

ABSTRACT

REITANO, VINCENT CARL. Fiscal Stabilization in Local Governments. (Under the direction of Dr. Bruce McDonald, III, and Dr. Thomas Birkland).

As a critical function of local government, fiscal stabilization is a continuous process involving the accumulation and allocation of fiscal savings to mitigate financial uncertainty and maintain service provision. From the perspective of an economist or public finance scholar, fiscal stabilization is the flow of funds from savings to expenditures. In contrast, an organizational theorist would deem fiscal savings as a type of slack resource which creates conflict between stakeholders. This multi-article dissertation examines these competing perspectives, to advance theory and methodological approaches in fiscal stabilization research. The first paper develops and tests an open systems model, which provides evidence that fiscal stabilization of expenditures is a function of conflicting stakeholder views. In the second paper, the intergovernmental dimensions of fiscal stabilization are examined, demonstrating that special purpose local governments saved a quarter of their federal stabilization funds in discretionary savings accounts during the Great Recession to prepare for future financial uncertainty. The third paper provides exploratory evidence illustrating that various econometric research methods used in stabilization research produce different results in the identification of the business cycle. Collectively, these findings indicate that academic research on fiscal stabilization deviates from practices and research methods promulgated by professional organizations and practitioners in the field.

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Fiscal Stabilization in Local Governments

by
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DEDICATION

To my parents

BIOGRAPHY

Vincent Reitano earned his BBA in 2012 and MPA in 2014 from Villanova University. Given his interest in applying statistical methodology to the public sector, he interned and subsequently worked with both the Department of Homeland Security and Department of Defense. These formative professional experiences, combined with a love of philosophy, compelled him to pursue a PhD at North Carolina State University. His research specializes in public budgeting and financial management, and is published in a variety of journals, including the *American Review of Public Administration*, *Public Budgeting & Finance*, *Public Finance Review*, and *Contemporary Economic Policy*, among others.

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Chapter 1

Introduction

1.1 Introduction to Fiscal Stabilization

Fiscal stabilization occurs when a government accumulates savings during an economic upturn and then expends the savings to counteract an economic downturn (Hou, 2003; Marlowe, 2005). The use of savings during a downturn is a critical aspect of stabilization, since it creates slack in the budget, which can be used to reduce expenditure gaps (Hendrick, 2006; Marlowe, 2005). The availability of slack during an economic downturn also provides a government with greater flexibility in decision-making, and ensures the maintenance of public service provision to constituents (Stewart, 2009; Stewart, Phillips, and Modlin, 2013). Given these benefits, fiscal stabilization has become a key aspect of local government financial management, which fosters long-term fiscal sustainability (Kavanagh, 2007).

The use of fiscal savings is widespread across state and local governments in the United States (Gauthier, 2009; NASBO, 2013). Forty six states hold fiscal savings in a budget stabilization fund [BSF] (Pew Charitable Trusts, 2015). A BSF has institutional rules dictating the deposit and withdrawal of funds (Hou, 2003, 2004). These rules do not apply to the account local governments use to hold fiscal savings, which is unassigned fund balance [UFB] (Hendrick, 2004, 2006; Marlowe, 2005). The lack of deposit and withdrawal rules provides local governments with autonomy in how they accumulate and allocate fiscal savings in UFB (Arapis and Reitano, Forthcoming; Marlowe, 2005; Wang and Hou, 2012).

Given the budgetary autonomy UFB provides, it is considered it to be one of the most interesting aspects of the budget, and a critical component of fiscal stabilization policy (Gauthier, 2009). Fiscal stabilization is typically studied from two perspectives: (1) Financial

management strategies which can be used to accumulate UFB; and, (2) How UFB can be used to reduce budgetary uncertainty, such as expenditure gaps (see Hendrick, 2006; Hendrick and Crawford, 2014). These two strands of literature on local government fiscal stabilization originate from stabilization theory developed in Musgrave (1959) and Gramlich (1991), and are detailed in the next section (Hou, 2013).

1.2 Literature on Fiscal Stabilization

Musgrave (1959) identifies three functions of government in *The Theory of Public Finance*, which are stabilization, distribution, and allocation. Stabilization is a government policy which serves as a response to business cycle fluctuations (Musgrave, 1959). The stabilization function of government, however, is distinct from the distribution of wealth and allocation of government resources (Musgrave, 1959). These distinct public finance functions were assumed to occur in a central government, rather than a subnational government (Musgrave, 1959; Oates, 1968). Research from public finance scholars, however, showed that stabilization also occurs in subnational governments (Gramlich, 1987, 1991; Rafuse, 1965). Analysis of aggregate time-series data demonstrated that state and local government revenues and expenditures are responsive to the business cycle, providing evidence of stabilization (Gramlich, 1987, 1991; Rafuse, 1965). For example, expenditures increased during economic upturns but decreased during economic downturns in the United States from 1955 to 1990, which shows that subnational governments are involved in stabilization (Gramlich, 1991).

Evidence of stabilization led Gramlich (1991) to reexamine three perspectives on subnational budgeting: neutrality, stability, and perversity. Neutrality indicates that a

government is not involved in stabilization over the business cycle, which aligns with Musgrave (1959). In contrast, stability is when a government is involved in countercyclical stabilization over fluctuations in the business cycle (Bahl, 1984; Gramlich, 1987, 1991; Rafuse, 1965). A hybrid of neutrality and stability is perversity, which is when a government balances its budget annually but is unresponsive to the business cycle (Gramlich, 1991). Since time-series analysis of revenues and expenditures supports that subnational governments were not neutral but involved in stabilization, Gramlich (1991) concludes that “the consensus that has developed around the conventional neutrality view...can be faulted” (p. 271).

Gramlich (1991) provided a foundation for research on subnational fiscal stabilization. The early literature on local government fiscal stabilization challenged the view of neutrality, and argued that subnational governments were involved in stabilization (Tyer, 1993; Vasche and Williams, 1987; Wolkoff, 1987). Due to increasing decentralization and the benefits of stabilization for government sustainability and service provision, the literature developed strategies to accumulate fiscal savings in UFB, which could be used to pursue stabilization (Hou, 2003; Nelson, 1990; Tyer, 1993). As part of the first stand of fiscal stabilization research, these strategies include revenue underestimation, expenditure overestimation, planning for accumulating reserves, and a combination of the three strategies (Tyer, 1993). The literature focuses on revenue strategies to plan for and accumulate UFB, a slack resource for fiscal stabilization (Hendrick, 2004, 2006; Shelton, Tyer, and Hembree 1999). For example, revenue from property taxes and sales taxes can be used to accumulate UFB (Arapis and Reitano, Forthcoming; Hendrick, 2004, 2006; Stewart, 2009).

Alternatively, enterprise transfer funds provide budgetary slack, and serve as a substitute to accumulating funds for stabilization in UFB (Arapis and Reitano, Forthcoming; Hendrick, 2004, 2006; Shelton et al., 1999).

The first strand of the literature develops strategies related to the accumulation of UFB, while the second strand examines if UFB can stabilize expenditures during economic downturns (Hou, 2003; Marlowe, 2005; Wang and Hou, 2012). Marlowe (2005) conducts the initial study of the countercyclical relationship between UFB and expenditure reductions (Hou, 2013, 2015). Analysis of 103 Minnesota municipalities from 1990 to 2003 with a linear trend model is unable to establish statistically significant evidence that they are using UFB to reduce expenditure gaps (Marlowe, 2005). The lack of evidence in Marlowe (2005) challenges the stabilization function of government, and instead supports the view of neutrality (Gramlich, 1991). Evidence for neutrality is also shown in a study of North Carolina Counties from 1900 to 2007 (Wang and Hou, 2012). The finding of neutrality, however, conflicts with the Government Finance Officers Association [GFOA]. The GFOA (2015) states that local governments use UFB to address financial uncertainty, such as expenditure gaps during economic downturns. This divergence of findings between Marlowe (2005), Wang and Hou (2012), and the GFOA (2015) may stem from theoretical and methodological concerns noted in the literature.

In regard to theory, Marlowe (2005) and Wang and Hou (2012) give little consideration to how environmental and institutional factors may affect the allocation of UFB to pursue stabilization. Not including these external factors conflicts with evidence that stabilization is a function of the external environment, which may lead to invalid model

specification and consequently bias model estimates (Gianakis and Snow, 2007; Hendrick, 2006; Rose and Smith, 2011; Stewart, 2009). Additionally, the use of a linear trend model does not capture the short-run trend and long-run cyclical component of the business cycle, which may invalidate results (Wagner and Elder, 2005). Collectively, these concerns reflect the "tremendous gap" in fiscal stabilization research theory and methodology, which is discussed in the next section (Hendrick, 2006, p. 43).

1.3 Status of Fiscal Stabilization Research

There are three limitations in the fiscal stabilization literature. First, from a theoretical perspective, researchers have argued that greater emphasis should be placed on the institutional, political, and ethical dimensions of fiscal stabilization (Hendrick, 2006; Rose and Smith, 2011; Snow, Gianakis, and Haughton, 2015; Stewart, Hildreth, and Antwi-Boasiako, 2015). Second, there is no consensus on an optimal method to capture the business cycle when studying fiscal stabilization, and little empirical validation of existing methods (Wagner and Elder, 2005, 2007). Third, fiscal stabilization research has focused on general purpose governments, rather than special purpose governments, which is problematic given that results may not be generalizable due to institutional differences (Duncombe and Hou, 2014; Hendrick, 2006). Collectively, the literature on fiscal stabilization has limitations regarding the application of theory and use of different statistical methods (Hendrick, 2006; Wagner and Elder, 2005, 2007).

The first limitation in the literature is related to the use of theory. Stewart et al. (2015) state that fiscal stabilization research does not consider the institutional, political, and ethical dimensions of local government decision-making, which can be potentially be attributed to

disciplinary differences between researchers. From the perspective of an economist or public finance scholar, which underlies much of the literature, fiscal stabilization is the flow of savings from UFB to expenditures to counteract an economic downturn (Hou, 2003; Marlowe, 2005; Wagner and Elder, 2005, 2007). In contrast, organizational theory would argue that the flow of fiscal savings, as a form of slack resources, creates goal conflict between stakeholders, in which they vie for access to the funds (Cyert and March, 1963; Hendrick, 2004, 2006; Rose and Smith, 2011).

The way that economists and public finance scholars model fiscal stabilization does not account for the underlying factors that may drive the accumulation and allocation of fiscal savings from organizational theory (Hendrick, 2006; Rose and Smith, 2011). For example, Arapis et al. (Forthcoming) argue that the literature has yet to consider the tradeoffs between fiscal stabilization and cutback management. Specifically, Levine (1978; 1979) considers that during an economic downturn, governments must weigh potential strategies to mitigate the effects of cutbacks on constituents, which requires consideration of equity when allocating fiscal savings and pursuing related stabilization strategies. Additionally, Rose and Smith (2011) challenge a strictly economic view of stabilization, instead stating "the availability of surplus funds often triggers political pressure for tax cuts and spending increases," or that the flow of UFB is not only tied to economic cycles as considered in stabilization theory (p. 187). Therefore, UFB is not only a countercyclical tool as considered by economists or public finance scholars, but is also related to political and institutional pressures (Rose and Smith, 2011; Stewart et al., 2015).

The role of political and institutional pressures is discussed in an annual report from the National Association of State Budget Officers (NASBO). The report states that fiscal savings "mean different things to different stakeholders," indicating that a strictly economic view does not completely characterize stabilization decision-making (p. 12). Decision-makers in government are not only motivated by the desire to pursue countercyclical stabilization of expenditures over the business cycle, but also "pressure" from external stakeholders (NASBO, 2013, p. 12).

The notion of external pressures driving fiscal stabilization is not without theoretical support. Hirschman (1970) demonstrates that stakeholders have the option to voice their concerns to a service provider, such as a government, which is noted by NASBO (2013). Additionally, organizational theory predicts that goal conflict will arise from the use of slack resources, such as stabilization funds (Cyert and March, 1963). Slack is allocated on a discretionary basis to "buffer against bad times," which can lead to conflict between internal and external stakeholders regarding the equity of its allocation to different expenditure categories (Cyert and March, 1963, p. 54).

Not incorporating organizational theory can lead to an incomplete account of how local governments pursue fiscal stabilization (Hendrick, 2006). It may also translate into the development of models which do not reflect the mechanism by which stabilization decisions occur (Stewart et al., 2015). For example, fiscal stabilization studied from an economic perspective would not incorporate theory on goal conflict to explain and model the allocation of UFB (Hendrick, 2006). This theoretical omission may bias statistical models estimating

the relationship between UFB and expenditure gaps at the local level, leading to invalid conclusions and recommendations for policymakers (Hendrick, 2006).

In addition to the gap in theory, a second limitation in the fiscal stabilization literature concerns research methodology. The literature has debated which method is most appropriate to isolate the short-run trend and long-run cyclical component of the business cycle, a critical step in fiscal stabilization research (Hou, 2003; Wagner and Elder, 2005). Utilizing an invalid research method to capture the business cycle may lead to bias in fiscal stabilization research, which can result in unsubstantiated recommendations for policymakers (Wagner and Elder, 2007).

Despite the potential for invalid conclusions, researchers have rarely validated their selected research methods. For example, Sobel and Holcombe (1996) and Douglas and Gaddie (2002) do not test the robustness of their additive fiscal stress measure across multiple business cycles, and only focus their analysis on one recession. The lack of a robustness tests does little to show if the measure is consistently capturing upturns and downturns in the business cycle, which is assumed in their fiscal stress model (Hou, 2003). Additionally, the additive measure only captures the short-run trend of the business cycle, which can lead to statistically different results based on the selected time period (Cirincione et al., 1999; Hou, 2003; Marlowe, 2005). In response, Hou (2003) develops a linear trend model to capture the business cycle, but also does little to validate the method. The only test Hou (2003) conducts is graphical analysis, which actually shows spurious identification of the business cycle during downturns across different states, an unacknowledged limitation.

Due to concerns with the additive measure developed by Sobel and Holcombe (1996), and linear trend in Hou (2003), Wagner and Elder (2005) argue for using econometric filters to extract the business cycle in fiscal stabilization research. These methods are developed to capture fluctuations in the business cycle (Hodrick and Prescott, 1997). Wagner and Elder (2005), however, do not substantiate the use of their method, and rely on graphical analysis of trends over time rather than conducting robustness checks.

Therefore, research applying the three methods has not conducted comparative analysis of which method performs the best when extracting the business cycle. Papers utilizing the three methods have only used graphical models, rather than conducting robustness checks (Wagner and Elder, 2007). This leaves a gap in the literature regarding which method can consistently extract upturns and downturns in the business cycle, to ensure unbiased estimates of the countercyclical stabilization of expenditures with UFB (Elder and Wagner, 2013; Hodrick and Prescott, 1997; Wagner and Elder, 2005, 2007)

A third limitation is the generalizability of fiscal stabilization literature, with respect to institutional context. While reviewing research on fiscal stabilization, Duncombe and Hou (2014) argue that it focuses on general purpose governments, rather than special purpose governments. Given the differences between the two types of governments, research on general purpose governments may not be generalizable to special purpose governments. For example, Hendrick (2006) shows that general purpose governments diversify revenues to reduce reliance on fiscal savings in UFB; however, this research finding may not be directly applicable to special purpose governments, given their inability to diversify revenues (Duncombe and Hou, 2014). The distinct context between types of local governments creates

a gap in the literature, and also does little to inform practitioners in special purpose governments of best practices (Arapis et al., Forthcoming; Duncombe and Hou, 2014).

1.4 Contributions to Literature

To advance the literature on fiscal stabilization, this dissertation addresses each of the three limitations discussed above. The first paper develops a theoretical framework in which fiscal stabilization funds are selectively allocated, contingent upon the interests of stakeholders internal and external to the organization (Hendrick, 2006; Nelson and Balu, 2014). This reflects theory from Hirschman (1970) regarding the voice option to express dissatisfaction with service provision, as well as the potential goal conflict that may arise from slack resources such as UFB (Cyert and March, 1963). The open systems model developed in the first paper contrasts with economic models in Elder and Wagner (2013), Hou (2003), and Wagner and Elder (2005; 2007), which assume stabilization is only due to economic variables.

Estimating the model provides evidence that school districts are selectively allocating UFB to particular expenditure categories through the Great Recession. There is indication of selective allocation stemming from the internal preferences of decision-makers, leading to goal conflict, in which UFB is used for administrative expenditures over educational service provision for students. Incorporating organizational theory into fiscal stabilization research shows that the utilization of UFB has a normative dimension due to goal conflict, rather than being a strictly economic function (Cyert and March, 1963). The conclusion that UFB has a normative dimension provides empirical support for the arguments in Hendrick (2006), Stewart et al. (2015), and NASBO (2013).

The second paper in the dissertation also advances theory on fiscal stabilization with respect to intergovernmental stabilization funds. The paper focuses on the intergovernmental dimensions of fiscal stabilization, by examining how budget stabilization funds from the federal American Recovery and Reinvestment Act (ARRA) changed school district stabilization behavior. Over \$100 billion dollars in ARRA funding was allocated to school districts, but there remains little understanding of where these funds were allocated (Cogan and Taylor, 2012).

To advance theory on fiscal stabilization, the paper develops and tests a decision framework for how stabilization funds from ARRA were utilized in school districts. Three options are considered: using the funds for teacher salaries and benefits as intended by ARRA, equally distributing funds across all expenditure categories, or allocating the funds to particular categories and saving funds in UFB for future use. These choices reflect the conflicting stabilization decisions among which governments must choose when facing a shock such as a recession (Duncombe and Hou, 2014; Levine, 1978, 1979).

Estimation of two-way fixed effects models reveals that competing preferences and conflicts between decision-makers in government influenced the use of ARRA funds. On average, each dollar increase in ARRA was associated with a 0.57 cent increase in personnel salaries. Additionally, .25 cents of each ARRA dollar was allocated to UFB. This finding shows that the intention of ARRA from federal policymakers was not upheld, since all of the money was not allocated to stabilizing teachers (Center on Education Policy, 2012; Cogan and Taylor, 2012). Instead of using all the funds to be distributed to teacher salaries, school districts saved a quarter of each dollar to prepare for future contingencies (Arapis et al.,

Forthcoming). The decision to save ARRA funds provides evidence of goal conflict between federal policymakers and school district budgeters, with respect to how intergovernmental transfers were used by school districts during an economic downturn (Cyert and March, 1963; Levine, 1978, 1979).

The third paper addresses methodological limitations in fiscal stabilization research. It compares the performance of three methods in fiscal stabilization research to identify upturns and downturns in the business cycle. To do so, the paper applies a panel of Florida counties from 1980 to 2012 (McDonald, 2015; McDonald and Gabrini, 2014). It uses the data to compare the additive measures of tax increases and expenditure decreases developed in Sobel and Holcombe (1996), linear trend model from Hou (2003, 2013), and the Hodrick-Prescott (1997) filter applied in Wagner and Elder (2005). A ratio is used to capture the percentage of time each approach can correctly identify an economic downturn consistent with National Bureau of Economic Research (NBER, 2017) recession dates. The ratio is then compared for each year and across different methods to see which method has optimal performance.

Results indicate that the additive measure from Sobel and Holcombe (1996) incorrectly identifies economic upturns and downturns for more than half the years in the panel. In contrast, the linear trend model isolates economic downturns for over 70% of counties in each year, while the filter shows a year lag in the identification of downturns. In regard to upturn years, the linear trend model and filter produces spurious results, but the filter has better performance. Collectively, these findings indicate that the linear trend performs the best in isolating downturns, but none of the methods consistently identify both

upturns and downturns. These findings challenge statements from Wagner and Elder (2007) regarding the performance of the linear trend model. Additionally, the findings build evidence challenging the use of the Hodrick-Prescott filter in applied research, which is shown to be inconsistent in business cycle identification (Hamilton, 2016). Therefore, future research should use multiple methods to check for the robustness of findings.

This dissertation also addresses concerns regarding the generalizability of findings, a third limitation in the fiscal stabilization literature. The first two papers build evidence that school districts are accumulating fiscal savings as shown by Duncombe and Hou (2014). They also provide evidence that school districts are allocating fiscal savings as part of their fiscal stabilization policy, which is distinct from research findings on general purpose governments from Marlowe (2005) and Wang and Hou (2012). Given these differences, this dissertation shows that research on the fiscal stabilization behavior of general purpose governments may not be generalizable to special purpose governments, given institutional differences (Duncombe and Hou, 2014).

1.5 Significance of Research

This dissertation holds significance for fiscal stabilization research and practice. The first two papers advance the theoretical aspects of stabilization research. Developing and testing an open systems model ensures consideration of the different stakeholders driving the allocation of fiscal savings, which allows for application of organizational theory as recommended by Hendrick (2006). It also aligns research with practice, given evidence from the field that fiscal stabilization is not a strictly economic policy, but is also a function of stakeholders with conflicting values (GFOA, 2015; NASBO, 2013; Stewart et al., 2015).

The second paper develops a model of the competing stabilization decisions a government can select when receiving intergovernmental transfers. The model is used to show that governments face three potential decisions regarding how to allocate transfer funds, some of which reflect selective allocation of the funds. The model builds upon theory in Levine (1978; 1979) regarding government retrenchment and stabilization decisions during economic downturns. It also links theory to praxis, given that the model captures the competing decisions a government faces, which requires consideration of the norms of stakeholder politics in financial management (Hendrick, 2006; Levine, 1978, 1979; Rose and Smith, 2011; Stewart et al., 2015).

To test the model, the second paper uses data from ARRA stabilization funding to school districts through the Great Recession. The literature evaluating the effect of ARRA funds has generally focused on macroeconomic stabilization in line with Musgrave (1959), and has struggled to find how the funds were utilized at the subnational level. For example, Cogan and Taylor (2012) were unable to track how some of the ARRA funding was used by state and local governments, leading them to hypothesize that it may have been used to pay off debt or be saved for future use. This paper presents empirical evidence that school districts in Pennsylvania used a quarter of each dollar to save for future uncertainty in UFB, a finding not established in the literature (Cogan and Taylor, 2012). In terms of practice, it indicates that school districts did not follow the intent of ARRA to focus on stabilizing teacher salaries, but instead pursued prudent financial management by saving intergovernmental transfer in UFB for a rainy day (Gauthier, 2009; GFOA, 2015).

Policymakers can use insight from the second paper to develop future legislation depending on their preferences. If policymakers intend to allow greater autonomy in how intergovernmental transfers are utilized, then the basic framework of ARRA could be used again in the event of a future economic downturn. In contrast, policymakers may intend to increase restrictions on the use of intergovernmental transfers, to ensure that the funds are used as intended by the federal government rather than to serve the interests of governments at the local level (Cogan and Taylor, 2012).

The third paper has significance for research methodology applied in the fiscal stabilization literature. It provides evidence of spurious business cycle identification, which indicates that fiscal stabilization research may be biased due to invalid research methods (Hou, 2003; Marlowe, 2005; Wagner and Elder, 2007). The use of invalid methods can potentially explain the lack of findings supporting countercyclical stabilization of expenditures in Marlowe (2005) and Wang and Hou (2012), which contrast with theory in Hou (2003) and statements from the GFOA (2015). It also develops tests which can be conducted to check robustness between the different methods to extract the business cycle and any alternatives used in future research.

In addition to methodological contributions, this dissertation is also significant due to emphasis on special purpose local governments. As noted by Duncombe and Hou (2014), research on fiscal stabilization at the local level focuses on general purpose governments, rather than special purpose governments. To address this gap in the literature, the first two papers of this dissertation examine the stabilization behavior of special purpose governments, by focusing on school districts. Despite the inability of school districts to diversify revenues

as general purpose governments, the first two papers show they still use fiscal stabilization strategies over the business cycle. This finding builds upon an emerging area of research on special purpose government stabilization behavior, indicating that they are involved in strategically preparing for financial uncertainty with UFB (Arapis et al., Forthcoming; Duncombe and Hou, 2014).

Collectively, the three papers make theoretical and methodological contributions. They address limitations in the literature, and also connect research to praxis in the field. Future research can build upon the models in this dissertation and use the methodological suggestions to develop defensible and evidence-based fiscal stabilization policy for local governments.

1.6 Organization of Dissertation

This dissertation is comprised of five chapters. After an introductory chapter, the individual papers are presented in chapters two through four. The fifth chapter concludes with a summary of findings across the papers, and implications for policy and future research.

The three papers in chapters two through four are each divided into five sections. These sections include the introduction, theoretical framework, research methodology, findings, and conclusion. A brief introduction presents the research question and outline of methods and findings. The theoretical framework continues with a review of the literature on fiscal stabilization, and uses it to develop models and testable hypotheses. A research methodology section follows, detailing the data, model, variables, and statistical methods. A

discussion of results is presented in the findings section. Finally, the implications of the findings for research and practice are detailed in the conclusion.

1.7 Summary

This dissertation addresses and builds upon the limitations in fiscal stabilization research. In a three paper format, it develops theory regarding the open systems nature of local government, which has implications for how fiscal stabilization decision-making occurs (Hendrick, 2006; Nelson and Balu, 2014). It then tests the open systems model with data from school districts, to show that fiscal stabilization is a function of the competing interests of internal and external stakeholders (Hendrick, 2006; Stewart et al., 2015). In the third paper, methodological approaches from the stabilization literature are compared, to show that they produce inconsistent results which are spurious for both upturn and downturn years. Collectively, these contributions can guide future research on fiscal stabilization in local governments.

References

- Arapis, T., & Reitano, V. (2017). Accumulating and maintaining fiscal savings: From theory to practice. *Journal of Government Financial Management*, 66(1), 34-39.
- Arapis, T., & Reitano, V. (Forthcoming). A glimmer of optimism in government savings accumulation? An empirical examination of municipal unassigned fund balance in Florida. *Public Finance Review*.
- Arapis, T., Reitano, V., & Bruck, E. (Forthcoming). The fiscal savings behavior of Pennsylvania school districts through the great recession. *Public Budgeting & Finance*.
- Bahl, R. (1984). *Financing state and local governments in the 1980s*. Oxford, UK: Oxford University Press.
- Center on Education Policy [CEP]. 2012. What impact did education stimulus funds have on states and school districts? Retrieved from <http://eric.ed.gov/?id=ED533671>
- Cirincione, C., Gurrieri, G.A., & DeSande, B.V. (1999). Municipal government revenue forecasting: Issues of method and data. *Public Budgeting & Finance*, 19(1), 26-46.
- Cogan, J.F., & Taylor, J.B. (2012). What the government purchases multiplier actually multiplied in the 2009 stimulus package. In L. Ohanian, J.B. Taylor, & I. Wright (Eds.), *Government policies and the delayed economic recovery* (pp. 85-114). Stanford, CA: Hoover Institution Press.
- Cyert, R.M., & March, J.G. (1963). *A behavior theory of the firm*. Upper Saddle River, NJ: Prentice Hall.
- Douglas, J.W., & Gaddie, R.K. (2002). State rainy day funds and fiscal crises: Rainy day funds and the 1990-1991 recession revisited. *Public Budgeting & Finance*, 22(1), 19-30.
- Duncombe, W., and Hou, Y. (2014). The savings behavior of special purpose governments: A panel study of New York school districts. *Public Budgeting and Finance*, 34(3), 1-23.
- Elder, E.M., & Wagner, G.A. (2013). Revenue cycles and risk-sharing in local governments: An analysis of state rainy day funds. *National Tax Journal*, 66(4), 939-960.

- Frank, H.A., & Zhao, Y. (2009). Determinants of local government revenue forecasting practice: Empirical evidence from Florida. *Journal of Public Budgeting, Accounting & Financial Management*, 21(1), 17-35.
- Gauthier, S.J. (2009). Fund balance: New and improved. *Government Finance Review*, April, 11-14.
- Gianakis, J., & Snow, D. (2007). The implementation and utilization of stabilization funds by local governments in Massachusetts. *Public Budgeting & Finance*, 27(1), 86-103.
- Government Finance Officers Association [GFOA]. (2015). Appropriate level of unrestricted fund balance in the general fund. Retrieved from <http://www.gfoa.org/appropriate-level-unrestricted-fund-balance-general-fund>
- Gramlich, E. (1987). Subnational fiscal policy. In John M. Quigle (Ed.), *Perspectives on Local Public Finance and Public Policy* (pp. 3-27). Greenwich, CT: JAI Press.
- Gramlich, E. (1991). The 1991 state and local fiscal crises. *Brookings Papers on Economic Activity*, 2, 249–287.
- Hamilton, J.D. (2016). Why you should never use the Hodrick-Prescott filter. Mimeo UC San Diego, Department of Economics.
- Hendrick, R. (2004). Assessing and measuring the fiscal health of local governments: Focus on Chicago suburban municipalities. *Urban Affairs Review*, 40(1), 78-114.
- Hendrick, R. (2006). The role of slack in local governments. *Public Budgeting & Finance*, 26(1), 14-46.
- Hendrick, R., & Crawford, J. (2014). Municipal fiscal policy space and fiscal structure: Tools for managing spending volatility. *Public Budgeting & Finance*, 34(3), 24-50.
- Hirschman, O. (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*. Cambridge, MA: Harvard University Press.
- Hodrick, R., & Prescott, E. (1997). Postwar U.S. business cycles: An empirical investigation. *Journal of Money, Credit and Banking*, 29(1), 1-16.
- Hou, Y. (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, Y. (2004). Budget stabilization fund: Structural features of the enabling legislation and balance levels. *Public Budgeting & Finance*, 24(3), 38-64.
- Hou, Y. (2013). *State government budget stabilization: Policy, tools, and impacts*. New York, NY: Springer.
- Hou, Y. (2015). *Local government budget stabilization: Explorations and evidence*. New York, NY: Springer.
- Kavanagh, S.C. (2007). *Financing the future: Long-term financial planning for local government*. Chicago, IL: Government Finance Officers Association.
- Levine, C.H. (1978). Organizational Decline and Cutback Management. *Public Administration Review*, 38(4), 316-325.
- Levine, C.H. (1979). More on Cutback Management: Hard Questions for Hard Times. *Public Administration Review*, 39(2), 179-183.
- Marlowe, J. (2005). Fiscal slack and counter-cyclical expenditure stabilization: A first look at the local level. *Public Budgeting & Finance*, 25(3), 48-72.
- McDonald, B., and Gabrini, C. (2014). Determinants of county charter decisions: An event history analysis of Florida counties. *Journal of Public Administration Research and Theory*, 24(4), 721-739.
- McDonald, B. (2015). Does the charter form improve the fiscal health of counties? *Public Administration Review*, 75(4), 609-618.
- Musgrave, R. (1959). *The theory of public finance*. New York, NY: McGraw-Hill.
- National Bureau of Economic Research [NBER]. (2017). The NBER's business cycle dating procedure: Frequently asked questions. Retrieved from http://www.nber.org/cycles/recessions_faq.html
- Nelson, A.A., and Balu, R. (2014). Local government response to fiscal stress: Evidence from the public education sector. *Public Administration Review*, 74(5), 601-614.
- National Association of State Budget Officers [NASBO]. (2013). *State budgeting and lessons learned from the economic downturn: Analysis and commentary from state budget officers*. Washington, DC: NASBO.
- National League of Cities. (2015). City fiscal conditions. Retrieved from <http://www.nlc.org/city-fiscal-conditions>

- Oates, W.E. (1968). The theory of public finance in a federal system. *The Canadian Journal of Economics*, 1(1), 37-54.
- Pew Charitable Trusts. (2015). *Why states save: Using evidence to inform how large rainy day funds should grow*. Washington, DC: Pew.
- Rafuse, R. (1965). Cyclical behavior of state-local finances. In R.A. Musgrave (Ed.), *Essays in fiscal federalism*. Washington, DC: The Brookings Institution.
- Rose, S., & Smith, D.L. (2011). Budget slack, institutions, and transparency. *Public Administration Review*, 72(2), 187-195.
- Shelton, M.S., Tyer, C.B., & Hembree, H. (1999). Benchmarking and local government reserve funds: Theory versus practice. *Public Management*, 81(9), 16-22.
- Snow, D., Gianakis, G.A., & Haughton, J. (2015). The politics of local government stabilization funds. *Public Administration Review*, 75(2), 304-314.
- Sobel, R.S. & Holcombe, R.G. (1996). The impact of state rainy day funds in easing state fiscal crises during the 1990–1991 recession. *Public Budgeting and Finance*, 16(3), 28–48.
- Stewart, L.M. (2009). Examining Factors that Impact Mississippi Counties’ Unreserved Fund Balance during Relative Resource Abundance and Relative Resource Scarcity. *Public Budgeting & Finance*, 29,45-73.
- Stewart, L.M., Phillips, J.N., & Modlin, S. (2013). An Evaluation of the Connection between Economic Volatility and Governmental Savings Levels for Illinois, North Carolina, and Mississippi Counties. *Public Finance and Management*, 13, 361-382.
- Stewart, L.M., Hildreth, R.W., & Antwi-Boasiako, K.W. (2015). The fund balance conundrum: An ethical perspective. *Administration & Society*, 47(8), 915-942.
- Tyer, C.B. (1993). Local government reserve funds: Policy alternatives and political strategies. *Public Budgeting & Finance*, 13(2), 75-84.
- Vanyolos, I. (2011). The impact of state-imposed fund balance limits on school districts: Evidence from New York state. *Journal of Public Budgeting, Accounting & Financial Management*, 23(2), 166-187.
- Vasche, D.J., & Williams, B. (1987). Optimal government budgeting contingency reserve funds. *Public Budgeting & Finance*, 7(1), 66-82.

- Wagner, G.A., & Elder, E.M. (2005). The role of budget stabilization funds in smoothing government expenditures over the business cycle. *Public Finance Review*, 33(4), 439-465.
- Wagner, G.A., & Elder, E.M. (2007). Revenue cycles and the distribution of shortfalls in U.S. states: Implications for an “optimal” rainy-day fund. *National Tax Journal*, 60(4), 727-742.
- Wang, W., & Yilin, H. (2012). Do local governments save and spend across budget cycles? Evidence from North Carolina. *American Review of Public Administration*, 42(2), 152-169.
- Wolkoff, M.J. (1987). An evaluation of municipal rainy day funds. *Public Budgeting & Finance*, 7, 52-63.
- Wooldridge, J.M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: The MIT Press.

Chapter 2

Selective Allocation of the Fiscal Stabilization Function

Abstract

Local governments utilize unassigned fund balance as a fiscal stabilization tool. This stabilization function of government may appear to be an uncontested aspect of fiscal policy, but recent discourse between elected officials and budgeters suggests that the accumulation and use of unassigned fund balance may also have a dimension of allocation. In particular, budgeters may allocate stabilization funds across all major expenditure categories or to particular expenditures to meet the demands of constituents and interest groups. This paper provides evidence that budgeters selectively allocated stabilization funds to particular expenditure categories across Pennsylvania school districts through the Great Recession. This behavior indicates that the lack of transparency regarding stabilization funds at the local level should be addressed with adoption of institutional rules common to the state level, such as strict deposit and strict withdrawal. These institutional rules could ensure that stabilization funds are not only allocated to meeting the demands of constituents and interest groups most likely to voice dissatisfaction with public service provision.

Keywords: fiscal stabilization, budgeting, school districts

2.1 Introduction

State and local governments pursue countercyclical stabilization policy through periods of fiscal stress. Evidence of countercyclical stabilization of expenditures has been established at the state (Douglas and Gaddie, 2002; Hou, 2003; Sobel and Holcombe, 1996; Wagner and Elder, 2007) and local level (Marlowe, 2005; Wang and Hou, 2012). At the local level, fund balance is the primary reserve account by which fiscal stabilization policy is conducted. Since there are no restrictions on the unassigned portion of fund balance, there are differing views of where to apply these funds when stabilizing a budget. For example, Governor Tom Corbett stated that fund balance should be used for across the board stabilization in Pennsylvania (McGill, 2012). Professional budgeters in the state challenged the governor, and deemed fund balance a contingency fund for select expenditures (Daniels, 2013; McGill, 2012). This indicates that budget stabilization may have an allocative dimension, which is subject to competing views of fund balance between elected officials and administrators.

The extant literature has yet to consider this allocative aspect of fiscal stabilization on select expenditure categories, instead focusing on the effect of stabilization on total expenditures. To test whether stabilization has an allocative dimension, this paper offers an analysis of where countercyclical stabilization efforts are focused. In particular, local governments may be allocating stabilization funds to select expenditure categories. The decision to selectively stabilize may reflect conflicting demands of stakeholders for limited public services following the Great Recession (Ammons et al., 2012; Martin et al., 2012). The phenomenon of selective allocation of stabilization has been discussed at the state level

(See National Association of State Budget Officers, 2013), and also observed at the local level (See Pennsylvania State Education Association, 2012), although rigorous evidence supporting this claim remains limited.

This paper develops a model of local government stabilization with longitudinal analysis. It is tested with a panel of special purpose local governments from Pennsylvania (N=499) over a ten year panel. Estimation of the model reveals that that unassigned fund balance is selectively allocated to particular expenditure categories, such as administration. This finding is magnified during downturn years when school districts cut back, aligning with the findings of Marlowe (2005) on a sample of general purpose local governments.

These findings advance the literature on three fronts. First, they provide insight into local government stabilization, an area which is noted as being limited (Marlowe, 2005; Wang and Hou, 2012). This study develops the scope of the extant research by testing the effect of stabilization funds through the Great Recession, a period which has resulted in calls for further research on the effects of fiscal stress on local government financial management and decision-making (Scorsone and Plerhoples, 2010). Further, the findings imply that two key functions of public finance developed in Musgrave (1959), stabilization and allocation, are interrelated in both downturn and upturn years.

The latter finding suggests that Musgrave (1959) did not consider the institutional aspects of stabilization policy. In particular, as open system institutions (Cyert and March, 1963; March and Simon, 1958), local governments consider the competing demands of internal and external stakeholders when formulating policy and allocating available resources to constituents (Hendrick, 2004; Nelson, 2012; Nelson and Balu, 2014), including the fiscal

stabilization function. These competing demands require consideration of how to allocate stabilization funds during times when constrained financial resources cannot meet all the needs of stakeholders during downturn years. Additionally, the role of competing demands in formulating stabilization policy indicates the need for greater transparency in how these funds are used at the local level. This finding echoes an emerging area of research on how financial management at the local level may cater to particular constituents or interests, given the lack of transparency around decision-making at the local level (Rose and Smith, 2011; Stewart et al., 2015).

What follows is a review of theory on state and local government stabilization funds and testable hypotheses in Section II. A model of special purpose local government stabilization is developed in Section III. Section IV presents the findings of the study, and Section V concludes with a discussion of implications for budgeters and policymakers.

2.2 Theoretical Framework

Theory of Fiscal Stabilization

In *The Theory of Public Finance*, Musgrave (1959) detailed three functions of government: stabilization, distribution, and allocation. As a policy aimed at reducing the economic effects of downturns in the business cycle, stabilization was deemed an exclusive function of the central government, given that subnational governments were assumed to be unresponsive to the business cycle. Oates (1972) also maintained that only central governments could enact fiscal policy aimed at stabilization, under the assumption that subnational governments did not have enough resources to enact stabilization. However, this early conceptualization of the stabilization function as being relegated to only the federal

government was contested with empirical evidence (Bahl, 1984; Gramlich, 1987, 1991; Rafuse, 1965).

Public finance scholars subsequently showed that subnational governments employed fiscal policy in response to business cycles (Gramlich, 1987, 1991). Research on subnational finance in relation to the business cycle was motivated by uncertainty regarding the financial implications of decentralization in the United States since the 1950s (Nelson, 1990). In particular, there was contention over whether Musgrave (1959) was correct in asserting that the federal government was primarily involved in stabilization, given increasing decentralization and rising expenditures at the subnational level (Gramlich, 1991; Nelson, 1990). Early research sought to clarify the role of subnational governments in financial policy, and employed analysis of time-series trends to show that subnational governments accumulated reserves through periods of growth and subsequently drained reserves in recessions (Bahl, 1984; Rafuse, 1965). Despite this research, attempts to link subnational fiscal policy to the stabilization function were not systematically tested until the seminal work of Gramlich (1987; 1991).

Gramlich (1987) studied aggregate economic time-series data to argue that state and local governments experience and actively respond to the business cycle with stabilization policy. Further, through the 1991 state and local budget crises, Gramlich (1991) provided empirical evidence that subnational governments pursued fiscal policy in response to cyclical fluctuations over the business cycle. For example, simulations and regression analysis demonstrated that fiscal imbalances at the subnational level could be explained by economic cycles and rising operating costs (e.g., healthcare) from 1955 through 1990 (Gramlich, 1991).

Evidence of cyclical trends in subnational finance compelled Gramlich (1991) to reconsider three views of subnational budgeting: neutrality, stability, and perversity.

Neutrality aligned with early public finance theory, which did not consider the stabilization effect of subnational spending relative to the central government (Musgrave, 1959; Oates, 1972). To accommodate evidence challenging neutrality, Gramlich (1991) also considered that subnational governments may pursue countercyclical fiscal policy in relation to economic growth and recession, referred to as stability. A third perspective is perversity, which requires that lower levels of government balance budgets each year as opposed to consideration of the macroeconomic business cycle. Ultimately, Gramlich (1991) concluded with a heterodox view which incorporated aspects of the three views of subnational budgeting, but noted that “the consensus that has developed around the conventional neutrality view...can be faulted” (p. 271).

Fiscal Stabilization in State Governments

Following Gramlich (1991), public finance scholars proceeded to study budgetary strategies and tools through which subnational governments pursue stabilization. In particular, researchers studied how state governments employed stabilization funds in response to the recession which occurred in the early 1990s, to empirically assess the viability of this financial management strategy (Douglas and Gaddie, 2002; Hendrick, 2006). Research on fiscal stabilization at the state and local level prior to this recession was largely unwarranted given the budget surpluses in the 1980s (Poterba, 1994).

Sobel and Holcombe (1996) demonstrate that states employ rainy day funds in response to fiscal stress. In particular, the rainy day fund is drained and funds directed to

counteract any expenditure imbalances which may result from exogenous fiscal stress such as a recession, contingent upon a mandated provision to ensure accumulation of funds. Their statistical model was unable to establish that rainy day fund caps and requirements to withdraw funds had any effect on countercyclical expenditure stabilization through a recessionary period. Douglas and Gaddie (2002) develop a more robust model specification than in Sobel and Holcombe (1996) to show that the inverse relationship between rainy day funds and fiscal stress is not a function of contingency features such as a mandated savings provision. This suggested that states were strategically using fund balances in response to the 1990-1991 recession.

Researchers also extended inquiry across multiple business cycles rather than focusing exclusively on the recession in the early 1990s. Hou (2003) shows that in downturn years, budget stabilization funds (BSF) rather than unassigned fund balance are used to reduce expenditure gaps arising from downturns in the business cycle across the states from 1979 to 1999. Hou (2004) advances these findings to show that BSF should be directed to specific stabilization functions such as the case of declining revenues. There is also evidence that balanced budget rules have a positive association with budget stabilization funds, indicating that fiscal institutions affect the accumulation of BSF (Hou, 2004). Additionally, across a panel of all states from 1969 to 1999, Wagner and Elder (2005) show that BSF with strict deposit and strict withdrawal rules can reduce expenditure cyclicity by twenty percent. Collectively, these studies demonstrate that BSF is used for countercyclical stabilization, contingent upon withdrawal and deposit rules instituted by the state.

Despite the similarity of conclusions reached by each of these studies, the role of fiscal stabilization received further examination after the 2001-2002 recession. In the years following this recession, state and local governments experienced persistent budget gaps, which compelled researchers to reassess financial management strategies such as the use of budget stabilization funds (Reschovsky, 2004). In particular, states faced constraints on own-source and intergovernmental revenue sources, stemming from tax cuts in addition to pressure from the federal government for unfunded mandates (Lav, 2003). These changes in revenue generation translated into expenditure reductions and use of stabilization funds for 38 states (McNichol, 2003). Researchers empirically tested how BSF was used to smooth expenditure gaps and also modeled the optimal size of BSF through the 2001-2002 recession (Hou and Moynihan, 2008; Wagner and Elder, 2007; Wang and Hou, 2012). Wagner and Elder (2007) use a Markov switching model on quarterly state data from 1979 to 2006 to show that savings of 2.5% to 2.8% of total revenues would be sufficient to meet the average revenue loss a state experiences during economic downturn (Wagner and Elder, 2007).

Further, Hou and Moynihan (2008) provide evidence that BSF can be used to develop countercyclical fiscal capacity to maintain government performance through downturn periods in 1991 and 2001. The authors demonstrate that both BSF and UFB are used to address financial performance, which is measured through expenditure changes and revenue raising strategies of state governments. Given these findings, Hou and Moynihan (2008) conclude that there exists a direct link between fiscal stabilization and performance, which should receive greater attention from policymakers given the positive outcomes which result for public service provision.

Fiscal Stabilization in Local Governments

Although there is evidence that state governments pursue countercyclical stabilization policy, there remains limited evidence of this behavior at the local level (Hou, 2015; Marlowe, 2005; Wang and Hou, 2012). Since local governments are critical to the delivery of public services, the development of financial management strategies can build fiscal capacity to sustain service provision in the event of fiscal stress (Mullins and Pagano, 2005). A small but growing body of research has developed around how local governments build and use stabilization funds, particularly unassigned fund balance (Arapis and Reitano, Forthcoming).

While state governments use BSF and rainy day funds, local governments use unassigned fund balance (UFB) for fiscal stabilization (Hendrick, 2006; Marlowe, 2005). In an early study, Wolkoff (1987) shows that only 6 out of 27 of the largest US municipalities had a formal rainy day fund, instead using fund balance to manage cyclical fluctuations. Marlowe (2012) repeated this study with more recent data to show that municipalities favor the use of fund balance, such as UFB, for fiscal stabilization. Therefore, research has focused on the effect of UFB as a fiscal stabilization tool at the local level, given its discretionary nature (Gauthier, 2009).

As a discretionary account, UFB is part of fund balance. Total fund balance is calculated as the difference between assets and liabilities. From Governmental Account Standards Board (GASB) Statement No. 54, there are four different portions of fund balance: committed, restricted, assigned, and unassigned. Committed, restricted, and assigned are designated for particular purposes, whereas unassigned is a discretionary account, which can be used for any purpose. Practitioners such as Gauthier (2009) have stated that “there is no

single item in a typical state or local governments financial statement that attracts more attention than fund balance,” and that unassigned fund balance plays a critical role for local government financial management (p. 1). The Government Finance Officers Association has created a variety of recommended policies regarding the accumulation of UFB, which should be at least two months of operating expenditures to mitigate the effect of contingencies such as economic downturns (Gauthier, 2009). In light of the Great Recession, this policy is still actively implemented by local governments, although adjustments are recommended to factor in risks unique to each local government (See Kavanagh, 2013).

While one side of the literature has examined strategies to accumulate UFB, an emerging area has examined how local governments use these funds to mitigate the effects of economic downturns on expenditures (Arapis and Reitano, Forthcoming). Marlowe (2005) presents the first study of local fiscal stabilization on a sample of 103 Minnesota cities from 1990 to 2000. The author provides limited evidence that budget stabilization occurs in local governments, contingent upon which fund these slack resources are located within. Evidence of the relationship between unassigned fund balance and expenditure stabilization is at an exploratory level, and there is also mixed evidence that assigned fund balance has a countercyclical effect during downturn years (Marlowe, 2005).

In contrast, Wang and Hou (2012) study the stabilization mechanism at the county level in North Carolina from 1990 to 2007, but are unable to establish evidence of the relationship between fund balance and countercyclical expenditure stabilization. Wang and Hou (2012) conclude that fund balance accumulation at the local level may not be enough to counteract fiscal stress through the two periods of encompassed by the time period of their

sample. The authors also note that the institutional context and size of the local government may have an effect on fund balance, implying the need to test the relationship between savings and countercyclical expenditure stabilization across different types of local governments.

Across all studies, there is consideration of the relationship between UFB and expenditures, examined in context of economic fluctuations. Cyclical shifts in spending may reflect the effect of national and regional economic cycles on local government finances (Marlowe, 2005; Wang and Hou, 2012). For example, spending decreases during downturn years may vary in magnitude, contingent upon the level of fiscal stress (Scorsone and Plerhoples, 2010). This expenditure gap, which is referred to as a cutback throughout this paper, can be estimated as the difference between current year and previous year expenditures. From Levine (1978, 1979), slack resources or fiscal savings, such as UFB, can be used to decrease the magnitude of cutbacks. More recent literature has also examined the effect of financial resources and strategies to reduce either the decision to cutback or the magnitude of the cutback (See Alm and Sjoquist, 2013; Nelson and Balu, 2014; Reschovsky, 2004).

In particular, Reschovsky (2004) examines factors related to the extent of cutbacks through the 2001-2002 recession, while Alm and Sjoquist (2013) and Nelson and Balu (2014) focus on the Great Recession. Across all of these studies, there is an emphasis on analyzing how financial strategies can be used to address cutbacks stemming from economic downturns, or cyclical variation. Therefore, these studies are focused on how financial

strategies, such as the use of UFB, can reduce the effect of economic downturns on expenditures. The expected relationship is presented in the first hypothesis:

H1: Unassigned fund balance will decrease expenditure cutbacks through economic downturns.

Stabilization of expenditure cutbacks with unassigned fund balance is a discretionary function of budgeters at the local level (Stewart et al., 2015). In particular, as considered in the first hypothesis, budgeters select when and how much unassigned fund balance should be used to counteract the effects of economic downturn on spending (Gauthier, 2009). The budgeter also faces the decision of where to apply savings from UFB.

Since savings in the form of UFB are discretionary in nature, they can be used for any purpose deemed by the government without the need to document decision criteria (Stewart et al., 2015). For example, in general purpose local governments, unassigned fund balance can be used to stabilize expenditures for local economic development zones as opposed to spending on social services, on the grounds that economic development generates a recovery to a greater degree than social services (Jordan, 2003). In special purpose local governments such as school districts, budgeters may also have to select between spending categories when pursuing stabilization. This requires a decision between stabilizing expenditures for salaries and benefits in relation to services for students, operational costs, and the administrative function, among other major areas of spending (Ellerson, 2012).

This suggests that government stabilization during a downturn period has a dimension of allocation, given the decision of the budgeter to selectively stabilize particular expenditure categories which reflect competing demands and goals of constituents and interests (Cyert

and March, 1963; Levine, 1979, 1979; Stewart et al., 2015). This phenomenon of selective allocation has been observed in the field at the state and local level. Specifically, a report from the National Association of State Budget Officers (NASBO, 2013) states that fiscal savings “mean different things to different stakeholders” (p. 12). Further, “states reported that the pressure to maintain pre-recession service levels drove their decision to use budgetary reserves,” with pressure resulting from various stakeholders seeking that their programmatic interests (e.g., funds for a particular social service program) be stabilized through economic downturns.

The NASBO (2013) report discusses the implications of the decision to address cutbacks through downturns to “vital programs,” a term which has a normative dimension (p. 13). Specifically, a program may be deemed vital by the interest of the stakeholders directly affected by it, therefore leading to demands that their program be stabilized, even in context of limited savings which could be allocated elsewhere (NASBO, 2013; Stewart et al., 2015). Since fiscal savings in unassigned fund balance are discretionary, there is no decision criterion for how these funds are allocated; therefore, it is up to the budgeter or government manager to decide how to allocate these funds during downturns, leading to normative decisions (Levine, 1978, 1979). These observations regarding the allocation of fiscal savings echo the still unresolved question posited by Key (1940): “On what basis shall it be decided to allocate X dollars to activity A instead of activity B?” (p. 1).

There is also some observation of selective allocation at the local level, but not directly considered in context of fiscal stabilization. For example, in the case of general purpose local governments, stabilizing economic development funds may cater to the

interests of local businesses, who may wield greater economic and political influence than social workers involved in delivery of public services (Jordan, 2003). Similarly, budgeters in school districts may consider senior teachers more politically viable than newer teachers and non-essential personnel involved in support services for a minority of services provided in public schools. Underlying both examples is the ability of an individual to voice their interest around a particular policy agenda (Hirschman, 1970). For example, school districts stabilize finances with cut backs to teachers based on seniority for fear of reprisal from unions, instead of attempting to stabilize budget gaps with cutbacks across all teachers (Boyd et al., 2011; Goldhaber and Theobald, 2013). This conscious decision reflects the discretion of school districts to meet the demands of particular interest, that of teachers, through a fiscal crisis. Demands can be met with heterogeneous stabilization policy to appease prominent and recognized agendas of interests most likely to voice dissatisfaction if they do not receive any stabilization funding (Hirschman, 1970).

For example, senior teachers protected by unions may be more likely to voice their dissent if they are cut than if teachers with no seniority are cut. On a broader scale, there are also conflicting interests between teachers in relation to support staff and administrators, two groups which are paid from separate expenditure categories. In particular, school districts may be more prone to stabilize expenditures for teachers relative to other key expenditures which directly support students, such as transportation costs, and even operational decisions, which may not have the political clout of teachers (Rosales, 2015). Each of these examples demonstrates that budgeters face a choice when stabilizing expenditures categories, based on

the recipient of the funds. The decision budgeters at the local level face when stabilizing is reflected in hypothesis two:

H2: Unassigned fund balance is selectively allocated to particular expenditures.

The two hypotheses reflects research findings indicating that local governments are open systems. Stemming from the Cyert and March (1963) and March and Simon (1958), organizations are a function of both internal and external dimensions. Research has provided evidence that local governments are open systems with respect to their decision-making, including financial management decisions regarding UFB (Hendrick, 2004; Nelson, 2012; Nelson and Balu, 2014). Therefore, the use of fiscal stabilization tools are subject to internal considerations and external demands of stakeholders. The next section presents research methodology to test each hypothesis.

2.3 Research Methodology

Model Specification

Determining whether fiscal stabilization has an effect on different expenditure categories, which would provide evidence for selective allocation, can be estimated within a regression context. To examine this relationship, this paper employs a panel of all 499 Pennsylvania school districts from 2003/2004 to 2012/2013. As discussed below, the literature on state and local government fiscal stabilization has generally adhered to a uniform methodological strategy, but this paper argues for and employs alternatives.

The literature on state and local fiscal stabilization has generally employed a linear trend model to capture cyclical variation (See Hou, 2013, 2015). Despite the widespread adoption of this approach, there are concerns over whether it is a valid method to capture

cyclical fluctuation. Wagner and Elder (2005; 2007) argue that the method is invalid, and contingent entirely upon the predictive validity of the expected trend. In particular, Wagner and Elder (2007) argue that the “linear trend model optimizes over the choice of the intercept faced significant criticism, with debate over interpretation (Krugman, 2012) and some arguing that filters, such as the Hodrick-Prescott filter, “should never be used” (Hamilton, 2016, p. 1). Alternative filters are proposed in Hamilton (2016), but the standard application has a long time dimension or higher data frequency that is unavailable for local governments.

Given concerns over existing methods employed in the literature, this paper proposes that a new measure of cyclical variation be employed, which captures the perspectives of budgeters and other strands of the financial management literature. Instead of employing methods such as filters, which seek to find trends in macroeconomic data that may not hold for governments at the local level (Hamilton, 2016), this paper offers a more direct alternative. This paper examines cyclical fluctuations by looking at the decision to cutback expenditures to an amount less than the previous year budgeted. The decision is modeled as both a dichotomous choice and also the magnitude of the cutback.

From the perspective of the practitioner, the decision to cut back is the standard measure of variation resulting from national or regional economic cycles. For example, NASBO (2013) and Olif et al. (2012) among others have studied the effects of economic downturns in terms of aggregate decreases in spending levels, rather than extracting a cyclical component from a linear trend model or filter. Financial management research on topics related to fiscal stabilization has also adopted similar measures, with Levine (1978;

1979) drawing the first link between fiscal savings and cutbacks stemming from economic downturns.

More recent literature, such as Reschovsky (2004), examines the magnitude of the expenditure cutback between the current and previous year for local governments and school districts. Further, Nelson and Balu (2014) analyze factors related to the dichotomous decision to cut back expenditures or raise revenues through downturns for school districts. On the revenue side, researchers have also captured fluctuations with changes in revenues year over year, to capture the effects of the Great Recession on state governments (See Alm and Sjoquist, 2013). Given the usage of these measures among practitioners and researchers, this paper imports them into research on fiscal stabilization. They capture the actual decision to reduce expenditures, rather than predicted and filtered trends, both of which are challenged in the literature (Hamilton, 2016; Wagner and Elder, 2005, 2007).

The decision to cut back can be modeled as a dichotomous choice. The choice to cut back receives a value of 1 if expenditures in the current year are less than the previous year, and 0 otherwise. Estimation of the effect of unassigned fund balance on the cutback decision can occur through three potential econometric methods: linear probability model, probit, or logit. The former choice allows for elimination of unobserved time variant and invariant factors, which could be systemically correlated with observed variables or the outcome. In contrast, a probit or logit model only allows for conditional fixed effects, which are not appropriate for this context. While Horace and Oaxaca (2006) provide evidence the LPM may bias results, Wooldridge (2002, p. 455) notes that it “need not provide very good

estimates of partial effects at extreme values [of all the covariates],” which is not the focus of this paper. Therefore, an LPM is employed, as shown in equation 1:

$$(1) \text{CutbackDecision}_{it} = \beta(\text{UFB})_{i,t} + \delta(\text{Controls})_{it} + \text{FE}_i + \text{TE}_t + \varepsilon$$

Where the *Cutback Decision*, a binary measure of whether a cutback in expenditures occurred, is a function of unassigned fund balance, control factors, and fixed effects. A discussion of control factors follows in the next subsection. Fixed and time effects eliminate unobserved variables that may be systematically correlated with the observed factors or outcome (Wooldridge, 2002). The inclusion of fixed and time effects eliminates bias in the parameter estimates from unobserved factors (Wooldridge, 2002).

Another concern is the endogenous nature of UFB, particularly with respect to reverse causation with the decision to cutback expenditures. From Kennedy (1998, 169), a lagged coefficient is considered exogenous since its value is determined in a year prior to the outcome, which are not asymptotically biased (Hendrick and Crawford, 2014). Therefore, UFB is lagged by one year, as shown in equation 2:

$$(2) \text{CutbackDecision}_{it} = \beta(\text{UFB})_{i,t-1} + \delta(\text{Controls})_{it} + \text{FE}_i + \text{TE}_t + \varepsilon$$

The use of a lag effect also reflects the consideration of budgeters. NASBO (2013) discusses how fiscal reserves are a way to delay and potentially avert a fiscal crisis, since the use of unassigned fund balance may occur in anticipation of an economic downturn and resultant expenditure cutbacks. Further, from the local level, school district budgeters have also depleted reserves at the first sign of economic downturn to counteract the long-term effects of the Great Recession on expenditures (PSEA, 2012, 2013). Therefore, a lag effect is considered exogenous (Hendrick and Crawford, 2014; Kennedy, 1998).

In addition to the decision to cut back, there is also the question of the magnitude of the cutback. Levine (1978; 1979) and other cutback theorists argue that the decision to cut back is inherently political, and may occur across the board or in select expenditure categories. To capture this aspect, the absolute magnitude of the cutback is also measured, referred to as the cutback amount, to reflect the severity of the economic downturn on the particular area of service delivery. The same approach as in the previous equation is adopted, namely a lag on UFB in addition to two way fixed effects. This is reflected in equation 3:

$$(3) \text{CutbackAmount}_{it} = \beta(\text{UFB})_{i,t-1} + \delta(\text{Controls})_{it} + FE_i + TE_t + \varepsilon$$

It should be noted that across all model estimates, the dependent variable concerns cutback across particular expenditure categories, rather than total expenditures. This approach allows for an examination of whether UFB is being selectively allocated to particular expenditure categories.

Dependent Variable

The dependent variable is total expenditures per pupil. This measure is decomposed to reflect expenditure categories which school districts may selectively stabilize. Pennsylvania school district accounting decomposes expenditures based on major categories: salaries and benefits (accounting codes 100 to 200), purchased services (accounting codes 200 to 800), and other (accounting code 900). From these major object level expenditures, accounting codes can be tracked to specific expenditures which are related to various stakeholder groups.

The single largest expenditure category is salaries and benefits, which encompasses more than 60% of total expenditures for the average year (PBSA, 2015). Services can be

decomposed into various expenditure categories, such as operations and maintenance costs, transportation costs, and purchased services. A final consideration is debt service, which may increase as more debt is accumulated. For the purpose of this paper, five expenditure categories are examined: salaries and benefits, operations and maintenance costs, transportation costs, debt service, and all other remaining expenditures.

Each of the five expenditure categories are modeled in two ways. First, there is the dichotomous decision to cut back, in which current year expenditures are less than prior year. Second, the magnitude of the cutback is also measured.

Independent Variables

The key independent variable of interest is unassigned fund balance, which is log transformed. Various controls for revenue sources, cost factors, and socioeconomics are included. Controls for variation in revenue sources are incorporated into the model with logged measures of local, state, and federal revenue. These are included to control for the variation in the revenue portfolio across all school districts in Pennsylvania. Variation may arise from differences in the property tax base, which can be equalized through state funding, although there is also variation arising from the distribution of federal revenue. Therefore, millage rates are also included. Additionally, the amount of long-term debt may constrain the available financial decisions of a school district, since greater debt may decrease financial condition. Therefore, a measure of long-term debt is included. Data for each of these financial variables is from PA Department of Education (DoE).

Institutional factors are also employed in the model and are also collected from PA DoE. School district enrollment reflects the capacity of school districts and associated cost

factors which may arise from educating students. This is captured by including ratios of categories of students, such as percent of free and reduced lunch (FRL) students, special education students, and nonwhite students. Additionally, to control for socioeconomics at the district level, a measure of aggregate income is incorporated.

2.4 Findings

Descriptive Statistics

Descriptive statistics are presented in table 2.1. There is evidence of widespread cutbacks across all major expenditure categories. Analysis of these trends over time reveals that a majority have occurred in the years during and after the Great Recession, although there are still some cutbacks in the years prior to this period of fiscal stress (PSEA, 2012, 2013). In regard to the descriptive statistics, there is considerable variation across all variables incorporated in the study, which reflects the economic and geographic dispersion throughout Pennsylvania, ranging from large urban cities such as Philadelphia and Pittsburgh to small rural areas. The key variable of interest, unassigned fund balance, also varies widely, indicating the range of savings strategies that school districts may adopt. The large range is consistent with the notion of risk based reserves, in which the government adjusts savings based on their individual risks (Kavanagh, 2013).

Table 2.1 Descriptive Statistics

| | Mean | Std. Dev. | Min | Max |
|------------------------------------|------------|-----------|-----------|------------|
| Dependent Variable(s) | | | | |
| Salaries and Benefits Cutback | 0.410 | 0.490 | 0.000 | 1.000 |
| Transportation Cutback | 0.420 | 0.490 | 0.000 | 1.000 |
| Operations and Maintenance Cutback | 0.480 | 0.500 | 0.000 | 1.000 |
| Other Expenditure Cutback | 0.450 | 0.490 | 0.000 | 1.000 |
| Debt Service Cutback | 0.460 | 0.500 | 0.000 | 1.000 |
| Independent Variables | | | | |
| Unassigned Fund Balance | 1280.126 | 1168.347 | -6069.550 | 11946.350 |
| Local Revenue Per Pupil | 7866.617 | 3884.589 | 1316.681 | 31565.570 |
| State Revenue Per Pupil | 5847.250 | 2704.689 | 822.380 | 30882.270 |
| Federal Revenue Per Pupil | 572.920 | 558.810 | 0.000 | 7848.600 |
| Millage Rate | 19.340 | 5.310 | 7.600 | 49.800 |
| Long Term Debt Ratio | 2.250 | 2.590 | 0.000 | 14.800 |
| Free and Reduced Lunch | 0.328 | 0.200 | 0.000 | 1.000 |
| Special Education Ratio | 0.170 | 0.040 | 0.000 | 0.400 |
| Nonwhite Ratio | 0.561 | 0.386 | 0.000 | 0.913 |
| Income | 146508.400 | 74965.220 | 33173.690 | 964065.200 |

Model Estimates

Estimation of equation 2 across the five major expenditure category cutbacks is presented in table 2.2. All estimates are from a linear probability model (LPM) to assess the dichotomous decision to cut back the particular expenditure category. Across four of the expenditure categories, the marginal effect of an increase in UFB decreases the decision of the school district to cutback. The only category which is not significant is debt service, which could reflect that this is viewed as a mandatory obligation which cannot be avoided, and therefore accounted for prior to using discretionary savings.

Table 2.2 Expenditure Cutback Linear Probability Model

| | Sal. Exp. | Trans. Exp. | Op. Exp. | Other | Debt |
|---------------------|---------------------|--------------------|---------------------|----------------------|---------------------|
| Log UFB | -.093*** (0.015) | -.035** (0.015) | -.052*** (0.016) | -.090*** (0.017) | -0.023 (0.017) |
| Log Loc. Rev. | 0.069 (0.133) | -0.129 (0.102) | -0.056 (0.110) | .446*** (0.150) | 0.157 (0.100) |
| Log State Rev. | 0.068 (0.129) | 0.128 (0.113) | .207* (0.100) | .540*** (0.116) | -0.032 (0.104) |
| Log Fed. Rev. | -0.035 (0.024) | -0.024 (0.019) | 0.000 (0.021) | -0.006 (0.022) | 0.009 (0.021) |
| Millage Rate | 2.82 (7.670) | .0902 (7.644) | -12.727 (8.120) | -24.88*** (7.970) | 2.62 (7.320) |
| LT Debt Ratio | -0.005 (0.020) | 0.01 (0.021) | 0.023 (0.021) | -0.015 (0.022) | -0.102*** (.018) |
| Free and Red. Lunch | -0.123 (0.077) | 0.103 (0.081) | 0.098 (0.083) | 0.069 (0.085) | 0.087 (0.078) |
| Special Education | 0.362 (0.534) | 0.171 (0.615) | 0.729 (0.521) | 0.403 (0.540) | 0.158 (0.634) |
| Nonwhite Ratio | -0.002 (0.018) | .0902* (0.016) | 0.006 (0.018) | -0.023 (0.013) | 0.011 (0.015) |
| Log Pers. Inc. | 0.286** (0.121) | .0902* (0.142) | 0.029 (0.021) | -0.231 (0.138) | 0.16 (0.132) |
| R Squared | 0.24 | 0.06 | 0.1 | 0.1 | 0.02 |
| Prob > F | 72.87*** | 13.01*** | 37.66*** | 18.17*** | 4.45*** |

*p<.05, **p<.01, ***p<.001

The results from table 2.2 support the first hypothesis. In particular, savings from a discretionary account such as UFB are decreasing the decision to cut back, which is consistent with Marlowe (2005). There is also evidence of selective allocation, which supports the second hypothesis. In particular, there are differences between the effect size of UFB on each expenditure category. This requires further consideration of the magnitude of the cutback, rather than the dichotomous decision to cut back.

The effect of UFB on the magnitude of the cut back is presented in table 2.3. For each one percent increase in prior year UFB, the decision to cut back salaries and benefits decreases by 1.28%, holding all other variables constant. In contrast, the effect size for operations and maintenance, and student transportation costs, are lower. For each one percent increase in prior year UFB, the amount cutback for operations and maintenance and transportation, decreases by .724% and .477%, respectively. The debt service category also has a negative coefficient, indicating a difference from the prior table.

Table 2.3 Expenditure Cutback Amount Regression

| | Sal. Exp. | Trans. Exp. | Op. Exp. | Other | Debt |
|---------------------|---------------------|--------------------|---------------------|-------------------------|---------------------|
| Log UFB | -1.28*** (0.192) | -.477** (0.193) | -.724*** (0.218) | -1.31*** (0.221) | -.41* (0.199) |
| Log Loc. Rev. | 0.478 (1.812) | -2.3 (1.550) | -1.064 (1.430) | 5.78** (2.140) | 1.58 (1.280) |
| Log State Rev. | 1.05 (1.760) | 2.05 (1.600) | 3.01* (1.400) | 7.61*** (1.710) | -0.566 (1.340) |
| Log Fed. Rev. | -0.38 (0.294) | -0.285 (0.250) | -0.021 (0.267) | -0.069 (0.301) | 0.005 (0.251) |
| Millage Rate | 74.64 (105.450) | .0902 (102.980) | 135.47 (110.180) | -336.82*** (109.100) | 21.61 (90.240) |
| LT Debt Ratio | -0.121 (0.262) | 0.146 (0.302) | 0.418 (0.290) | -0.083 (0.304) | -1.22*** (0.222) |
| Free and Red. Lunch | -1.403 (1.010) | 1.39 (1.060) | 1.44 (1.080) | 0.641 (1.130) | 0.852 (1.000) |
| Special Education | 6.83 (6.480) | 3.14 (7.990) | 11.19 (6.650) | 5.66 (7.270) | 3.53 (7.380) |
| Nonwhite Ratio | -0.044 (0.257) | -0.101 (0.211) | 0.064 (0.253) | -0.312 (0.178) | 0.038 (0.178) |
| Log Pers. Inc. | -3.96** (1.510) | 0.908 (1.810) | -0.814 (1.640) | -2.25 (1.830) | 1.79 (1.510) |
| R Squared | 0.25 | 0.07 | 0.11 | 0.11 | 0.03 |
| Prob > F | 78.56*** | 14.29*** | 39.77*** | 20.60*** | 5.89*** |

*p<.05, **p<.01, ***p<.001

The largest effect size is observed on the other category, which includes a range of administrative and business functions. For each one unit increase in prior year UFB, the decision to cut back in other expenditure categories decreases by 1.31%. This finding provides further support for the second hypothesis. In particular, school districts are using UFB to decrease the magnitude of cutbacks in the other category to a higher degree than other expenditures, despite the fact that the other category only reflects a quarter of total expenditures in the average year and is for administrative purposes.

Collectively, these findings provide evidence for both hypotheses developed in the theoretical framework. This provides evidence that a particular type of local government, school districts, are using UFB to reduce the decision to cut back. Further, there is selective allocation of UFB depending on the expenditure category, a finding which supports the second hypothesis and has yet to be established in the literature. The extant literature has only examined the effect of UFB on total expenditures, rather than specific categories, to understand where fiscal savings are applied.

2.5 Conclusion

The findings of this paper suggest that school districts selectively use UFB for stabilizing particular expenditure categories. The findings advance the literature on stabilization at the state and local level, which has examined the effect of BSF and UFB on total expenditures (Hou, 2003, 2013, 2015; Marlowe, 2005; Wang and Hou, 2012). In particular, this paper provides more specific findings by modeling which expenditure categories are stabilized by UFB and the magnitude of the stabilization effect.

These findings offer three contributions to the literature on fund balance and savings behavior of local governments. First, they provide evidence that a type of special purpose local government (school districts) which encompasses over 15% of all governments in the US (U.S. Census Bureau, 2012) pursues countercyclical stabilization. This develops a limited but growing body of evidence that governments at the local level are affected by cyclical variation and respond to it with fiscal policy tools such as UFB.

Second, the findings show that school districts are selectively using UFB for purposes not considered in much of the literature on government savings. The majority of literature has shown that UFB is accumulated during upturn years and then expended during downturn years to stabilize expenditures. This paper provides a more nuanced view of UFB behavior which challenges assumptions regarding UFB. In particular, governments at the local level may be allocating UFB to particular expenditures based on the interests of stakeholders. This finding suggests that two of the three major functions of public finance may be interrelated through the budgeting process (See Musgrave, 1959). Specifically, the decision to stabilize may also bring questions of where to allocate these funds, which will have ramifications for constituents. For the case of Pennsylvania school districts, the two largest categories which received stabilization efforts were salaries and benefits and the other costs category, the latter of which reflect administrative and business functions of school districts.

The effect size of salaries and benefits can be interpreted in two ways. First, it could indicate that this expenditure category is a majority portion of total expenditures, and should therefore receive a larger share of UFB. Alternatively, it may reflect selective allocation due to interests of teachers and their union representatives, who would voice their concern if

teachers were cut back through economic downturns such as the Great Recession (Rosales, 2015). The latter explanation has been considered in the broader discussion of cutbacks among school districts, indicating that budgeters may be aware of the potential response if savings are not used to support teachers and staff, who are represented by unions.

The finding that the other category receives the largest amount of stabilization efforts from UFB provides further support for selective allocation. There remains no direct economic reason why budgeters would seek to stabilize this particular function to a greater degree than salaries and benefits, or expenditures which must be provided for all students, such as transportation. To an extent, this could indicate that administration is unwilling to take large cutbacks.

Given evidence of selective allocation, this paper recommends that greater oversight should be placed on how governments are using UFB. Existing reporting standards simply show movement of actual funding levels of UFB and total fund balance. Greater emphasis should be placed on reporting where these funds are being applied, particularly in times of fiscal stress, when questions of the equity of stabilization may arise.

As discussed in the introduction, there is a diversity of views regarding how fund balance should be used and who should receive the benefits of its stabilizing effect. At a minimum, governments should be pressed to provide greater transparency as to how UFB is being accumulated and where it is being applied in downturn years (Stewart et al., 2015). Additionally, this transparency should provide insight into how and why the stabilization function is occurring. The decision criteria underlying stabilization decisions should be

published. This can provide further insight into how stabilization funds are allocated over the business cycle.

Transparency at the local level can be developed through institutional rules. At the state level, BSF is increasingly governed by deposit and withdrawal rules (St. Clair, 2013). Strict withdrawal rules can be implemented to ensure that unassigned fund balance is being used in a prescribed manner, whether across the board to stabilize all major expenditure categories or for those categories deemed essential. This can avoid the possibility of selective allocation demonstrated in this paper.

Collectively, each of the findings show that knowledge regarding UFB is still limited. There is evidence accruing across states and local governments about how UFB is utilized, but research should shift to validating these findings with surveys of budget practitioners. Statistical modeling can only reveal trends over time, which can be subsequently validated by the views of practitioners. Further research on UFB will develop a more robust understanding of how governments develop the capacity to build and use countercyclical tools, and which constituents will be affected by these decisions. Therefore, a seemingly uncontested policy tool such as UFB may also carry a dimension of allocation.

References

- Alm, J.E., & Sjoquist, D.L. (2013). State government revenue recovery from the great recession. *State & Local Government Review*, 46(3), 164-172.
- Ammons, D., Smith, K., and Stenberg, C. (2012). The future of local government: Will current stresses bring major, permanent changes? *State & Local Government Review*, 44(1), 64S-75S.
- Arapis, T. and Reitano, V. (Forthcoming). A glimmer of optimism in government savings accumulation? An empirical examination of municipal unassigned fund balance in Florida. *Public Finance Review*.
- Bahl, R. (1984). *Financing state and local governments in the 1980s*. Oxford, UK: Oxford University Press.
- Boyd, D., Grossman, P., Ing, M., Lankford, H., Loeb, S., & Wyckoff, J. (2011). The influence of school administrators on teacher retention decisions. *American Educational Research Journal*, 48(2), 303-333.
- Cyert, R., and March, J. (1963). *A behavioral theory of the firm*. Oxford, UK: Blackwell.
- Daniels, M. (2013). Number crunchers offer different PA estimates. Retrieved from <http://watchdog.org/217137/paindy-number-crunchers-offer-different-pa-deficit-estimates/>
- Douglas, J. and Gaddie, R. (2002). State Rainy day funds and fiscal crises: Rainy day funds and the 1990-1991 recession revisited. *Public Budgeting & Finance*, 22, 19-30.
- Duncombe, W., and Hou, Y. (2014). The savings behavior of special purpose governments: A panel study of New York school districts. *Public Budgeting and Finance*, 34(3), 1-23.
- Ellerson, N. (2012). *Weathering the storm: How the economic recession continues to impact school districts*. Alexandria, VA: American Association of School Administrators.
- Gauthier, S.J. (2009). Fund balance: New and improved. *Government Finance Review*, April, 11-14.
- Goldhaber, D.D., & Theobald, R. (2013). Managing the teacher workforce in austere times: The determinants and implications of teacher layoffs. *Education Finance & Policy*, 8(4), 494-527

- Gramlich, E. (1987). Subnational fiscal policy. In John M. Quigle (Ed.), *Perspectives on local public finance and public policy* (pp. 3-27). Greenwich, CT: JAI Press.
- Gramlich E. (1991). The 1991 state and local fiscal crises. *Brookings Papers on Economic Activity*, 2, 249–287.
- Hamilton, J.D. (2016). Why you should never use the hodrick-prescott filter. Mimeo UC San Diego, Department of Economics.
- Hendrick, R., & Crawford, J. (2014). Municipal fiscal policy space and fiscal structures: Tools for managing spending volatility. *Public Budgeting & Finance*, 34(3), 24-50.
- Hendrick, R. (2004). Assessing and measuring the fiscal health of local governments: Focus on Chicago suburban municipalities. *Urban Affairs Review*, 40(1), 78-114.
- Hendrick, R. (2006). The role of slack in local government finances. *Public Budgeting & Finance*, 26(1), 14-46.
- Hirschman, O. (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*. Cambridge, MA: Harvard University Press.
- Horace, W.C., & Oaxaca, R.L. (2006). Results on bias and inconsistency of ordinary least squares for the linear probability model. *Economic Letters*, 90, 321-327.
- Hou, Y. (2003). What stabilizes state general fund expenditures in downturn years-budget stabilization fund or general fund unreserved undesignated balance? *Public Budgeting & Finance*, 23(2), 64-85.
- Hou, Y. (2004). Budget stabilization fund: Structural features of the enabling legislation and balance levels. *Public Budgeting & Finance*, 24(3), 38-64.
- Hou, Y. (2005). Fiscal reserves and state own-source expenditure in downturns. *Public Finance Review*, 33(1), 117-144.
- Hou, Y. (2013). *State government budget stabilization: Policy, tools, and impacts*. New York, NY: Springer.
- Hou, Y. (2015). *Local government budget stabilization: Explorations and evidence*. New York, NY: Springer.
- Hou, Y., and Moynihan, D. (2008). The case for countercyclical fiscal capacity. *Journal of Public Administration Research and Theory*, 18, 139-159.

- Jonas, J. (2012). Great recession and fiscal squeeze at U.S. subnational government level. International Monetary Fund Working Paper 184. Retrieved from <https://www.imf.org/external/pubs/ft/wp/2012/wp12184.pdf>
- Jordan, M. M. (2003). Punctuations and agendas: A new look at local government budget expenditures. *Journal of Policy Analysis and Management*, 22(3), 345-360.
- Kavanagh, S.C. (2013). A risk based analysis of general fund reserve requirements. Chicago, IL: Government Finance Officers Association.
- Kennedy, P. (1998). *A guide to econometrics* 6th edition. Hoboken, NJ: Wiley-Blackwell.
- Key, V.O. (1940). The lack of a budgetary theory. *American Political Science Review*, 34(6), 1137-1144.
- Krugman, P. (2012). Filters and full employment. New York, NY: NY Times.
- Lav, I.J. (2003). Piling on problems: How federal policies affect state fiscal conditions. *National Tax Journal*, 56(3), 535-554.
- Levine, C.H. (1978). Organizational decline and cutback management. *Public Administration Review*, 38(4), 316-325.
- Levine, C.H. (1979). More on cutback management: Hard questions for hard times. *Public Administration Review*, 39(2), 179-183.
- March, J.G., Simon, H. (1958). *Organizations*. Oxford, UK: Wiley.
- Marlowe, J. (2005). Fiscal slack and counter-cyclical expenditure stabilization: A first look at the local level. *Public Budgeting & Finance*, 25(3), 48-72.
- Martin, L., Levey, R., and Cawley, J. (2012). The “new normal” for local government. *State & Local Government Review*, 44(1), 17S-28S.
- McGill, A. (2012). Districts, Corbett spar over ‘rain day’ reserve funds. Retrieved from http://articles.mcall.com/2012-06-11/news/mc-school-fund-balances-corbett-20120611_1_reserve-funds-fund-balance-rainy-day-fund
- Mullins, D.R., & Pagano, M.A. (2005). Local budgeting and finance: 25 years of developments. *Public Budgeting & Finance*, 25(4S), 3-45.
- Musgrave, R. (1959). *The theory of public finance*. New York, NY: McGraw-Hill.

- National Association of State Budget Officers [NASBO]. (2013). *State budgeting and lessons learned from the economic downturn: Analysis and commentary from state budget officers*. Washington, DC: NASBO.
- Nelson, A.A., and Balu, R. (2014). Local government response to fiscal stress: Evidence from the public education sector. *Public Administration Review*, 74(5), 601-614.
- Nelson, K. L. (2012). Municipal choices during a recession: Bounded rationality and innovation. *State and Local Government Review*, 44(IS), 44S-63S.
- Nelson, M. (1990). Decentralization of the subnational public sector: An empirical analysis of the determinants of local government structure in metropolitan areas in the US. *Southern Economic Journal*, 57(2), 443-457.
- Oates, W. E. (1972). *Fiscal federalism*. New York, NY: Harcourt Brace Jovanovich.
- Olif, P., Mai, C., Palacios, V. (2012). *States continue to feel recession's impact*. Washington, DC: Center on Budget and Policy Priorities.
- Pennsylvania School Board Association [PSBA]. (2015). School district snapshot – Understanding funding, spending, and saving. Retrieved from <https://www.psba.org/wp-content/uploads/2015/07/PSBA-School-District-Snapshot-2015.pdf>
- Pennsylvania State Education Association [PSEA]. (2012). *Sounding the alarm*. Harrisburg, PA: The Pennsylvania School Education Association.
- Poterba, J.M. (1994). State responses to fiscal crises: The effects of budgetary institutions and politics. *Journal of Political Economy*, 102(4), 799-821.
- Reschovsky, A. (2004). The impact of state government fiscal crises on local governments and schools. *State & Local Government Review*, 36(2), 86-102.
- Rafuse R. (1965). Cyclical behavior of state-local finances. In: Richard A. Musgrave (Ed.), *Essays in fiscal federalism*. Washington, DC: The Brookings Institute.
- Rose, S., & Smith, D.L. (2011). Budget slack, institutions, and transparency. *Public Administration Review*, 72(2), 187-195.
- Rosales, J. (2015). Number crunchers often target support staff for pay cuts. Retrieved from <http://neatoday.org/2015/10/06/number-crunchers-oftentarget-support-staff-for-pay-cuts/>

- Scorsone, E.A., and Plerhoples, C. (2012). Fiscal stress and cutback management amongst state and local governments: What have we learned and what remains to be learned? *State and Local Government Review*, 42(2): 176-187.
- Sorensen, B.E., and Yosha, O. (2001). Is state fiscal policy asymmetric over the business cycle? *Economic Review*, 3, 43-64.
- Sobel, R., and Holcombe, R. (1996). The impact of state rainy day funds in easing state fiscal crises during the 1990–1991 recession. *Public Budgeting and Finance*, 16(3), 28–48.
- St.Clair, T. (2013). The impact of budget stabilization funds on state pension contributions. *Public Budgeting & Finance*, 33(3),55-74.
- Stewart, L.M., Hildreth, R.W., & Antwi-Boasiako, K.W. (2015). The fund balance conundrum: An ethical perspective. *Administration & Society*, 47(8), 915-942.
- U.S. Census Bureau. (2012). *Government organizations summary report: 2012*. Washington, DC: U.S. Department of Commerce.
- Wagner, G.A., & Elder, E.M. (2005). The role of budget stabilization funds in smoothing government expenditures over the business cycle. *Public Finance Review*, 33(4), 439-465.
- Wagner, G., & Elder, E. (2007). Revenue cycles and the distribution of shortfalls in U.S. states: Implications for an “Optimal” rainy-day fund. *National Tax Journal*, 60, 727-742.
- Wang, W., and Hou, Y. (2012). Do local governments save and spend across budget cycles? Evidence from North Carolina. *American Review of Public Administration*, 42(2), 152-169.
- Wolkoff, M. (1987). An evaluation of municipal rainy day funds. *Public Budgeting & Finance*, 7(2), 52-63.
- Wooldridge, J.M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: The MIT Press.

Chapter 3

Intergovernmental Transfers and Fiscal Stabilization

Abstract

The American Recovery and Reinvestment Act allocated \$264 billion in funding to state and local governments to counteract the effects of the Great Recession. Over \$100 billion was devoted to public education, \$48.5 billion of which was for discretionary budget stabilization. This paper develops a model which shows the financial management decisions school districts faced when allocating ARRA. Estimation of the model across all Pennsylvania school districts shows that \$.57 of each dollar of ARRA was allocated to personnel expenditures to avoid cutbacks. School districts also strategically saved a quarter of each dollar of funding into unassigned fund balance.

Keywords: state and local government, financial management, stabilization

3.1 Introduction

Governments pursue fiscal stabilization to counteract the negative effects of an economic downturn (Musgrave, 1959). As a core function of public finance, fiscal stabilization can encompass a range of policy tools, each of which differs between levels of government (Hou and Moynihan, 2008; Musgrave, 1959). At the federal level, tax cuts and stimulus funding are typical fiscal policies in response to a downturn, which are aimed at decreasing unemployment and increasing national output (Abel, Bernanke, and Croushore, 2011). At the subnational level, state and local governments use savings accounts to mitigate the effects of expenditure gaps and maintain service provision for constituents (Hou, 2003; Marlowe, 2005).

In response to the severity of the Great Recession, which was the worst downturn since the Great Depression (Arapis and Reitano, Forthcoming), federal and subnational governments around the world coordinated stabilization policy (Organization for Economic Cooperation and Development [OECD], 2010). In the United States, the American Recovery and Reinvestment Act (ARRA) distributed a significant portion of federal funds through the intergovernmental system, which focused on stabilization of state and local governments. Coordinating stabilization between federal and subnational governments was unprecedented, since stabilization is traditionally associated with the Federal government rather than through subnational governments (Musgrave, 1959; Oates, 1968, 1972). In contrast, ARRA distributed \$264 billion of federal funding to state and local governments out of a total \$787 billion (Congressional Budget Office, 2013).

Funding for ARRA was intended to promote job growth and stimulate the economy while also addressing more pervasive structural issues such infrastructure and public education (Council of Economic Advisers, 2010). The stimulus package helped to stabilize unemployment by generating between 400,000 to 2.4 million jobs by 2011 (Congressional Budget Office [CBO], 2011). Jobs in the public sector were also saved from being cut due to prolonged weaknesses in state and local budgets (Harris and Shadunsky, 2013; Oliff, Mai, and Palacios, 2012). For example, ARRA avoided job cuts for over 250,000 employees in the public education system (Domestic Policy Council [DPC], 2013). Once ARRA funding was distributed, a survey revealed that a majority of expert economists considered the benefits of ARRA to have exceeded the cost (Initiative on Global Markets, 2014).

Despite research showing that ARRA functioned as planned, by savings jobs and stimulating the economy, there remains little inquiry into how this stabilization policy affected the finances of the intergovernmental system. Some researchers have suggested that state and local governments used ARRA funding not for expenditures but to pay off debt (Cogan and Taylor, 2012). Empirical evidence showing how state and local governments used ARRA remains limited, and has yet to consider that governments may have allocated this federal stabilization funding to other accounts, such as savings. Allocating funding from the Recovery Act to savings would reflect a strategic decision to prepare for the possibility of prolonged fiscal stress and a “new normal” following the Great Recession (Ammons, Smith, and Stenberg, 2012; Martin, Levey, and Cawley, 2012; Perlman and Benton, 2012).

This paper tests how funding from ARRA was utilized by local governments. Given the restrictions attached to grants for general purpose governments, this paper studies special

purpose governments, particularly school districts (Johnson, 2009). School districts faced significant fiscal stress in the years during and after the Great Recession, due to cuts in state budgets and weaknesses in property taxes (Ellerson, 2012; Oliff and Leachman, 2011). ARRA allocated \$48.5 billion in discretionary stabilization funds to allow school districts to address the effects of fiscal stress on budgets (Center on Education Policy, 2012).

To empirically test how ARRA was used by school districts, this paper employs a ten year panel of Pennsylvania school districts from FY 2003 to FY 2013. Dynamic panel regression models estimated on this data provide evidence that \$.57 of each \$1 of ARRA was devoted to paying school employee salaries and benefits. Additionally, \$.25 of each \$1 was saved by school districts into their unassigned fund balance, a discretionary account which can be utilized for addressing budget crises. Collectively, these findings suggest that school districts selectively used the stabilization funds from ARRA to avoid cutting teachers from FY 2009 to FY 2011 while also accumulating savings in the event of prolonged fiscal stress following the Great Recession.

These findings yield implications for research and practitioners. First, they build a growing body of evidence that state and local governments strategically build savings (e.g., Hou, 2003; Marlowe, 2005). Second, the findings demonstrate that the coordinated approach to stabilization policy enacted through ARRA had a positive effect on the intergovernmental system in the short-run. It allowed local governments such as school districts to simultaneously avoid cutback of personnel while also building countercyclical stabilization. This finding suggests that future forms of stabilization from the federal level should consider allocating funds on a discretionary basis through the intergovernmental system. Practitioners

at the federal level should consider this when drafting further stabilization legislation, while those at the state and local level should review how they allocated ARRA funding.

What follows is a discussion of fiscal stabilization and development of hypotheses in Section II. Consideration of the research design and an estimable dynamic model encompass section III. In Section IV, the findings of the model are presented. Section V concludes with a discussion of implications for research and practice.

3.2 Theoretical Framework

The Stabilization Function

There are three key functions of public finance: stabilization, distribution, and allocation (Musgrave, 1959). Stabilization emphasizes that governments respond to or stabilize the effects of the business cycle on employment and prices. According to Musgrave, the central government is the primary driver of fiscal stabilization, since the size and role of subnational governments is inconsequential in relation to national macroeconomic trends. The view that subnational governments are not involved in stabilization was held among many of the early public finance researchers, including Musgrave (1959) and Oates (1968; 1972). These researchers maintained that state and local governments did not have enough discretionary resources to counteract the business cycle in relation to the size of the federal government (Marlowe, 2005, 2012).

The tools of the federal government to pursue stabilization are more diverse in nature than at the subnational level, and reflect various ideologies, ranging from Keynesian stimulus to supply-side “trickle-down” economics (Abel, Bernanke, and Croushore, 2011). Under Keynesian stabilization, funding is channeled through the federal government to stimulate

aggregate demand to stabilize and subsequently counteract the effects of the business cycle. In contrast, a supply-side approach ascribes to the view that tax incentives can better promote economic growth relative to direct government expansion, which may crowd out investment. Both approaches to fiscal stabilization have been employed in the United States, with unresolved debate over the merits of each approach (Abel et al., 2011 Musgrave, 1985). At the state and local level, stabilization is pursued through budget stabilization funds and unassigned fund balance, savings accounts which can be used to reduce expenditure gaps and continue service provision to constituents (Arapis and Reitano, Forthcoming; Hou, 2003; Marlowe, 2005).

State and local governments became more involved in various government functions, including stabilization, due to increasing expenditures and decentralization starting in the 1970s (Nelson, 1990). These trends motivated research into the ability of state and local governments to pursue fiscal stabilization. Gramlich (1987, 1991) provided early evidence that subnational government finance was responsive to economic cycles, suggesting that stabilization policy was also occurring at these lower levels of government, a direct challenge to Musgrave (1959) and Oates (1968, 1972).

Sobel and Holcombe (1996) advanced stabilization research by demonstrating that state governments used budget stabilization funds (BSF) to reduce fiscal imbalances. States were also shown to strategically use BSF to counteract the effects of fiscal imbalances, even if mandated provisions for use of BSF were not in place (Douglas and Gaddie 2002). Hou (2003) demonstrated that states used BSF in addition to unassigned fund balance (UFB) as countercyclical tools to reduce expenditure gaps resulting from economic downturns. Hou

and Moynihan (2008) extend this line of research on BSF to show that this particular savings account is linked to government performance at the state level through economic downturns.

Research also shows that local governments pursue fiscal stabilization. Marlowe (2005) presents exploratory evidence that a sample of 103 Minnesota municipalities use UFB as a countercyclical tool to smooth expenditure imbalances during downturn years.

Regression estimates also showed that some municipalities were strategically siphoning UFB during upturn years to build countercyclical capacity for future downturns. However, the relationship between UFB and expenditure gap during economic downturns was not established across North Carolina counties from 1990 through 2007 (Wang and Hou, 2012).

In context of the Great Recession, Arapis and Reitano (Forthcoming) demonstrate that Florida municipalities strategically accumulated UFB through intergovernmental revenue following the Great Recession to prepare for future periods of economic downturn.

Fiscal Stabilization & ARRA

A review of the literature on the stabilization function reveals little consideration of how the federal government pursues stabilization through the intergovernmental system. As conceptualized by Musgrave (1959) and Oates (1968;1972), and studied empirically since the seminal work of Gramlich (1987; 1991), stabilization research has separated inquiry on the federal government and subnational governments. This separation of research by level of government does not align with stabilization policy. For example, in response to the Great Depression, portions of federal stabilization funding through the New Deal were focused on stabilizing state and local governments in addition to local economies (Fishback, Horace, and Kantor, 2005). The severity of the Great Recession also prompted a similar approach to

federal stabilization. Out of \$787 billion in stabilization funding, over \$264 billion was allocated to state and local governments (CBO,2013). However, research has focused on the effects of this funding on employment, rather than considering how state and local governments utilized this funding (CBO, 2011, 2013).

Funding for state and local governments was provided in various forms of grants. Stabilization funds were provided to help reduce state and local government budget gaps, reflecting weaknesses in revenue generation stemming from unemployment (decreased income tax) and the crash of the housing market (decreased property tax). Johnson (2009) notes that there were two primary grants through ARRA at the local level: formula and competitive. Formula grants addressed gaps in programs traditionally supported by the federal government while competitive grants were intended to spur collaboration and innovation at the local level. Much of the funding from the Recovery Act was funneled to the states, which led to challenges for local governments to pursue competitive grants, suggesting issues associated with implementation of ARRA funding (Johnson, 2009; Perlman, 2009).

At the local level, the issues general purpose governments faced in obtaining ARRA funds to reduce the effects of the Great Recession were not evident for school districts. As special purpose governments, school districts received over \$100 billion in funding, \$48.5 billion of which was focused on stabilization of budgets (Center on Education Policy, 2012). The funding was channeled from the federal government to the states. Upon receipt of the funds and broad agreement to distribute for the improvement of education, states provided

the money to local education agencies, such as school districts, to be used on a discretionary basis (Center on Education Policy, 2012).

The intended effect of stabilization funds was to ensure that school districts did not cut personnel, which could increase unemployment and also have negative ramifications for student outcomes (DPC, 2013). Empirical evidence shows that school districts saved at least 250,000 jobs, although there remains little inquiry into how else the funds were used by school districts. It is not feasible that the entirety of stabilization funding was used for retaining teacher and staff positions, since that would be over \$194,000 paid per position retained, a figure which exceeds average teacher and staff salaries across the country. This calculation suggests that funding from ARRA may have been allocated to other financial accounts.

As open systems, school districts may have decided to allocate ARRA funding due to internal and external influences. As developed in the seminal work of Simon and March (1958) and Cyert and March (1963), open systems organizations make decisions based on criteria internal to and external to the organization. Researchers have acknowledged that local governments, including school districts, operate as open systems (Nelson, 2012; Nelson and Balu, 2014). Within this system, internal factors include consideration of decision determinants which are within the organization, while external factors are outside the direct control of the organization. Examples of internal factors include management and finances while external factors range from political influences, unions, and constituents who may voice their preferences for how the government spends revenues (Hirschman, 1970). In context of this decision-making framework, school districts faced the decision of how to

allocate funding from the Recovery Act, ranging from spending the discretionary funds for various expenditure categories to paying off debt or possibly saving the funds for fiscal stress in the future.

If school districts followed the direct intent of ARRA as specified in the general purpose of the law, then funding would be directed primarily to stabilization of expenditures for maintaining school personnel. This could be reflected in the number of personnel positions saved, as demonstrated by the CBO (2011), but this provides little insight into how the funding was allocated. Funding from ARRA may have saved jobs in public education from being cut, but it could have also been directed to other expenditure categories, in addition to increasing savings or paying off debt.

There are three general ways a school district may have used funding from the federal government during the Great Recession. Each would have a direct effect on how the funding of ARRA was allocated, decisions which can be hypothesized and then empirically tested with regression modeling. First, the school district may have followed the general purpose of ARRA, and focused on savings jobs for personnel in context of decreasing property tax revenues from the housing market crash. The second decision a school district could have pursued would be an across the board distribution of the funding, a strategic response which would create equity across expenditure categories in response to the crisis of the Great Recession. Third, a school district could pursue a less uniform distribution of funding from the Recovery Act, which would neither reflect the intent of the stabilization legislation nor focus on an equitable distribution of the funding across expenditure categories.

If a school district intended to follow the intent of ARRA, then stabilization would be directed primarily to personnel, with the remaining funding going to other expenditures aimed at ensuring continued education provision for students. This would ensure that stabilization funds were consistent with the objectives of federal legislation. As discussed in legislation underlying ARRA, the funding was intended to stabilize the economy (CBO, 2011). If funding was directed to personnel expenditures, it would avoid personnel cutbacks stemming from the Great Recession, therefore circumventing the possibility of increased unemployment in the public education sector. The allocation of funding from a higher level of government would follow the guidelines of a lower level of government, to avoid negative effects on unemployment and the macro economy, which suggests that:

H1: School districts will allocate ARRA stabilization funding to teacher and staff salaries and benefits.

A second potential allocation of the funding would be equitable in nature. This would allow school districts to use ARRA to stabilize all expenditure functions equally. For example, salaries and benefits for personnel would receive an equal share of funding with support services aimed at improving instruction of students, among other categories of expenditures. This equal distribution of funding across categories would direct attention to various stakeholders in public education, including salaried personnel and recipients of public education, students. All of the funding would be devoted to expenditures in this equitable distribution, with no funding going into savings. In particular, if funding was allocated into savings accounts, there would be no direct way to trace how ARRA funding could be allocated equitably across expenditure categories in the future. Therefore, an

equitable financial management strategy would require that any discretionary stabilization funding received from ARRA be distributed equally across all expenditure categories in the year received rather than into savings accounts to be used in the future. Based on this discussion, the following hypothesis is developed:

H2: School districts will allocate ARRA funding equally across all expenditure categories.

A third potential allocation of funding would be less uniform in nature. It would not directly seek to fulfill the intent of ARRA nor focus on an equitable distribution of funding in the year the discretionary stabilization funding was received. Additionally, funding could be used to accumulate savings through unassigned fund balance (UFB) for future fiscal stress. This would reflect a decision in which the school district selects how to use ARRA as it best sees fit as opposed to any external influences such as the intent of the Reform Act. In the context of this discussion, the following hypothesis is developed:

H3: School districts will allocate ARRA funding in a non-uniform manner encompassing a mix of expenditure categories in addition to accumulating savings.

Each of the three hypotheses demonstrates the various decisions a school district could have made with stabilization funding. As an open system, each school district may have decided to pursue either of these three financial management strategies upon receipt of ARRA, given the lack of restrictions on \$48.5 billion in funding. An estimation strategy is proposed in the next section to empirically assess how each dollar of ARRA was distributed by school districts to various financial accounts, ranging from expenditures to savings accounts and paying debt.

3.3 Research Methodology

Model Specification

This paper tests how ARRA was allocated by school districts. As open systems, school districts are subject to internal and external factors, which may affect their decision-making. A model which tests the relationship between ARRA and various financial indicators is presented in Equation (1):

$$(1) Y_{it}^k = Y_{it-1} + \beta(ARRA)_{it} + \delta(Internal)_{it} + \theta(External)_{it} + FE_{it} + TE_t + \varepsilon_t,$$

Where k indexes school district allocation decision Y for school district i in period t . The effect of ARRA on each outcome Y is gauged through the magnitude of the coefficient β . A range of outcome variables Y are considered to test each of the three hypotheses from the previous section. These outcome variables include expenditures, fiscal savings in unassigned fund balance, and debt. An autoregressive component Y_{it-1} is incorporated into the model to control for the effect of decision-making from the previous year on current year outcomes Y . A vector of controls δ is included for internal factors which may affect school district decision making, in addition to a vector θ to control for external influences. A two-way fixed effects approach controls for unobserved time variant and time invariant determinant factors through the inclusion of fixed effects denoted by FE_{it} and time effects TE_t for each year included in the panel.

A two way fixed effects approach is preferable to a cross-sectional design. The use of fixed effects eliminates unobserved heterogeneity that may arise due to factors not included in the regression, which could be systematically correlated with the error term or observed

factors included in the regression. Eliminating the bias which may result from these unmeasured factors through fixed effects is a benefit of using a panel regression approach over a cross-sectional research design which cannot eliminate these unobserved factors. Fixed effects control for time invariant factors that may affect school district decision-making, such as geographic and institutional differences districts. Time effects control for time variant trends not already controlled for with included covariates in the model. In addition to this statistical modeling strategy, clustering on the school district level is also incorporated to ensure that standard errors are robust to within district variation.

Data

A panel data set of Pennsylvania school districts from FY 2003 through FY 2013 is used to test the three hypotheses developed in the prior section. It encompasses all 499 school districts in the state and includes various determinant factors which reflect the open system they operate within. Applying the open systems framework allows for consideration of the various influences a school district may face, which is consistent with literature on school district decision-making (Nelson and Balu, 2014). Further, it allows for consideration of the various internal and external factors that may affect the decision-making of school districts, particularly in terms of how to allocate ARRA to financial management.

Pennsylvania provides a relevant context for studying the effect of ARRA on the intergovernmental system. State funding decreased by almost \$800 million through the Great Recession, and over \$2 billion in stabilization funds were allocated to the state from ARRA from 2009 through 2011 (Pennsylvania State Education Association, 2012, 2013). The state also has a comprehensive longitudinal database which tracks financial data over time.

In addition to the comprehensive reporting and transparency of school district data in Pennsylvania, the state also has active professional organizations which have documented the response to the Great Recession through annual surveys of administrators (See Pennsylvania Association of School Administrators, 2015). These surveys can complement the findings of the regression models tested in this paper. Therefore, Pennsylvania presents a rich research context for conducting empirical analysis of the effects of ARRA at the local level.

For the purpose of this study, the majority of data is collected from the Pennsylvania Department of Education (PA DoE). The only data series which was not available for the length of the panel from the PA DoE was number of students in poverty, that was collected from the National Center on Education Elementary and Secondary Information System. All financial data is normalized by dividing by total enrollment per school district. Data on political representation of school districts is from the US Congressional Relationships File and historical data from the PA legislature.

Dependent Variables

The focus of this paper is to assess how ARRA is allocated to various financial accounts. These accounts include expenditures, savings, and debt. A major expenditure category for school districts is personnel salaries and benefits, which are on average over 70% of total expenditures. Expenditures devoted to salaries and benefits are the first dependent variable of interest. The remaining 30% of expenditures are aggregated and reflect a second dependent variable. Outside of expenditures, ARRA may also be allocated to savings. School districts use unassigned fund balance as a savings account (Duncombe and Hou, 2014), which serves as a third dependent variable. As noted by Gauthier (2009), fund

balance receives significant attention from researchers and practitioners, since it shows the capacity of a government to respond to a recession with fiscal savings. A final dependent variable of interest is long-term debt accumulation, which could be paid down with ARRA. To normalize each of these dependent variables, each is expressed as the ratio of total enrollment in each school district.

Independent Variables

Since school districts are open systems, they are subject to both internal and external factors. Controlling for these factors is critical to ensuring a consistent estimate of how school districts are allocating ARRA. The primary variable of interest is the amount of ARRA funding per pupil, which is interacted with a binary indicator for the length of funding from 2009 through 2011. This allows for a test of how ARRA funding per pupil is associated with the four dependent variables of interest discussed in the previous subsection.

A range of control factors which may affect decision-making are also included. In regard to internal factors, controls for revenue sources are incorporated into the model. School districts depend on two primary revenue sources: local and state. Local revenue sources may vary between school districts, depending on their ability to generate own-source revenue from property taxes and other local taxes. Given that Pennsylvania has significant economic variation, ranging from large urban metro areas in Philadelphia and Pittsburgh, to rural towns, controlling for variation in total local revenue is critical. Local revenues reflect the majority of funding for Pennsylvania school districts, and can constrain internal financial decision-making, and are therefore included in this study. A second revenue source which varies between school districts is state revenue. While the formula for revenue has changed

through the Great Recession, it has generally sought to allocate funding in relation to property values at the local level, to help smooth over differences in local funding that may create disparities in education spending. In addition to revenue sources, school districts face internal decisions regarding economies of scale. A control for enrollment and enrollment squared is included to capture differences in how school districts achieve cost efficiency (Eom et al., 2014). A squared term is included to capture the potential non-linearity of enrollment, which could suggest an economy of scale (Duncombe and Hou, 2014).

Controls for external factors are also incorporated into the model. Personal income per pupil is the ratio of total personal income in school district out of total enrollment. This ratio reflects disparities in wealth which may arise from the local economy. Further, the number of students receiving free or reduced lunch out of total number of students enrolled is also external to the school district, but can have an effect on financial decision-making. The number of students with this designation is a proxy for poverty in the school district, which can create burden on school district expenditures, savings, and potentially increase debt (National Center on Education Statistics, 2015).

The political views of constituents may also have an effect on school district decision-making. For example, a majority of constituents who are Republican may support austerity in response to a financial crisis, while a Democratic majority may seek expansion of funding to public education. To account for these differences, two measures are included in the model. After linking congressional voting boundaries to school districts with US Census files, historical records from the PA legislature were matched to each district. A measure of

total number of Republicans out of total number of elected representatives was included.

Another control for unanimous control by one political party is also included.

3.4 Findings

Descriptive Statistics

Descriptive statistics are presented in table 3.1. Each of the four dependent variables of interest has a large standard deviation. In terms of the two expenditure outcomes, each has standard deviation which is over 40% of the mean. Unassigned fund balance has the highest variation among all dependent variables, signaling that school districts may pursue various savings strategies. Long-term debt has a large range which exceeds the average, suggesting that some districts have no debt while others carry a significant portion of debt per pupil to continue operations. The key independent variable of interest gauging ARRA per pupil from FY 2009 through FY 2011 also has a large range.

Table 3.1 Descriptive Statistics

| Dependent | Mean | Std. Dev. | Min | Max |
|-------------------------|-------------|------------|------------|-------------|
| Personnel Sal. and Ben. | 8394.7150 | 2496.3520 | 1505.3630 | 39058.2100 |
| Non-personnel Exp. | 5287.4070 | 2349.2910 | 396.4651 | 45615.3800 |
| Unassigned Fund Balance | 1280.1260 | 1168.3470 | -6069.5500 | 11946.3500 |
| LT Debt | 13226.3900 | 11129.2600 | 0.0000 | 585938.7000 |
| Independent | | | | |
| ARRA | 88.0489 | 207.7032 | 0.0000 | 2066.5050 |
| Local Revenue | 7866.6170 | 3884.5890 | 1316.6810 | 31565.5700 |
| State Revenue | 5847.2500 | 2704.6890 | 822.3803 | 30882.2700 |
| Personal Income | 146508.4000 | 74965.2200 | 33173.6900 | 964065.2000 |
| Enrollment | 3422.1430 | 8100.2270 | 193.0000 | 189779.0000 |
| Poverty Percent | 0.3277 | 0.1996 | 0.0000 | 1.0000 |
| Republican | 0.6150 | 0.4437 | 0.0000 | 1.0000 |
| Unan. Party Contr. | 0.8406 | 0.3661 | 0.0000 | 1.0000 |

Dynamic Model Estimates

There are four key dynamic regression models which are presented in Table 3.2. The primary variable of interest is the effect of ARRA, which reflects how this federal stabilization funding was allocated. Controls for internal and external factors are included.

Table 3.2 Dynamic Regressions

| | Sal. And Ben. | Non-Sal. Exp. | UFB | Debt |
|--|-------------------------|----------------------------|-------------------------|-------------------------------|
| Personnel Sal. And Ben. _{t-1} | 0.0629 (0.07) | | | |
| Non-Personnel Exp. _{t-1} | 0.0000 | -0.1146*** (0.0176) | | |
| Unassigned fund balance _{t-1} | | | 0.4492*** (0.0443) | |
| LT Debt _{t-1} | | | | 0.0785 (0.0635) |
| ARRA | 0.5732** (0.2309) | -0.3383 (0.3243) | 0.2468* (0.1251) | -0.5315 (0.6986) |
| Local Revenue | 0.2662*** (0.0678) | 0.0825 (0.0558) | 0.0404 (0.0278) | 0.0785 (0.0635) |
| State Revenue | 0.3224*** (0.1180) | -0.2062* (0.0924) | 0.0766 (0.0671) | 0.1075 (0.1602) |
| Debt Service | 0.0246 (0.0155) | -0.0132 (0.0083) | -0.0042 (0.0032) | 0.1161 (0.2651) |
| Personal Income | 0.0054*** (0.0012) | -0.0019 (0.0026) | -0.0010 (0.0010) | 0.0011 (0.0083) |
| Enrollment | 0.0508 (0.1499) | -0.6582* (0.3042) | -0.0301 (0.1019) | -2.855* (1.1928) |
| Enrollment Squared | 0.0000 (0.0000) | 0.0000* (0.0000) | 0.0000 (0.0000) | 0.0000* (0.0000) |
| Poverty Percent | 279.0871 (162.5431) | 211.3474 (339.5370) | -117.8178 (135.1081) | 537.2478 (1,267.775) |
| Republican * Unan. | -763.7619 (574.5721) | -2224.4710 (2,075.4360) | 809.2562 (526.2386) | -638.1300 (2,532.803 0) |
| R-Squared | 0.6064 | 0.1462 | 0.2384 | 0.123 |
| F Statistic | 1561.6*** | 1.29*** | 21.12*** | 13.21*** |

*p<.5, **p<.01, ***p<.001

ARRA had a statistically significant effect on salaries and benefits per pupil. \$0.57 per dollar of ARRA funding was distributed to paying personnel salaries and benefits. This suggests that more than half of the funding was used by Pennsylvania school districts to stabilize personnel, a key provision of ARRA. In contrast, ARRA had no statistically significant effect on other expenditures per pupil.

There is also mixed evidence for the effect of federal stabilization on the other two outcome variables. \$0.25 per dollar of ARRA was devoted to unassigned fund balance, which shows that school districts were saving a quarter of this stabilization funding. Accumulation of savings in unassigned fund balance was likely not an intended effect of the funding but reflects the decision-making of school districts to hold onto short-term funding for long-term planning. Any amount in unassigned fund balance can be used for discretionary purposes, which suggests that districts were seeking to maintain savings in the event of prolonged fiscal stress rather than spending on other expenditure categories. Further, there is no evidence that school districts used ARRA for paying down long-term debt.

Collectively, these decisions demonstrate that school districts used ARRA for two distinct purposes. First, school districts intended to maintain personnel, to ensure that service provision to students would continue. Second, these local governments intended to take part of the funding for savings, suggesting that they were aware of the short-term nature of the stabilization funding and therefore intended to keep some of it for long-term contingencies. As noted by the American Association of School District Administrators (2012) and surveys of all school districts from the Pennsylvania State Education Association (2012; 2013), school districts were aware of the short-term nature of ARRA. This paper provides empirical

evidence that they intended to counteract the short-term nature of the funding by saving for a future rainy day.

Overall, these findings challenge hypothesis 1 and 2. There is no evidence that the expenditures were used exclusively for retaining personnel as expected in the first hypothesis. Further, there is no evidence of equitable use of the funding across expenditure categories, given that over half of ARRA stabilization funding was devoted to salaries and benefits. Therefore, the dynamic models support hypothesis 3: allocation of ARRA was not uniform. On average, school districts used just over half of the funding for personnel, and a quarter of the funding for savings. The remaining quarter of ARRA was not accounted for by the models, which suggests that it was used for diverse purposes across districts not accounted for in the model.

3.5 Conclusion

This paper provides insight into how ARRA affected the intergovernmental system. It develops an open system model of school districts and provides an empirical estimate of how ARRA was allocated to financial accounts. Estimation of the model provides evidence that stabilization funding was used by school districts to counteract the effects of the Great Recession in addition to saving for a future rainy day through unassigned fund balance. More than half of each dollar of ARRA was devoted to personnel salaries and benefits while a quarter of each dollar was saved in unassigned fund balance. There is no statistically significant evidence that ARRA funding was associated with paying for non-personnel expenditures or decreasing long-term debt. This finding suggests that the remaining \$0.18 of

ARRA not accounted for by the model may have been allocated for a variety of purposes, but not across non-personnel expenditures or long-term debt for the average school district.

These findings yield implications for research and practice. First, the manner in which school districts used ARRA provides evidence that they were aware of its short-term nature. Since the Great Recession had a prolonged effect on local and state revenue sources, the influx of federal funding was perceived as both short-term funding to avoid cutting personnel while also presenting an opportunity to save money into unassigned fund balance. This advances the limited understanding of school district financial management by providing further evidence that budgeters in school districts are responsive to both internal and external influences (Duncombe and Hou, 2014; Nelson and Balu, 2014). Internal influences such as declining own-source revenue compelled school districts to seek external funds for addressing temporary budget gaps while also accumulating savings into unassigned fund balance for future budget shortfalls. The use of the funding also circumvented the concerns of teachers, parents, and students, stakeholders who would have been adversely affected if the funding from ARRA was not used to retain personnel to ensure continued public education service provision.

Additionally, the findings support the discretionary nature of ARRA, and suggest that this style of fiscal stabilization from the federal level should be employed in the event of a future recession. Channeling stabilization funds through the intergovernmental system was a unique approach, which coordinated fiscal stabilization across levels of government. School districts followed the intent of ARRA by distributing over half of each dollar to personnel teacher and salaries, which simultaneously averted cutoffs in addition to ensuring continued

service provision for students. This fulfilled a primary purpose of the Recovery Act, which was to smooth unemployment due to the Great Recession. A portion of the money was also used for stabilization in a sense not directly anticipated by ARRA. In particular, ARRA enable local governments such as school districts to accumulate additional countercyclical resources into unassigned fund balance. The decision to save suggests that the effects of ARRA may also be hold in the medium to long-term, given that unreserved fund balance can be used at any point in the future for a contingency.

Collectively, these findings advance the research on the effects of ARRA by showing how the funding was used at the local level. These findings demonstrate that funding was used for paying personnel salaries and benefits, which is consistent with the findings of CBO (2011) and DPC (2013). The findings also provide evidence that ARRA was used for building unreserved fund balance, a decision which has yet to be established in the literature.

Elected officials and administrators should consider using a similar countercyclical approach when developing stabilization policy in the future. As the threat of another recession is subject to discussion among economic analysts and the media, there will be ongoing questions of how to stabilize the economy. A decentralized and coordinated approach to fiscal stabilization policy could prove to be an optimal approach, given that it allows governments at the lower level to select how best to allocate funds for remediating budget gaps while also avoiding cuts to the public sector (See OECD, 2010). As demonstrated in this paper, ARRA was integral to avoiding further layoffs in the public sector, while also allowing local governments to allocate funds to other pressing financial concerns by building unreserved fund balance for the possibility of future fiscal stress.

References

- Abel, A.E., Bernanke, B.S., & Croushore, D. (2011). *Macroeconomics*, 7th ed. Upper Saddle River, NJ: Prentice Hall.
- Ammons, D., Smith, K., and Stenberg, C. (2012). The future of local government: Will current stresses bring major, permanent changes? *State & Local Government Review*, 44(1), 64S-75S.
- Arapis, T. and Reitano, V. (Forthcoming). A glimmer of optimism in government savings accumulation? An empirical examination of municipal unassigned fund balance in Florida. *Public Finance Review*.
- Center on Education Policy [CEP]. 2012. What impact did education stimulus funds have on states and school districts? Retrieved from <http://eric.ed.gov/?id=ED533671>
- Cogan, J.F. & Taylor, J.B. (2012). What the government purchases multiplier actually multiplied in the 2009 stimulus package. In L. Ohanian, J.B. Taylor, & I. Wright (Eds.), *Government policies and the delayed economic recovery* (pp. 85-114). Stanford, CA: Hoover Institution Press.
- Congressional Budget Office [CBO]. (2011). Estimated impact of the American recovery and reinvestment act on employment and economic output from July 2011 through September 2011. Retrieved from <http://www.cbo.gov/sites/default/files/cbofiles/attachments/02-22-ARRA.pdf>
- Congressional Budget Office [CBO]. (2013). Federal grants to state and local governments. Retrieved from https://www.cbo.gov/sites/default/files/113th-congress-2013-2014/reports/03-05-13FederalGrants_onecol.pdf
- Council of Economic Advisers. (2010). The economic impact of the American recovery and reinvestment act of 2009. Retrieved from <https://www.whitehouse.gov/administration/eop/cea/Economic-Impact/>
- Cyert, R., and March, J. (1963). *A behavioral theory of the firm*. Oxford, UK: Blackwell.
- Domestic Policy Council [DPC]. (2013). Education impact of the American recovery and reinvestment act. Retrieved from https://www.whitehouse.gov/assets/documents/DPC_Education_Report.pdf
- Douglas, J. and Gaddie, R. (2002). State Rainy day funds and fiscal crises: Rainy day funds and the 1990-1991 recession revisited. *Public Budgeting & Finance*, 22, 19-30.

- Duncombe, W., and Hou, Y. (2014). The savings behavior of special purpose governments: A panel study of New York school districts. *Public Budgeting and Finance*, 34(3), 1-23.
- Ellerson, N.M. (2012). Weathering the storm: How the economic recession continues to impact school districts. Retrieved from https://www.aasa.org/uploadedFiles/Policy_and_Advocacy/files/Weathering_the_Storm_Mar_2012_FINAL.pdf
- Eom, T.H., Duncombe, W., Nguyen-Hoang, P., & Yinger, J. (2014). The unintended consequences of property tax relief: New York's STAR program. *Education Finance and Policy*, 9(4), 446-480.
- Fishback, P.V., Horace, W.C., & Kantor, S.(2005). Did new deal grant programs stimulate local economies? A study of federal grants and retail sales during the Great Depression. *The Journal of Economic History*,65(1), 36-71.
- Gauthier, S.J. (2009). Fund balance: New and improved. *Government Finance Review*, April, 11-14.
- Gramlich, E. (1987). Subnational fiscal policy. In John M. Quigle (Ed.), *Perspectives on local public finance and public policy* (pp. 3-27). Greenwich, CT: JAI Press.
- Gramlich E. (1991). The 1991 state and local fiscal crises. *Brookings Papers on Economic Activity*, 2, 249–287.
- Harris, B., & Shadunsky, Y.(2013). State and local governments in economic recoveries: This recovery is different. Urban-Brookings Tax Policy Center. Retrieved from <http://www.taxpolicycenter.org/UploadedPDF/412807-State-and-Local-Governments-and-Recessions.pdf>
- Hirschman, A.O. (1970). *Exit, voice, and loyalty: Responses to decline in firms, organizations, and states*. Cambridge, MA: Harvard University Press.
- Hou, Y. (2003). What stabilizes state general fund expenditures in downturn years-budget stabilization fund or general fund unreserved undesignated balance? *Public Budgeting & Finance*, 23(2), 64-85.
- Hou, Y., and Moynihan, D. (2008). The case for countercyclical fiscal capacity. *Journal of Public Administration Research and Theory*, 18, 139-159.

- Initiative on Global Markets. (2014). Economic stimulus (revisited). Retrieved from http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_5bfARfqluG9VYrP
- Johnson, N.(2009). Does the American recovery and reinvestment act meet local needs? *State and Local Government Review*,41(2), 123-127.
- March, J.G., Simon, H. (1958). *Organizations*. Oxford, UK: Wiley.
- Marlowe, J. (2005). Fiscal slack and counter-cyclical expenditure stabilization: A first look at the local level. *Public Budgeting & Finance*, 25(3), 48-72.
- Marlowe, J.(2012). Fiscal slack, reserves, and rainy-day funds. In J. Justice, H. Levine, & E. Scorsone (Eds.), *Local Government Fiscal Health* (pp. 321-342).New York, NY: Taylor & Francis.
- Martin, L., Levey, R., and Cawley, J. (2012). The “new normal” for local government. *State & Local Government Review*,44 (1), 17S-28S.
- Musgrave, R.(1959). *The theory of public finance*. New York, NY: McGraw-Hill.
- Musgrave, R. (1985). A brief history of fiscal doctrine. In A.J. Auerbach &M. Feldstein (pp. 1-59). Amsterdam, Netherlands: Elsevier. *Handbook of Public Economics*
- National Center for Education Statistics [NCES]. (2015). Concentration of public school students eligible for free or reduced-price lunch. Retrieved from http://nces.ed.gov/programs/coe/indicator_clb.asp
- Nelson, A.A., & Balu, R. (2014). Local government response to fiscal stress: Evidence from the public education sector. *Public Administration Review*,74(5): 601-614.
- Nelson, K. L. (2012). Municipal choices during a recession: Bounded rationality and innovation. *State and Local Government Review*, 44(IS), 44S-63S.
- Nelson, M. (1990). Decentralization of the subnational public sector: An empirical analysis of the determinants of local government structure in metropolitan areas in the US. *Southern Economic Journal*, 57(2), 443-457.
- Oates, W.E. (1968). The theory of public finance in a federal system. *The Canadian Journal of Economics*,1(1), 37-54.
- Oates, W.E. (1972). *Fiscal federalism*. New York, NY: Harcourt Brace Jovanovich.

- Oliff, P. & Leachman, M. (2011). *New school year brings steep cuts in state funding for schools*. Washington, DC: Center on Budget Policy and Priorities.
- Oliff, P., Mai, C., & Palacios, V. (2012). *States continue to feel recession's impact*. Washington, DC: Center on Budget Policy and Priorities.
- Organization for Economic Cooperation and Development [OECD]. (2010). Fiscal policy across levels of government in times of crisis. Retrieved from <https://www.oecd.org/ctp/federalism/44729769.pdf>
- Pennsylvania Association of School Administrators. (2015). Continued cuts: The PASA-PASBO report on school district budgets. Retrieved from [http://file2.pasbo.org/PASA-PASBOreport_Spring2016%20\(FINAL\).pdf](http://file2.pasbo.org/PASA-PASBOreport_Spring2016%20(FINAL).pdf)
- Pennsylvania State Education Association [PSEA]. (2012). Sounding the alarm. Retrieved from https://www.psea.org/uploadedFiles/LegislationAndPolitics/Key_Issues/PSEA-SoundingTheAlarm-March2012.pdf
- Pennsylvania State Education Association [PSEA]. (2013). Sounding the alarm 2: PSEA's updated white paper on Pennsylvania's school funding crisis. Retrieved from <https://www.psea.org/soundingthealarm/>
- Perlman, B. (2009). The ARRA of our ways. *State and Local Government Review*, 41(2), 120-122.
- Perlman, B., & Benton, J.E. (2012). Going it alone: New survey data on economic recovery strategies in local government. *State and Local Government Review*, 44(1S), 5S-16S.
- Sobel, R., and Holcombe, R. (1996). The impact of state rainy day funds in easing state fiscal crises during the 1990–1991 recession. *Public Budgeting and Finance*, 16(3), 28–48.
- Wang, W., and Hou, Y. (2012). Do local governments save and spend across budget cycles? Evidence from North Carolina. *American Review of Public Administration*, 42(2), 152-169.

Chapter 4

Examining Methodological Approaches in Budget Stabilization Research

Abstract

The literature on budget stabilization requires a researcher to isolate the effect of the business cycle on expenditures. At the state and local level, this occurs through either additive fiscal stress measures, linear trend models, or econometric filters; however, little has been done to corroborate claims that one method has greater predictive validity than another. To address this gap in the literature, this paper compares each method across a panel of Florida counties from 1980 to 2012. The additive measure produces spurious results for a majority of years. In contrast, the linear trend models captures expenditure gaps in over 70% of counties during national recessions, while the Hodrick-Prescott filter shows a year lag in capturing downturns. Comparatively, the linear trend produces the best results for downturn years relative to the additive measure and filter. These findings indicate that researchers should test multiple approaches to check the robustness of their findings.

Keywords: budget stabilization, statistical methodology, public finance

4.1 Introduction

As open systems organizations, subnational governments are subject to both internal and external influences (Hendrick, 2006; Nelson and Balu, 2014). A variety of external influences local governments face when making decisions have been identified, ranging from local institutions to exogenous shocks and policies (Nelson, 2012; Reitano, Forthcoming). According to Marlowe (2005; 2012) and Scorsone and Plerhoples (2010), local governments are particularly susceptible to uncertainty arising from the external environment, which challenges their fiscal sustainability (Kavanagh, 2007). In response to this uncertainty, researchers and practitioners have developed budget stabilization strategies, which occur through the use of fiscal savings to mitigate revenue shortfalls and reduce expenditure gaps (Hou, 2013, 2015). Despite the widespread application of this stabilization strategy, evidence underlying it is predicated on how researchers identify and model economic shocks over the business cycle (Elder and Wagner, 2013; Gauthier, 2009; Hou and Moynihan, 2008; Stewart, 2009; Wagner and Elder, 2005, 2007). The literature has debated which method is most appropriate, but has little uniformity in methodology and research design (Elder and Wagner, 2013; Hou, 2003; Wagner and Elder, 2005, 2007).

To provide clarity to the budget stabilization literature, this paper compares different approaches to capturing economic downturns at the local level. Across the literature, there are three broad approaches to measuring how subnational governments employ stabilization funds over the business cycle, which has periodic upturns and downturns (Hou, 2003; Marlowe, 2005). The first approach utilizes elementary time-series graphs and additive measures to show trends in stabilization policy through economic downturns (Douglas and

Gaddie, 2002; Gramlich, 1991; Sobel and Holcombe, 1996). Studying trends over time in financial data is a descriptive process which does not account for dynamics in the business cycle, and may lead to different policy recommendations depending on the length of the time-series under study (Cirincione, Gurrieri, and Desande, 1999; Hou, 2003; Wagner and Elder, 2007). The second approach addresses these limitations with a model that extract a trend. A linear-trend predicts fluctuations in expenditures to capture the magnitude of upturns and downturns in relation to the business cycle (Hou, 2003; Marlowe, 2005). Despite the methodological advances offered in this second approach, estimates are contingent upon the validity of the predicted linear-trend, which depends on proper specification of the trend model (Wagner and Elder, 2007).

A third approach acknowledges the aforementioned limitations and utilizes macro econometric techniques such filters, which are specifically designed to extract the business cycle (Wagner and Elder, 2005). Filters extract a trend and cyclical component, which can be used to isolate turning points in the business cycle, therefore leading to a more flexible estimator for stabilization research relative to the linear trend (Canova, 1994; Wagner and Elder, 2005). Despite their widespread adoption, filtering techniques face increased criticism from the economics literature, given their inability to consistently extract a cyclical component from historical data (Hamilton, 2016).

While these approaches have strengths and weaknesses, there is no comparative test of how they perform in isolating economic downturns experienced by subnational governments. To address this concern, this study reviews each of the three methodological approaches, details their assumptions and limitations, and then conducts a comparison. The

comparison will address the following research question: is each approach providing estimates similar to trends in the national business cycle?

To answer the research question, this study utilizes a panel of Florida counties from 1980 through 2012. Florida provides an ideal context due to a heterogeneous economic, regional, and political base (Arapis and Reitano, Forthcoming; McDonald, 2015; McDonald and Gabrini, 2014). With this panel, the three methods in the stabilization literature are tested and their estimates compared. The additive fiscal stress measure developed by Sobel and Holcombe (1996) does not provide consistent estimates of either upturns or downturns, and is therefore unable to capture turning points. In contrast, the linear trend predicts national recessions for at least 70% of counties in a given year, while the Hodrick-Prescott filter exhibits a year lag effect in recession detection. For non-recession years, there is evidence that both the linear trend model and the filter are producing spurious results, although the filter has better performance. Comparatively, the linear trend is shown to be optimal for recession prediction relative to the additive fiscal stress measure and filter. Collectively, these results cast considerable doubt on the validity of the three methods over the whole business cycle, challenging much of the research on budget stabilization on methodological grounds.

This study advances the research methodology within public budgeting and financial management on two fronts. First, it offers the initial comparison of methodological approaches in the subnational budget stabilization literature, which clarifies the optimal methods for future research. Second, the findings indicate that a variety of methods should be used to triangulate research conclusions, given that each method has strengths and

weaknesses. Collectively, these findings indicate that research should potentially avoid relying on econometric methods, and look to alternative methods such as case studies and risk analysis employed by practitioners and the Government Finance Officers Association (Gauthier, 2009; Rubin, 2015). These alternatives focus on contextual knowledge to inform evidence-based decision making, which has been shown to have the same or better predictive validity than statistical models in local government research (Frank and Zhao, 2009).

This paper is structured into five sections. A discussion of the methodological approaches and findings of each paper on budget stabilization is included in the section which follows. The third section provides a formal overview of the three methodological approaches. Findings are presented in the fourth section. The fifth section concludes with implications for researchers and practitioners.

4.2 Theoretical Framework

Budget Stabilization and the Business Cycle

Budget stabilization is a countercyclical process involving the accumulation and allocation of fiscal savings over the business cycle (Hou, 2003). During upturns in the business cycle, a government can shift a portion of their surplus to a savings account (Hendrick, 2006). Accumulated savings can then be used to respond to revenue shortfalls and expenditure gaps arising from economic downturns (Hou, 2003; Marlowe, 2005). The use of fiscal savings during an economic downturn creates slack in the budget, and ensures the continuation of service provision for constituents over the business cycle (Hendrick, 2004, 2006).

Since budget stabilization involves the countercyclical use of fiscal savings, research examining it must take into account fluctuations in the business cycle (Hou, 2003; Marlowe, 2005). The business cycle has a short-run trend and long-run cyclical component, both of which should be measured and controlled for when studying budget stabilization (Wagner and Elder, 2007). Without considering both, research may only capture short-run trends less than two years, rather than extracting a long-run cyclical component (Wagner and Elder, 2007).

Only examining short-run trends will lead to bias in model estimates and invalid policy conclusions, since government finances may only be experiencing a temporary change for the selected period of time under study (Cirincione, Gurrieri, and Desande, 1999). In the case of budget stabilization, this could lead a researcher to conclude that the use of fiscal savings is associated with a temporary fluctuation unique to the government under study, rather than the long-run business cycle affecting all state and local governments (Wagner and Elder, 2005). Only extracting a short-run trend can also confound research examining the effect of fiscal savings on revenue shortfalls and expenditure gaps, which would challenge the validity of findings from existing research (Wagner and Elder, 2007).

There is debate regarding which methods should be used to capture the trend and cyclical component of the business cycle in budget stabilization research (Wagner and Elder, 2005). The literature captures the business cycle through three main methods, but has yet to reach a consensus on which is optimal (Elder and Wagner, 2013; Wagner and Elder, 2007). These are: time-series analysis with additive measures, linear trend models, and econometric filters. This section will review all three methods.

The initial research on subnational budget stabilization utilizes elementary time-series analysis and additive measures to capture trends over time (Hou, 2013). Gramlich (1991) uses aggregated time-series data to show that state and local government accumulate a surplus over the business cycle. Graphical analysis reveals that surpluses are due to trends rather than long-run cycles; specifically, short-run trends in healthcare are linked to decreased surpluses during an economic downturn rather than the long-run cyclical component of the business cycle from 1955 to 1990.

Gramlich's (1991) methodology was expanded upon by Sobel and Holcombe (1996), and later by Douglas and Gaddie (2002). Sobel and Holcombe (1996) utilize time-series analysis and ordinary-least squares regression to study the relationship between budget stabilization funds (BSF) and fiscal stress over the business cycle. They develop a measure of fiscal stress, which is the sum of total tax increases and expenditure gaps. Sobel and Holcombe (1996) argue their measure of fiscal stress captures trends in the business cycle, since states facing an economic downturn would not raise taxes but may decrease expenditures. Thus, the sum of tax increase and expenditure decreases captures the magnitude of the business cycle for an individual government.

The Sobel and Holcombe (1996) measure of fiscal stress does not extract both a trend and cyclical component. Instead, their measure captures "indirect" short-run trends in revenues and expenditures rather than actual business cycle fluctuations (Hou, 2003, p. 67). One consequence of only isolating the short-run trend is that it does not capture the long-run cyclical dynamics of the business cycle (Wagner and Elder, 2007). Since the business cycle is defined by both its trend and cyclical component, Sobel and Holcombe (1996) are not

actually capturing the business cycle, but instead short-run trends, which may bias results (Hou, 2003).

Further, Sobel and Holcombe (1996) assume that tax increases would only occur during an economic upturn, while expenditure decreases reflects an economic downturn. Under this assumption, the fiscal stress measure is combining rather than separating economic upturns and downturns, which makes it difficult to interpret (Hou, 2003). Specifically, a higher magnitude of the fiscal stress measure signals a larger effect of the business cycle, but does not indicate if a government is experiencing an upturn or downturn (Sobel and Holcombe, 1996). This property makes interpretation of the measure nearly impossible if used in a panel containing both upturn and downturn years, which is the standard in fiscal stabilization research (Hou, 2003).

The fiscal stress measure of the business cycle also has an implicit assumption that state governments are homogeneously affected by an economic downturn such as a national recession. In particular, it does not weight the dollar amount of tax increase or expenditure decrease by per capita income or total population, which would minimize differences across states (Hendrick, 2004, 2006). The assumption also contradicts research showing that economic downturns have a heterogeneous effect on state and local governments, which should be captured by weighting financial data (Reschovsky, 2004; Stock and Watson, 1989).

In addition to concerns with the fiscal stress measure of the business cycle, there are issues with respect to their time-series data and econometric methods. Sobel and Holcombe (1996) only examines a short time-series from 1989 to 1992. Not including a longer time-

series to graphically interpret trends in the fiscal stress could bias the results (Cirincione et al., 1999). In particular, Sobel and Holcombe (1996) give no consideration of data prior to and after the recession, which does not allow for analysis of long-run trends in the business cycle which research using state level time-series data should incorporate (Stock and Watson, 1989).

Despite the concerns, Sobel and Holcombe (1996) examine trends in their fiscal stress measure for 1989 to 1992, and also use it as a dependent variable in their stabilization model. They regress a binary indicator for a BSF on their fiscal stress measure, to see if there is support for the hypothesis that states are pursuing countercyclical stabilization of expenditures. The authors are unable to establish any statistically significant evidence to support their hypothesis. The unexpected results may potentially result from their decision to use an additive measure, which does little to parse out the different components of the business cycle (Wagner and Elder, 2007).

Given the unexpected findings, Douglas and Gaddie (2002) seek to build upon Sobel and Holcombe (1996). They surprisingly apply the same measure of fiscal stress from Sobel and Holcombe (1996), but incorporate more controls, including the amount of dollars in a BSF. There is an assumption that the inclusion of controls will provide a better measurement of the stabilization process over the business cycle; however, the authors do little to remediate the aforementioned issues, such as extracting both the short-run trend and long-run cyclical component. While they do show that higher savings in a BSF lower fiscal stress from the business cycle, the results can still be challenged, given the concerns with their outcome variable (Wagner and Elder, 2007).

Additionally, the use of a cross-section rather than a panel challenges the validity of findings in Sobel and Holcombe (1996) and Douglas and Gaddie (2002), given that financial data may experience long-run trends (Wooldridge, 2002). A cross-section is a static view of state governments at one point in time, which cannot capture changes over time and does not have the advantages of using panel data to estimate a longitudinal model. For example, a cross-section cannot eliminate unobserved factors with fixed and time effects as in a standard two-way fixed effects panel model (Wooldridge, 2002). The inability to eliminate these factors may lead to a systematic correlation between unobserved variables and both the observed variables and error term, leading to biased parameter estimates (Wooldridge, 2002). In the cases of Sobel and Holcombe (1996) and Douglas and Gaddie (2002), one example of an unobserved factor is per capita income, which could be associated with the fiscal stress outcome measure. Not including per capita income could bias the parameter estimates in terms of magnitude and directionality. If a panel was used instead, fixed effects could eliminate this unobserved factor in a longitudinal model.

The use of a cross-sectional model also has concerns with respect to a type of endogeneity, particularly reverse causality (Wooldridge, 2002). There is no attempt to address the reverse causation between a rainy day fund and fiscal stress, which may change the magnitude and directionality of the parameter estimate of the rainy day fund. Thus, the estimate may actually reflect the effect of fiscal stress on the rainy day fund, which violates the assumption that directionality flows from an independent to dependent variable. This could be remediated with a two-way fixed effects model, but the use of an instrumental variable (IV) which introduces exogenous variation would be ideal. For example, a

randomized variable correlated with the rainy day fund but not the fiscal stress measure would eliminate unobserved factors which could lead to reverse causation (Wooldridge, 2002).

Overall, given the extensive concerns regarding how the business cycle is captured and related methodological concerns, the estimates of Sobel and Holcombe (1996) and Douglas and Gaddie (2002) can be challenged. There are clear concerns with respect to interpretation of their fiscal stress measure and how it extracts upturns and downturns in the business cycle, compounded by the use of a cross-section of data. Collectively, these issues challenge the validity of findings and their relevance to policymakers (Hou, 2003; Wagner and Elder, 2007).

Hou (2003) provides the first direct attempt to address the noted concerns in Sobel and Holcombe (1996) and Douglas and Gaddie (2002). In particular, Hou (2003) develops a multi-step framework to estimate the effect of the business cycle on expenditures, test the procyclical nature of expenditures, and then systematically examine the effect of countercyclical funds on expenditure gaps over the business cycle. In the first step, Hou (2003) employs a linear-trend model to calculate the expenditure gap. A linear trend of total general fund expenditures is calculated, and the residuals are compared to the actual expenditures. This provides a measure of economic upturns or downturns. If the actual value is greater than the residual, then the state is experiencing an upturn; conversely, if the actual value is less than the residual, the state is in a downturn stemming from the business cycle.

This trend approach provides a systematic and regression based approach to capturing the business cycle, which reflects an improvement over additive measures such as in Sobel

and Holcombe (1996) and Douglas and Gaddie (2002). Specifically, the linear trend captures deviations from the expected trend in expenditures, based on the prior historical trends in the dependent variable. In contrast, the additive measure does not control for prior trends, and is therefore limited in the information it carries regarding both short-run trend and long-run cyclical changes in a given time-series (Hou, 2003).

Given the advantages of the linear trend approach developed in Hou (2003), it was widely adopted to study countercyclical stabilization of expenditures (Hou, 2013). After Hou (2003), papers applying the linear trend approach include Hou (2004; 2005; 2006) and Hou and Moynihan (2008) at the state level. Marlowe (2005) and Wang and Hou (2012) applied the linear trend approach at the local level.

Despite the advances in the linear trend model over time-series analysis and additive measures from Gramlich (1991) and Sobel and Holcombe (1996), it has been prone to spurious results that run counter to evidence from professional organizations such as the GFOA. For example, Marlowe (2005) and Wang and Hou (2012) are both unable to establish evidence that local governments in Minnesota and North Carolina are able to use UFB to reduce expenditure gaps. These findings largely conflict with views espoused by professional organizations and practitioners, which argue that fiscal savings are used in response to economic cycles in state and local governments (GFOA, 2015; NASBO, 2013).

The divergence in findings can be attributed to concerns with the linear-trend approach. The findings of papers which apply the linear trend approach are dependent upon the ability of the methodology to capture upturn and downturn years. Specifically, the linear trend is a function of time trend and unit level intercept parameters, which are unable to

capture both the short-run trend and long-run cyclical component of the business cycle (Wagner and Elder, 2007). The inability to extract both parts of the business cycle may lead to spurious results that are inconsistent with national cyclical trends when applying the linear trend model; thus, results may be inconsistent and not reflect what is occurring in a government (Wagner and Elder, 2007).

Despite the criticism of the linear trend model from Wagner and Elder (2007), few attempts have been made to check for the validity of the linear trend approach. Hou (2003, 2004), Hou and Moynihan (2008), Marlowe (2005), and Wang and Hou (2012) employ graphical methods to check if the linear-trend gap is correctly estimating economic upturns and downturn. This is purely descriptive analysis, and the graphs in Hou (2003) actually show evidence of spurious results across states, but are not addressed in the paper. One systematic method of checking if the linear-trend gap is correctly estimating the business cycle component is by triangulating the findings with alternative econometric methods.

An econometric filter extracts a cyclical and trend component out of a time-series of data, which is consistent with the definition of the business cycle (Hodrick and Prescott, 1997). The exact method by which a filter extracts these values depends on the underlying assumptions and calculations. The Hodrick-Prescott filter (HP) is a common approach, which minimizes the squared sum of the first difference and second difference deviation between the actual value and cyclical component. After the minimization, which should also be adjusted based on the frequency of the data, the cyclical component can be analyzed. If the cyclical component has a value below zero, this could be an indication of a downturn, and likewise, a shift to a positive value indicates a turning point and upward momentum (Canova,

1994). Collectively, shifts reflect turning points, which over time, create a numerical and graphical picture of upturns and downturns in a given time-series such as gross domestic product, revenues, or expenditures (Canova, 1994; Hodrick and Prescott, 1997).

Researchers commonly use these turning points in ex-post analysis to compare the ability of different filters to capture business cycle shifts in relation to estimates from the National Bureau of Economic Research (NBER). The NBER determines recession and depression dating in the United States. In relation to budget stabilization research, Wagner and Elder (2007) utilize the HP filter to extract a cyclical component. They are able to show countercyclical stabilization of expenditures at the state level with an econometric filter, which challenges research from Hou (2003), potentially confirming the issues with the linear trend approach. Thus, there are inconsistent findings in the literature, depending on how the business cycle is extracted.

In sum, there are three methods applied in the budget stabilization literature. The next section provides a research question to compare the methods. Each question is examined in this paper on an exploratory basis.

Comparing Methodological Approaches

This section develops a research question which can be used to examine the validity of the different methodologies in the budget stabilization literature. A comparison between methods shows will provide evidence if each is providing estimates similar to trends in the national business cycle.

The first question requires consideration of national business cycles. The National Bureau of Economic Research (NBER) Business Cycle Dating offers the standard

methodology and data on business cycle dates and turn points. The NBER methodology estimates when the U.S. experiences a recession based on decreases in GDP for two consecutive quarters (NBER, 2017). This rule can be modified, however, in cases such as the Great Recession from December 2007 to June 2009; the second quarter of 2008 did not have a decline in GDP, but NBER still maintained the U.S. was experiencing a recession (NBER, 2017). The NBER methodology can be used to compare the ability of each model to pick up national trends on expenditures. Simply, when a cyclical component is identified by either the additive model, linear trend, or filter, it will be compared with national recession dates.

The research question also involves checking if each method indicates a change in the business cycle from an upturn to a downturn or a downturn to an upturn. This form of turning point analysis requires a long panel to ensure that there is variation to capture (Hou, 2013; Stock and Watson, 1989). A turning point is when the components of additive fiscal stress measure change in magnitude, there is a change in direction above or below the linear trend line, or the cyclical component of an econometric filter has a change in directionality.

Collectively, the research question can advance the literature on budget stabilization. The literature has only argued for rather than provide empirical evidence of which methodological approach is optimal given the complexity of capturing the business cycle (See Stock and Watson, 1989). Therefore, this paper addresses this gap in the literature. No hypotheses are provided given the exploratory nature of these questions, but the next section details the different research methods to address each question.

4.3 Research Methodology

Identification of Economic Downturns

In this section, a panel dataset is utilized to test the validity and reliability of three types of models: additive measures of the business cycle, linear trend models, and econometric filters. This analysis is conducted in context of the three research questions posed in the prior section of the paper. While the key aspects of each methodological approach are provided in the preceding section, further explanation of how to test each research question is considered.

The first research question requires consideration of isolating the effect of the national business cycle on expenditures. The additive fiscal stress measure from Sobel and Holcombe (1996) and Douglas and Gaddie (2002) is one approach to extract the business cycle. It is a composite measure which sums tax increases and expenditure decreases, which is reflected in equation 1:

$$(1) \text{ Fiscal Stress} = \text{Tax Increases} + \text{Expenditure Decreases}$$

Analysis of the two components of the fiscal stress measure as well as their sum are methods to extract business cycle fluctuations. A tax increase would signal an economic upturn, while an expenditure decrease shows the presence of an economic downturn (Sobel and Holcombe, 1996; Douglas and Gaddie, 2002). Additionally, the additive measure can show the magnitude of fiscal stress in relation to the business cycle; higher values signal the business cycle is having a stronger effect on a government. It should be noted, however, that it is a one-sided measure rather than looking at both economic upturns and downturns in the business cycle (Hou, 2003). Therefore, the fiscal stress measure from Sobel and Holcombe

(1996) does not delineate between upturns and downturns, as in the linear trend model and econometric filters (Hou, 2003).

An alternative to the additive measure is to use a trend model developed by Hou (2003). The linear-trend approach requires estimation of an econometric model to calculate expected expenditures, which are subsequently utilized to predict the extent of the expenditure gap. This provides an estimate of if local government expenditures are going above or below the expected linear trend line. The process is shown in equations 2 and 3:

$$(2) \quad E1^*_{it} = \alpha_i + \beta_i T_i + u_{it}$$

$$(3) \quad Expenditure\ Gap1_{it} = \frac{E_{it} - E1^*_{it}}{E1^*_{it}}$$

Where $E1^*_{it}$ is the actual expenditures as a function of unit level fixed effects and time effects. The residuals generated from equation 2 can be input into equation 3 to obtain the expenditure gap, to see if the predicted expenditures are above or below the actual expenditures. Marlowe (2005) and Wang and Hou (2012) build upon this process by incorporating controls for heterogeneity at the local level, which is shown in equation 4

$$(4) \quad E2^*_{it} = \alpha_i + \beta_i T_i + Z_{it} + u_{it}$$

$$(5) \quad Expenditure\ Gap2_{it} = \frac{E_{it} - E2^*_{it}}{E2^*_{it}}$$

The residuals calculated from equation 4 are then used to calculate the expenditure gap shown in equation 5. This allows for the inclusion of a vector of controls Z, which can include local economic, institutional, and political factors that may determine the level of expenditures. Therefore, the estimates of equation 5 may be more robust to different factors at the local level which are not included in equation 3 (Marlowe, 2005).

The framework of the linear-trend approach depends on linear trend line capturing fluctuations in expenditures, which is a challenging assumption to uphold given it is a linear

model, which may not be able to capture dynamic fluctuations over the business cycle (Wagner and Elder, 2005, 2007). In particular, the linear trend is a function of time trend and unit level intercept parameters, which are unable to capture both the short-run trend and long-run cyclical component of the business cycle (Wagner and Elder, 2007). An alternative method is to filter the data to remove the trend and cyclical component. As shown in equation (5), for example, the Hodrick-Prescott filter (1997) extracts a cyclical component based on long-run trends in a time-series.

$$(6) \text{Min } \tau (\sum_{t=1}^T (y_t - \tau_t)^2 + \alpha \sum_{t=2}^{T-1} [(\tau_{t+1} - \tau_t) + (\tau_t - \tau_{t-1})]^2)$$

Where y_t is the time-series of interest, particularly expenditures, which is the sum of a trend component τ and a cyclical component c . In the first summand, the sum of the squared difference between y_t and τ_t is a first difference, followed by a second difference subject to a penalty factor α for the frequency of data. The differences in each sum operator are what capture trends in the prior year. Ravn and Uhlig (2002) show that α should be set at 6.25 for annual time series, with higher values corresponding to higher frequencies of data. After the data is filtered, the sign of the cyclical component can signal whether an upturn or downturn in expenditure is occurring. For example, a negative value in the cyclical component indicates a negative deviation from the past trend. In contrast, a positive value in the cyclical component indicates an upturn (Canova, 1994).

Once the linear-trend and filters are estimated, the results can be compared in relation to NBER business cycles. Simply, when a negative expenditure gap or cyclical component is identified by one of the methods, it will be compared with national recession dates.

Comparing model estimates with recession dates is consistent with Canova (1994), who

argues it checks for the validity and sensitivity of recession dating to different methods. For this paper, if the prediction from either model and the actual NBER recession dating match, then the sub national government in a given year will receive a score of one. Each of these scores are added up across the number of counties in a given year and divided by the total number of counties, as shown in equation 7:

$$(7) \text{ Recession Prediction} = \frac{\text{Correct Identification}_t}{\text{Number of Government Units}_i}$$

The ratio approach presented in equation 7 can also be applied to identify the detection of spurious results in relation to NBER results. It would entail checking if a negative value of the linear trend or a negative value of the cyclical component are found in non-recession NBER years. The inconsistency between the estimated models and NBER would signal spurious results.

Data

The latter research questions are investigated on an exploratory basis. A panel data set from McDonald and Gabrini (2014) which has all 67 Florida counties from 1980 to 2012 is utilized. Estimating the additive measure in equation 1 from Sobel and Holcombe (1996) and Douglas and Gaddie (2002) requires revenue and expenditure data. Similarly, the linear-trend from Hou (2003) uses expenditure data for the reduced form model in equation 2, and additional controls to estimate the alternative linear trend model specification in equation 4. As shown in equation 2, total expenditures are regressed as a function of time and individual intercepts for each government in the panel (e.g., county or school district). To provide a more robust model that controls for regional heterogeneity, the linear trend model is also estimated with a vector of control factors, as shown in equation 4. For the purpose of this paper, the vector Z will include variables capturing own-source and intergovernmental

revenues, institutional factors including county form of government, political share of registered Republican and Democratic voters, local income and unemployment characteristics, and educational attainment and population. These controls have been identified as critical in relation to government financial decisions, with respect to Florida counties (McDonald, 2015; McDonald and Gabrini, 2014), Florida local governments (Arapis and Reitano, Forthcoming), and municipalities in other states (Marlowe, 2005, 2012; Wang and Hou, 2012).

To extract a cyclical component in the data, the HP filter shown in equation 6 only requires expenditure data over the panel. The filter will extract the trend and cyclical components in expenditures within each county for each year. The estimates can then be compared between the additive measure, linear trend models, and HP filter.

4.4 Findings

Trend Analysis with Additive Business Cycle Measure

Tables 4.1 and 4.2 show the tax and expenditure components of the fiscal stress measure developed by Sobel and Holcombe (1996) to capture the business cycle. The first column reflects the downturn or upturn year, followed by the tax increase and expenditure decrease component in the second and third column. The tax increase and expenditure decrease are represented in dollar amounts, and can be interpreted as the dollar increase in taxes across all Florida counties or dollar decrease in expenditures across all Florida counties. The fourth column measures fiscal stress, which is the sum of tax increases and expenditure decreases, as shown in equation 1. There is no direct interpretation of the fiscal stress

measure, but a potential interpretation is that an increase in fiscal stress indicates a larger effect on the business cycle (Hou, 2003).

Table 4.1 presents mixed evidence of business cycle detection for NBER downturn years. Four out of seven downturn years show that expenditure decreases are higher than tax increases across all counties in Florida. These results are unexpected, since Sobel and Holcombe (1996) assume that tax increases should only be occurring in upturn years, and be less than total expenditure decreases in downturn years. Therefore, the measure is not working as they intend. This could potentially reflect the concerns regarding the lack of a weighting scheme by per capita income or total population, which are not considered in the Sobel and Holcombe (1996) fiscal stress measure (Hendrick, 2004, 2006).

Table 4.1. Trend Analysis and Additive Fiscal Stress Measure for Downturn Years

| NBER Downturn Year | Tax Increase (\$) | Exp. Decrease (\$) | Fiscal Stress (\$) |
|--------------------|-------------------|--------------------|--------------------|
| 1981 | 201296717.00 | 58331419.70 | 259628136.70 |
| 1982 | 252936209.00 | 361785091.30 | 614721300.30 |
| 1990 | 361746399.00 | 107394860.00 | 469141259.00 |
| 1991 | 280951538.00 | 310041352.80 | 590992890.80 |
| 2001 | 366816151.00 | 69292721.70 | 436108872.70 |
| 2008 | 44085756.00 | 1379120726.00 | 1423206482.0 |
| 2009 | 64255802.00 | 3087335047.00 | 3151590849.0 |

Table 4.1 also presets the sum of the tax increase and expenditure decrease for a given year, which is the fiscal stress measure. Since the expenditure decrease is presented as an absolute value, the fiscal stress measure will always be positive (Sobel and Holcombe, 1996; Douglas and Gaddie, 2002). Therefore, the measure only provides insight into the magnitude of the business cycle in a given year, rather than the directionality in terms of an

upturn or downturn (Hou, 2003). Examining the relative magnitude between downturn years demonstrates that the business cycle may have intensified the lag effect on Florida counties. A sample interpretation of the fiscal stress measure is that increase in the magnitude of the fiscal stress measure from \$259628136.70 in 1981 to \$614721300.30 in 1982 indicates a \$355093163.60 larger effect of the business cycle (Hou, 2003). Across the years of NBER downturn in table 1, the fiscal stress measure increases from 1981 to 1982, 1990 to 1991, and 2008 to 2009. The year 2001 cannot be interpreted in terms of increases or decreases, since the 2001 recession only lasted for a year (NBER, 2017). The interpretations must be considered with caution, however, given the inability of the fiscal stress measure to capture the directionality of either an upturn or downturn (Hou, 2003).

Table 4.2 presents results for tax increase, expenditure decreases, and the fiscal stress measure in upturn years. Ten out of twenty six years have tax increases greater than expenditure decreases, which would indicate that these two measures are correctly detecting upturns less than half of the time (Sobel and Holcombe, 1996). Thus, there are spurious results for more than half of the upturn years. These concerns are compounded when analyzing the fiscal stress measure, which has little evidence of consistently lower levels of fiscal stress. There are large deviations between years which cannot be readily explained given that these were not downturn years, and that there is no directionality in the fiscal stress measure (Hou, 2003).

Table 4.2. Trend Analysis and Additive Fiscal Stress Measure for Upturn Years

| NBER Upturn Year | Tax Increase (\$) | Exp. Decrease (\$) | Fiscal Stress (\$) |
|------------------|-------------------|--------------------|--------------------|
| 1983 | 66888536.0000 | 16854667.9400 | 83743203.9400 |
| 1984 | 167349558.0000 | 1503684956.0000 | 1671034514.0000 |
| 1985 | 160775301.0000 | 97745398.8100 | 258520699.8000 |
| 1986 | 270055111.0000 | 434928310.5000 | 704983421.5000 |
| 1987 | 293590766.0000 | 426563118.9000 | 720153884.9000 |
| 1988 | 310318196.0000 | 118350549.8000 | 428668745.8000 |
| 1989 | 278162478.0000 | 110961458.0000 | 389123936.0000 |
| 1991 | 280951538.0000 | 310041352.8000 | 590992890.8000 |
| 1992 | 225512880.0000 | 311652536.9000 | 537165416.9000 |
| 1993 | 107000928.0000 | 612453689.2000 | 719454617.2000 |
| 1994 | 126080486.0000 | 1020231218.0000 | 1146311704.0000 |
| 1995 | 187780260.0000 | 596630889.6000 | 784411149.6000 |
| 1996 | 153072197.0000 | 491479049.2000 | 644551246.2000 |
| 1997 | 145415025.0000 | 198813087.6000 | 344228112.6000 |
| 1998 | 301539727.0000 | 126056049.0000 | 427595776.0000 |
| 1999 | 317592337.0000 | 409338132.8000 | 726930469.8000 |
| 2000 | 332104783.0000 | 993012709.3000 | 1325117492.0000 |
| 2002 | 531916027.0000 | 118315396.0000 | 650231423.0000 |
| 2003 | 562373576.0000 | 262406146.8000 | 824779722.8000 |
| 2004 | 718889146.0000 | 566753109.6000 | 1285642256.0000 |
| 2005 | 798024918.0000 | 477850594.0000 | 1275875512.0000 |
| 2006 | 1278410669.0000 | 2268178568.0000 | 3546589237.0000 |
| 2007 | 1603878836.0000 | 171293927.5000 | 1775172763.0000 |
| 2010 | 51646040.0000 | 102441366.4000 | 154087406.4000 |
| 2011 | 10311897.0000 | 3346490545.0000 | 3356802442.0000 |
| 2012 | 14379931.0000 | 1883261692.0000 | 1897641623.0000 |

Collectively, tables 4.1 and 4.2 provide evidence of the difficulty in capturing upturns and downturns with the fiscal stress measure developed by Sobel and Holcombe (1996). In relation to the first research question, there is mixed evidence of business cycle detection with tax increases and expenditure decreases. Additionally, the fiscal stress measure only captured the magnitude rather than the directionality of business cycle, and is therefore

unable to provide insight into the second research question regarding turning points between upturns and downturns (Hou, 2003).

Linear Trend and Econometric Filter Estimates

Two alternatives to the fiscal stress measure from Sobel and Holcombe (1996) are tested and compared in tables 4.3 and 4.4 for downturn and upturn years. It should be noted that each table presents estimates of the ratio in equation 7. As shown in table 4.3, each of the methods to isolate the business cycle are reaching different results. Across the seven periods of recession identified by NBER, the ability of each method of capture this fluctuation differs considerably depending on the time period and method. All of the results in table 4.3 reflect estimation of equation 7 across the two linear trend models (columns 2 to 3) and the Hodrick-Prescott filter (columns 4).

Table 4.3. Downturn Year Detection Ratio

| NBER Downturn Year | Expenditure Gap | Expenditure Gap 2 | HP Filter |
|--------------------|-----------------|-------------------|-----------|
| 1981 | 0.8060 | 1.0000 | 0.3284 |
| 1982 | 0.7910 | 0.9851 | 0.6119 |
| 1990 | 0.7761 | 0.9254 | 0.3881 |
| 1991 | 0.7910 | 0.9104 | 0.4030 |
| 2001 | 0.7463 | 0.8358 | 0.5970 |
| 2008 | 0.7313 | 0.8060 | 0.4776 |
| 2009 | 0.7463 | 0.8209 | 0.8955 |

As a means to understanding the second column in table 4.3, a sample interpretation for the year 1981 expenditure gap is provided: For 80.60% of counties in 1981, the expenditure gap correctly predicts a recession. The same interpretation would apply to the third column of table 4.3, which presents the expenditure gap 2 estimates. The baseline linear

trend model as shown in column 2 (equation 3) and linear trend model with controls as shown in column 3 (equation 5) each capture recessions for at least 70% of counties in Florida. The linear trend model with controls has a higher ability to capture economic recessions reported by NBER, which could align with the recommendation that regional heterogeneity should be considered when studying budget stabilization (Marlowe, 2005). Expenditure prediction may not simply be a function of a linear trend over time, but also due to other local financial, political, and institutional factors, particularly in a state such as Florida, which has economically diverse counties (Arapis and Reitano, Forthcoming).

Estimates of the HP filter are presented in table 4.3 column 4. As a means to understanding the fourth column, a sample interpretation for the year 1981 HP filter estimate is provided: For 32.84% of counties in 1981, the HP filter predicts a recession. Across each of the recession years in table 4.3, the HP filter exhibits a similar lag effect as shown in the tax increase and expenditure decrease measures from Sobel and Holcombe (1996). For example, the HP filter is extracting a downturn for more counties in the second year of a recession, from 1981 to 1982, 1990 to 1991, and 2008 to 2009. Despite this minor similarity between results, there are concerns with respect to the low estimates from the Great Recession. In 2008, the HP filter picks up the downturn for 48% of counties, and increases to almost 90% by 2009. This could potentially reflect a lag effect, but evidence from Arapis and Reitano (Forthcoming) indicates that local governments faced fiscal stress starting from 2008. Additionally, according to Florida Tax Watch (2009), the Great Recession had severe financial ramifications for the state since its start. The concern over the validity of estimates

from the HP filter are not unique to this study, with Hamilton (2016) showing that the method produces spurious results which are inconsistent with NBER cycles.

Overall, the results indicate widespread divergence in cycle identification across the linear trend models and HP filter. The two linear trend models perform the best from the ratio measure proposed in equation 7, while the filter show more variation, and little ability to predict the duration of largest economic shock since the Great Depression, namely the 2008-2009 Great Recession (Ammons et al., 2012; Martin et al., 2012). Therefore, in regard to the first research question, the linear trend model appears to have greater validity than the filter models in predicting downturns, challenging the assertions in Wagner and Elder (2005; 2007) that linear trends are of little value to stabilization research.

It should be noted that analysis of time periods which are not facing a shock (e.g., non-recession years) casts considerable doubt on the linear trend and HP filter. As shown in table 4.4, both expenditure gap models are showing that at least 70% of counties are experiencing an expenditure downturn in non-NBER recession years, which seems doubtful given the financial growth exhibited by counties at the local level over the past two decades (Arapis and Reitano, Forthcoming). This concern is compounded by the finding that neither method is able to consistently capture turning points, which addresses the second research question. The two linear trend estimates show a majority of counties are experiencing a downturn in the years after a recession. These findings contrast with the HP filter, which show a lower detection of downturns during an NBER defined upturn, which is likely a function of its ability to extract both a trend and cyclical component (Canova, 1994; Hodrick and Prescott 2003). Therefore, since the linear trend only captures short-run trends, it may be

unable to capture changes between economic cycles relative to the HP filter (Wagner and Elder, 2005).

Table 4.4 Upturn Year Detection Ratio

| NBER Upturn Year | Expenditure Gap | Expenditure Gap 2 | HP Filter |
|------------------|-----------------|-------------------|-----------|
| 1983 | 0.8333 | 1.0000 | 0.5455 |
| 1984 | 0.8182 | 0.9848 | 0.2121 |
| 1985 | 0.8030 | 0.9848 | 0.2576 |
| 1986 | 0.7879 | 0.9697 | 0.4394 |
| 1987 | 0.7879 | 0.9848 | 0.3636 |
| 1988 | 0.8030 | 0.9697 | 0.3333 |
| 1989 | 0.8030 | 0.9545 | 0.4545 |
| 1992 | 0.7576 | 0.9091 | 0.5758 |
| 1993 | 0.7879 | 0.9091 | 0.3333 |
| 1994 | 0.7576 | 0.9091 | 0.3636 |
| 1995 | 0.8030 | 0.9091 | 0.3636 |
| 1996 | 0.8030 | 0.9091 | 0.4848 |
| 1997 | 0.8182 | 0.9091 | 0.4242 |
| 1998 | 0.8030 | 0.8788 | 0.4091 |
| 1999 | 0.7879 | 0.8636 | 0.4091 |
| 2000 | 0.7576 | 0.8636 | 0.3030 |
| 2002 | 0.7879 | 0.8485 | 0.5303 |
| 2003 | 0.7727 | 0.8333 | 0.4242 |
| 2004 | 0.7879 | 0.8485 | 0.2727 |
| 2005 | 0.7576 | 0.8030 | 0.2424 |
| 2006 | 0.7424 | 0.8030 | 0.5152 |
| 2007 | 0.7576 | 0.8182 | 0.8030 |
| 2010 | 0.7727 | 0.8182 | 0.7727 |
| 2011 | 0.7727 | 0.8030 | 0.4545 |
| 2012 | 0.7273 | 0.8333 | 0.2273 |

These findings regarding recession detection and turning point analysis supports the concerns noted in Wagner and Elder (2005; 2007), that linear trends have little basis in either theory or practice. Additionally, when analyzing the papers which employ this method, such as Hou (2003), graphs which are provided to illustrate the linear trend indicate that it

produces spurious results. Specifically, the linear trend model produces spurious results for some states such as New York, which experienced a downturn from 1988 to 1993, while other large states, such as California and Ohio, experienced an economic upturn as measured by the expenditure gap for this period (Hou, 2003). The finding in Hou (2003) is inconsistent with NBER research on business cycles during this period and research from Sobel and Holcombe (1996) showing how all states experienced a downturn during the 1990-1991 recession.

The HP filter also has considerable variation over the non-recession years as shown in table 4.4, column 4. The average number of counties facing a downturn for each of the non-recession years is 42% for the HP filter. These results indicate almost half of counties are experiencing a downturn in upturn years, which provide further evidence that filters are leading to spurious results (Hamilton, 2016).

4.5 Conclusion

This paper identified different approaches to isolating the business cycle in budget stabilization research. As argued in the theoretical framework, each approach can be challenged on theoretical and methodological grounds, and is subject to debate in the literature (Wagner and Elder, 2005, 2007). For the purpose of this paper, an additive fiscal stress measure, linear trend models, and an econometric filter are tested. Estimates of each approach are then compared, given their widespread adoption in the literature (Hou, 2013).

The estimates of each approach yields considerably different results. The two components of the additive fiscal stress measure from Sobel and Holcombe (1996) detects upturns and downturns for less than half of the years in the panel. Additionally, their

composite fiscal stress measure is able only to show the magnitude, rather than the direction or turning point in the business cycle. Therefore, the concerns expressed by Hou (2003) and Wagner and Elder (2007) regarding the additive measure are supported.

The linear trend models surprisingly shows the most consistent estimates during downturns, providing results parsimonious with NBER recession cycles over 70% of counties across 7 periods of economic downturn. In contrast, the HP filter varied considerably, and failed to predict the entire period of economic downturn during the 2008-2009 recession; this period, known as the Great Recession, is widely considered to be the worst economic downturn since the Great Depression, and severely stressed local governments across the country, including those in Florida (Ammons et al., 2012; Arapis and Reitano, Forthcoming).

The linear trend models exhibit spurious results to a greater degree during non-downturn years. Both expenditure gap models indicate downturns for over 70% of the time for non-recession years, while the filters shows more consistent results for upturn years. This could potentially indicate that counties in Florida are either in an ongoing expenditure cutback for over 30 years, due to local economic variation and downturns unique to a particular county, or that the models are not producing valid estimates. Given the discussion of spurious results in Hou (2003) and Marlowe (2005) and evidence that Florida governments at the local level do not use long-term expenditure retrenchment (Arapis and Reitano, Forthcoming), this paper argues the linear trend model is prone to spurious results in non-NBER recession years.

Collectively, these findings cast doubt on all three approaches and challenge much of the literature. The validity of findings in Hou (2003) and Marlowe (2005) are contingent upon the linear trend model estimates, and, as this paper has shown, there is some evidence the method can predict when a national downturn occurs but leads to spurious results for non-downturn years. This concern is not alluded to in either paper, despite graphical trends presented in the Hou (2003) paper that show the spurious results which the linear trend produces. It could be argued then, that Wagner and Elder (2005; 2007) are correct in their assertion that linear trend models are invalid; however, the filter tested in this paper shows little ability to consistently capture downturns, a concern that is noted among macroeconomists (Cogley and Nason, 1994; Hamilton, 2016).

Given these findings, there is little reason to support the conclusions from research on subnational budget stabilization in academic research. Indeed, the lack of findings that BSF and UFB are providing countercyclical stabilization of expenditures may stem from the selected methodological approach employed in works such as Hou (2003), Marlowe (2005), and Wang and Hou (2012). In terms of research, these results indicate the need for checking the robustness of findings with different methodological approaches. Therefore, it is challenging to find models which can accurately predict economic cycles in both upturn and downturn years; this conclusion essentially mirrors forecasting research, which finds that prediction is important for reducing information asymmetry among decision-makers, but is always going to be an imprecise science and art (Makridakis and Taleb, 2009).

Despite these assertions regarding the validity of budget stabilization research, the question of how to develop policy recommendations for practitioners remains. In terms of

praxis, this paper recommends that academic research on budget stabilization should not be employed by decision-makers until greater analysis of academic research methodology occurs. Given the need for some form of insight, practitioners should instead look to case study research and frameworks developed by professional organizations such as the GFOA. In particular, the GFOA (2015) does not rely upon assumptions from econometric models, but instead looks to trends in actual financial data, contextual factors regarding local financial risk levels, and the local knowledge of practitioners. These recommendations have been in place for over two decades, and continue to be accepted among practitioners, despite their lack of reliance on econometric methods employed in the literature (Gauthier, 2009).

As argued in Frank and Zhao (2009) and Reitano (Forthcoming), local governments may not have the technological and methodological capabilities to identify impending economic downturns that are available to state governments, but they still have knowledge of their local jurisdiction. Contextual knowledge is often shown to have about the same or in some cases better predictive validity relative to a complex statistical model such as those tested in this paper (Frank and Zhao, 2009). Therefore, given the uncertainty surrounding econometric models utilized in budget stabilization research, this paper recommends that practitioners follow the advice of professional organizations and apply expertise about their local environment when making budget stabilization decisions.

References

- Ammons, D.N., Smith, K.W., & Stenberg, C.W. (2012). The future of local government: Will current stresses bring major, permanent changes? *State & Local Government Review*, 44(1S), 64S-75S.
- Arapis, T. and Reitano, V. (Forthcoming). A glimmer of optimism in government savings accumulation? An empirical examination of municipal unassigned fund balance in Florida. *Public Finance Review*.
- Arapis, T., Reitano, V., & Bruck, E. (Forthcoming). The Fiscal Savings Behavior of Pennsylvania School Districts Through the Great Recession. *Public Budgeting & Finance*.
- Canova, F. (1994). Detrending and turning points. *European Economic Review*, 38, 614-623.
- Cogley, T., & Nason, J.M. (1995). Effects of the hodrick-prescott filter on trend and difference stationary time series: Implications for business cycle research. *Journal of Economic Dynamics and Control*, 19, 253-278.
- Cirincione, C., Gurrieri, G.A., & DeSande, B.V. (1999). Municipal government revenue forecasting: Issues of method and data. *Public Budgeting & Finance*, 19(1), 26-46.
- Douglas, J.W., & Gaddie, R.K. (2002). State rainy day funds and fiscal crises: Rainy day funds and the 1990-1991 recession revisited. *Public Budgeting & Finance*, 22(1), 19-30.
- Duncombe, W., and Hou, Y. (2014). The savings behavior of special purpose governments: A panel study of New York school districts. *Public Budgeting and Finance*, 34(3), 1-23.
- Elder, E.M., & Wagner, G.A. (2013). Revenue cycles and risk-sharing in local governments: An analysis of state rainy day funds. *National Tax Journal*, 66(4), 939-960.
- Florida Tax Watch. (2009). The current recession in Florida: Comparative information and data on the worst economic downturn since the 1930s. Retrieved from <http://www.floridatxwatch.org/resources/pdf/eco32.pdf>
- Frank, H.A., & Zhao, Y. (2009). Determinants of local government revenue forecasting practice: Empirical evidence from Florida. *Journal of Public Budgeting, Accounting & Financial Management*, 21(1), 17-35.
- Gauthier, S.J.(2009). Fund balance: New and improved. *Government Finance Review* 11-14.

- Government Finance Officers Association [GFOA]. (2015). Appropriate level of unrestricted fund balance in the general fund. Retrieved from <http://www.gfoa.org/appropriate-level-unrestricted-fund-balance-general-fund>
- Gramlich, E. (1987). Subnational fiscal policy. In John M. Quigle (Ed.), *Perspectives on Local Public Finance and Public Policy* (pp. 3-27). Greenwich, CT: JAI Press.
- Gramlich, E.(1991). The 1991 state and local fiscal crises. *Brookings Papers on Economic Activity*, 2, 249–287.
- Hamilton, J.D. (2016). Why you should never use the Hodrick-Prescott filter. Mimeo UC San Diego, Department of Economics.
- Hendrick, R. (2004). Assessing and measuring the fiscal health of local governments: Focus on Chicago suburban municipalities. *Urban Affairs Review*, 40(1), 78-114.
- Hendrick, R. (2006). The role of slack in local governments. *Public Budgeting & Finance*, 26(1), 14-46.
- Hodrick, R., & Prescott, E. (1997). Postwar U.S. business cycles: An empirical investigation. *Journal of Money, Credit and Banking*, 29(1), 1-16.
- Hou, Y. (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, Y. (2004). Budget stabilization fund: Structural features of the enabling legislation and balance levels. *Public Budgeting & Finance*, 24(3), 38-64.
- Hou, Y. (2013). *State government budget stabilization: Policy, tools, and impacts*. New York, NY: Springer.
- Hou, Y. (2015). *Local government budget stabilization: Explorations and evidence*. New York, NY: Springer.
- Hou, Y., & Moynihan, D.P. (2008). The case for countercyclical fiscal capacity. *Journal of Public Administration Research & Theory*, 18(1), 139-159.
- Kavanagh, S.C. (2007). *Financing the future: Long-term financial planning for local government*. Chicago, IL: Government Finance Officers Association.
- Makridakis, S., & Taleb, N. (2009). Living in a world of low levels of predictability. *International Journal of Forecasting*, 25, 840-844.

- Marlowe, J. (2005). Fiscal slack and counter-cyclical expenditure stabilization: A first look at the local level. *Public Budgeting & Finance*, 25(3), 48-72.
- Marlowe, J. (2012). Fiscal slack, reserves, and rainy-day funds. In J. Justice, H. Levine, & E. Scorsone (Eds.), *Local Government Fiscal Health* (pp. 321-342). New York, NY: Taylor & Francis.
- Martin, L.L., Levey, R., & Cawley, J. (2012). The new normal for local government. *State and Local Government Review*, 44(1S), 17S-28S.
- McDonald, B., and Gabrini, C. (2014). Determinants of county charter decisions: An event history analysis of Florida counties. *Journal of Public Administration Research and Theory*, 24(4), 721-739.
- McDonald, B. (2015). Does the charter form improve the fiscal health of counties? *Public Administration Review*, 75(4), 609-618.
- Nelson, A.A., and Balu, R. (2014). Local government response to fiscal stress: Evidence from the public education sector. *Public Administration Review*, 74(5): 601-614.
- Nelson, K.L. (2012). Municipal choices during a recession: Bounded rationality and innovation. *State and Local Government Review*, 44(1S), 44S-63S.
- National Association of State Budget Officers [NASBO]. (2013). *State budgeting and lessons learned from the economic downturn: Analysis and commentary from state budget officers*. Washington, DC: NASBO.
- National Bureau of Economic Research [NBER]. (2017). The NBER's business cycle dating procedure: Frequently asked questions. Retrieved from http://www.nber.org/cycles/recessions_faq.html
- National League of Cities. (2015). City Fiscal Conditions. Retrieved from <http://www.nlc.org/city-fiscal-conditions>
- Pew Charitable Trusts. (2015). *Why states save: Using evidence to inform how large rainy day funds should grow*. Washington, DC: Pew.
- Rafuse, R. (1965). Cyclical behavior of state-local finances. In Richard A. Musgrave (Ed.), *Essays in fiscal federalism*. Washington, DC: The Brookings Institute.
- Ravn, M.O., & Uhlig, H. Notes: On adjusting the hodrick-prescott filter for the frequency of observations. *The Review of Economics and Statistics*, 84(2), 371-380.

- Reitano, V. (Forthcoming). An open systems model of local government forecasting. *American Review of Public Administration*.
- Reschovsky, A. (2004). The impact of state government fiscal crises on local governments and schools. *State and Local Government Review*, 36(2), 86-102.
- Rubin, I. (2015). Past and future budget classics: A research agenda. *Public Administration Review*, 75(1), 25-35.
- Scorsone, E.A., & Plerhoples, C. (2010). Fiscal stress and cutback management amongst state and local governments: What have we learned and what remains to be learned? *State and Local Government Review*, 42(2), 176-187.
- Sobel, R.S. & Holcombe, R.G.(1996). The impact of state rainy day funds in easing state fiscal crises during the 1990–1991 recession. *Public Budgeting and Finance*, 16(3), 28–48.
- Stewart, L.M. (2009). Examining Factors that Impact Mississippi Counties’ Unreserved Fund Balance during Relative Resource Abundance and Relative Resource Scarcity. *Public Budgeting & Finance*, 29,45-73.
- Stewart, L.M., Phillips, J.N., & Modlin, S. (2013). An Evaluation of the Connection between Economic Volatility and Governmental Savings Levels for Illinois, North Carolina, and Mississippi Counties. *Public Finance and Management*, 13, 361-382.
- Stock, J.H., & Watson, M.W. (1989). New indexes of coincident and leading indicators. *NBER Macroeconomics Annual*, 4, 351-409.
- Vanyolos, I. (2011). The impact of state-imposed fund balance limits on school districts: Evidence from New York state. *Journal of Public Budgeting, Accounting & Financial Management*, 23(2), 166-187.
- Wagner, G.A., & Elder, E.M. (2005). The role of budget stabilization funds in smoothing government expenditures over the business cycle. *Public Finance Review*, 33(4), 439-465.
- Wagner, G.A., & Elder, E.M. (2007). Revenue cycles and the distribution of shortfalls in U.S. states: Implications for an “optimal” rainy-day fund. *National Tax Journal*, 60(4), 727-42.
- Wang, W., & Yilin, H. (2012). Do local governments save and spend across budget cycles? Evidence from North Carolina. *American Review of Public Administration*, 42(2), 152-169.

Wooldridge, J.M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: The MIT Press.

Chapter 5

Conclusion

5.1 Summary of Dissertation

Fiscal stabilization occurs when a government accumulates fiscal savings during an economic upturn and then expends the savings to mitigate an economic downturn (Hou, 2003; Marlowe, 2005). The decision to pursue stabilization, however, requires consideration of allocation. For example, selecting which expenditure category should be stabilized with slack resources is a function of allocation. Local governments may selectively allocate slack to address the conflicting interests of internal and external stakeholders, with preference given to those most likely to voice their dissatisfaction with service provision (Hirschman, 1970). To examine the allocation of own-source and intergovernmental slack resources, this dissertation develops an open systems model and decision framework. Both are used to test the selective allocation of slack resources across expenditure categories in response to stakeholder conflicts. The models are tested with data from special purpose government at the local level, which provides evidence of selective allocation in fiscal stabilization.

Since the literature does not consider allocation of stabilization funds, which may lead to bias in model estimates, methods in literature are also studied (Hendrick, 2006). To examine if results in the literature are biased from existing methods, a comparative test of three methods used in stabilization research is conducted. The methods include an additive measure (Sobel and Holcombe, 1996), a linear trend model (Hou, 2003), and the Hodrick-Prescott (1997) filter utilized in Wagner and Elder (2005). Each model is estimated with data from a panel of Florida counties from 1980 to 2012 (McDonald, 2015; McDonald and Gabrini, 2014). The ability of each model to correctly identify upturns and downturns in the business cycle is tested with a ratio measure, which can show the performance of each

method. Collectively, the development of new models and the comparison of methods indicate that fiscal stabilization is a function of the business cycle and conflicting stakeholder interests.

5.2 Findings

This dissertation provides evidence that special purpose local governments are selectively allocating both own-source and intergovernmental slack resources during fiscal stabilization. In regard to own-source slack resources, estimates of an open systems model show that the interests of stakeholders are considered during the allocation of unassigned fund balance (UFB) in response to economic downturns. The administrative function is stabilized with the highest percentage of UFB relative to other expenditures which have a direct effect on students and teachers. The finding provides evidence of conflict arising from own-source slack resources, in which the interests and goals of administrators outweigh those of students and teachers during fiscal stabilization (Cyert and March, 1963). There is also evidence of selective allocation of fiscal stabilization funds from external sources, such as intergovernmental transfers from the American Recovery and Reinvestment Act (ARRA). Estimates of a decision framework show that for each dollar of ARRA funding, \$.57 was allocated by school districts to teacher salaries. Additionally, \$0.25 of each dollar of ARRA was allocated to accumulating slack in UFB. Since a quarter of each dollar of ARRA is allocated to UFB, school districts valued prudent financial management, rather than directing all stabilization funds to teacher salaries and instructional expenditures as intended by federal policymakers (Center on Education Policy, 2012).

Selective allocation of own-source slack and external slack resources indicates the presence of goal conflict and the influence of stakeholder voice (Cyert and March, 1963; Hirschman, 1970). School districts utilize UFB selectively, to support internal stakeholders such as administrators. Additionally, ARRA funds are selectively allocated to the long-term sustainability of the school district, in contrast to the interests of federal policymakers (Center on Education Policy, 2012). Stabilizing one group of stakeholders over another may result from discretion in how governments decide to allocate UFB and also ARRA funds (Arapis and Reitano, 2017; Hendrick, 2004, 2006).

Testing for selective allocation in fiscal stabilization could not occur without the development of new models informed by theory from Cyert and March (1963) and Hirschman (1970). The literature has instead modeled the effect of UFB on total expenditures, which does not capture the decision to stabilize select expenditure categories (Marlowe, 2005; Wang and Hou, 2012). As defined by the GFOA (2015), the use of fiscal stabilization funds such as UFB occurs for particular expenditure categories, rather than being tied to the total level of expenditures as modeled in the literature. Only modeling stabilization of total expenditures may lead to mismeasurement, by not considering the different expenditure categories which may be stabilized. Not incorporating theory and praxis to develop and test models of fiscal stabilization can potentially bias results and may invalidate conclusions of existing studies (Hendrick, 2006).

Given the concern over bias, this dissertation also compares three methods applied in the fiscal stabilization literature. Comparing each of the three methods shows they produce spurious results in the identification of the business cycle. Additionally, the methods do not

consider organizational theory to explain the mechanism by which stabilization funds are allocated, as recommended in the literature (Duncombe and Hou, 2014; Hendrick, 2006). To conduct a comparison, three methods in the literature are estimated with a panel of Florida counties from 1980 to 2012, and compared with a ratio measure. The additive model developed by Sobel and Holcombe (1996) performs the worst and produces spurious results for more than half of the time across upturns and downturns. In contrast, the linear trend from Hou (2003) correctly identifies economic downturns over 70% of the time, while the Hodrick-Prescott filter shows a year lag in the identification of recessions. Both the linear trend and filter, however, are unable to consistently identify upturns and turning points.

Collectively, these results indicate that the methods used in stabilization research are producing spurious results. Further, the literature does not use theory from Cyert and March (1963) and Hirschman (1970) to develop models of fiscal stabilization, and instead models stabilization of total expenditures rather than select expenditure categories. Models of fiscal stabilization need to isolate the business cycle and also model the voice of conflicting stakeholders, which collectively form the various internal and external factors that affect government decision-making during an economic downturn (Hendrick, 2006; Nelson and Balu, 2014). Not incorporating both internal and external factors does not completely characterize fiscal stabilization and may lead to biased model estimates and research conclusions (Hendrick, 2006).

5.3 Policy Implications

Evidence of selective allocation in the first two papers indicates that transparency is a key concern when using slack resources. Since UFB is accumulated and allocated with no

restrictions, local governments can use it on a discretionary basis (Arapis and Reitano, 2017; Hendrick, 2006; Marlowe, 2005). Discretion does not allow for democratic deliberation of how to allocate slack resources in UFB, but instead provides local government with the opportunity to favor the interests of select stakeholders (Cyert and March, 1963; Levine, 1978, 1979). An additional consequence of discretion is information asymmetry between decision-makers in the government and the public, due to a lack of transparency around UFB, which can foster political decision-making (Rose and Smith, 2011; Stewart et al., 2015). Two policy implications can potentially reduce information asymmetry from UFB and also provide budgeters with a systematic method of developing fiscal stabilization policies.

First, the Governmental Accounting Standards Board (GASB) and the GFOA can consider the findings of this research when developing policy and best practices. As shown in this dissertation, selective allocation arising from the discretion around UFB can be used to benefit internal stakeholders. For example, selective allocation of UFB to administrators and the use of ARRA for accumulating savings may act against the interests of students and teachers through an economic downturn in a school district. Reducing information asymmetry between decision-makers and constituents could potentially alleviate the concern over selective allocation (Rose and Smith, 2011). To reduce information asymmetry, the GASB can consider new reporting mechanisms to increase transparency. Additionally, the GFOA (2015) should continue to promulgate the use of a predefined plan for fiscal stabilization, which can create transparency in how a government responds to an economic downturn before it occurs.

A second policy implication relates to how governments conduct analysis of historical fiscal stabilization policies to inform the development of future policies. This dissertation shows that econometric methods perform poorly when applied to fiscal stabilization research, leading to spurious identification of the business cycle, and little ability to consider the different stakeholders that may influence stabilization decisions. Given the lack of evidence supporting the use of econometric methods from the literature, greater emphasis should be placed on using contextual knowledge (Frank and Zhao, 2009). As argued by Frank and Zhao (2009), the use of contextual information often performs at the same level or better than econometric methods in financial management. Practitioners should continue to use contextual knowledge when making stabilization decisions, so that they are considering internal and external factors that may influence fiscal stabilization decision-making (GFOA, 2015; Hendrick, 2004, 2006).

5.4 Limitations

There are three limitations in this dissertation, including the generalizability of findings, use of a short panel, and focus on a single historical economic shock. In regard to the first limitation, using a panel dataset from Pennsylvania may not allow findings to generalize to other states, because of institutional differences in school funding formulas (Duncombe and Hou, 2014). A similar concern is expressed in a study on UFB accumulation in New York school districts, which also concludes that results may not generalize beyond the selected state under study (Duncombe and Hou, 2014). Despite these concerns, the literature argues for single state studies on school district fiscal stabilization, given the challenges in controlling for institutional differences across states (Arapis, Reitano, and

Bruck, Forthcoming; Duncombe and Hou, 2014). In contrast, the use of data on all Florida counties from 1980 to 2012 may allow results to generalize to other counties. Florida has a diverse economic base and counties have similar best practices across states, which may indicate one can generalize the results to counties in other states (McDonald, 2015).

While using data from one state may create concerns over the generalizability of findings, doing so is recommended in the local government fiscal stabilization literature (Arapis and Reitano, Forthcoming; Marlowe, 2005; Wang and Hou, 2012). Only one study cited in this dissertation conducts research on fiscal stabilization with local governments from more than one state, and that study considers it a limitation. Stewart et al. (2013) study fiscal savings behavior in local governments in Illinois, North Carolina and Mississippi. They conduct econometric analysis in each individual state as well as a pooled regression across the states. Two concerns with pooling local government data across states is differences in institutional context and the ability to generalize findings (Stewart et al., 2013). The parameter estimates in Stewart et al. (2013) differ across states and also between the pooled model and individual states. Given the inability to separate and control for differences between three states in the pooled model, Stewart et al. (2013) consider it a limitation, due to "inherent differences between states" (p. 375).

A second limitation is the use of a short time-series in the Pennsylvania panel. Utilizing a panel with only ten years of data may lead to bias in the results, since doing so does not capture long-term trends in the business cycle (Hou, 2003; Marlowe, 2005). The dataset has only one full business cycle, including one period of upturn and then a subsequent downturn period. Extending the dataset would allow the model to capture trends over

multiple business cycles, as conducted in Duncombe and Hou (2014) in their study of fiscal savings in New York school districts. The use of a long panel, however, was not possible due to lack of data from the Pennsylvania Department of Education [DoE] (2017). In response to this limitation, this dissertation utilizes fixed and time effects to eliminate unobserved factors, such as time trends over the business cycle, which may be systematically correlated with the observed factors (Wooldridge, 2002). The fixed effects methodological strategy reduces bias in the parameter estimates (Wooldridge, 2002). As a result, a methodological strategy was utilized to address this limitation arising from a lack of data (DoE, 2017).

A third limitation is that the Pennsylvania panel focuses on the Great Recession, which is considered the worst economic downturn since the Great Depression (Ammons et al., 2012; Martin et al., 2012). Using a panel which encompasses this time period may be biased, since it was a historical shock which affected all local government revenue sources, and required the unprecedented use of austerity policy (Nelson and Balu, 2014). Despite the unique nature of the Great Recession, the literature has still advocated for using data from this time period, in the event a future recession has a similar shock on local governments (Arapis and Reitano, Forthcoming; Nelson and Balu, 2014).

5.5 Future Research

Future research should continue to study how stabilization funds such as UFB are allocated. The literature models the relationship between UFB and total expenditures, but as shown in this dissertation, research should examine how UFB is allocated to different expenditure categories (Hou, 2003; Marlowe, 2005; Wang and Hou, 2012). This type of analysis provides evidence of the different interests local governments may be stabilizing due

to conflicts between stakeholders. Modeling the allocation of UFB is consistent with organizational theory on slack resources and also reflects the decisions faced by local government decision-makers during economic downturns (Cyert and March, 1963; GFOA, 2015).

Future research should also test if selective allocation is occurring in other types of local governments. Applying the models developed in this dissertation could serve as one approach to test for selective allocation, which can build evidence of a stabilization practice across governments at the local level. The application of models from this dissertation can continue to address calls in the literature for greater uniformity in how theory is used to study fiscal stabilization. (Duncombe and Hou, 2014; Hendrick, 2006).

References

- Ammons, D., Smith, K., & Stenberg, C. (2012). The future of local government: Will current stresses bring major, permanent changes? *State & Local Government Review*, 44(1), 64S-75S.
- Arapis, T., & Reitano, V. (2017). Accumulating and maintaining fiscal savings: From theory to practice. *Journal of Government Financial Management*, 66(1), 34-39.
- Arapis, T. & Reitano, V. (Forthcoming). A glimmer of optimism in government savings accumulation? An empirical examination of municipal unassigned fund balance in Florida. *Public Finance Review*.
- Arapis, T., Reitano, V., & Bruck, E. (Forthcoming). The fiscal savings behavior of Pennsylvania school districts through the great recession. *Public Budgeting & Finance*.
- Center on Education Policy [CEP]. 2012. What impact did education stimulus funds have on states and school districts? Retrieved from <http://eric.ed.gov/?id=ED533671>
- Cyert, R.M., & March, J.G. (1963). *A behavioral theory of the firm*. Upper Saddle River, NJ: Prentice Hall.
- Duncombe, W., & Hou, Y. (2014). The savings behavior of special purpose governments: A panel study of New York school districts. *Public Budgeting and Finance*, 34(3), 1-23.
- Frank, H.A., & Zhao, Y. (2009). Determinants of local government revenue forecasting practice: Empirical evidence from Florida. *Journal of Public Budgeting, Accounting & Financial Management*, 21(1), 17-35.
- Government Finance Officers Association [GFOA]. (2015). Appropriate level of unrestricted fund balance in the general fund. Retrieved from <http://www.gfoa.org/appropriate-level-unrestricted-fund-balance-general-fund>
- Hendrick, R. (2004). Assessing and measuring the fiscal health of local governments: Focus on Chicago suburban municipalities. *Urban Affairs Review*, 40(1), 78-114.
- Hendrick, R. (2006). The role of slack in local governments. *Public Budgeting & Finance*, 26(1), 14-46.
- Hodrick, R., & Prescott, E. (1997). Postwar U.S. business cycles: An empirical investigation. *Journal of Money, Credit and Banking*, 29(1), 1-16.

- Hou, Y. (2003). What stabilizes state general fund expenditures in downturn years-budget stabilization fund or general fund unreserved undesignated balance? *Public Budgeting & Finance*, 23(2), 64-85.
- Kavanagh, S.C. (2007). *Financing the future: Long-term financial planning for local government*. Chicago, IL: Government Finance Officers Association.
- Levine, C.H. (1978). Organizational decline and cutback management. *Public Administration Review*, 38(4), 316-325.
- Levine, C.H. (1979). More on cutback management: Hard questions for hard times. *Public Administration Review*, 39(2), 179-183.
- Marlowe, J. (2005). Fiscal slack and counter-cyclical expenditure stabilization: A first look at the local level. *Public Budgeting & Finance*, 25(3), 48-72.
- McDonald, B., & Gabrini, C. (2014). Determinants of county charter decisions: An event history analysis of Florida counties. *Journal of Public Administration Research and Theory*, 24(4), 721-739.
- McDonald, B. (2015). Does the charter form improve the fiscal health of counties? *Public Administration Review*, 75(4), 609-618.
- Nelson, A.A., & Balu, R. (2014). Local government response to fiscal stress: Evidence from the public education sector. *Public Administration Review*, 74(5), 601-614.
- Pennsylvania Department of Education [DoE]. (2017). Pennsylvania information management system (PIMS). Retrieved from <http://www.education.pa.gov/teachers%20-%20administrators/pims/pages/default.aspx#tab-1>
- Rose, S., & Smith, D.L. (2011). Budget slack, institutions, and transparency. *Public Administration Review*, 72(2), 187-195.
- Sobel, R.S. & Holcombe, R.G. (1996). The impact of state rainy day funds in easing state fiscal crises during the 1990–1991 recession. *Public Budgeting and Finance*, 16(3), 28–48.
- Stewart, L.M., Phillips, J.N., & Modlin, S. (2013). An Evaluation of the Connection between Economic Volatility and Governmental Savings Levels for Illinois, North Carolina, and Mississippi Counties. *Public Finance and Management*, 13, 361-382.

- Stewart, L.M., Hildreth, R.W., & Antwi-Boasiako, K.W. (2015). The fund balance conundrum: An ethical perspective. *Administration & Society*, 47(8), 915-942.
- Wagner, G.A., & Elder, E.M. (2005). The role of budget stabilization funds in smoothing government expenditures over the business cycle. *Public Finance Review*, 33(4), 439-465.
- Wang, W., & Yilin, H. (2012). Do local governments save and spend across budget cycles? Evidence from North Carolina. *American Review of Public Administration*, 42(2), 152-169.
- Wooldridge, J.M. (2002). *Econometric analysis of cross section and panel data*. Cambridge, MA: The MIT Press.