources that may affect municipal governments' revenue volatility: property tax revenues and intergovernmental revenues. The property tax has low elasticity compared to other taxes (Wilford 1965; Felix 2008). If not constrained by certain tax limits, local government officials may be able adjust the millage rates in the opposite direction to offset changes in property values. Also, the property values are not assessed every year. Thus the changes in market property values are not immediately reflected in property tax collections (Mikesell and Liu 2013). The combination of millage rates adjustments together with the property value assessment lags makes property tax a stable local revenue source. This feature of property tax has proven to be an important advantage in economic recessions, which explains why local governments' revenue collections held up better than state governments in the Great

Recession (Alm, Buschman, and Sjoquist 2011; Alm 2013; Mikesell and Liu 2013). I hypothesize that cities with greater dependence on the property tax have lower overall revenue volatility and are thus in lower needs of expenditure adjustments. I expect the sign of $\Delta Property\ Tax_{i,t}$ to be negative.

In contrast, the dependence on intergovernmental revenues may add uncertainty in municipal revenue estimation because the amount of aid and the time for disbursements are not subject to municipal governments' complete control. The delay of aid disbursement may create cash flow problems which increases the need of expenditure adjustments. To make things worse, state governments sometimes reduce the amount of aid or delay the disbursement during economic recessions due to their own fiscal stress (Reschovsky 2004; Hoene 2009).This forces municipal governments to make further expenditure adjustments. I hypothesize that cities with a greater share of intergovernmental revenues have more expenditure adjustments. The sign of $\Delta Intergovt'l\ Revenue_{i,t}$ is thus expected to be positive.

Municipal expenditures are driven by local residents' demands in public goods and services. A city with a growing population is more likely to increase expenditures on police, fire, public infrastructure, and so on. I include population growth ($\Delta Population\ _{i,t}$) in the model and expect this variable to have a positive sign. Municipal governments' own-source revenues are generated from the local economic base, and are thus affected by the overall economic condition. I use state unemployment rates to measure the overall economic conditions. Greater unemployment rates indicate a declining economy in which government expenditure growth tends to slow down.

Therefore, I hypothesize a higher unemployment rate ($Unemployment\ Rate_{m,t}$) is associated with lower municipal expenditure growth ($\Delta TE_{i,t}$).

3.4 Sample Descriptions and Results

This study is based on the same data set—the combined Census and GFOA panel data—used in Chapter Two. Details of data cleaning are described in section 2.3 in Chapter Two. The sample includes 15,958 observations for 2,160 individual cities of fifty states between fiscal years 2003 and 2011. Table 5 Panel A presents descriptive information about the cities in the sample. All the financial variables have been inflation-adjusted based on the Consumer Price Index of all urban consumers published by the Bureau of Labor Statistics. Panel B shows the descriptive statistics of variables included in the regressions. The average change in total general fund revenues (ΔTR) is 7.4 percent with a standard deviation of 14.6 percent, suggesting that changes in total general fund revenues are relatively moderate for most of the cities from 2003 to 2011. The average change in total general fund expenditures (ΔTE) is 6.8 percent with a standard deviation of 14.7 percent. The smaller average change in general fund expenditures with a similar standard deviation indicates that on average general fund expenditures are less volatile than general fund revenues during the study period.

Table 6 reports the first-differenced estimators from pooled OLS regressions. In cross-section time series data set, observations within each municipality may be correlated in some unknown way, inducing correlation in $\mu_{i,t}$ within i. This error is often referred as the clustered errors. In the presence of clustered errors, OLS estimates are still unbiased but standard errors may be underestimated, leading to incorrect inference. To

address this issue, I use the Huber-White standard errors clustered by individual municipality which allow for intragroup correlation (Froot 1989). Numbers in parentheses in Table 6 are Huber-White standard errors.

Table 5. Descriptive Statistics of Variables

Panel A: Characteristics of Sample Cities

	Mean	Std.Dev.	Min	Max
Total General Fund Expenditures (’000)	94,400	1,430,000	0.401	73,100,000
Total General Fund Revenues (’000)	99,000	1,530,000	389.942	79,200,000
Total UFB (’000)	14,500	32,600	-320,000	922,000
Debt Service Exps./Total Exps.	0.047	0.043	0	0.777
Salary Exps./Total Exps.	0.292	0.108	0	0.756
Property Tax Rev./Total Rev.	0.203	0.135	0	0.776
Intergovt'l Rev./Total Rev.	0.162	0.119	0	0.901
Population	69,970	258,823	33	8,391,881

Panel B: Regression Variables

	Mean	Std.Dev.	Min	Max
ΔTE	0.068	0.147	-2.035	4.469
ΔTR	0.074	0.146	-0.953	4.797
ΔUFB	0.033	0.174	-3.338	6.528
ΔDebt Service	-0.001	0.023	-0.236	0.508
ΔSalary	-0.004	0.068	-0.469	0.490
ΔProperty Tax	0.003	0.037	-0.385	0.382
ΔIntergovt'l Revenue	-0.003	0.053	-0.619	0.594
ΔPopulation	0.020	0.276	-0.912	12.883
Unemployment Rate	6.794	2.382	2.6	13.8

Number of Observations: 15,958
Number of Cities: 2,160
Average Time Span: 7.4 years

Table 6. Regression Results from the First-Differenced Equation Model

	Revenues Increase			Revenues Decrease		
	Full	**Moderate Increase (Increase < 13%)**	**Large Increase (Increase >= 13%)**	**Full**	**Moderate Decrease (Decrease < 8%)**	**Large Decrease (Decrease >= 8%)**
ΔTR	0.431***	0.348***	0.446***	0.373***	0.244*	0.303*
	(0.114)	(0.049)	(0.143)	(0.118)	(0.134)	(0.172)
ΔUFB	-0.088***	-0.065**	-0.135***	-0.107***	-0.057*	-0.311***
	(0.026)	(0.027)	(0.040)	(0.033)	(0.030)	(0.080)
ΔDebt Service	-0.056	-0.102	0.057	-0.215	-0.163	-0.570
	(0.080)	(0.079)	(0.169)	(0.152)	(0.141)	(0.499)
ΔSalary	-0.042*	-0.036*	-0.062	-0.144***	-0.097*	-0.357**
	(0.023)	(0.022)	(0.056)	(0.051)	(0.052)	(0.144)
ΔProperty Tax	0.072	0.011	0.245**	-0.004	-0.019	0.033
	(0.049)	(0.054)	(0.102)	(0.057)	(0.059)	(0.157)
ΔIntergovt'l Revenue	0.033	0.015	0.102**	0.149**	0.144*	0.203**
	(0.036)	(0.039)	(0.086)	(0.072)	(0.084)	(0.101)
ΔPopulation	0.008***	0.006*	0.008**	0.001	-0.015**	0.000
	(0.002)	(0.003)	(0.003)	(0.005)	(0.007)	(0.004)
Unemployment Rate	-0.003***	-0.003***	-0.004	-0.004***	-0.004***	0.000
	(0.001)	(0.001)	(0.005)	(0.002)	(0.001)	(0.008)
	(Year dummies' outputs omitted)					
Constant	0.045***	0.062***	0.082*	0.017	0.018	-0.064
	(0.015)	(0.009)	(0.046)	(0.023)	(0.024)	(0.089)
Sample Sizes	5,597	4,401	1,196	1,278	1,035	243
R^2	0.271	0.101	0.362	0.119	0.061	0.226

Note: Numbers in parentheses are Huber-White standard errors clustered by individual municipalities.
* $p < 0.1$ ** $p < 0.05$ *** $p < 0.01$

The first three columns of Table 6 in the table present regression estimates from the full sample of revenue increase, the moderate revenue increase, and the large revenue increase samples; the last three columns present regression estimates from the full revenue decrease sample, the moderate revenue decrease, and the large revenue decrease samples. I hypothesize that when a city experiences a large revenue change, it may rely more on UFB to adjust expenditure changes. I define a 'large' revenue change if a city's revenue increase falls into the 75th percentile and revenue decrease falls into the 25^{th} percentile. In other words, I choose the top 25 percent of observations with the largest percent revenue increase or decrease as 'large' revenue changes. The cutting point for large revenue increase is 13 percent and the cutting point for large revenue decrease is 8 percent.

The first-differenced estimators provide useful information on how municipal expenditures change in response to marginal changes in the explanatory variables. Among all explanatory variables, ΔTR has the largest effect on expenditure changes. This confirms my hypothesis that expenditure changes are primarily driven by revenue changes. Holding other variables constant, when general fund revenues increase by 10 percentage points, general fund expenditures increases by 4.3 percentage points; when total general fund revenues fall by 10 percentage points, total general fund expenditures fall by 3.7 percentage points. This positive relationship gets stronger when revenue changes are large. If a city has a large revenue increase, a 10-percentage-points revenue increase causes expenditure to rise by 4.5 percentage points. The same marginal revenue increase only causes expenditure to rise by 3.5 percentage points among cities with moderate revenue increase. The same pattern holds for cities that experience revenue

declines. Overall, the coefficients of ΔTR are smaller in the revenue decrease models than those in the revenue increase models, suggesting that municipal governments use more expenditure adjustment strategies to cope with revenue declines.

The negative coefficients of ΔUFB indicates the tradeoffs between municipal governments' spending and saving: more savings accumulated in the UFB slows down expenditure growth, and withdrawing savings from the UFB pushes up expenditure growth. In the revenue increase models where municipal governments experience revenue surpluses, holding other variables fixed, a 10-percentage-points increase in ΔUFB pulls down expenditure growth by 0.9 percentage points. This suggests that the UFB absorbs revenue surplus, preventing expenditure growth caused by revenue increase. The UFB's role in preventing expenditure growth is greater when cities experience larger revenue growth. In the revenue decrease models where municipal governments face revenue shortfalls, holding other variables fixed, a 10-percentage-points ΔUFB decrease boosts expenditure growth by 1.1 percentage points. This indicates that the UFB releases financial slack to fill in the budget gap, preventing spending cuts caused by revenue declines. The UFB's role in preventing spending cuts is greater when cities experience large revenue decrease. In all, ΔUFB always counteracts the changes of total general fund expenditures, suggesting it stabilizes expenditures when revenues fluctuate. The overall greater coefficients of ΔUFB in the revenue decrease models further indicates that the UFB plays a more significant role in helping municipal governments stabilize expenditures when they face a revenue shortfall. Since my choice of large revenue change is arbitrary, I conduct robustness checks by choosing alternative cutting points other than the two used in the regressions. For the revenue increase models,

I choose 10 percent and 15 percent as the alternative cutting points of large revenue increase; for the revenue decrease models, I choose 5 percent and 10 percent as the alternative cutting points of large revenue decrease. Results demonstrate consistent and similar patterns: municipal governments adjust expenditures to a greater extent during revenue decrease and the UFB plays more important roles in expenditure adjustments when a city responds to revenue declines. In general, the greater changes of general fund revenues, the greater roles the UFB plays in expenditure adjustments.

Expenditure categories that restrain municipal government officials spending discretion are expected to reduce municipal expenditure adjustments. That is to say, as the share of debt service expenditures and the share of salary expenditures in total expenditures increase, expenditure adjustments (ΔTE) decrease. Since debt service expenditures restrict municipal government officials' spending flexibility more than salary expenditures do, I expect the size of coefficients of ΔDebt Service to be greater than the size of coefficients of ΔSalary. The regression estimates confirm my hypotheses: the negative signs of the coefficients of these two variables (except the coefficient of ΔDebt Service in the large revenue increase model) suggest these two expenditure categories restrain government officials' spending discretion, which leads to less expenditure adjustments. The overall larger coefficients of ΔDebt Service than the coefficients of ΔSalary reflect debt service expenditures' non-discretionary nature, although these ΔDebt Service regression estimates are not statistically significant. The non-significant estimates of ΔDebt Service are probably due to the small share of debt service expenditures in total expenditures and the little change of the year-to-year ΔDebt Service. As shown in Table 5 Panel A, debt service expenditures count less than 5

percent in total expenditures. Changes in such a small share in total expenditures may not affect government officials' spending flexibility. In addition, Table 5 Panel B shows that ΔDebt Service has little variation compared to other variables. One disadvantage of the first-differenced equation model is that variables with little year-to-year variation cannot be estimated with precision. For ΔSalary, its effects on municipal expenditure adjustments are greater in the revenue decrease models. Holding other variables fixed, if the share of salary expenditures decreases by 10 percentage points during revenue shortfalls, municipal governments' total general fund expenditures increases by 1.4 percentage points. The negative signs of this variables indicate municipal governments adjust salary expenditures to stabilize the overall general fund expenditures.

A greater share of property tax revenues in total revenues is expected to stabilize municipal revenues, which leads to a lower need in expenditure adjustments. Regression estimates on ΔProperty Tax do not seem to support this hypothesis. The coefficients of ΔProperty Tax are positive in the revenue increase models, though only in the large revenue increase model the coefficient shows statistical significance. The coefficients of ΔProperty Tax are negative in the full and moderate revenue decrease models, and is positive in the large revenue decrease model. None of these estimates in the revenue decrease models are statistically significant. I cannot make any meaningful statistical inference based on these imprecise results. One possible explanation is that in states which have passed any form of tax and expenditure limitation rules, local government officials cannot change property tax rates without voters' approval. This restricts government officials from adjusting the millet rates or the assessed property values to reach their desired property tax yields. Another possible explanation is that there is

relatively small year-to-year changes in property tax revenues during the study period. How the property tax affects municipal expenditure stabilization needs further exploration in future studies.

The effects of ΔIntergovernmental Revenue on ΔTE are relatively consistent. Overall, a greater share of intergovernmental revenues increases the need of expenditure adjustments. The effects are larger during revenue shortfalls. When a city experiences a revenue decrease, if its share of intergovernmental revenues increases by 10 percentage points, the city's general fund expenditures would further fall by 1.5 percentage points.

The effect of population growth on changes in municipal general fund expenditures are positive when revenues rise. This confirms my hypothesis that a city with a growing population needs to provide more public goods and services to meet local residents' growing demands, which inevitably pushes up expenditures.

The negative coefficients of state unemployment rate in all of the models also confirms my hypothesis. Increase in unemployment rate indicates a declining economy. Municipal expenditure growth is more likely to slow down as the overall economic condition gets worse. This model uses state unemployment rates to capture the impact of general economic conditions. This is not a precise measure of local economic conditions. Future studies should try to use an economic measure that matches local conditions better.

3.5 Conclusion

In this chapter, I examine how municipal governments adjust expenditures in response to changes in revenues. I find that, on average, municipal governments smooth

their expenditures substantially so that expenditures do not change as much as revenues do. I also find that financial slack (UFB) is an important expenditure stabilization tool in municipal financial management. Different from previous studies which examine the beginning-of-year UFB's effect on expenditure stabilization over the course of business cycles, I shift the research focus to examine how marginal changes in the UFB help municipal governments stabilize their year-to-year expenditures in order to dissect the mechanism of the UFB's expenditure stabilization effects. I find that changes in the UFB always counteract the changes of total general fund expenditures, suggesting that the UFB plays an expenditure stabilization role: when a municipal government has a revenue surplus, the UFB absorbs part of the surplus, avoiding excessive expenditure growth caused by revenue increase; when a municipal government encounters a revenue shortfall, UFB releases financial slack to fill in the budget gap, mitigating dramatic spending cuts. The UFB's expenditure stabilization roles are more significant when municipal governments experience a revenue decrease, or when the revenue changes are large. These findings provide strong evidence that UFB works as an expenditure stabilization tool in municipal governments, complementing prior studies on local government counter-cyclical expenditure stabilization policies. I also find evidence that spending flexibility affects municipal governments' expenditure adjustments. This finding provides evidence to support organization theory's view on financial slack—it can be used as a cushion to buffer against the risk factors a government faces. This study uses the first-differenced equation model which addresses important statistical issues such as omitted fixed effects and serial correlations in the dependent and explanatory variables. The limitation of this model is that it cannot make precise estimations on

variables with little year-to-year change. Future studies should examine the effects of such variables (i.e. debt service expenditures, and property tax revenues) on municipal expenditure adjustments.

3.6 References

Alm, James, Robert D Buschman, and David L Sjoquist. 2011. "Rethinking Local Government Reliance on The Property Tax." *Regional Science and Urban Economics* 41 (4): 320-31.

Alm, James. 2013. "A Convenient Truth: Property Taxes and Revenue Stability." *Cityscape* 15 (1): 243-45.

Bourdeaux, Carolyn, and W. Bartley Hildreth. 2012. "Pullback Management: State Budgeting under Fiscal Stress." In *The Oxford Handbook of State and Local Government Finance*, edited by Robert D. Ebel and John E. Peterson, 816-42. New York, NY: Oxford University Press.

Cyert, Richard M, and James G March. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

Felix, R Alison. 2008. "The Growth and Volatility of State Tax Revenue Sources in the Tenth District." *Federal Reserve Bank of Kansas City Economic Review* 93 (3): 63-88.

Froot, Kenneth A. 1989. "Consistent Covariance Matrix Estimation with Cross-Sectional Dependence and Heteroskedasticity in Financial Data." *Journal of Financial and Quantitative Analysis* 24 (03): 333-55.

Gramlich, Edward M. 1987. "Subnational Fiscal Policy." In *Perspectives on Local Public Finance and Public Policy*, edited by John M. Quigle. Greenwich, CT: JAI Press.

Hendrick, Rebecca. 2006. "The Role of Slack in Local Government Finances." *Public Budgeting & Finance* 26 (1): 14-46.

Hoene, Christopher W. 2009, December. *City Budget Shortfalls and Responses: Projections for 2010-2012*. Washington, D.C.: National League of Cities. Accessed on September 19, 2015. *http://www.awcnet.org/documents/NLCBudgetShortFallsResponsesResearchBrief.pdf*.

Hou, Yilin. 2003. "What Stabilizes State General Fund Expenditures in Downturn Years—Budget Stabilization Fund or General Fund Unreserved Undesignated Balance?" *Public Budgeting & Finance* 23 (3): 64-91.

Hou, Yilin. 2005. "Fiscal Reserves and State Own-Source Expenditure in Downturn Years." *Public Finance Review* 33 (1): 117-44.

Hou, Yilin. 2008, October 23-25. "Parameters of Local Government Options for a Downturn: Evidence from Georgia Counties." 2008 Annual Conference of the Association for Budgeting and Financial Management (ABFM), Chicago, IL.

Joyce, Philip 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 & Finance* 21 (2): 62-87.

Levinson, Arik. 1998. "Balanced Budgets and Business Cycles: Evidence from the States." *National Tax Journal* 51 (4):715-32.

Levinthal, Daniel, and James G March. 1981. "A Model of Adaptive Organizational Search." *Journal of Economic Behavior and Organization* 2 (4): 307-33.

Marlowe, Justin. 2005. "Fiscal Slack and Counter-Cyclical Expenditure Stabilization: A First Look at the Local Level." *Public Budgeting & Finance* 25 (3): 48-72.

Mikesell, John L, and Cheol Liu. 2013. "Property Tax Stability: A Tax System Model of Base and Revenue Dynamics through the Great Recession and Beyond." *Public Finance and Management* 13 (4): 310-34.

Moe, Terry M. 1984. "The New Economics of Organization." *American Journal of Political Science* 28 no. 4 (November): 739-77.

Musgrave, Richard Abel. 1959. *Theory of Public Finance*. New York: NY: McGraw-Hill.

Navin, John C, and Leo J Navin. 1997. "The Optimal Size of Countercyclical Budget Stabilization Funds: A Case Study of Ohio." *Public Budgeting & Finance* 17 (2): 114-27.

Oates, Wallace E. 1972. *Fiscal Federalism*. New York, NY: Harcourt Brace Jovanovich.

Plerhoples, Christina, and Eric A. Scorsone. 2012. "Fiscal Stress and Cutback Management among State and Local Governments." In *Handbook of Local Government Fiscal Health*, edited by Helisse Levine, Jonathan B. Justice and Eric A. Scorsone, 253-84. Burlington, MA: Jones & Bartlett Learning.

Pollock, Richard, and Jack P Suyderhoud. 1986. "The Role of Rainy Day Funds in Achieving Fiscal Stability." *National Tax Journal* 39 (4): 485-97.

Poterba, James M. 1995. "Balanced Budget Rules and Fiscal Policy: Evidence from the States." *National Tax Journal* 48 (3): 329-36.

Reschovsky, Andrew. 2004. "The Impact of State Government Fiscal Crises on Local Governments and Schools." *State & Local Government Review* 36 (2): 86-102.

Thatcher, Daniel G. 2008, *September. State Budget Stabilization Funds*. Washington D.C.: National Conference of State Legislatures. Revised on September 26, 2008. Accessed on March 15, 2016 http://www.ncsl.org/research/fiscal-policy/state-budget-stabilization-funds-spring-2008.aspx.

Thompson, Fred, and Bruce L Gates. 2007. "Betting on the Future with a Cloudy Crystal Ball? How Financial Theory Can Improve Revenue Forecasting and Budgets in the States." *Public Administration Review* 67 (5): 825-36.

Wagner, Gary A. 2003. "Are State Budget Stabilization Funds Only the Illusion of Savings?: Evidence from Stationary Panel Data." *The Quarterly Review of Economics and Finance* 43 (2): 213-38.

Wagner, Gary A, and Erick M Elder. 2005. "The Role of Budget Stabilization Funds in Smoothing Government Expenditures over the Business Cycle." *Public Finance Review* 33 (4): 439-65.

Wagner, Gary A, and Erick M Elder. 2007. "Revenue Cycles and the Distribution of Shortfalls in US States: Implications for an "Optimal" Rainy Day Fund." *National Tax Journal* 60 (4): 727-42.

Wang, Wen, and Yilin Hou. 2012. "Do Local Governments Save and Spend across Budget Cycles? Evidence from North Carolina." *The American Review of Public Administration* 42 (2): 152-69.

Wang, Wen. 2015. "The Great Recession and the Use of Fund Balances in North Carolina Counties." In *Local Government Budget Stabilization*, edited by Hou Yilin, 17-32. New York, NY: Springer.

Wilford, Walton Terry. 1965. "State Tax Stability Criteria and the Revenue-Income Elasticity Coefficient Reconsidered." *National Tax Journal* 18 (3): 304-12.

Wolkoff, Michael. 1987. "An Evaluation of Municipal Rainy Day Funds." *Public Budgeting & Finance* 7 (2): 52-63.

Wooldridge, Jeffrey M. 2012. *Introductory Econometrics: A Modern Approach, Upper Level Economics*. Mason, OH: South-Western Cengage Learning.

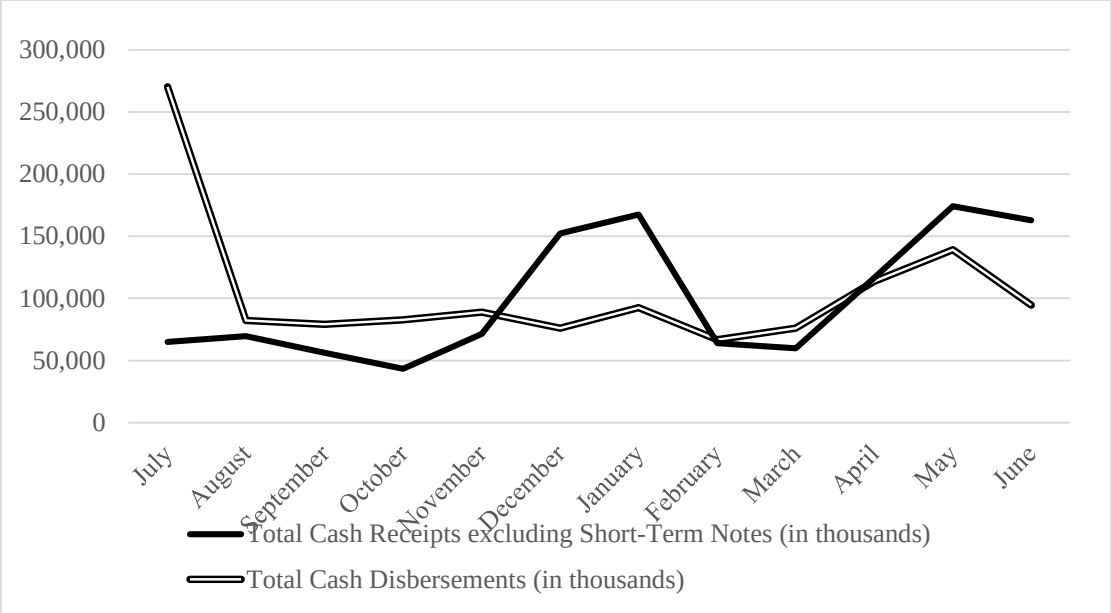
CHAPTER 4

FINANCIAL SLACK AND MUNICIPAL SHORT-TERM BORROWING

4.1 Introduction

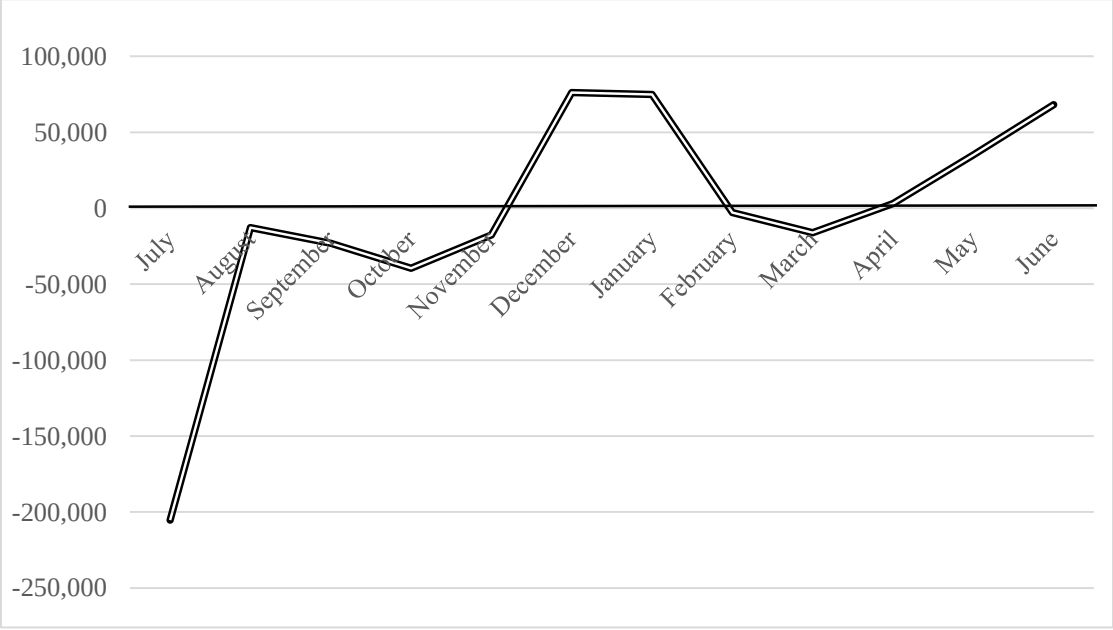
Cash flow problems are a common issue in many municipal governments. During the normal course of a fiscal year, the day-to-day revenue and expenditure flows of a governmental unit are rarely equal. Many governments receive lump sum, scheduled payments of major revenue sources once or twice a year, or at quarterly intervals. On the other hand, operating expenditures, especially recurring expenses such as personnel costs are roughly constant throughout the fiscal year. Figure 8 presents City of San Diego's general fund cash flows to illustrate this problem. The city receives property taxes from the County of San Diego twice every fiscal year,[12] creating two bulges in its cash flow-in trend: one in December and January, and the other in May and June. On the expenditure side, except May and July, its monthly cash disbursements are pretty constant over the course of the year. The consequence of the mismatch between cash flow-ins and flow-outs is temporary cash shortfalls during a fiscal year. As shown in Figure 9, in absence of any cash management strategy, the City would have a negative end-of-month cash balance seven out of twelve months.

[12] The property taxes paid to County of San Diego are "delinquent after December 10 and April 10, respectively." The City receives its shared property taxes from the County afterwards. See City of San Diego's Comprehensive Annual Financial Report Fiscal Year Ended June 30, 2013, page 65.



Data source:
http://www.sandiego.gov/investorinformation/documents/otherupdates/genfundsummary.shtml

Figure 8. City of San Diego's General Fund Cash Flows, Fiscal Year 2013 ($'000)



Data Source:
http://www.sandiego.gov/investorinformation/documents/otherupdates/genfundsummary.shtml

Figure 9. City of San Diego's End-of-Month General Fund Cash Balances, Fiscal Year 2013 ($'000)

Managing government cash flows is not simply a technical problem, but a critical issue in municipal financial management. For a municipal government, failure in meeting its obligations of matured bond principal and interest payments or in funding expenditures in a timely manner could cause catastrophic problems. To manage cash flows, municipal governments can use either internal financial resources such as financial slack they have accumulated or external financing tools such as short-term borrowing if permitted by the state government. If both options are available, how do municipal governments choose between internal financing and external financing? Do they prefer one financing instrument to another? In this chapter of the dissertation, I apply a theory—the pecking order theory—commonly used in corporate financial management studies that explains firms' preference ranking over various financial resources in the context of municipal governments. I examine whether a pecking order of preference over internal and external financial resources also exists in municipal governments, and whether financial slack reduces municipal short-term borrowing. The discussion proceeds in six sections: following the introduction section, section two introduces the pecking order theory and its applications in prior research. Section three develops a theoretical model of municipal short-term borrowing. Section four introduces data sources, describes the California sample, and discusses appropriate methods. The final two sections interpret regression results and imply findings of this study for the theories and practices of municipal fiscal management.

4.2 Pecking Order Theory and Governments' Preference over Financial Resources

4.2.1 Theories of Capital Structure: the Trade-Off Theory vs. the Pecking Order Theory

The theories of organizational capital structure and financing decision-making can be synthesized into two dominant theories—the trade-off theory and the pecking order theory. The trade-off theory describes a family of related theories that assume that firms seek an optimal capital structure through a tradeoff between the tax advantages of issuing debt and the costs of financial distress when the debt burden is too high (Modigliani and Miller, 1958). The major benefits associated with debt issuance include the tax benefits on debt interest payments, and the mitigation of cash flow problems. The primary costs of debt include debt interest payments, fees associated with a bond issue (e.g. fees for underwriters, rating agencies, etc.), bankruptcy costs, and agency costs. A value-maximizing firm seeks to maintain a capital structure that the marginal costs of debt equal its marginal benefit. This theory predicts that firms have target capital structure and they adjust gradually toward an optimal debt ratio.

An alternative theory that explains organizational capital structure is the pecking order theory (Myers, 1984; Myers and Majluf, 1984). In the pecking order theory, there is no well-defined optimal debt ratio. Changes in debt ratios are driven by the need for external funds, not by any attempt to reach an optimal capital structure. The pecking order theory suggests that information asymmetry between owners/managers and investors creates a preference ranking over financial sources: internal funds first, followed by debt, and then equity. Firms follow this pecking order of financing in order to minimize adverse selection costs. Due to information asymmetry, owners and

managers of a firm know the true value of the firm's assets and growth potential. Investors can only guess these values. In most cases, if a firm is overvalued by the market, the managers of the firm will be happy to sell equity whereas the managers of an undervalued firm will not. This suggests a potential adverse selection problem in the corporate stock market (Leary and Roberts 2004; Goyal and Frank 2008). If a firm offers to sell equity, investors may view it as a negative signal regarding the quality of the equity and the firms' value (Baskin 1989). Therefore, firms prefer internal financial sources the most because using internal sources avoids the information asymmetry and underinvestment problems. When internal financial resources are insufficient to meet the financing need, firms first turn to risk-free debt, then risky debt, and finally equity. Firms' pecking order behavior may also be explained by agency costs (Myers 2003). The agency theory argues that if managers search for external financial sources, they have to explain project details to outside investors and keep administration more transparent. This unavoidably exposes themselves to investor monitoring. Managers dislike this process and therefore they prefer using internal financial resources over external financing (Goyal and Frank 2008).

4.2.2 The Modified Pecking Order Theory and Its Applications

Neither the trade-off theory nor the pecking order theories could tell a full story of organizations' capital structure and their financing decision-making (Leary and Roberts 2010). Nevertheless, some researchers find that the pecking order is "a much better first-cut explanation of the debt-equity choice" (Shyam-Sunder and Myers 1999, 221). The pecking order is a good descriptor of firms' financial behavior (Titman and Wessels 1988; Shyam-Sunder and Myers 1999; Leary and Roberts 2004; Lemmon and Zender

2010). In Leary and Roberts' recent study, they find that 77 percent of the firms in their sample follow the pecking order in choosing between internal and external finance (Leary and Roberts 2010). Some organizations such as nonprofit organizations do not have equity. Researchers describe a more liberal interpretation of the theory—the "modified (or dynamic) pecking order theory"—which relaxes the ordering of the hierarchy's second rung, the choice between debt and equity, only examining the preference order of internal and external financial resources. The modified pecking order theory sometimes is used to explain nonprofit organizations' capital structure and borrowing decisions. Scholars find evidence that nonprofit organizations also follow a pecking order of preference over financing sources: internal funds are preferred over external borrowing (Bowman 2002, Denison 2009, Yan, Denison, and Butler 2009, Calabrese 2011).

Governments, similar to nonprofit organizations, do not have equity. It seems that the modified pecking order theory might be used to study governments' financial management behaviors. However to my best knowledge, there is no study in public financial management that applies the modified pecking order theory to explain governments' borrowing decision and their capital structure. This chapter of the dissertation presents the first known study that tests the application of the pecking order and modified pecking order theories from firms and nonprofit organizations to municipal governments, and examines whether municipal governments also have a pecking order preference when managing their cash flows.

4.2.3 The Internal and External Financial Resources of Municipal Governments

In the management literature, the internal financial resources refer to cash, investment income, and other fungible resources a firm holds. External financial resources are those raised from external security issues (Myers and Majluf 1984; Baskin 1989; Goyal and Frank 2008). In the government context, the internal financial resources refer to financial slack a government has accumulated, and the external financial resources are those raised from municipal security issues—government debt financing. As introduced in Chapter One, financial slack are accounting-based excess resources available to a government. It occurs when actual revenues exceed actual expenditures in a particular fiscal period, often caused by random errors in budget estimations and the conservative forecasting bias. In the previous two chapters, I examine factors that determine a municipal governments' financial slack accumulation, and financial slack's role in municipal expenditure stabilization, respectively. In this chapter, I examine how financial slack affects a city's borrowing behavior by studying municipal governments' preference over internal financial resources (i.e. financial slack) and external financial resources (i.e. debt financing).

In the United States, subnational governments finance their current expenditures primarily by tax revenues such as property and sales taxes and non-tax revenues such as charges and fees. When a government cannot raise enough tax or non-tax revenues to cover its expenditures in a short time manner, it can increase liquidity through debt financing by issuing municipal securities. Municipal securities include "a bond, note, warrant, certificate of participation or other obligation issued by a state or local government or their agencies or authorities" according to the Municipal Securities

Rulemaking Board (MSRB).[13] When municipal securities qualify for federal income tax exemption—interest or other investment earnings on them are excluded from gross income of the investors (bondholders)—the issuing government can borrow at much lower interest rates than taxable corporate securities. By the fourth quarter of 2015, the U.S. state and local governments have accumulated outstanding municipal securities of over $2.96 trillion, equal to 16.5 percent of U.S. gross domestic product (Federal Reserve Board of Governors 2016).

The majority of municipal securities issued by subnational government are in the form of bonds. Bonds are characterized by their long-term maturity schedules. A typical long-term bond matures in more than 15 years from issuance.[14] Bonds are generally used to finance capital investments. The reasons are capital assets are usually high-priced items, and financing such assets by pay-as-you-go (pay-go) approach requires large initial cash outlays which may cause a considerable tax rate increase or saving idle cash (slack) over several years. The pay-go financing approach may also impose an intergenerational inequity problem with current residents bearing its costs, while future residents enjoy the benefits. In addition, the pay-go method may cause the over-exhaustion of a tax base in the asset acquisition or construction period. Therefore, capital assets are usually financed through debt that matches the life range of the assets.

Notes are distinguished from bonds by their short maturity length. Notes usually mature in one year or less, although sometimes notes with longer maturities are also

[13] Source: "Glossary of Municipal Securities Terms" The Municipal Securities Rulemaking Board. Updated August 2013. Source: http://www.msrb.org/glossary.aspx (Accessed on April 4, 2016).
[14] Ibid.

issued.[15] Notes are issued when the liquidity is low and repaid when available cash balances are expected to be strong. Governments issue notes primarily for cash management purposes—to offset the temporary cash deficit caused by the mismatched revenue schedule and expenditure schedule. Such notes are called cash flow management notes, including grant anticipation notes (GANs), tax anticipation notes (TANs), revenue anticipation notes (RANs), and tax and revenue anticipation notes (TRANs). Governments also issue short-term notes to provide interim financing for long-term capital investment projects (Trogen 2000; Fitch Ratings 2015). These notes are generally in the form of bond anticipation notes (BANs), construction loan notes (CLNs), or other forms of commercial papers (CPs). BANs are issued in anticipation of long-term bonds. CLNs are issued to fund construction of projects, and are repaid from bond proceeds or some pre-arranged commitment. CPs usually mature with 270 days, and they are often backed by a line of credit with a bank.[16] In this study, I focus on the cash management notes only since the research interest of this chapter is to examine municipal governments' preference over internal and external financial resources when managing their cash flows.

4.3 A Model of Municipal Short-Term Borrowing

I develop a model of municipal short-term borrowing which incorporates the amount of cash management notes issued by an individual municipal government in a particular fiscal year as a percentage of its total operating expenditures as the dependent variable (labeled as $Note_{i,t}$), and unreserved general fund balance as a percentage of its

[15] Ibid.
[16] Ibid.

total operating expenditures as the independent variable (labeled as $Slack_{i,t}$). In the later regression analysis, $Slack_{i,t}$ is lagged by one year to measure a city's beginning-of-year financial slack (labeled as $Slack_{i,t-1}$). The model also incorporates several control variables that are hypothesized to affect a city's dependence on short-term borrowing, including a municipal government's institutional, fiscal, demographic characteristics as well as some key features of the notes issued by government, and economic and market condition indicators. The general structure of the model is expressed:

$$Note_{i,t} = f\big(Slack_{i,t-1},\ Fiscal\ Policy\ Space_{i,t},\ Fiscal\ Structural\ Factors_{i,t},\ City\ Size_{i,t},\ Note\ Features_{i,t},\ Economic\ Condition_{m,t},\ Municipal\ Security\ Market\ Condition_{t}\big) \quad (13)$$

A government's *fiscal policy space* refers to the freedom government officials can operate, decide, and create fiscal policy; in other words, how many options or tools government officials can use to solve financial problems (Pagano and Hoene 2010). For municipal governments, their fiscal policy space is usually determined by state governments' restrictions on local fiscal policies (Hendrick and Crawford 2014). Most of these constraints take the form of tax and expenditure limitations. In California, the passage of its Proposition 13 in 1978 changed local governments' fiscal policy space as it shifted the control of property taxes (property value assessment and property tax revenue allocation) from local governments to the state (Shires 1999; Hoene 2004). Under Proposition 13, the assessed property value was rolled back and frozen at the 1976 assessed level. Increases in property value assessment should be no more than 2 percent per year as long as the property is not sold; once sold, the property is reassessed at

1percent of the sale price, and the 2 percent yearly increase cap becomes applicable to future years. Any new special tax from local governments must be passed by a two-thirds vote of the electorate (Hoene 2004). These limitations however, may not apply to municipalities that have adopted a city charter. The California State Constitution allows cities to adopt city charters, and local governments can gain more fiscal policy space once they obtain the charter. Compared to the general law cities, charter cities have broader assessment power and taxation powers (for example, imposing real property transfer tax). They have supreme authorities over local expenditures, land use and zoning decisions, and municipal contracts. They also have the freedom to choose form of government, methods of elections, voting requirements, personnel matters, and among others.[17] As of July 1, 2011, among the 482 incorporated cities in California, 121 cities are charter cities, and the rest are general law cities.[18] To examine how fiscal policy space factor influences municipal short-term borrowing, I include $Charter\ City_{i,t}$ in the model. This variable is coded 1 if a municipal government is a charter city in a particular fiscal year; 0 if it is a general law city.

A government's *fiscal structure* denotes its key financial characteristics, such as revenue sources, tax burden, debt structure, levels of fund balance, and so forth (Hendrick and Crawford 2014). Proposition 13 has changed Californian municipal governments' fiscal structures. Cities in California shifted their dependence on property tax revenue to a diversity of revenue sources, particularly to charges and miscellaneous

[17] Source: "General Law City v. Charter City" League of California Cities. http://www.cacities.org/Resources-Documents/Resources-Section/Charter-Cities/Chart_General_Law_v-_Charter_Cities-07-26-11 (Accessed on April 4, 2016).
[18] "Charter City List" League of California Cities. http://www.cacities.org/Resources/Charter-Cities (Accessed on April 4, 2016).

revenues. Researchers find that between 1978 and 1995, total charges and miscellaneous revenues of California cities grew by nearly 400 percent (Shires 1999). There is little change in expenditure structure. However, one notable change in expenditure shares is the interest paid on outstanding debt, which increased from 3 percent to 8 percent between 1972 and 2002 (Hoene 2004). Changes in revenue structures inevitably influence how municipal governments manage their financial resources. To capture the impact of fiscal structure on municipal governments' short-term borrowing, I include five fiscal structure factors in the model as described below.

The first measure is dependence on intergovernmental revenue. Financial professionals and researchers have recognized that over dependence on intergovernmental revenues is a risk factor in municipal finance because the amount of aid from the state and federal government and the time of aid disbursement are not under the control of municipal government (Bowman, Calia, and Metzgar 1999; Hendrick 2006). To make things worse, state governments often reduce the amount of aid or delay the disbursement during economic recessions when municipal governments are in greater need of such revenue (Hoene 2009). Dependence on intergovernmental revenues adds uncertainty to municipal revenue estimation and sometimes creates cash flow problems in municipal financial management. This suggests that municipal governments with greater dependence on intergovernmental revenues may need more internal and/or external financial resources to manage their cash flows. I use revenues received from state and county governments as a percentage of total municipal revenues to measure this variable, and label it $IG\ Revenue_{i,t}$.

The second measure is revenue diversification calculated by a reversed Herfindahl-Hirschman Index based on five primary own-source general revenues: property taxes (include secured and unsecured property taxes, and supplemental property taxes), sales and transient lodging taxes, franchises and business license taxes, real property transfer taxes, and other taxes (include utility users tax, construction development taxes, and admission taxes). Calculation of revenue diversification is shown below. The value of this index ranges from 0 to 1 with increasing values indicating greater revenue diversification. Effective revenue diversification is considered to reduce revenue volatility (Carroll 2009). Municipal governments with stable revenue streams may need less short-term debt to balance their cash flows.

$$RD = \frac{1-\sum_{j=1}^{5} R_j^2}{1-\frac{1}{5}} \tag{14}$$

Non-discretionary spending categories such as salary expenditures and debt service expenditures restrict a municipal government's spending flexibility and may increase demands in short-term borrowing to manage cash flows. I include $Salary_{i,t}$ measured as salary expenditures as a percentage of total municipal operating expenditures, and $Debt\ Service_{i,t}$ measured as expenditures on debt principal retirement, interests, and other financial charges as a percentage of total municipal operating expenditures in the model. The last fiscal structural factor is $Debt\ Burden_{i,t}$ measured as per capital long-term debt outstanding. Debt burden influences municipal short-term borrowing in two ways: on one hand, higher current debt burden may reduce a government's future debt issuance capacity; on the other hand, more long-term debt outstanding is associated with higher interest payments on debt, indicating that a

municipal government may have higher demand in issuing notes to manage its cash flows. How debt burden affects a city's short-term borrowing will be tested in the empirical analysis.

The size of a city may affect its access to the municipal securities market, as smaller cities sometimes face more restrictions on debt issuance. City size is also associated with the independent variable—$Slack_{i,t}$. Findings in Chapter Two of this dissertation and previous studies suggest that smaller cities generally accumulate more financial slack (Hendrick 2006; Marlowe 2012). I include the natural logarithm of population to control the impact of city size.

Municipal financial activities are open to the general economy. Therefore, the local economic condition and the municipal securities market condition directly shape municipal finance and financial management. Municipal revenues tend to move with the ebb and flow of local economic activities. When local economy booms, municipal revenues increase due to the strong tax base; while local economy is in recession, municipal governments receive fewer revenues due to shrinking tax base and are more likely to suffer financial stress. I use the unemployment rate of the county where the city locates to control for the general economic condition.

The municipal securities market condition is also taken into account in the model—lower yields indicate lower borrowing cost for municipal governments and this may give some incentive for municipal governments to take advantage of securities market. The Bond Buyer publishes indices on a weekly basis for general obligation bonds, revenue bonds, and notes. These indices reflect the average estimated yields of the

bonds or notes. I use the Bond Buyer's One-Year Note Index to measure the overall municipal securities market condition.

The model also includes note interest rate charged on a particular transaction to capture the cost of short-term borrowing. I hypothesize that if a city can borrow at lower interest rates, it might issue more notes to take advantage of the low borrowing costs.

4.4 Data Sources, Sample Description, and Methodology

4.4.1 Data Sources and Sample Creation

This model is tested using a sample of cities in California. I choose California cities to study this subject for three reasons. First, California is among those states where local governments actively issue notes for cash management purpose. Second, California is among the very few states that release its local governments' short-term debt issuance information. Third, California has the largest population and economy in the United States, making this study significant even though it is not a nationwide study. In addition, the California Constitution gives its cities the authority to become charter cities. Charter cities have much more local controls than the general law cities, and they have supreme authority over municipal affairs.[19] This provides an opportunity to examine how institutional factors affect municipal governments' financial management options.

I compile information from various sources. The two primary data sources are the California Debt and Investment Advisory Commission (CDIAC)'s Debt Issuance Database and the California State Controller's website. California state law requires that

[19] Source: "Charter Cities: A Quick Summary for the Press and Researchers" League of California Cities. http://www.cacities.org/Resources/Charter-Cities (Accessed on April 4, 2016).

all governmental agencies which issue debt should report information on each issuance to the CDIAC.[20] In 2006, the CDIAC launched a publicly accessible database that includes comprehensive information on bonds, notes, and other public debt sold or issued by the State and all of its local governmental agencies. The information includes issue dates, issuer, type of bond issuance, and financial characteristics associated with each bond sale such as interest costs, sale type, sources of payment, and others. Data is available from 1984 to the present, and is updated monthly. This database is especially valuable for the study of short-term borrowing. Some alternative data sources may provide information on government notes issuance. For example, the Census Bureau's Local Government Finance database reports the year-end note outstanding. However, because most of the notes are paid off within 12 months, the year-end note outstanding does not tell much about the amount of notes that have been issued during the year, but rather the amount of outstanding notes that are carried to the next fiscal year. The note issuance information reported in the CDIAC's database provides a much accurate measure of the amount of short-term debt issued by a municipal government in a particular fiscal year.

The CDIAC's Debt Issuance Database does not report municipal revenues, expenditures, assets, liabilities, fund balances, and other financial information. I obtain such information from the California State Controller's open data website. Cities in California are required by law to report their financial data in paper format to the Controller within 90 days after the close of the fiscal year, or in the required electronic format within 110 days. The Controller's office reviews, compiles, and publishes the

[20] Source: "Government Code 8855(k) and 8855(i)" State of California Lenitive Counsel. http://www.leginfo.ca.gov/cgi-bin/displaycode?section=gov&group=08001-09000&file=8855-8859 (Accessed April 4, 2016).

annual financial transaction reports. I obtain the list of California charter cities from the League of California Cities' website, each city's population information from the California Department of Finance's website, the county level unemployment rates from the Bureau of Labor Statistics' website, and the one-year note index from the Bond Buyer's website.

4.4.2 Sample Selection and Selection Bias

I draw a sample of 478 California cities that include key information captured by the various sources mentioned above. Four cities are left out, either because they were incorporated after 2010, or there is obvious data error or missing data.[21] Due the change in definition of unreserved general fund balance (UFB) required by GASB Statement No. 54, I restrict the time span of the sample between fiscal years 2003 and 2011 to avoid potential measurement inconsistency on fund balance. Regarding the issuance of short-term debts, I restrict the sample to include cash management notes only, excluding all other types of notes such as projects notes, notes for single or multiple family housing, equipment, utility, and among other purposes. Among the 478 cities in California, 420 cities (or 88%) have never issued any cash management notes from fiscal years 2003 through 2011. Fifty-eight cities issued 209 cash management notes during the study period. Seventeen of them issued cash management notes only once, and five cities have issued cash management notes every year during the nine years.[22] Table 7 presents a

[21] These four cities are: City of Jurupa Valley (incorporated on July 1, 2011), City of Eastvale (incorporated on October 1, 2010), City of Escalon (multiple years of negative general fund operating expenditures), and City of Paso Robles (key financial information is missing).
[22] These five cities are: City of Berkeley, City of Los Angeles, City of Oakland, City of San Diego, and City of Selma.

detailed distribution of cash management notes issued by California cities between fiscal years 2003 and 2011.

Table 7. Cash Flow Notes Issuances Distribution, FY2003-FY2011

Number of Note Issuances	Number of Cities	Column 1 × Column 2	Percent	Cumulative Percent
1	17	17	8.1	8.1
2	12	24	11.5	19.6
3	5	15	7.2	26.8
4	5	20	9.6	36.4
5	5	25	12.0	48.4
6	3	18	8.6	57.0
7	3	21	10.0	67.0
8	3	24	11.5	78.5
9	5	45	21.5	100.0
Total	**58**	**209**		**100.0**

The fact that a large number of cities never issue cash management notes raises a concern of potential selection bias in the sample. Sample selection bias arises when a researcher does not observe a random sample of a population of interest. In other words, observations on the dependent variable are not missing randomly, but conditional on some variables. One such example is the effect of education on women's wages where the dependent variable can only be observed when an individual female participates in the labor market. Without any correction, samples with selection bias often lead to inconsistent estimators and biased inferences (Heckman 1979). Similar in this study of municipal short-term borrowing, observations on the dependent variable (i.e. Note) can only be observed if a city has issued cash management notes. The issuance of cash

management notes by these cities is not random, but rather depends on several factors. For example, in California, charter cities often enjoy more fiscal policy space than the general law cities. Due to the more fiscal tools they have, they may not need to accumulate as much financial slack to manage cash flows as the general law cities do. This will affect their need in short-term debt financing. It is also reasonable to hypothesize that cities that face greater fiscal stress are more likely to issue cash management notes. To compare whether cities that issue cash management notes significantly differ from those which do not, I conduct a two-sample t-test to compare cities that have issued cash management notes and those that have not over some key municipal characteristics variables. Results in Table 8 show that charter cities, cities with more population, less financial slack, more diversified revenue sources, greater shares of salary expenditures and debt service expenditures are more likely to issue cash management notes. This suggest that selection bias exists in this sample.

Table 8. Two-Sample T-Test of Cash Flow Notes Issuance

Variable	**Mean**		**Difference**	**t-Statistics**
	Cities without Note Issuance	Cities with Note Issuance		
Charter City	0.24	0.49	-0.25	-8.15
Population	48,89	337,84	-288,95	-21.68
Financial Slack	41.19	9.52	31.67	8.81
Intergovernmental Revenue	6.27	5.35	0.92	1.51
Revenue Diversification	0.74	0.79	-0.05	-5.33
Salary	32.54	39.88	-7.34	-8.86
Debt Interest	2.47	4.12	-1.65	-7.60
Debt Burden	846.33	80.48	756.86	0.26

4.4.3 Heckman Selection Model

Researchers use models to take account of sample selection bias. Among those widely used models in social science literature is the Heckman selection model. The Heckman selection model is a type of Tobit model that treats selection bias as an omitted variable bias. The first stage of this model is to create a selection equation and estimate the probability that a city would issue cash management notes. Then a statistically adjusted value (inverse mills ratio) is calculated for each observation based on the expected error from the selection equation. In the second stage, the model that examines whether financial slack reduces the amount of cash management notes issuances includes inverse mills ratio as an explanatory variable. The results—the Heckman estimators—are thus adjusted from self-selection bias (details see Heckman 1979).

Variables used in the first stage selection model are: $Slack_{i,t-1}$, $Charter\ City_{i,t}$, $IG\ Revenue_{i,t}$, $Revenue\ Diversification_{i,t}$, $Debt\ Burden_{i,t}$, $Debt\ Service_{i,t}$, $Salary_{i,t}$, $Log\ Population_{i,t}$, $Unemployment\ Rate_{m,t}$, and $Note\ Index_t$. These variables are expected to affect a city's probability to issue cash management notes. The second stage estimation model includes all variables used in the first stage except $Charter\ City_{i,t}$ because a city (or town) charter may influence a city's access to the municipal securities market, and hence its probability to issue notes; but it does not necessarily determine how much notes a city issues. The amount of notes issuance is more likely dependent upon a city's fiscal stress over cash flows. The second stage model also includes one variable that is not included in the selection equation—interest rate at notes issuance ($Note\ Interest_i$). The note interest rates reported in the CDIAC database are either calculated based on net interest cost (NIC) or true interest cost (TIC). TIC and

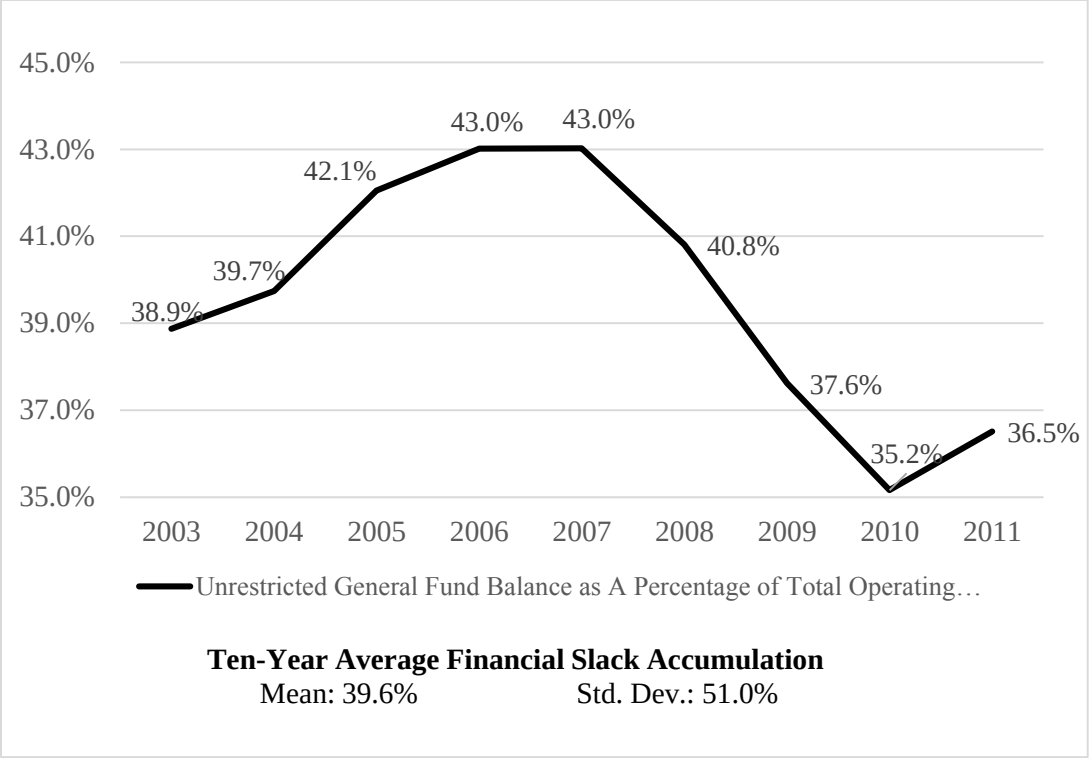
NIC are similar, except that TIC takes into account the time value of money. The longer it takes for a bond to mature and the more interest payment periods are involved, the greater difference between NIC interest rate and TIC interest rate. In recent years, TIC interest rates are gaining more popularity among researchers as a proper measure of bond costs (Hildreth and Zorn 2005). Unfortunately, the note information in the CDIAC database is not sufficient to convert all interest rates into a uniform one. However, this is less of an issue for notes than for long-term bonds. Most notes mature within a year, and interest is payable at maturity without redemption prior to maturity. The short maturity length and single interest payment period indicate that conceptually, the difference between NIC interest rate and TIC interest should be negligible. A few cities reported both NIC and TIC interest rates in the CDIAC database in Fiscal Year 2012. These cases confirm my assumption that the differences between the two interest rates are subtle. The next section presents descriptive statistics on municipal financial slack and note issuance by California cities and the Heckman estimators of municipal short-term borrowing.

4.5 Findings

4.5.1 An Overview of Financial Slack Accumulation and Notes Issuance by California Cities

In organizational theory, slack is considered a crucial buffer which protects organizations from uncertainty and risks (Levinthal and March 1981; Moe 1984). Further, the pecking order theory believes that financial slack (internal fund) is preferred by financial managers compared to debt and equity (Myers 1984; Myers and Majluf 1984). From an organizational perspective, accumulating financial slack is a good management strategy. A commonly cited standard suggests that governments should

maintain rainy day funds approximately five percent of the general fund expenditures (Joyce 2001). The GFOA recommends that the "five-percent rule" should only be an appropriate benchmark for very large cities, and the majority of cities should maintain unrestricted general fund balance no less than fifteen percent of regular general fund operating revenues or expenditures (Gauthier 2009). Figure 10 demonstrates the trend of average financial slack accumulation by California cities between fiscal years 2003 and 2011. The trend of slack accumulation shows a clear pro-cyclical pattern: during economic expansions (FY2003 – FY2007), cities increased their financial slack levels, and the accumulated slack peaked when the economy reached the summit in FY2007. Slack declined significantly in the Great Recession of 2007-2009. When the economy recovered from recession, slack accumulation recovered accordingly. During the nine years, California cities accumulate UFB about 39.6 percent of total operating expenditures (or 4.7 months of total general fund operating expenditures). The pro-cyclical slack accumulation pattern of California cities is comparable with the national slack accumulation trend (see Figure 2 in Chapter Two). However, California cities' financial slack level is way beyond the GFOA's recommended 15 percent benchmark (or 5 percent for the very large cities). In Chapter Two of the dissertation, based on a nationwide sample of cities, I find that on average, American cities accumulated UFB about 20 percent of operating expenditures between fiscal years 2003 and 2011. California's cities accumulated almost twice as much financial slack during the same period.



Source: "California Local Government Revenues and Spending" reported on the California Local Government Finance Almanac website (http://www.californiacityfinance.com/) (author's calculation)

Figure 10. Average (Mean) Financial Slack Accumulation by California Cities (%UFB)

There are some possible explanations of California cities' above the national average financial slack accumulation. Findings in Chapter Two and several previous studies show that smaller cities accumulate more financial slack. It is possible that the California sample includes a larger proportion of smaller cities. To investigate this possibility, I compare the population distributions of the two samples. Table 9 shows that in general, cities in the California sample are smaller than cities in the nationwide sample. However, the city size difference in the two sample is marginal and the two samples have pretty comparable population distributions. This indicates that the difference in city sizes in the two samples is not the primary explanation of California cities' above national

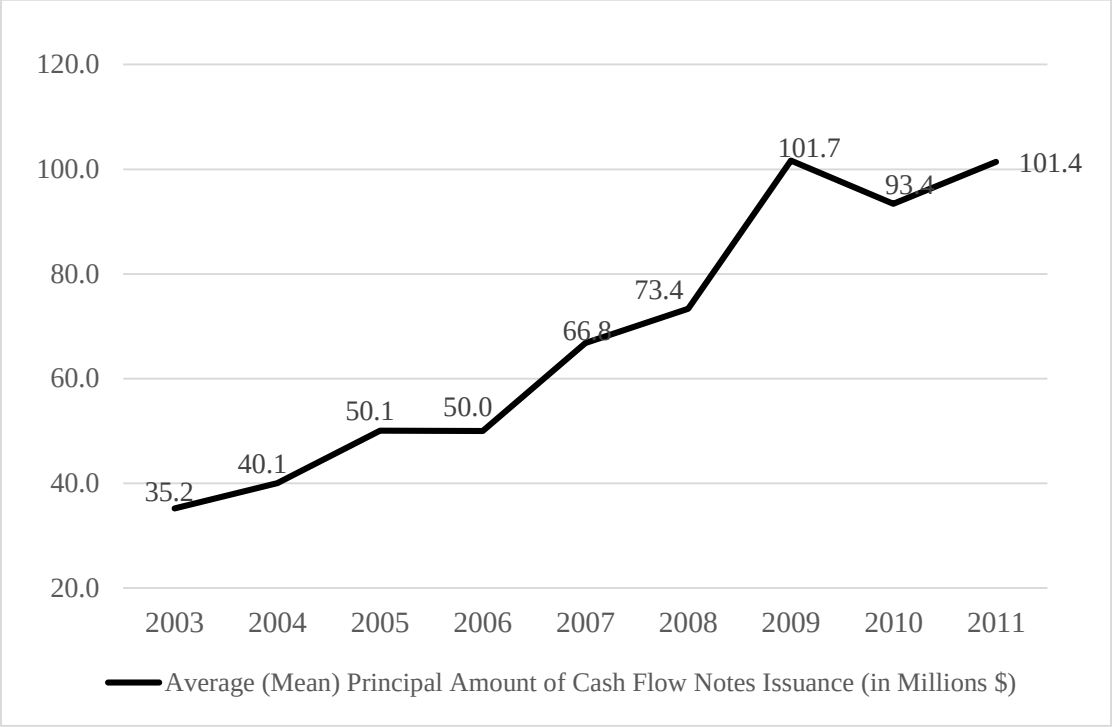
average financial slack level. Another possible explanation is California's Proposition 13 which restricts the state and local governments' revenue raising capacity. Cities that are affected by Proposition 13 cannot take advantage of the rising property values because the growth rate of assessed property values is capped. Government officials cannot adjust tax revenues by changing the millage rates without voters' approval. The restriction in revenue raising capacity and the loss in revenue adjustment flexibility probably motivate these cities' government officials to accumulate more financial slack in order to increase their management discretion.

Table 9. Population Distributions of the Two Samples

	California Sample	**Nationwide Sample**
Mean	63,104	69,954
1st Quartile	99 ~ 10,756	33 ~ 14,000
2nd Quartile	10,761 ~ 28,281	14,002 ~ 28,522
3rd Quartile	28,301 ~ 64,635	28,531 ~ 60,649
4th Quartile	64,679 ~ 3.8 million	60,652 ~ 8.4 million

Regarding notes issuance, during this nine-year period, 58 cities have issued 209 notes for cash management purpose. Nine cities issued notes more than once within a fiscal year. For data analysis purpose, I consider the multiple note issuances within a fiscal year as only one, taking the sum of multiple principals as the total principal, and the weighted average interest rate as the interest rate, and the weighted average maturity length as the maturity length. Figure 11 presents the average cash management notes issued by California cities between 2003 and 2011. The trend of note issuances

demonstrates a relatively constant upward slope, with a peak of notes issuance in fiscal year 2009, when the U.S. economy was in the midst of the Great Recession.



Source: Debt issuance data reported on the California Debt and Investment Advisory Commission website (author's calculation)

Figure 11. Average (Mean) Cash Management Notes Issuance by California Cities (Millions $)

The majority of these notes are issued in the form of tax and revenue anticipation notes (TRANs). Most of these notes are paid by general fund revenues. Negotiated sale is the dominant way of notes sales, and most cities choose net interest costs (NIC) to measure the costs. Among cities that issued cash flow notes, the mean average amount of principals issued by an individual city in a fiscal year is $58.5 million, with the smallest principal amount of $250,000 and the largest principal amount of $1.26 billion. The mean

average interest rate for these notes is 2.29%. On average, these notes matured in 366 days, with the shortest maturity length of 49 days, and longest mature length of 411 days. Table 10 presents the detailed descriptive statistics of cash management notes issued by California cities during the study period.

Table 10. Descriptive Statistics of Note Issuance by California Cities (FY2003~FY2011)

	Median	**Mean**	**Std. Dev.**	**Min**	**Max**
Principal Amount (million $)	6.36	58.5	182	0.25	1,260
Interest Rate (%)	1.95	2.29	1.37	0.08	9.00
Maturity Length (days)	379	366	50	49	411
	Frequency		**Percent**	**Cumulative Percent**	
Forms of Notes					
Tax and Revenue Anticipation Notes (TRANs)	206		98.56	98.56	
Tax Anticipation Notes (TANs)	2		0.96	99.52	
Revenue Anticipation Notes (RANs)	1		0.48	100	
Repayment Sources					
General Fund Revenues	205		98.09	98.09	
Property Tax Revenues	3		1.44	99.53	
Intergovernmental Transfers	1		0.48	100.00	
Sales Types					
Competitive Sales	48		22.97	22.97	
Negotiated Sales	161		77.03	100.00	
Interest Types					
Net Interest Costs (NIC)	135		64.59	64.59	
True Interest Costs (TIC)	69		33.01	97.61	
Variable Interest Rates	5		2.39	100.00	

4.5.2 Does Financial Slack Reduce Municipal Short-Term Borrowing?

The modified pecking order theory predicts that managers prefer internal funds to external funds, and hence financial slack might reduce a city's need of short-term borrowing. I use a Heckman selection model to examine the impact of beginning-of-year financial slack on municipal cash flow note issuance. All coefficients are robust estimators obtained by using the cluster option that specifies to which group (i.e. city) each observation belongs to. This cluster option relaxes the usual requirement of independent observations—observations are independent across groups (clusters) but not necessary within groups. Table 11 reports the Heckman estimators and the associated robust standard errors and z statistics.

The coefficients on beginning-of-year financial slack are negatively significant at both stages, suggesting that financial slack not only lowers a city's probability to issue cash management notes, but also reduces the principal amount of the notes issued in a fiscal year. The second stage coefficient on beginning-of-year financial slack shows that when UFB as percentage of total operating expenditures increases by 10 percentage points, the principal amount of notes as percentage of total general fund revenue decreases by 1.88 percentage points. Considering the mean average general fund of $41 million (or median average general fund revenue of $14.5 million) among California cities, the 1.88 percentage points drop in cash management notes equals about $770,800 decrease (or $261,000 decrease) in total principal amount of notes.

Table 11. Heckman Estimators on Notes Issuance

	Coefficient	**Robust Std. Err.**	**Z Statistics**
Second Stage			
Financial Slack (beginning of year)	-0.188**	0.083	-2.25
Intergovernmental Revenue	-0.020	0.112	-0.18
Revenue Diversification	-0.853	9.416	-0.09
Debt Burden	-0.003	0.003	-1.05
Debt Interest Expenses	0.587**	0.250	2.35
Salary Burden	0.360***	0.113	3.20
Note Interest Rate	-0.244	0.676	-0.36
Log of Population	0.752	1.141	0.66
Unemployment Rate	0.214	0.516	0.41
Note Index	1.426	1.130	1.26
First Stage (Selection Model)			
Financial Slack (beginning of year)	-0.022***	0.004	-5.17
Charter City	0.134	0.104	1.29
Intergovernmental Revenue	-0.001	0.009	-0.08
Revenue Diversification	-0.837	0.600	-1.39
Debt Burden	-0.000	0.000	-0.12
Debt Interest Expenses	0.031	0.020	1.58
Salary Burden	0.022***	0.007	3.23
Log of Population	0.248***	0.075	3.30
Unemployment Rate	-0.016	0.031	-0.51
Note Index	0.047	0.066	0.71
Number of Obs.	3,756		
Censored Obs.	3,574		
Uncensored Obs.	182		
Rho	0.964		
Sigma	11.476		
Lambda	11.062		
Wald Chi2(10)	38.61***		

Note: significance levels are indicated as * p < 0.10 ** p < 0.05 *** p < 0.01 (2-tailed)

The statistically significant coefficients on salary expenditures at both stages and the significant coefficient on debt interest expenditures at the second stage suggest that a city's salary payment burden and debt interest payment burden exert obvious positive influence on whether a city borrows short-term debt and how much it borrows. On average, when a city's salaries and wages paid to city employees as percentage of total operating expenditures increases by 10 percentage points, the principal amount of notes as percentage of total revenue rises by 3.6 percentage points. When a city's debt interest payment as percentage of total general fund operating expenditures increases by 10 percentage points, the principal amount of notes as percentage of total revenue rises by 5.9 percentage points. These findings provide evidence to support organization theorists' argument that greater share of non-discretionary expenditure categories restrict a city's financial management flexibility and thus increases its dependence on short-term borrowing.

The coefficient on the natural logarithm of population is positively significant only at the first stage, suggesting that larger cities are more likely to issue cash management notes, but the size of a city does not necessarily influence how much cash management notes it needs to issue. The coefficients on charter cities are not significant at either stage of Heckman estimation procedure. This suggests that issuing cash management notes is not a financial management choice specifically associated with charter cities. There is no obvious difference between charter cities and the general cities regarding using short-term borrowing to manage their cash flows.

4.6 Conclusion

This paper examines factors that affect municipal governments' short-term borrowing, regarding the probability and amount of cash management notes issuance. The finding that financial slack reduces a city's probability to issue notes and the principal amount of note issuance supports the modified pecking order theory's claim: when both internal financial resources (financial slack) and external financial resources (short-term borrowing) are available, government financial officers prefer internal financing to external financing. This study extends the application of pecking order theory from firms and nonprofit organizations to local governments. The conclusion that government financial officers also have a pecking order preference over public financial resources further indicates that the modified pecking order theory can be used to analyze government financial officers' decision making in public finance and financial management in future research.

The paper also finds that holding financial slack constant, non-discretionary spending categories such as debt interest burden and salary burden increase a city's dependence on short-term borrowing. This is because non-discretionary spending categories restrict financial managers' flexibility in managing financial resources. When confronted with financial challenges such as revenue shortfalls, municipal financial managers with fewer available resources on hand have to rely on short-term borrowing. This evidence supports Cyert and March (1963) and other organization theorists' claim that organizations exposed to more risk factors need more financial slack to hedge against potential risks and uncertainties. Results from this study thus explain why municipal governments accumulate financial slack, and to some extent, provide justification of

municipal financial slack accumulation as a financial management strategy. Revenue factors (i.e. intergovernmental revenue ratio and revenue diversification) do not appear to exert any significant influence on municipal short-term borrowing in this study.

In all, this study finds evidence to support both the modified pecking order theory's claim on managers' preference over financial resources and organization theory's slack-risk relationship. It improves our understanding of the roles of financial slack in local government finance. Financial slack plays more than a countercyclical expenditure stabilization role as discussed in Chapter Three of this dissertation and in a few other studies (Marlowe 2005; Wang 2015). It may also improve local governments' credit worthiness (Marlowe 2011). This study adds one more role of financial slack in local government financial management: it serves as a convenient cash management tool and reduces municipal governments' reliance on short-term borrowing. Yet there is still a tremendous gap in our understanding of local government slack accumulation, regarding the rationales, the optimal level, and the impacts. This analysis was limited to a single state. If data is available, future studies should examine local governments across states and take account of fiscal, political, managerial, organizational, and economic factors. Another limitation of this study is that it primarily examines the impacts of a city's fiscal structural factors on municipal government officials' preference over internal and external financial resources, without paying much attention to those political factors such as forms of government, political conservatism, and party affiliation. The fiscal policy space variable—charter city—captures some of the variations that political factors explain because charter cities have greater political authorities such as the freedom to choose forms of government, methods of election, voting requirements, and among

others. Nevertheless, this dummy variable cannot capture the nuance of impacts of particular political factors on municipal financial decision making. Future research should overcome this limitation.

4.7 References

Baskin, Jonathan. 1989. "An Empirical Investigation of the Pecking Order Hypothesis." *Financial Management* 18 (1): 26-35.

Bowman, Woods, Roland Calia, and Judd Metzgar. 1999. *Evaluating Local Government Financial Health: Municiapalities*. Chicago, IL: The Civic Federation.

Bowman, Woods. 2002. "The Uniqueness of Nonprofit Finance and the Decision to Borrow." *Nonprofit Management and Leadership* 12 (3): 293-311.

Calabrese, Thad D. 2011. "Testing Competing Capital Structure Theories of Nonprofit Organizations." *Public Budgeting & Finance* 31 (3): 119-43.

Carroll, Deborah A. 2009. "Diversifying Municipal Government Revenue Structures: Fiscal Illusion or Instability?" *Public Budgeting & Finance* 29 (1): 27-48.

Cyert, Richard M, and James G March. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

Denison, Dwight V. 2009. "Which Nonprofit Organizations Borrow?" *Public Budgeting & Finance* 29 (3): 110-23.

Federal Reserve Board of Governors. March 10, 2016. Z.1 Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomics Accounts. Fourth Quarter 2015. In *Board of Governors of the Federal Reserve System*. Washington DC: Federal Reserve Board of Governors.

Fitch Ratings. 2015. "Rating U.S. Public Finance Short-Term Debt." New York City, NY: Fitch Ratings Inc..

Gauthier, Stephen J. 2009, December. *GFOA Updates Best Practice on Fund Balance*. Chicago, IL: The Government Finance Officers Association.

Goyal, Vidhan K, and Murray Frank. 2008. "Tradeoff and Pecking Order Theories of Debt." In *Handbook of Corporate Finance: Empirical Corporate Finance,* edited by Espen Eckbo, 135-202. Amsterdam: North-Holland Publishing.

Heckman, James J. 1979. "Sample Selection Bias as a Specification Error." *Econometrica: Journal of the Econometric Society* 47 (1): 153-61.

Hendrick, Rebecca. 2006. "The Role of Slack in Local Government Finances." *Public Budgeting & Finance* 26 (1): 14-46.

Hendrick, Rebecca, and Jared Crawford. 2014. "Municipal Fiscal Policy Space and Fiscal Structure: Tools for Managing Spending Volatility." *Public Budgeting & Finance* 34 (3): 24-50.

Hildreth, W Bartley, and C Zorn. 2005. "The Evolution of the State and Local Government Municipal Debt Market over the Past Quarter Century." *Public Budgeting & Finance* 25 (4): 127-53.

Hoene, Christopher 2004. "Fiscal Structure and the Post-Proposition 13 Fiscal Regime in California's Cities." *Public Budgeting & Finance* 24 (2): 51-72.

Hoene, Christopher W. 2009, December. *City Budget Shortfalls and Responses: Projections for 2010-2012.* Washington, D.C.: National League of Cities. Accessed on September 19, 2015. *http://www.awcnet.org/documents/NLCBudgetShortFallsResponsesResearchBrief.pdf*.

Joyce, Philip 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 & Finance* 21 (2): 62-87.

Leary, Mark T, and Michael R Roberts. 2004. "Financial Slack and Tests of the Pecking Order's Financing Hierarchy." Unpublished working paper, Duke University.

Leary, Mark T, and Michael R Roberts. 2010. "The Pecking Order, Debt Capacity, and Information Asymmetry." *Journal of Financial Economics* 95 (3): 332-55.

Lemmon, Michael L, and Jaime F Zender. 2010. "Debt Capacity and Tests of Capital Structure Theories." *Journal of Financial and Quantitative Analysis* 45 (5): 1161-87.

Levinthal, Daniel, and James G March. 1981. "A Model of Adaptive Organizational Search." *Journal of Economic Behavior and Organization* 2 (4): 307-33.

Marlowe, Justin. 2005. "Fiscal Slack and Counter-Cyclical Expenditure Stabilization: A First Look at the Local Level." *Public Budgeting & Finance* 25 (3): 48-72.

Marlowe, Justin. 2011. "Beyond 5 Percent: Optimal Municipal Slack Resources and Credit Ratings." *Public Budgeting & Finance* 31 (4): 93-108.

Marlowe, Justin. 2012. "Fiscal Slack, Reserves, and Rainy-Day Funds". In *Handbook of Local Government Fiscal Health*, edited by Helisse Levine, Jonathan B Justice and Eric A Scorsone, 321-41. Burlington, MA: Jones & Bartlett Learning.

Modigliani, Franco, and Merton H Miller. 1958. "The Cost of Capital, Corporation Finance and the Theory of Investment." *The American Economic Review* 48 (3): 261-97.

Moe, Terry M. 1984. "The New Economics of Organization." *American Journal of Political Science* 28 no. 4 (November):739-77.

Myers, Stewart C, and Nicholas S Majluf. 1984. "Corporate Financing and Investment Decisions when Firms Have Information that Investors Do Not Have." *Journal of Financial Economics* 13 (2): 187-221.

Myers, Stewart C. 1984. "The Capital Structure Puzzle." *The Journal Of Finance* 39 (3): 574-92.

Myers, Stewart C. 2003. "Financing of Corporations." In *Handbook of the Economics of Finance*, edited by George M. Constantinides, M. Harris and Rene M. Stulz, 215-53. Amsterdam: North Holland Publishing.

Pagano, Michael A, and Christopher Hoene. 2010. "States and the Fiscal Policy Space of Cities." In *The Property Tax and Local Autonomy*, edited by Michael Bell, David Brunori and Joan Youngman, 243-84. Cambridge, MA: Lincoln Institute of Land Policy.

Shires, Michael A., and M. Shires. 1999. *Patterns in California Government Revenues since Proposition 13*. San Francisco, CA: Public Policy Institute of California.

Shyam-Sunder, Lakshmi, and Stewart C. Myers. 1999. "Testing Static Tradeoff against Pecking Order Models of Capital Structure." *Journal of Financial Economics* 51 (2): 219-44.

Titman, Sheridan, and Roberto Wessels. 1988. "The Determinants of Capital Structure Choice." *The Journal of Finance* 43 (1): 1-19.

Trogen, Paul C. 2000. "Uncovering Patterns of State Short-Term Debt Financing." *Journal of Public Budgeting, Accounting & Financial Management* 12 (3): 370-98.

Wang, Wen. 2015. "The Great Recession and the Use of Fund Balances in North Carolina Counties." In *Local Government Budget Stabilization*, edited by Yilin Hou, 17-32. New York, NY: Springer.

Yan, Wenli, Dwight V Denison, and John S Butler. 2009. "Revenue Structure and Nonprofit Borrowing." *Public Finance Review* 37 (1): 47-67.

CHAPTER 5

CONCLUSION

5.1 Summary of the Dissertation

In this dissertation, I explore the role of financial slack in municipal finance. The subject of study is of significant importance and policy relevance because municipal governments are the layer of governments that are closest to citizens. In the past decade, American cities have experienced an economic peak in 2007, an economic recession between late 2007 and 2009, and economic recovery from 2010. During this turbulent economic time, how cities managed their finances directly shape the outcomes of public goods and service provision that matters to people's daily life. In the management literature, organization theorists posit that financial slack increases an organization's capacity in absorbing internal and external shocks. It offers managers more discretion to respond to uncertainty. In the turbulent economic time when government officials face more uncertainty in managing their cities' revenues and expenditures, what roles does financial slack play in municipal financial management?

Prior studies on how financial slack affects government management primarily focus on financial slack's expenditure stabilization role in state governments. Findings from these studies have reached a relatively consistent conclusion that financial slack has a counter-cyclical stabilization effect on state expenditures. Studies on financial slack's role in local governments are much scarce. The majority of these studies also focus on financial slack's expenditure stabilization role, but findings from these studies are mixed. Some find that financial slack stabilizes local expenditures (Marlowe 2005; Wang 2015), others do not find such effect (Hendrick 2006; Wang and Hou 2012). Almost all these

studies at the local level use samples of cities (or counties) in one state or a particular metropolitan area. Results from these studies have relatively low external validity. This dissertation addresses the limitations in the current research on financial slack in municipal finance.

The revenue chapter investigates whether tax revenue volatility contributes to municipal financial slack accumulation. Based on a nationwide sample of cities, I use a dynamic panel analysis approach to conduct the empirical analysis. I find that tax revenue volatility as a risk factor increases a city's financial slack level. In addition to this, other risk factors in a city's fiscal system such as non-discretionary expenditure categories also contribute to municipal financial slack accumulation. These findings provide evidence to support organization theory's risk-slack hypothesis. This chapter also provides important descriptive information that improves our current understanding of financial slack accumulation by American cities. It presents the national average municipal financial slack level, the pro-cyclical trend of slack accumulation over the course of the business cycles, and the regional differences in financial slack accumulation. The information presents an overall picture of financial slack accumulation by American cities, providing a basis for further assessment of financial slack's roles in municipal finance.

The expenditure chapter examines whether financial slack stabilizes municipal expenditures. Different from prior studies that focus on beginning-of-year financial slack's expenditure stabilization role in economic booms and busts, I examine this question by looking at how the year-to-year change in financial slack affects the year-to-year change in municipal expenditures. Results suggest that financial slack absorbs additional revenues when there is a revenue surplus and it release financial resources

when there is a revenue shortfall. Changes in financial slack always counteract changes in expenditures, thus financial slack smooths expenditure fluctuations. This study shifts the research attention on financial slack from the macro perspective to a relatively micro perspective. It dissects the mechanism of financial slack's expenditure stabilization role in municipal finance. Results from this study complement prior studies on financial slack's counter-cyclical expenditure stabilization.

The municipal securities chapter explores whether financial slack reduces municipal short-term borrowing. Based on a sample of California cities, I use a Heckman selection model to examine municipal governments' preference over internal financial resources (i.e. financial slack) and external financial resources (i.e. short-term borrowing). Results show that financial slack reduces both the probability municipal governments issue notes and the amount of notes issuance, suggesting that municipal governments prefer internal financial resources to external financial resources. This finding provides evidence to support the modified pecking order theory that governments, like firms and nonprofit organizations, also have a preference ranking over internal and external financial resources. This chapter is the first-known study that tests the application of the modified pecking order theory from firms and nonprofit organizations to local governments.

In summary, this dissertation is a comprehensive examination of municipal financial slack, exploring both the determinants of financial slack accumulation and the impacts of financial slack on municipal financial management. It covers three primary subfields in municipal finance, namely, municipal revenues, municipal expenditures, and municipal securities. Results from this dissertation complement prior studies on

government financial slack, provide evidence to support some known theories, and extend the application of theories in the government context. The next section discusses the innovations and contributions of this dissertation.

5.2 Innovations and Contributions

5.2.1 Innovations

This dissertation is built on theories in a variety of fields. I draw theories from the management literature, corporate and nonprofit finance, economics, and public finance, and apply them to municipal governments. At the initial dissertation design stage, I interviewed practitioners and researchers with experience in local government finance. These interviews and discussions provide a foundation to assess financial slack's roles in municipal finance. Based on theories and practitioners' perspectives, this dissertation goes beyond the conventional research focus—financial slack's expenditure stabilization role. This dissertation explores both the determinants of municipal financial slack accumulation and the impacts of financial slack on municipal financial performance and decision-making.

I obtain information from a variety of sources, including the accounting information from CAFRs, the revenue, expenditure, and debt information from the Census Bureau, and the social economic information from various government agencies and research institutes' websites. I combine the information of various sources and create a nationwide sample of cities. The nationwide sample of cities provides a venue to observe the overall picture of financial slack accumulation by American cities. It also significantly improves the external validity of the findings compared to prior studies.

In each chapter, I carefully choose an appropriate research design and analytical strategy based on the research question and the features of data structures. For example, in the revenue chapter, I use a dynamic panel data analysis approach to address the persistency of the dependent variable; in the expenditure chapter, I use the first-differenced equation model to examine how changes in the independent variable affect the changes in the dependent variable; and in the municipal securities chapter, I use a Heckman selection model to overcome the selection bias problem. The choice of appropriate analytical strategies together with rigorous statistical checks guarantees the robustness and reliability of results.

I attempt to approach the research questions from new perspectives rather than simply follow other scholars' research designs in prior studies. For example, in the expenditure chapter, I shift the research focus from financial slack's expenditure stabilization effects in the business cycles to its stabilization effects on the year-to-year expenditure adjustments. I also attempt to apply theories and hypotheses in other fields to the context of municipal governments. For example, in the securities chapter, I apply the modified pecking order theory which is often used in the studies of firms and nonprofit organizations' capital structures to the analysis of municipal governments' preference on internal and external financial resources. These attempts lead to research findings that provide new perspectives to our understanding of financial slack's roles in municipal finance.

5.2.2 Contributions

Theoretical Contributions

This dissertation improves our current understanding of financial slack beyond the 'five percent' rule of thumb and the GFOA's recommended best practice. It provides empirical evidence that a municipal government that faces more risk factors tend to accumulate more financial slack. Although this dissertation does not find a formula to assess the 'appropriate' financial slack level for individual cities, I believe these findings provide some insight for future studies that dedicate to this research goal. Results from this dissertation support Cyert and March (1963) and other organization theorists' risk-slack hypothesis: financial slack improves an organization's capacity in respond to risks and uncertainties, thus an organization that faces more risk factors accumulate more financial slack. This finding suggests that municipal government officials accumulate financial slack to prepare for future uncertainties. It improves our understanding of government saving beyond public choice scholars' assumption that governments are slack-maximizing bureaucracies. Government financial slack accumulation is driven by government officials' intention to increase management capacity against future risks and uncertainties. This finding helps us to better understand government financial resources allocation between spending and saving.

This dissertation also improves our understanding of the roles of financial slack in local government finance. Financial slack is not just a convenient tool to management expenditure fluctuations, it also affects government credit ratings (Marlowe 2011), cash flow management, and short-term borrowing. Financial slack may have other roles in

local government finance awaiting researchers to explore. This dissertation pushes towards that research direction.

Policy Implications

Besides the theoretical contributions, this dissertation carries valuable policy implications in threefold. For municipal government officials, this dissertation provides information of the national and regional average municipal financial slack levels which help them to compare their cities financial slack levels with their peers. The findings that risk factors affect municipal financial slack accumulation further help local officials to assess the appropriateness of their cities' financial slack level and decide their cities' needs in financial slack accumulation. The findings that financial slack stabilizes municipal expenditures and reduces municipal short-term borrowing inform municipal government officials that financial slack is a convenient tool to manage expenditure volatility and cash flows if not considering the intergenerational equity issue of the taxpayers.

For state policy makers, this dissertation delivers a message that when making policies to guide local fiscal practices, state policy makers should realize the importance of financial slack in municipal finance. Most state governments use financial slack to stabilize budgets and expenditures. Almost all state governments have established a formal fund for this purpose. However, some state governments prohibit their local governments from establishing or operating a formal stabilization fund. Some state governments impose caps on the size of local general fund balance. These policies help

state governments to better monitor and control local fiscal practices, but they also limit the roles of financial slack in local financial management.

For citizens, this dissertation may help them better understand their local governments' financial choices and decisions. Governments are not the leviathans that by nature desire to accumulate slack. Government financial slack accumulation is partially driven by government officials' intention to increase management capacity to respond to future risks and uncertainties. In addition to a cushion against risks, financial slack is also a convenient tool for government officials to manage expenditures and cash flows because the use of UFB is under their discretion. I expect these findings provide citizens another perspective to assess their local governments' saving behavior and help them make informed decisions when they need to vote for any amendment such as California's Proposition 13.

5.3 Limitations and Future Research Directions

This dissertation takes an organizational perspective and examines how financial slack helps government officials manage municipal finances. It does not examine the costs associated with financial slack accumulation. One such cost is the opportunity cost. Holding valuable financial resources as financial slack increases municipal governments' capacity in coping with potential risks in the future, but at the same time, municipal governments lose the chance to use these resources to address current issues if there are any. This reflects the tradeoff between increasing future capacity and addressing current needs. Other costs include inefficiency, satisficing, and agency problems concerned by public choice scholars. Researchers have found that nonprofits with large endowments tend to show agency problems between managers and donors. Many of such nonprofits

pay higher salaries to their managers and spend less on programs (Core, Guay, and Verdi 2006). Do municipal governments with more financial slack also pay more to elected officials (e.g. mayors, city managers, chief financial officers, etc.) or have greater administrative costs? This dissertation examines the *effectiveness* of financial slack as a management tool in municipal finance, but it does not address the *efficiency* problem. Without a full assessment of costs and benefits, effectiveness and efficiency, I cannot make a strong policy recommendation that financial slack is a *good* management tool for local governments. This is the limitation of this dissertation, but it also indicates the great research potential of local government financial slack in the future.

Another limitation of the dissertation is the lack of political factors. Most prior studies on municipal financial slack incorporate more or less political factors, and researchers find that some political factors such as forms of government and political conservatism have significant impacts on local financial performance and decision making (Hendrick, 2006; Marlowe, 2005). All of these studies that incorporate political factors as control variables analyze samples of cities in one state or one metropolitan area. For a study that uses a nationwide sample of cities, it is quite challenging to incorporate political factors due to lack of data. Adding the state-level aggregated political factors to the models does not address this issue well because the state-level aggregated variables cannot capture the variations of impacts imposed by these political factors on individual cities. Nevertheless, the lack of political factors does not bias the empirical estimations because the generalized methods-of-moment model and the first-differenced equation model both remove the time-invariant factors of each individual cities. Most of the political factors (e.g. forms of government, political conservatism, etc.)

can be considered as roughly time-invariant during a nine-year period. Despite there is not much concern on estimation bias due to lack of political factors, future studies should still attempt to incorporate possible political factors so that we will be able to observe how a particular political factor affects municipal governments' financial slack accumulation and financial decision making.

This dissertation reveals that financial slack is not just an expenditure stabilization tool. It plays a lot more roles in municipal finance yet to be explored. Marlowe (2011) sets a good example by studying how financial slack affects local governments' credit ratings. This dissertation also demonstrates an intention to explore financial slack's complex roles. To improve our understanding of financial slack and to make it an effective and efficient policy tools, future studies should follow this path to explore the various roles financial slack plays in local government finance, anticipated and unanticipated, positive and negative.

5.4 References

Core, John E, Wayne R Guay, and Rodrigo S Verdi. 2006. "Agency Problems of Excess Endowment Holdings in Not-for-Profit Firms." *Journal of Accounting and Economics* 41 (3): 307-33.

Cyert, Richard M, and James G March. 1963. *A Behavioral Theory of the Firm*. Englewood Cliffs, NJ: Prentice-Hall.

Hendrick, Rebecca. 2006. "The Role of Slack in Local Government Finances." *Public Budgeting & Finance* 26 (1): 14-46.

Marlowe, Justin. 2005. "Fiscal Slack and Counter-Cyclical Expenditure Stabilization: A First Look at the Local Level." *Public Budgeting & Finance* 25 (3): 48-72.

Marlowe, Justin. 2011. "Beyond 5 Percent: Optimal Municipal Slack Resources and Credit Ratings." *Public Budgeting & Finance* 31 (4): 93-108.

Wang, Wen, and Yilin Hou. 2012. "Do Local Governments Save and Spend across Budget Cycles? Evidence from North Carolina." *The American Review of Public Administration* 42 (2): 152-169.

Wang, Wen. 2015. "The Great Recession and the Use of Fund Balances in North Carolina Counties." In *Local Government Budget Stabilization*, edited by Yilin Hou, 17-32. New York, NY: Springer.