Fiscal Sustainability of Local Governments: Effects of Government Structure, Revenue Diversity, and Local Economic Base

by

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ABSTRACT

This dissertation develops a framework for the analysis of fiscal sustainability among U.S. local governments. Fiscal sustainability is defined as a type of fiscal condition that allows a government to continue service provision now and in the future without introducing disruptive revenue or expenditure patterns. An assessment of local fiscal sustainability is based on three types of indicators: pension liability funding, debt burden, and budgetary balance. Three main factors affect a government's long-term financial condition: government structure, financial structure and performance, and local economic base. This dissertation uses a combination of the U.S. Census Bureau Annual Survey of Government Finances and Employment, the U.S. Census Bureau Decennial Census, the Bureau of Labor Statistics data, and the Government Finance Officers Association financial indicators database to study the effects of the three factors on local fiscal sustainability. It is a pioneer effort to use government-wide accounting information from Comprehensive Annual Financial Reports to predict local fiscal sustainability status. The results of econometric models suggest that pension liability funding is most affected by the size of government, debt burden is most strongly associated with the size of local economic base, and budgetary balance is influenced by the degree of local own-source revenue diversification.

TABLE OF CONTENTS

Appendix

LIST OF TABLES

LIST OF FIGURES

Chapter 1

INTRODUCTION

This study develops a theoretical framework for the analysis of local government fiscal sustainability and focuses on three important determinants of a government's long-term fiscal health: pension liability funding, debt management, and budgetary balance. The study aims at identifying economic and financial factors that affect fiscal sustainability and at pointing out structural characteristics of governments that are on a fiscally sustainable path. It is based on the analysis of governments' past performance and may be viewed as a variation of fiscal condition analysis. Yet, it analyses time-series data and goes beyond examining a snapshot of governments' performance. The study focuses on pension liability funding and debt management – two indicators of local government financial condition that have long-term implications for the ability of a government to fulfill service obligations now and in the future. The study extends beyond short-term fiscal condition analysis into an effort to operationalize the concept of local fiscal sustainability and explore its determinants empirically using individual government data for fiscal years 2003-2007.

At present, there is no unified framework for the analysis of fiscal sustainability at the level of local government in the U.S. There are three main explanations for such a void. First, fiscal sustainability as a concept is relatively new. Its definitions are still being formed. Though the notion of sustainability was brought into the policy context by environmental policy analysts at the end of the 1980s, most of the empirical research to

date has focused on national-level fiscal sustainability with the World Bank and the International Monetary Fund actively pursuing the sustainability agenda since the Asian crisis of 1997. However, the national framework where fiscal sustainability is defined through a government's ability to repay debt is ill-suited for sub-national governments that exist under a different set of constraints, such as, for example, debt limits and balanced budget requirements. At the subnational level, theoretical frameworks of fiscal sustainability have only been developed in the past six years (Chapman, 2008; Ward & Dadayan, 2009; IPSASB, 2011; GASB, 2011; Mahdavi &Westerlund, 2011; Raju, 2011).

Second, the concept of fiscal sustainability is difficult to apply to U.S. local governments that are highly decentralized and heterogeneous in their economic, financial, and organizational structures and institutional environments. This heterogeneity impedes quick and simple observations about elements of financial and organizational structures that make some governments more sustainable than others.

And third, data availability and data quality problems have prevented fiscal health and sustainability analysis across governments. Local annual financial statements, comprehensive annual financial reports (CAFRs), and U.S. census survey data do not systematically include variables that are valuable for fiscal sustainability analysis, for example, actuarial valuations of pension fund assets and liabilities, property values, accurate annual demographic and economic profiles, and variables that would characterize financial management styles and expertise or measure similarities in local institutional environments. Also, the data from different sources are very difficult to merge. As data-related challenges gradually disappear when more and more governments

switch to modern e-reporting platforms, the analysis of local governments' long-term fiscal health and sustainability is likely to develop further due to its relevance for financial management decisions, policy makers, and for government's accountability at large.

A vast majority of American cities enjoy the freedom of fiscal federalism. They exert significant powers over revenue collections, the use of varying revenue sources, debt issuance, and service delivery.[1] With that power to make choices they also carry a responsibility for financial decisions. A government equipped with an understanding of the implications of its present decisions for its future ability to meet service requirements may be more careful in its decisions, more proactive in mitigating financial risks and more disciplined as a provider of public goods and services. It should be noted, however, that not all local governments may find long-term sustainability analysis useful. There may be no users of this information in entities with limited revenue raising powers, no powers to incur debt, and very narrow decision-making powers over levels of service delivery (IPSASB, 2011:7). Examples of such entities in the U.S. would include villages, towns and small cities with no home-rule status.

The goal of this dissertation is twofold. The first objective is to create and test an empirical framework of local fiscal sustainability using a unique dataset of longitudinal financial and accounting records from municipal Comprehensive Annual Financial Reviews (CAFRs), U.S. Census Bureau Annual Survey of Governments, The U.S. Census Bureau Decennial Survey, and the Bureau of Labor Statistics. The second

[1] Tax, expenditure, and debt limits may constrain the ability of a government to exercise discretion over finances but not eliminate it.

objective is to identify and discuss the usefulness of accounting, financial and non-financial information that local governments would benefit from and should collect for the analysis of fiscal sustainability. This dissertation is organized as follows. Chapter 2 reviews fiscal sustainability literature that is relevant for the analysis at the local level. Chapter 3 synthesizes the literature into a theoretical framework. Chapter 4 describes the data and provides descriptive statistics for the cities in the sample. The correlation matrix for the variables used in the analysis is presented in Appendix B. Chapter 5 develops model specifications for three separate components of sustainability. Chapter 6 recognizes limitations of the study and offers conclusions and directions for future research.

Chapter 2

LITERATURE REVIEW

National Fiscal Sustainability

The term 'sustainability' was introduced into the public policy context by the World Commission on Environment and Development in 1987 (World Commission on Environment and Development, 1987). A development - meant broadly as a change in any environment - was deemed sustainable if it satisfied present generation needs without compromising the ability of future generations to satisfy theirs. This concept signaled to policymakers and analysts a way of discussing environmental and economic development goals simultaneously (Dollery and Grant, 2011) without juxtaposing them or looking for a tradeoff. It also yielded a new normative orientation for managing public resources.

In the 1990s the World Bank started funding research on national fiscal sustainability.[2] Burnside (2003), who is affiliated with the World Bank, notes that national fiscal sustainability has many definitions but they usually relate to fiscal policies of a government. Two supporting concepts of sustainability are important at the national level. The first is solvency that is "the ability of the government to service its debt

[2] National financial crises of the 1930s exposed social and economic costs of political decisions that led to government bankruptcy. Reparation payments, imposed by European countries on Germany after WW1, led to the country's economic demise that contributed to the rise of fascism. The system of fiscal regulation was created in 1944 under the Bretton Woods agreement. It provided for the creation of the International Monetary Fund (IMF) whose major function was to set up a global exchange rate policy, help governments with problems in the balance of payments, and provide policy advice to countries in need. Over the decades, the need to study causes of national financial crises has expanded the IMF's agenda. The IMF has become a leader in fiscal sustainability research: it developed models to describe and classify country economies, explain past financial experiences and their causes and predict hazards to fiscal sustainability.

obligations in perpetuity without explicit default" (Burnside, 2003: 1). Burnside (2003) notes that a government is often deemed insolvent when the insolvency is already obvious. Such analyses inform the theory but do not offer guidance on preventive measures to avoid a crisis. The second concept refers to a government's ability to maintain current policies while remaining solvent. It usually focuses on optimal fiscal and monetary policy adjustments to avoid insolvency in the future. Burnside (2003) recognizes that fiscal sustainability analysis should be centered on the optimality of policy rather than its mere feasibility.

Burnside (2003) points out that a clear understanding of the goals of fiscal sustainability analysis should precede the choice of methods for analysis. He distinguishes four potential goals of fiscal sustainability analysis at the national level: 1) estimation of the government's ability to borrow; 2) prediction of the onset of fiscal crisis; 3) assessment of financial risks associated with contingent liabilities; 4) assessment of the prior fiscal policy record and discussion of future policy choices. (p.2) Burnside's parsimony of goals is attractive as a learning device but an empirical application of this parsimony reveals that the goals are not mutually exclusive. For example, a prediction of the onset of a crisis (goal 2) is likely to be based on the assessment of financial risks associated with contingent liabilities (goal 3).

In the national context, fiscal sustainability is often operationalized as a minimized fiscal vulnerability to a capital account crisis.[3] Fiscal sustainability is assessed through present-value calculations of public indebtedness under different assumptions about future

[3] The implication being that a current account crisis may be solved through borrowing. So, the borrowing constraint becomes key for sustainability assessment.

macroeconomic and demographic environments. Such analyses produce predictions of changes in the primary balance[4] under different projections of economic growth, interest rates, and public debt service obligations. This relatively simple approach leaves the analyst with a need to choose assumptions about the future. As a result, market analysts tend to adopt cautious and conservative perspectives whereas government officials – who have vested interest in good financial performance of their jurisdictions - tend to choose scenarios based on more favorable assumptions (Barnhill and Kopits, 2003). Optimistic assumptions may also be attractive to politicians because they may provide a justification for such "electoral strategies" as tax cuts or expenditure increases. Another disadvantage of this scenario-based approach is that it does not account for different sources of fiscal risk.[5] Polackova and Schick (2002) observe that contingent obligations tend be outside the framework of conventional public financial analysis while playing an important role in the rise of government debt. The authors offer to extend public fiscal management beyond the budgetary framework to measure and manage fiscal risks of implicit government obligations which they dub as "hidden deficits". The authors create a government fiscal risk matrix that distinguishes between explicit and implicit sources of obligations. These obligations can produce direct liabilities or contingent liabilities. Explicit obligations result from laws and contracts. Implicit obligations are "moral" obligations of a government that reflect "public and interest group pressures" (p. 23). Direct liabilities are certain in any event, while contingent liabilities become obligations

[4] Primary balance is measured as the difference between revenues and spending excluding interest payments on debt.
[5] For example, off-budget accounts and contingent obligations.

only if a particular event occurs. The table below reproduces Polackova and Schick's (2002) matrix with some examples.

Table 1. National Government Fiscal Risk Matrix (adapted and abridged)

	Direct liabilities	**Contingent liabilities**
Explicit obligation	Sovereign debt, non-discretionary expenditures, legally binding discretionary expenditures (civil servant salaries and pensions)	State guarantees of non-sovereign borrowing (lower levels of government, other public and private entities), state guarantees for loans (mortgage, agriculture, student loans), trade and exchange rate guarantees, guarantees on private investments, state insurance schemes
Implicit obligation*	Future public pensions (not mandated by law or they would become explicit), social security schemes, health care schemes, future costs of public investment projects	Default of a sub-national government or public/private entity on nonguaranteed debt/obligations, banking failure, cleanup of liabilities of entities being privatized, failure of a nonguaranteed pension fund, employment fund, social security fund (protection of small investors), default of the central bank on its obligations (applicable to developing countries), environmental recovery, disaster relief, military spending

* Implicit obligation is a moral obligation that reflects public and interest group pressures.

Burnside (2003) suggests that modern fiscal sustainability analysis needs to incorporate the effects of uncertainty and move beyond the dichotomy of a sustainable/unsustainable government to a more realistic discussion of the probability of insolvency. He references several studies that use the value-at-risk methodology (VaR) to model the risk and offer a more realistic and explicit way of factoring in risks of the public sector. One of them is a work by Barnhill and Kopits (2003). The authors adopt the VAR approach from corporate finance where it is often used to assess stock price changes and investment risks. Based on specific input parameters of risk factors, a distribution of possible

financial conditions is simulated and the probability of a financial crisis is determined. The simulation provides a confidence interval for the target outcome (e.g. the worst possible loss) and helps analysts to determine the necessary fiscal adjustment to compensate for the financial risk and maintain fiscal sustainability with a desired confidence level. Sources of risk at the national level are highly volatile exchange rates, interest rates, inflation rate, output, commodity prices, and asset prices (Barnhill and Kopits, 2003). Variance and covariance of key risk variables is critical for the VaR approach. The authors find that their Monte Carlo simulations predict fiscal vulnerability better than scenario-based calculations. They note that the future use of the VaR methodology for public sector sustainability research would benefit from more integrated risk assessments where, for example, the risk of bank failures and government default are modeled as correlated events. [6]

Local Fiscal Sustainability

Fiscal sustainability at the local level has been defined in several ways. Chapman (2008) offers its definition as "the long-run capability of a government to consistently meet its financial responsibilities" (Chapman, 2008: S115) and identifies three types of pressures that governments face: cyclical, structural, and intergovernmental. Cyclical pressures reflect the influence of the business cycle on governmental finance and are often common for all the three levels of government. Structural pressures that affect fiscal sustainability

[6] An implication of this approach for local government is a potential inclusion of non-local risk factors in the assessment of fiscal risks, for example, state unemployment or state fiscal imbalance.

include demographic changes, suburbanization trends, overall mobility of population and businesses, structural shift from the consumption of goods to the consumption of services, and the rise of new revenue sources such as e-commerce (Chapman, 2008). Effects of these factors on local ability to continuously meet financial obligations are direct and tangible. Structural pressures are, perhaps, the most actionable aspect of fiscal sustainability management because some of them are under local policymakers' control. Intergovernmental pressures stem from local government relationships with other governments. While the federal government and states may not issue direct local mandates, they impact local financial conditions through "intergovernmental programs with many strings attached" (Chapman, 2008: S121).

The International Public Sector Accounting Standards Board (IPSASB) views fiscal sustainability as "the ability of an entity to meet service delivery and fiscal commitments both now and in the future" (IPSASB, 2011: 5). It posits that an assessment of fiscal sustainability requires a broad range of data. "These data include financial and non-financial information about current economic and demographic conditions, assumptions about national and global trends such as productivity, the relative competitiveness of the national or local economy and expected changes in demographic variables such as age, longevity, gender, income, educational attainment and morbidity" (IPSASB, 2011:6). The IPSASB (2011) distinguishes three broad dimensions of fiscal sustainability: fiscal capacity; service capacity, and vulnerability. Fiscal capacity is the ability of a government to repay liabilities "on a continuing basis over the period of projections without increasing levels of taxation" (IPSASB, 2011: 8). Service capacity "is the extent to which (a) the entity can maintain services at the volume and quality provided to

current recipients at the reporting date and (b) meet obligations related to entitlement programs for current and future beneficiaries" (IPSASB, 2011: 8). Vulnerability is the degree of fiscal dependence on funding sources that are outside the entity's control (ex. inter-governmental transfers) and the degree of the entity's ability to increase revenue levels and create new revenue sources (IPSASB, 2011: 8).

The Government Accounting Standards Board (GASB)[7] views fiscal sustainability as "the forward-looking aspect of economic condition" and defines it as "a government's ability and willingness to generate inflows of resources necessary to honor current service commitments and to meet financial obligations as they come due, without transferring financial obligations to future periods that do not result in commensurate benefits." (GASB, 2011: x) The inclusion of a government's willingness to generate resources is a unique feature of the GASB definition. GASB (2011) suggests that governments should make four types of projections part of their financial reporting: projections of cash inflows, cash outflows, financial obligations, and debt service. In addition, they should include a narrative discussion of major intergovernmental service interdependencies in financial reports. These projections and narrative discussions should help users to

[7] The Government Accounting Standards Board (GASB) is recognized by governments and the accounting industry as the official source of generally accepted accounting principles (GAAP) for governments. GASB was formed in 1984 by the Financial Accounting Foundation (FAF) and 10 national associations of state and local governments to establish and improve financial reporting standards for U.S. state and local governments. GASB is an operations component of FAF, which is a private non-profit entity, financed by the sale of its publications, state and local governments and the municipal bond community. GASB does not have the enforcement authority, and its standards are not regulations or laws. But compliance with GASB standards is enforced through the laws of certain states and auditing procedures (auditors render opinions on the compliance with GAAP). The Dodd-Frank Wall Street Reform and Consumer Protection Act of 2010 provided GASB with an independent source of funding - an accounting support fee from bond dealers.

determine local fiscal capacity and service capacity, which are not described in financial statements or CAFRs. GASB (2011) suggests that the projections be reported separately for government activities and business-type activities. In addition, separate predictions should be made for major resource inflows and outflows. (A significant inflow or outflow amounts to 10 or more percent of the total activity of a particular type.) Ample disclosure of assumptions and their narrative discussion should accompany the projections (GASB, 2011). The GASB approach, described in the "Preliminary Views" distributed to the wider audience for comments, was not well received by the practitioner community. Government financial managers pointed out the difficulty of making accurate projections and being accountable for them. Such financial projections are inherently subject to uncertainties as they are based on current policy or assumptions about changes in social, economic, and demographic conditions.

The Australian tradition of local fiscal sustainability analysis has a longer history than the American tradition. Dollery and Grant (2011) review six studies of fiscal sustainability in Australian councils[8] and conclude that they all share an "accounting" bias, meaning that they are too narrowly focused on accounting and financial ratios. The Price Waterhouse Coopers (PWC) report on Australian Local Fiscal Sustainability (2006) is one representative example of these studies. PWC defines fiscal sustainability as a council's ability to manage "expected financial requirements and financial risks and shocks over the long term without the use of disruptive revenue and expenditure measures" (PWC, 2006: 95 as cited in Dollery and Grant, 2011: 38). PWC developed five

[8] A council is a name for Australian local government bodies for cities, shires and other municipalities. Terms 'city', 'shire', 'municipality' are also used but they denote geographic areas, not governing bodies.

financial ratios as key performance indicators and uses them to assess fiscal sustainability of a sample of 100 councils. These key performance indicators are presented in Table X:

Table 2: *PriceWaterhouseCoopers* Key Performance Indicators

Indicator	Metrics
Operating surplus or deficit: operating revenue – operating expenses	A deficit of over 10 % of total revenue indicates a high level of financial risk.
Interest coverage: earnings/borrowing costs	The ratio of 3 or more is the lower threshold of sustainability.
Sustainability ratio: capital expenditure/depreciation	The ratio over one indicates that the assets are increasing. But note that the ratio may be biased due to changes in asset valuation procedures.
Current ratio: current assets/current liabilities	A sustainable government should have at least the ratio of one.
Rates coverage: total rates revenue/total costs	The ratio of 40% is considered by the PWC as a sustainable level of self-funding.

PWC also conducted infrastructure sustainability analysis using a modified 'viability index' to gauge the level of pressures for infrastructure renewal. The index includes three measures: 1) cumulative long-term debt/ annual rate income; 2) cumulative underlying operating surplus/debt; 3) rate effort, rates affordability, and population growth. PWC (2006) recognizes that using performance indicators for comparing councils of different sizes may bias comparison results in favor of one type. Yet, they suggest that an assessment of financial performance without comparisons with similar governments may bias the evaluation even more.

Dollery & Grant (2011) criticize existing approaches to fiscal sustainability from two perspectives. First, they posit that fiscal sustainability discussions should not be conflated

with discussions of fiscal viability. Australian local governments are always fiscally viable because they have taxing powers and because the Local Government Act binds residents to meet all outstanding obligations. Governments cannot "go out of business" as commercial entities do. But governments may or may not be fiscally sustainable while having financial viability. Second, Dollery and Grant (2011) believe that the existing framework needs to incorporate the analysis of societal and environmental objectives and functions of governments. Researchers need to acknowledge that fiscal sustainability is contingent on the funding of environmental and social programs. "Without prescribed economic requirements to meet environmental and social sustainability objectives in local government, it thus makes little sense to use the term financial sustainability in isolation." (Dollery and Grant, 2011: 44)

No empirical studies have modeled a comprehensive set of pressures on fiscal sustainability identified by Chapman (2008) and Dollery and Grant (2011). Hagist and Vatter (2009) echo Chapman (2008) in that they highlight the importance of demographic changes and population mobility. In their view, a municipal budget is fiscally sustainable if it allows the government to maintain "current sets of rules with respect to public in- and outputs (goods, services, taxes and other receipts)… and the level of municipal equity relative to the municipal production potential." (Hagist and Vatter, 2009: 6) The "municipal production potential" is directly related to the quality and quantity of the local labor force. Hagist and Vatter (2009) use detailed accounting information for three German cities and examine their potential fiscal sustainability under several demographic scenarios. They operationalize demographic changes through projections of fertility rates, mortality rates, and migration. Simulations of the governments' ability to bridge the fiscal

gap under different scenarios within a 50-year horizon allow the authors to conclude that "surpluses or deficits seem not to be the most determining factors for how fiscally sustainable municipalities work" (Hagist and Vatter, 2009: 24). In contrast, fertility rates, life expectancy, a percentage of population from the 30-50 age cohort, and migration rates appear to be important sustainability indicators. Changes in the demographic structure mediate negative effects of operational deficits (primary budget gap) and repayment of debt (the indebtedness gap). The authors criticize the cash-flow approach to the assessment of fiscal sustainability and posit that "focusing only on fiscal gaps or just debt without any comparison with the future economic power of the debtor is inadequate." (Hagist and Vatter, 2009:8) It is noteworthy that Hagist and Vatter (2009) are pioneers in using simulations to analyze local fiscal sustainability; the dominant approach in national fiscal sustainability studies. The simulation approach, however, has been applied to the study of topics related to fiscal sustainability, such as the management of fund balances and fiscal slack (Hendrick, 2004; Kriz, 2003). As the fiscal sustainability paradigm is yet to be developed, research on related concepts of fiscal stress and fiscal health is relevant for building the framework.

Fiscal Stress

The Congressional Budget Office (CBO) defines fiscal stress as a gap between projected revenues and expenditures that can be short-term, in the case of transitory economic shocks, or long-term, in the case of a structural budget imbalance (CBO, 2010). Sources of a structural imbalance may include political tensions among budget decision makers, demographic shifts, especially when high income households or businesses move out of a

jurisdiction, lack of budgetary controls (BBRs, TELS, debt limits), and borrowing. Borrowing may be a source of but also a response to a fiscal crisis when short-term borrowing is used to alleviate temporary stress. When revenue sources consistently do not provide sufficient revenues to match spending, governments have to make hard decisions: increase revenues, decrease services, borrow long-term or shift payments/costs/expenditures into the future. (CBO, 2010).

McManus and Pammer (1990) define fiscal stress as the level of strain of the property tax base and view fiscal stress as a factor that affects a government's response to further changes in the economic environment. Particularly, they identify three groups of factors affect government responses to stress: a government's dependency on other levels of government, budget flexibility, and external environment. McManus and Pammer (1990) also highlight differences in retrenchment strategies for urban and rural areas. They find that urban areas tend to raise revenues in response to actual revenue shortfalls; whereas rural areas tend to cut expenditures. Lu (1994 cited in Cooper 1996) finds that smaller counties tend to reduce capital expenditures as a response to revenue shortages more often compared with larger counties with richer tax bases.

Marando (1990) examines responses of 152 city governments to cuts in state aid – a change that qualifies as an increase in fiscal stress - and finds that operating and capital expenditure cuts are the most popular measures, followed by the contracting out of services through third party providers. A reduction in service levels is the least popular option among governments (which may reflect a stronger orientation of governments towards service provision than towards operating a fiscally sustainable enterprise).

Clark (1994) creates a city wealth index based on per capita income and taxable property value. He creates a fiscal strain ratio by dividing local per capita expenditures of common government functions by the wealth index thus taking into account variables that are under the control of the government (expenditures) and beyond it (tax base wealth).

Though fiscal stress may pose significant limitations on a local government's ability to satisfy local resident service preferences, it may also be an important disciplining device. So, Caiden (1980) suggests that fiscal stress may have a strengthening effect on local financial management as it requires governments to control expenditures.

Carmeli (2003) distinguishes between a fiscal crisis – a gap between revenues raised and expenditures needed – and a financial crisis – a case when "an organization does not repay its current liabilities on time." (1425) Whereas an organization facing a fiscal crisis may avoid a financial crisis by using reserves, the likelihood of a government to incur a financial crisis when it experiences a fiscal crisis is higher.

Fiscal Health

Zhao and Coyne (2011) identify three main ways to measure fiscal health: through revenue-raising capacity, through the need for local services or the underlying costs of their provision; and through need-capacity gaps. Revenue-raising capacity is viewed as the underlying ability of local governments to raise revenues from local sources. It is measured through the tax base (property values, measures of local economic conditions) but not through actual revenues that might reflect local choices of rates, not the underlying fiscal conditions. An example of such capacity measure is an RRS - a

"representative revenue system" that relies solely on the size of a community's tax bases (Advisory Commission on Intergovernmental Relations, 1986). Another capacity measure is per capita income (Ladd and Yinger, 1989). The need-based side of fiscal health includes a measurement of factors that affect spending on local public services but are outside the direct control of local officials - local economic and social characteristics (e.g. population density, unemployment, poverty rate) (Ladd, Reschovsky, and Yinger, 1991; Wasylenko and Yinger, 1988; Bradbury and Zhao, 2009). The need-capacity gap, or fiscal gap measures the difference between a community's underlying costs and its revenue-raising capacity (Zhao and Coyte, 2011). Zhao and Coyte (2011) find that the distribution of state unrestricted aid to municipalities is not strongly correlated with municipal capacity gaps. So, for example, the municipal gap constructed for FY 2008 explained less than half of the variation in the municipal aid distribution and the explanatory power of the municipal gap remained unchanged in FY 2011, in spite of three consecutive years of aid cuts.

Groves and Valente (1994) distinguish between short-term, midrange and long-term fiscal health. Short-term health has to do with the ability of a government to pay its bills on time; midrange fiscal health should reflect the government's ability to balance its revenues and expenditures in the budget over a longer period of time. Long-term fiscal health is the service-level solvency, or the ability of a government to provide adequate levels of services over an extended period of time using the existing resource base (Groves and Valente, 1994 as cited in Hendrick, 2004). Hendrick (2004) defines fiscal health as "the ability of government to meet its financial and service obligations." (p.80) This definition approximates fiscal health to the concept of fiscal sustainability though it

does not mention the temporal aspect of government performance. In fact, after stating the definition Hendrick (2004) recognizes the importance of the time aspect of fiscal health. She reviews the literature on fiscal stress and general health indicators and demonstrates that fiscal health is a complex phenomenon characterized through different dimensions that may affect one another in different time frames.[9] Local demographic and economic environment, social needs, fiscal needs, tax efforts and revenue-raising capacity, fiscal structures, fund balances, debt, and service generosity are only some of the factors that have been used to construct indicators of health. It appears from Hendrick's literature review that fiscal health research gained momentum in the late 1970s (Brookings, 1976; CBO, 1978; U.S. Department of the Treasury, 1978; Advisory Commission on Intergovernmental Relations, 1979), continued through the 80s (Clark and Ferguson, 1983; ACIR, 1988; Ladd and Yinger, 1989; almost waned by the mid 1990s (Brown, 1993) and revived in the new millennium to be marked by a seminal ICMA publication in 2003, Hendrick's paper in 2004 and Kloha et al.'s publication in 2005. Methods for constructing fiscal health indices included various ways of standardizing and scaling variables of interest (Brookings, 1976; U.S. Department of the Treasury, 1978), factor analysis (CBO, 1978), scoring algorithms for standardized values (Brown, 1993; Kloha et al., 2005), calculation of fiscal health as the extent of fiscal disparity - the size of a gap between spending needs and costs of service provision (Ladd and Yinger, 1989), and a calculation of potential revenues from various revenue sources by multiplying existing local revenue bases by previously determined regional revenue

[9] e.g. "… municipalities with high levels of stress on one dimension may not necessarily have high or low levels of stress on other dimensions, although they are more likely to have high levels of stress across dimensions, and, over time, stress in one area may lead to stress in other areas." (Hendrick, 2004: 89)

rates (ACIR, 1988). Hendrick (2004) develops the following four dimensions of fiscal health for Chicago municipalities: revenue wealth, spending needs, fiscal balance, and fiscal slack. Hendrick (2004) insists that "[t]he complexity and indirect nature of the relationships between dimensions make it difficult to construct one, comprehensive indicator of fiscal health or financial condition. Rather, measures of these dimensions should be constructed separately and assessed in relation to one another to produce a complete and more accurate picture of fiscal conditions." (Hendrick, 2004: 89) Hendrick (2004) constructs her measures by standardizing component variables by standard deviations into z-scores, weighing them by regression coefficients[10] and adding them up to form an index. Hendrick's index of the environmental component of fiscal health is based on three measures of revenue wealth: income per capita, sales receipts per capita and equalized assessed residential property value (statistics that are available for Chicago suburbs from the state comptroller) and on four measures of spending needs: median age of housing, weighted crime rate per capita, population density, and an indicator for the location of the government in a fire district. Similarly to Ladd and Yinger (1989) who calculate a fiscal disparity gap by subtracting service needs from revenue capacity Hendrick (2004) arrives at her index of environmental fiscal health by subtracting a measure of need from a measure of wealth. Her use of the rank order of municipalities as measures of need and wealth is subject to criticism because it is highly dependent on the type of municipalities in the sample. Hendrick (2004) defends this approach by saying that it is more robust to outliers and allows for a better classification than a z-value based approach. She constructs an index of fiscal slack based on four component variables

[10] Regression coefficients from a regression with the component variables as predictors and revenues per capita as the dependent variable.

scaled by local expenditures: the percentage of the unreserved fund balance, the percentage of enterprise income, the percentage of capital expenditures, and the percentage of debt service. The unreserved fund balance is the one variable in this set that measures directly available surplus resources available for bridging potential budget gaps. Hendrick (2004) points out that in her interviews with regional financial officials they acknowledge the use of enterprise funds in managing fiscal stress, though it is less direct than the use of unreserved fund balances. Enterprise funds are less visible to the public because they are not part of government activities financial statements (however, they are part of government wide statements in the CAFR for governments complying with GASB Statement 34). The percentage of capital expenditures is viewed by Hendrick (2004) as a fiscal slack variable on the grounds of the government's ability to postpone capital expenditures and redirect the capital budget to the operating budgets should such a need arise. Debt service expenditures are included into the fiscal slack index because their increase reduces fiscal slack. Governments are legally bound to make debt service payments irrespective of revenue decreases. When debt service burdens are high, a government facing a crisis will have a reduced flexibility in using spare resources for operating needs. Hendrick (2004) mentions another measure of slack that is important but not included in her analysis due to its non-linear relationship with other variables: a government's size. Size is an element of slack because in larger organizations managers manage a larger number of activities and have "more horizontal and vertical linkages" (98) that increase their flexibility – the ability to make choices and tradeoffs - in managing resources. Hendrick's argument about differences among cities of a different size may be developed: established urban centers may enjoy a synergy of economic

resources that smaller cities may not have. Yet, size may or may not be associated with stronger fiscal health: larger governments are likely to have a larger scope of operations, higher revenue volatility and a larger proportion of their resources committed to expenditures that are mandatory. In other words, diseconomies of scale may exist.

The fiscal balance dimension is captured in Hendrick's framework with two ratios: own-source revenues relative to wealth and total spending relative to needs. Wealth and needs are indices constructed previously for measuring the environmental health dimension. The fiscal balance ratios "reflect the extent to which the government has used up or captured the revenue sources in its environment and whether it provides adequate services to its constituents (businesses and residents)." (Hendrick, 2004: 96) The more resources are used up, the fewer resources are available; the more services are underfunded, the harder it will be to cut spending and the greater the need for spending increases. After constructing measures of fiscal health in three dimensions, Hendrick maps these measures by municipality to show how governments in her sample fare against each other. She recognizes that future fiscal health research should focus on the effects of fiscal slack - an aspect of financial condition that has been often overlooked.

Fiscal Slack

Fiscal slack did garner attention of researchers in the past decade (Marlowe, 2006, Kriz, 2003, Cornia and Nelson, 2003). Usually it includes general fund balances (reserved and

unreserved) and rainy day fund balances (this term usually applies to state finances) or sinking fund balances (this term is usually used at the local level[11]).

Nollenberger (2003) distinguishes four functional categories of reserves: operational, catastrophic, replacement, and liquidity reserves. It also highlights that there are no rules for governments to follow in allocating funds to reserves. The level of reserves should be a function of the level of risk associated with revenue and expenditure sources. Factors that affect reserve decisions include: kinds of natural disasters typical for the area, insurance coverage, revenue base flexibility, overall financial health of a government, state regulations and the national economy. [12]

Marlowe (2006) lists the following reasons for keeping reserves: fiscal stabilization, which is the most important, improvement of bond ratings, facilitation of strategic management, flexibility of the budget process, maintenance of consistent cash flow, and the maintenance of consistent tax rates.

Marlowe (2006) defines a normatively optimal fund balance as "a pool of slack resources that is large enough to promote fiscal stability without raising opportunity costs and political friction." (Marlowe 2006: 373) Through the survey of 245 small Minnesota municipalities Marlowe (2006) shows that even though 49 percent of the respondents have some form of a fund balance policy, most leave the optimal amount of funds to the discretion of the administrator. He finds that the average balance is between 31 and 39

[11] The sinking fund is a naming convention in the U.S. Census Bureau's annual survey of governments.
[12] While the factors are very broad, the ICMA offers managers a test of ten questions that should guide local managers in the decisions on the levels of reserve fund resources.

percent of total expenditures which is much higher than the 5-15 percent range typically cited in the professional literature.

Marlowe (2006) suggests that municipalities with non-diversified portfolios may need larger reserves because a decline in one revenue source may sharply reduce available revenues. However, revenue diversification is a double-edged sword. Diversified revenues may increase revenue volatility: if they are cyclical in nature then a drop in one revenue source is likely to be associated with a drop in another source. It would be valuable to include revenue source cyclicality as a separate characteristic in the analysis of revenue diversification.

Marlowe (2006) also notes an apparent dependency between the level of slack resources and state aid disbursement to local governments. If state aid disbursements were bi-annual or quarterly, local governments might not need to keep large slack resources. Similarly, if property taxes were collected more frequently, local governments would also be less likely to keep large slack resources. At the same time, modifications of the state aid disbursement may take away local financial autonomy: with frequent aid disbursements local governments may experience less financial flexibility and a disincentive for long term expenditure planning (Marlowe, 2006).

Marlowe (2011) points out that financial management research has offered few alternatives in setting an appropriate level of fiscal slack that would allow a government to withstand an economic shock such as a revenue shortfall. As a result, local governments tend to simply set reserve requirements as a certain percentage of total expenditures (Joyce, 2001; Marlowe, 2011). The disadvantage of this approach is the

opportunity cost of these reserves. By harboring excessive cash resources as slack, governments may forego potential short-term or capital investments and higher interest earnings than those earned on cash balances. Hoping to confirm that excessive slack adds no value, Marlowe (2011) hypothesizes s a concave effect of slack on local credit rating: after slack resources reach some optimum level, their positive effect on credit ratings should stall or drop. However, he finds that the effect of slack resources is monotonic: additional resources in the sinking funds have a consistent positive effect on governments' credit ratings. At the same time he recognizes that different jurisdictions have different needs for slack resources.[13] A high level of slack may help a fiscally stressed jurisdiction to secure a higher credit rating. But a high level of slack resources may not have the same effect for the credit rating of a fiscally flourishing municipality.

Following GASB guidelines, slack resources are classified into reserved, unreserved designated and unreserved undesignated. Reserved are resources committed for a specific purpose and enforceable by a higher level government or local legislation; unreserved designated are resources that the management decides to spend on certain purposes; and unreserved undesignated resources are fund balances that are not associated with any potential spending purpose. Marlowe (2011) points out that there is lack of uniformity in the classification of balances across governments. Some governments classify as designated resources what others classify as the unreserved; other governments include designated resources into the reserved. So, for example, some governments classify capital project fund balance as designated and others see it as unreserved because capital

[13] Marlowe (2011) examines a sample of 514 local debt issuers for 2006-2010 and finds that the levels of slack do differ among them.

spending is not specific enough until associated with a particular project. As a result, individual fund balances are not comparable across governments. Marlowe (2011) warns of the measurement and reliability problems in the case of examining effects of separate fund balances. His analysis of the impact of slack resources on credit ratings focuses on the unreserved and total fund balance of the general fund as well as on a broader measure of slack: unrestricted net assets. The total general fund balance consists of reserved, unreserved designated and unreserved undesignated components. Unrestricted Net Assets (UNA) are calculated following the accrual method of accounting, while unreserved fund balances are reported using the modified accrual method (revenues are recognized when they are available and measurable and expenditures – as soon as a transaction occurs). As a result, UNA reflect a more long-term financial position of a government while unreserved fund balances only include cash or assets that may be converted into cash quickly. Marlowe (2011) points out that UNA may be negative since they often include debt issued by the entity for another entity (conduit debt) that will be repaid with future resources that are not included in the calculation of the entity's revenues. Marlowe comes up with a comparative measure of slack resources by scaling UNA by the total net assets of a jurisdiction.

Kriz (2003) suggests that an optimum slack level should depend on a potential shortfall between revenues and expenditures. He equates optimal slack with the unreserved fund balance that will be required to bridge the gap. Municipalities with more volatile expenditures or revenues appear to keep higher levels of slack to cover shortfalls in revenues or to adjust to increasing expenditures. Kriz (2003) questions the benchmark of 5 percent as an optimal level of slack resources because he observes that localities have

diversity in revenue systems and differential exposures to financial risk. For example, large municipalities in Minnesota tend to rely more on intergovernmental aid and less on property taxes than small municipalities. In addition, their property tax bases differ. Kriz (2003) determines optimal levels of reserves for local governments using the simulation approach. He models expected local revenues as a function of past revenues multiplied by the revenue growth rate: $E(R_1) = R_0 (1+U)$, where R_0 is the present revenue, R_1 is the future revenue, and U is the revenue growth rate. Changes in revenues (U) are stochastic (random), determined by outside influences and cannot be forecast. Kriz (2003) assumes that revenues follow a stochastic process - the geometric Brownian motion – and uses the Monte Carlo simulation to model it. He identifies four main factors that affect the level of optimal reserves: revenue growth, revenue volatility, desired expenditure growth, and the interest rate earned on invested fund balances. He views revenue growth and investment earnings as sources of risk for policymakers and desired expenditure growth - as a policy variable that can be managed. The budget reserve is modeled as a percent of current total revenues needed to sustain expected expenditure growth. The results of the simulation for 10 years suggest that a government needs to maintain the reserves of 34 percent of the total revenue if it wants to have a 50 percent confidence that it will maintain a 5 percent expenditure growth in the market environment with 5 percent inflation (that is 10 percent nominal growth). To maintain the same growth with the same confidence, at the same inflation for 25 years, a government needs to maintain 121 percent of total revenues in reserves. The model is sensitive to the time scale and yet it demonstrates that there can be no magic rule of 5 percent reserve fund balance for governments to follow to escape budget shortfalls. Kriz (2003) recognizes that his model is subject to criticisms since past

data may not be predictive of future conditions. Yet, he believes that the "burden of proof should lie with those that seek to model the future in a way different from the past" (p. 892). He notes though that more historical data for analysis might add credibility to simulation results. One implication of Kriz's simulation for practice is that the more local governments shift from property taxes as the main revenue source, the higher reserve levels they should keep to weather an economic storm.

Cornia and Nelson (2003 cited in Marlowe, 2006) use a simulation of Utah revenues and expenditures, changes in revenue trends, and changes in the economy to establish a confidence interval for the expected revenue shortfalls. They conclude that there is a less than 5 percent probability that revenue shortfall would exceed 5 percent of general expenditures. Thus, they do defend the "magical" optimal fund balance level of 5 percent.

Hendrick (2006) notes that fiscal slack has a complex relationship with the fiscal structure, as well as political and socio-economic environment of a government. She finds that municipalities tend to accumulate slack as the amount of fiscal risk or uncertainty increases. Interestingly, home-rule municipalities tend to accumulate more slack resources than non-home-rule municipalities. While Hendrick (2006) finds that slack is an effective response of Chicago suburban municipalities to changing conditions, she also points out that the effect of slack on reducing fiscal stress should be examined along with the other response options such as revenue increases and cuts in spending. It may also depend on whether the economic and fiscal conditions are improving or worsening.

Joyce (2001) studies the influence of revenue volatility on the size of state rainy day funds and finds little relationship between fund balances and revenue volatility. He uses five sources of revenue variation to construct a volatility index: the percentage of state revenues from corporate taxes, the volatility of economic environment (the proxy for economic environment changes is the change in unemployment rates), the percentage change in revenues gained from the federal aid, the percentage of revenues from gambling, and the percentage of spending on Medicaid. Ranking the states from top to bottom, he assigns them relative scores for each component. This enables conclusions about states that keep insufficient or excessive reserves for their types of financial structures. Joyce (2001) recognizes that budgetary data may not offer a sufficient explanation of rainy day fund balances. He distinguishes 3 non-fiscal factors that may affect the reserve levels. First is the ideology of state policymakers: they will accumulate higher reserves if they believe that the funds need to shield the state from raising taxes or cutting services in a recession; they will accumulate lower reserves if they believe that the funds should only offer a way to cover a short-term budget deficit. Second, states with high levels of inter-branch conflict may run larger reserves because they cannot hope to achieve consensus on actions to adjust the budget at the time of fiscal stress. Thirdly, states may have resources coming from other sources than the rainy day fund, for example, gubernatorial reserves. Joyce's analysis debunks the idea that 5 percent is an optimal level of a state rainy day fund balance but recognizes that the index he constructed needs to be refined. The research on the role of slack in fiscal management is moving in the direction of offering practitioners solutions that would be more fine-tuned

to their fiscal, organizational, social, economic and political environments than simple rules of thumb.

Existing definitions of local fiscal sustainability acknowledge several pressures that governments face in meeting financial obligations. These pressures include factors under governments' control such as financial structures and beyond it such as local service needs, intergovernmental constraints, and economic cycles. Fiscal stress and health research informs the sustainability discussion by pointing out approaches to measuring and benchmarking local fiscal condition. The role of fiscal slack in managing local fiscal health is a subject of debate.

Chapter 3

THEORETICAL FRAMEWORK

Types of local government responsibilities

Many U.S. local governments have a larger degree of fiscal autonomy than governments in countries with more centralized governance structures. The other side of financial and institutional independence is the expectation that local governments should be able to manage their resources effectively and be fiscally sustainable.

Local governments provide a host of services to local communities that include but are not limited to police and fire protection, sanitation, solid waste management, sewerage, health and hospital services, highways and street management, library and cultural facility operation. Own-source revenues and intergovernmental aid represent an obvious budget constraint to the generosity of local government services. In addition, governments often operate under institutional constraints, both local and those imposed by higher levels of government. Balanced budget requirements, home-rule status, tax and expenditure limitations, and debt limits are some of the most widely discussed of these constraints.

Besides providing general services to constituencies – fulfilling explicit direct short-term obligations - most local governments have explicit direct long-term service obligations that include repayment of debt and legally mandated discretionary spending such as salaries and pensions to public employees. They also assume explicit contingent obligations when they commit to guarantee fulfillment of obligations of other public or

private entities. This happens when general governments guarantee the repayment of debt of their business–type activities (utility companies), school districts, community facility districts (CFDs) or issue conduit debt for altogether private companies.[14] General local governments may also assume explicit contingent obligations of smaller levels of government as it happens when a city government guarantees school district debt. Local governments have implicit direct obligations in the form of future pensions to employees and obligations to continue financing public capital projects to provide adequate service. Also, localities may have implicit contingent obligations when they are "morally" obliged to step in if an important local service provider with non-guaranteed debt defaults or if a natural disaster strikes. Unlike a national government, whose external market position becomes more vulnerable if it does not meet implicit contingent obligations (for example, because of banks defaults or defaults of large market industries), local governments enjoy much more leeway in determining whether to step in and address these obligation (partially because there are higher levels of government that may effect a bailout).

Explicit and implicit contingent obligations have the potential to affect governments' resource wealth negatively and represent the source of fiscal risk that is outside the government's control. At the same time, the likelihood of these contingent obligations to materialize into actual obligations is quite small, as is the likelihood of default of local utility operations or force of nature events.[15] This analysis recognizes potential sources

[14] Though by issuing conduit debt local governments do not take on any legal obligations to repay it, they may be inclined to step in to prevent a default if the debt funds publicly vital services.

[15] The inclusion of risks stemming from contingent liabilities in models presents analysts with the hardest challenge in national fiscal sustainability research. The challenge is as hard at the local level.

of risk from contingent obligations but does not include them in the sustainability framework. Instead, it limits the discussion to explicit and implicit direct obligations of governments that include current operations management, debt management and pension liability funding. These sources of fiscal risk are more proximal, measured directly and may be acted upon.

Besides these expenditure-driven sources of fiscal risk, there are factors that affect local fiscal sustainability on the revenue side. Primarily, local vulnerabilities on the revenue side relate to the government's ability to secure sufficient revenues from existing revenue sources for satisfying existing obligations.

Operational Definition of Local Fiscal Sustainability

Local fiscal sustainability is viewed in this study as a state of government finances that allows the government to continuously provide services and satisfy all of its obligations. Compared with the concept of fiscal condition, fiscal sustainability has the inter-temporal dimension in that it relates to the government's ability to satisfy service requirements not only now but also in the future. When a government's fiscal condition is characterized as sustainable, the government is able to provide services expected by the community and perform its financial obligations such as debt repayment and pension benefit payments without compromising inter-generational equity and introducing disruptive revenue and expenditure policies.

This work distinguishes between three key dimensions through which the level of sustainability may be assessed: pension liability funding, debt burden and budget balance.

The higher the level of pension liability funding, the lower the debt, and the smaller the mismatch of actual revenues and expenditures, the higher is the prospective capacity of a government to navigate changes in the economy and demography without the need to introduce service cuts or disruptive revenue increases. How a government fares on these conditions should depend on factors that have to do with the economic base, government organization, fiscal structure, and financial performance. A large share of fiscal sustainability research at the national level was conducted to predict governments' defaults on debt. It focused on the identification of unsustainable governments and implicitly created a binary category: sustainable-unsustainable. The environmental sustainability paradigm has adopted three main states of sustainability: strong sustainability, weak sustainability, no sustainability (Chapman, 2008). In contrast, fiscal sustainability is viewed in this dissertation as a continuum, a characteristic that is more fluid and dynamic than any rigid categorical classification would suggest.

It is important to acknowledge, that local financial management with a priority of maintaining fiscal sustainability may be in conflict with a fiscal management that is oriented towards improved service provision or/and meeting residents' preferences. In other words, less generous governments that are fiscally conservative, may have a higher likelihood of being fiscally sustainable. While fiscal austerity may be a panacea for fiscal problems, it may not be a normatively sound rationale for public service provision. A vexing question for public administrators is not how to minimize spending but how to provide an optimal level of public services efficiently. It is therefore more promising to focus on characteristics of financial and institutional systems that make governments

successful service providers, instead of focusing solely on the governments' ability to maintain balanced budgets.

As earlier noted, this study will examine three distinct indicators of local fiscal sustainability: pension liability funding level, debt burden and budgetary balance. The ability of a government to fund pension plans adequately and avoid high debt levels and budget deficits may depend on a variety of factors that are grouped into distinct categories in this chapter after the discussion of three dependent variables.

Indicators of Fiscal Sustainability

Pension liability funding

Pension liability obligations are long-term commitments of governments to pay pensions to retired employees. Unlike other post-employment benefits (OPEBs), another type of long-term obligations of local governments, pension obligations are contractual so that a government cannot walk away from them or decrease benefit levels with relative facility. In other words, pension liability obligations are the largest, the most binding, and therefore the most financially consequential type of local government long-term direct obligations.

Public pension plans are generally more expensive than private plans as public retirement benefits are more generous than benefits in comparable private plans (Brown, Clark, Rauh, 2011). There is usually a different plan for general government (all employees other than safety and teachers) and for public safety employees and teachers (if the local government mandate includes education worker employment). All full-time employees

are eligible to participate in retirement systems. In addition, part-time employees may be eligible to participate if they meet specific participation criteria.[16] Cities often participate in multiple-employer public employee retirement systems that act as investment and administrative agents of all participants.[17] Local pension contributions may go to locally administered or state administered plans (42% and 52% respectively, according to Munnell et al., 2011). Locally-administered plans are heterogeneous, including the largest New York City plans with assets over 30 billion dollars and plans that have less than 10 million dollars in assets. Single-employer pension plans provide benefits to employees or one employer and multiple-employer pension funds pool assets from a number of employers to make investments and then distribute pension plan assets to employees based on their shares of contributions as reflected on the separate accounts of each agent employer.[18]

As activities of pension funds benefit retired employees – third parties - and not the general public, they are usually accounted for in separate fiduciary funds and not reported as part of the direct government financial statements. Data on pension obligations are not part of the U.S. Census of Governments Annual Governments Survey. A number of local pension plans make part of the Public Plans Database maintained by the Boston

[16] For example, eligible part-time employees of Stockton, CA qualified for pension benefits (Stockton CAFR, 2005).
[17] One example would be CalPERS – California Public Employees' Retirement System providing benefits to more than 1.6 million public employees and 300 employers.
[18] Social security covers ~94% of employees in the United States. Government pension plan participants may or may not be covered by the Social Security benefits (Provision 218). "Government employers might feel an increased responsibility to fund the plan if plan benefits represent their employees' only source of retirement income." (Munnell et al. 2011: 258)

College.[19] A large majority of local pension systems, however, are still not amenable to research because they are not part of any database. Data on pension liability assets and liability funding that are used in this dissertation come from the Government Financial Officers Association's database of local financial records that was created using individual city CAFRs.

Munnell et al. (2011) distinguish two measures of the financial health of local plans: 1) "the funded ratio" – showing the share of plan liabilities covered by assets; 2) the percent of annual pension cost (APC) paid – which shows of the plan sponsor is keeping up with the obligations as they accumulate. Examining a sample of 126 pension retirement systems the authors conclude that locally administered plans have a larger share of plans that are funded at low levels, compared to state plans. On the whole, Munnel et al. (2011) observe that state and local pension plans were on the path to full funding before the Great Recession of 2007-2009. The crisis reduced the value of pension assets, resulting in an increase in the degree of underfunded pension liabilities. The drop in housing prices was an extraordinary development on the market and an exogenous shock for local governments.

GASB Statement No. 25 "*Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans"*[20] requires government pension

[19] The database is publicly available at http://pubplans.bc.edu/pls/apex/f?p=1988:3:0

[20] Statement No. 25 will be replaced by Statement No. 67 *Financial Reporting for Pension Plans* after June 15, 2013 (GASB, 2012a).
In addition, GASB has adopted Statement No. 68, *Accounting and Financial Reporting for Pensions,* a new standard to guide defined benefit reporting. It will be effective after June 15, 2014 and will likely result in governments reporting higher pension liabilities. For a more detailed account of the changes introduced by the standard, see Easterday &

disclosures to present 1) the discounted value of their future pension benefit payments, known as the accrued actuarial liability, 2) the value of their accumulated pension plan assets. GASB's standards are meant to affect reporting not funding of pension plans. "The Statements do not address how governments approach pension plan *funding* - a government's policy regarding how much money it will contribute to its pension plan each year." (GASB, 2012b)

GASB requires that governments discount their pension liabilities using the rate of return on their pension plan assets (Easterday & Eaton, 2012). Novy-Marx and Rauh (2009a) view this approach to discounting benefits as misguided, primarily because it does not account for the risk of pension plan assets investment and may confuse users of the information about the amount of unfunded pension liabilities. They emphasize that if the governments choose assets with higher rates of return to fund the liabilities, the liability will appear smaller after discounting. But assets with higher rates of return are usually riskier and may or may not yield the expected outcomes. The discounting formula does not take the associated risk into account.[21] The Financial Accounting Standards Board (FASB) requires corporate pension plans to use risk-adjusted discount rates for their future obligations. According to Easterday & Eaton (2012) while the public employee retirement systems steadily used the 8 percent discount rate in the calculations of liabilities in 2001-2010, the corporate rates dropped from 7.25 percent in 2001 to 5.55

Eaton, 2012. Munnell (2011 book) points out that the implications of GASB statements are important. The very fact that GASB does not set standards for actuarial valuation of pension assets is likely to result in financial data that will not be comparable across governments. In addition, lax requirements towards asset valuation may result in governments' offering more generous benefits to employees than they would have.

[21] For a more detailed explanation of how the present value of the liabilities is calculated, see Rauh (2010) and Novy-Marx and Rauh (2010).

percent in 2005, went up to 6.3 percent by 2007 and dropped to 5.35 percent by 2010. The expected rate of return on pension assets in government administered plans was a stable 8 percent, while the expected rates of return on corporate pension plan assets went down from 8.8 percent to 7.55 percent from 2001 to 2010 (Easterday and Eaton, 2012). In fact, most economists object to this discount factor as too high (Brown and Wilcox, 2009; Brown, Clark, Rauh, 2011; Munnell, 2011) and suggest that an appropriate discount rate should reflect the risk of the liabilities. As benefits of pension funds are usually guaranteed under state laws, the appropriate discount rate is a riskless rate (Munnell, 2011). According to the analysis by Munnell et al. (2011), the optimal discount rate for pension plan liabilities should be close to 30-year Treasury bonds, a most common type of similarly riskless securities. Applying alternative discount rates, Munnell et al. (2011) show that the 2009 pension funding gap for a sample of 126 state and local plans goes up from $0.7 trillion to $2.7 trillion.

Levels of annual required contributions (ARC) to pension plans are developed by actuaries. They are usually based on two types of assumptions: demographic and economic. Demographic assumptions include expected mortality, length of service, salary growth (SLGE, 2013). Economic assumptions include expected inflation and investment returns. “The ARC includes the so-called “normal cost,” which is the projected growth in the present value of benefits generated by active employees in the coming year. It also includes any payment required to address unfunded liabilities, which are typically calculated over a 30-year amortization period.” (p.2) If the fund sponsor (government) consistently makes 100 percent of ARC and if the demographic and economic assumptions are accurate (and they usually are in the long-run according to SLGE, 2013),

then pension liabilities are fully funded. When either contributions are not made in full or assumptions diverge from actual demographic or economic conditions, the plans report unfunded liabilities. According to SLGE (2013), the value of the pension plan assets may go down because of a financial crisis so that it may fall below the present value of promised future pension obligations. Alternatively, pensions may be over-funded if pension plan assets generate high returns in the period of an economic boom. (SLGE 2013).

Munnell et al. (2011) highlight that a more realistic measure of pension liability funding may have a sobering effect and prevent plan managers from offering more generous benefits. However, a change in the discount rate that might be needed to reflect a more realistic amount of unfunded liabilities, cannot not be accommodated by governments, given the state of the economy. Localities just cannot significantly increase their pension plan contributions. The implementation of a change would need to wait until the economy exhibits a stable growth. "Moreover, changing the discount rate would have to be considered by the community of actuaries, accountants, and sponsors in the context of other changes, such as perhaps extending the amortization period from 30 to 40 years. That is, an increase in the measure of the unfunded liability need not automatically translate into an immediate and intolerable increase in annual amortization payments for states and localities." (262)

Debt Burden

Local debt burden is a particularly relevant indicator of fiscal sustainability of a government, according to International City/County Management Association (ICMA)

(Nollenberger 2003). It is usually measured as a ratio of local direct debt or total local long term debt divided by population or personal income or some form of asset valuation. The denominator choice depends on what local financial managers consider to be more accurate as a measure of important changes in local conditions. In general, a fast increase in long-term debt may be an alarming sign for a government. A debt level within 10 percent of assessed property valuation is considered appropriate. A high ratio may indicate excessive burden while a low ratio may signal underinvestment in public infrastructure (and decreased prospects for the development of businesses).

Deficit

While the majority of local governments are subject to explicit balanced budget rules and eventually present a balanced budget, in actuality, they seldom arrive at a natural balance at the end of the year. By nature a budget is just a plan for revenues and expenditures. In this regard, a budget is not deterministic. When revenues exceed expenditures, the excess is directed to a reserve fund, and more specifically to the unrestricted part of the reserve fund. If a government ends the year with a deficit, the reserve fund is tapped and the deficit is covered. Usually, if the balance in unreserved funds decreases from year to year, it may indicate consistent operating deficits. The ICMA (2003) indicates that credit-rating firms do not pay too much attention to a deficit unless it is sustained over the years and is large. The lack of a clear operationalization of largeness is an incentive for testing models with different measures of deficit size. Prediction of fiscal deficits may be valuable for governments as a signal of the need for policy changes; for residents as a

signal that their taxes may increase and for investors in municipal securities as a tool to make more informed investment choices.

Balanced budget requirements (BBRs) are designed to keep governments accountable and prevent them from accumulating operating deficits. However, as budgets are only plans of resource acquisition and use in the coming fiscal year(s), BBR do not make governments deficit proof. Moreover, a recent working paper by Costello, Petacchi and Weber (2012) suggests that BBRs also have unintended consequences by forcing states into "fire sales" – sales of assets below their book value - at the time of fiscal distress and by shifting expenditures into the next fiscal periods. Hou and Smith (2010) highlight the heterogeneity of state BBRs and find their differing effects depending on stringency and on the response variable that is used to measure budgetary balance. The researchers define budgetary balance as "the situation where revenues available for government operations are greater than or equal to outlays at the start, middle, and end of the fiscal year or budget cycle so that the fiscal year ends in zero or positive balance (surplus) instead of deficit" (p. 63). They use six different measures of budgetary balance to model effects of BBRs. Four of them may be applied at the local level. They include: 1) total balance – the broadest measure equal to the difference between total revenues and expenditures;[22] 2) general balance – the difference between general revenue and general expenditures which differ from total revenues and expenditures by excluding utilities, liquor stores, and insurance trusts; 3) general fund balance – the difference between general fund revenues and expenditures – the most widely used measure of balance in

[22] The U.S. Census Bureau, however, explicitly indicates that the difference between total revenue and total expenditures does not necessarily indicate a deficit because the data are statistical in nature.

existing research (Hou and Smith, 2010); and 4) the unreserved undesignated balance of the general fund - the narrowest accounting measure of budgetary balance that is more exclusive because it is available only through CAFRs and not through the U.S. Census Bureau surveys. This measure does not directly measure any aspect of government operations. Yet, it is a valid approximation of local spare resources.

I construct six measures of a government's budgetary balance: the difference between total revenues and total expenditures, a deficit, a severe deficit, the difference between general fund revenues and expenditures, a general fund deficit, a general fund severe deficit. I focus, however, on the first three measures of budgetary balance as more consequential for the local fiscal sustainability status. Models for the measures of budgetary balance through the general fund balances are presented in the Appendix.

Table 3: Measures of Budgetary Balance

Variable	**Type**	**Variable Construction**
Difference	Continuous	Total revenue – Total expenditure/ total expenditure
Deficit	Binary	If Total revenue – Total expenditure< 0, then Deficit=1
Severe Deficit	Binary	If (Total revenue – Total Expenditure)/Total Expenditure<-0.1 then Severe deficit=1.

This dissertation is focused on the analysis of the relationships of the three indicators of a government's fiscal sustainability described below - pension funding level, debt burden, and budgetary balance - with three types of predictor variables that are described below.

Predictors of Fiscal Sustainability

Demographic and economic factors

To a large extent, a local government's ability to continuously perform its service obligations now and in the future depends on its ability to secure necessary revenues to cover expected expenditures. Local socio-demographic composition and economic factors are determinants of the local tax base, resident preferences for services, and spending needs. Local revenue capacity - the ability of governments to raise revenues from local resources (Zhao and Bradrury, 2009) - is affected by the welfare of its residents who pay taxes and consume public fee-based services. The use of income per capita as a measure of demand for services is a classic convention among public finance researchers (Ladd and Yinger, 1989; Hendrick, 2004).[23] Resident preferences for local public spending also play a role in the local service provision. Zhao and Bradbury (2009) find that the ability of local governments to tap into their property tax bases increases with residents' incomes. They ground the finding in consumer theory where local residents' incomes act as the budget constraint. The incomes influence resident choices for different bundles of private and public goods and services and influence the willingness of residents to subject themselves to increased property taxation that supports the provision of additional goods and services. Local demography, such as resident age distribution, race and ethnicity, as well as the percent of residents in poverty and their employment status may be relevant factors that governments consider in social service provision such as hospital care, income assistance, and public transportation. It is

[23] Statistically significant coefficients on this variable may be viewed as the evidence to support the median voter model.

important to note that some of these variables are correlated, for example, income per capita, poverty level and the unemployment rate. Their concurrent use in the models is therefore not justified.

Due to high correlations among available demographic and economic variables, I use only a subset of them that are least correlated and present the most research interest. These variables include population size, population over 65, income per capita, the unemployment rate. I acknowledge that these variables may measure not only the economic base but also resident preferences for goods and services. Following Hendrick (2004), I recognize that spending needs cannot be the same for central cities that provide extensive social and health services and for smaller peripheral governments that do not.

Overlapping Debt

Local governments often have geographically overlapping jurisdictions such as community facility districts and various revenue authorities which also issue debt. The ICMA (2003) uses long-term overlapping bonded debt divided by assessed property valuation as a measure of whether a government will be able to assume the debt and service provision by an overlapping jurisdiction if it defaults. Though, the ICMA recognizes that the probability of this happening is slim, they find the indicator useful. What is surprisingly overlooked in the ICMA approach is the fact that overlapping debt may preclude a government's ability to borrow from the same tax base. This work uses overlapping debt as a predictor variable in the model for local debt burdens. A locality reporting a higher overlapping debt burden on its CAFR should be likely to abstain from carrying high debt per capita.

Revenue Diversification

Local fiscal sustainability should be directly affected by local revenues available for satisfying all current and future obligations of a government, for reducing the debt burden and for mitigating deficits. City government revenues come from three main sources: local taxes such as the property tax, the sales tax, much less often the income tax[24] other smaller taxes, sources other than taxes such as user fees and charges, and intergovernmental transfers. Their relative importance in the local revenue budget differs. The property tax is still an important and often main revenue source for many local governments but the move towards revenue diversification has been very pronounced among local governments over the past three decades. According to Hendrick (2002), revenue diversification can be used as a productive strategy to reduce fiscal stress and tax effort. At the same time, it can increase revenue volatility or reduce it depending on what sources of revenues are used to diversify (Carroll, 2009) and on the condition of economic base (Yan, 2011). Suyderhoud (1994) suggests that revenue diversification may improve revenue efficiency and equity while Ladd and Weist (1987) argue that it is not a silver bullet and that its design and effects should be determined by policy objectives. Carroll (2009) examines the effects of tax and non-tax revenue diversification on revenue volatility and finds that both types of diversification tend to reduce volatility when the diversification away from local option sales and income taxes is implemented. She also examines effects of tax and nontax diversification on expenditures and finds no statistically significant effects. Sjoquist, Walker and Wallace

[24] Local income taxes are common only in some states, such as Ohio, Pennsylvania, and New York.

(2005) study effects of diversification way from the property tax and find that it does decrease levels of property taxation but that it is also associated with increased levels of spending.

Chernick, Langley and Reschovsky (2011) explore the degree of local reliance on property tax and define revenue diversification as the percentage of local own source revenue collected from sources other than the property tax (diversity index=1 – (property tax revenue/total own-source revenue)). They find that central cities that draw on a diversified mix of revenue sources have higher levels of per capita revenue. They point out that a city with a diversified tax system can set lower tax rates for every revenue base and thus reduce the deadweight loss from taxation. By raising revenues from multiple sources governments may be raising revenues more efficiently. Another explanation for the positive effect of revenue diversification on overall revenues is the idea that revenue complexity may shadow actual 'cost of government'(Carroll, 2009) and produce a fiscal illusion: since revenue diversity often implies revenue complexity and dispersion across multiple separate revenue sources, it becomes more difficult for residents to clearly understand their total tax burdens and prevents them from actively monitoring governmental revenue levels and growth (Chapman and Gorina, 2012).

A potential downside of revenue diversification away from the property tax is an increased reliance of a government on income elastic revenue sources. The latter comprise sales taxes, fees and various user charges. They show faster declines than non-elastic sources at the time of economic crises. Local governments that rely on elastic sources more than others have a higher risk of facing a revenue shortfall when an

economic recession hits. At the time of an economic boom, elastic revenue sources are an advantage for governments to have because they keep up with inflation and allow for proportionate revenue increases. A good mix of revenue sources (elastic and inelastic) strengthens financial performance, according to Standard and Poor's as cited in the Nollenberger (2003).

Revenue Effort

Local revenue effort is used as a predictor of three different dimensions of fiscal sustainability to test if a higher level of revenue effort is associated with a higher level of pension liability funding, lower debt and a lower likelihood of an operational deficit. Mildred and Pratt (2005) measure local revenue effort as the ratio of per capita own-source revenues to per capita income. The researchers note that the assessed value of real property is not an appropriate measure of local capacity to raise revenues because of the lack of equalization of assessments. Yet they implicitly acknowledge that property value might be a better alternative to personal income by having to explain why they choose the per capita income as the denominator and not property value. The actual value of the city's personal and business property is used in this work as the denominator in the revenue effort measure.

Intergovernmental Aid

There are two types of aid from the federal and state government to cities: mandatory grants that are targeted for a specific function (often education or transportation in the case of federal grants) and discretionary grants that are allocated on an annual basis and

may be used by city governments for broad purposes. Most intergovernmental aid is distributed to local governments from states. The influence of state support of local financial structure and fiscal sustainability may go in two directions. State aid transfers may act as additional resources for strengthening local financial position. Normatively, state aid is designed to compensate for the disparity in local fiscal capacity provide localities. Zhao and Coyte (2011) find, however, that the distribution of municipal unrestricted aid is not strongly correlated with municipal capacity gaps. The municipal gap constructed for FY 2008 explained less than half of the variation in the municipal aid distribution and the explanatory power of the municipal gap remained unchanged in FY 2011, in spite of three consecutive years of aid cuts. State aid may also negatively affect local fiscal condition if it acts as a soft budget constraint and depresses local competitiveness and entrepreneurial spirit. Compared to highly dependent governments, highly autonomous governments may use different revenues to fund their service obligations, may be more innovative and be efficient in service provision.

Fee Coverage Ratio

This indicator is otherwise known as "user charge coverage" and measures if collected fees and charges are sufficient for covering services that they are designed to finance. Government activity operations, unlike business-type operations, are usually not self-financing. Yet, if a government covers a large share of its activities through fees and charges for the general services it provides, then the local government may have a wider fiscal space to rely on taxes for covering pension obligations and debt obligations.

Fiscal Slack and Net Assets

The general fund is usually the main operating fund of a city. The general fund balance is the most direct source of fiscal slack for covering expenses. A significant fund balance deficit at the end of the year raises concerns about the ability of the city to continue funding its operations. Resources accumulated in the sinking fund are usually the next step for governments who have exhausted their general fund balances. Yet, a government has an even broader spare resource base: its net assets. Net assets include not only general fund balances and sinking fund resources, they also gauge the level of local operating and capital assets net of debt. I posit that local governments with a rich base of net assets are more likely to avoid severe deficits. Governments may sell net assets if needed which they often do when face with a deficit. Governments with higher levels of net assets should also have lower levels of debt. First, debt is usually issued to fund capital assets. If the level of assets is already high, no need for debt issuance may exist. Second, non-capital assets that are part of the net assets measure may make it easier for a government to pay out debt and keep the levels of debt under control. The use of net assets as a predictor in the models has become possible after the implementation of GASB Statement 34 by governments.

The issuance of GASB Statement No. 34 in June 1999 marked a turning point in government reporting. It mandated two additional government-wide statements to be presented in the CAFRs of state and larger local governments after June 2001: Statement of Net Assets and Statement of Activities (Chaney, Mean, Schermann, 2002). It also made the Management Discussion and Analysis section mandatory. The new reporting

model focused on government programs and functions instead of separate funds. The new statements were based on the full accrual basis of accounting and the economic measurement focus.[25] The new reporting model was implemented by many larger local governments after June 2001 and provided analysts with an opportunity to study a government's financial condition separately for government activities, business-type activities and for the government as a whole. (Chaney, Mead, Schermann, 2002)

There are three components of net assets that are reported in government wide financial statements and that are part of the GFOA financial indicators database: net assets invested in capital assets net of related debt, restricted net assets, and unrestricted net assets. Net assets invested in capital assets net of related debt are calculated by subtracting related debt from the net book value of capital assets. The capital assets include land, construction in progress, buildings, improvements, furniture and equipment, vehicles, infrastructure and the intangibles, if any (copyrights, trademarks, trade names, etc.). If the outstanding debt for the assets is higher than the value of the assets, then net capital assets indicator will be negative. Restricted net assets are reported when constraints on net assets are set either by external creditors (other governments or individual contributors) or imposed through constitutional provisions or enabling legislation. For example, revenues from a newly created revenue stream that are to be

[25] Government fund reporting historically uses the modified accrual basis of accounting and the financial resources measurement focus. The modified accrual basis acknowledges revenues not when they are earned but when they become available. The financial resources basis means that the focus is on measuring assets that are cash or are expected to be converted into cash within the accounting period. Proprietary fund reporting is based on the full accrual basis of accounting and the economic resources measurement focus. In contrast, the economic resources focus measures not only cash and assets quickly convertible into cash but also long-term assets. In addition, the economic resources focus takes depreciation into account (GASB, 2007).

used for a specific purpose would make part of restricted net assets. Restricted net assets, unlike restricted assets in general, must be restricted by an external body or legislation. Restricted net assets cannot be negative because, they are a requirement of an external body or legislation and because all the shortfalls will be covered from unrestricted net assets. Unrestricted net assets are a plug number. They are calculated by taking Total Net Assets (which are calculated as Total Assets-Total Liabilities) and subtracting the net assets invested in capital assets and restricted net assets. (GASB, 2007) It is not uncommon to have a net assets deficit when a government finances long-term liabilities on a pay-as-you-go basis and appropriates resources each year as payments come due.

Employment and financial administration

A key premise of public administration as a field is that management matters. Sufficient staffing of government operations is a necessary precondition for a successful performance of various functions. From this perspective the number of employees per capita of a local government may serve as a proxy for the generosity of service provision. Apparently, the number of employees is not always associated with improved service quality; however, it is a sound assumption that as organizational capacities, and namely administrative resources, increase it becomes easier for a government to be more responsive and improve the quality of service provision. The effect of the number of local government employees on the government's fiscal sustainability is less clear. Usually local governments employ personnel in common and variable functions, either full- or part-time. The common functions include areas where governments have extensive responsibility such as police and fire protection, sanitation, highways, and other general

services. Variable functions include employment in health and hospitals, public welfare services (usually higher levels of government are more involved in these functions) and utility operations (which may as well be operated privately). On the one hand, the larger the number of employees, the higher may be the implicit future obligations to them after retirement. From this perspective, the percent of full time employees as a share of total employees of the city may be a better measure of the effect of local employees on the city's sustainability. On the other hand, the larger the government team, the larger the organizational capacity for using available resources and providing services in a more sustainable fashion. Organizational capacity of local governments, measured as employees per capita, may have indirect effects on local sustainability – the ability of a government to maintain service provision now and in the future in the face of economic and demographic shifts. At the same time, as the number of government employees increases, so does the room for internal competition, rivalries within organizations, and potential waste in service deliveries (Chapman, 1999), especially if the specialization within a department is too detailed. Though the data on city employment of financial administration personnel has been available from the Census Bureau for several decades, few studies have looked at the effects of finance personnel employment on the fiscal affairs of a government. Carmelli and Cohen (2001) suggested that a lack of organizational resources and managerial skills is one of the main reasons for a fiscal crisis as it leads to the inability of a government to provide services efficiently and adapt to a changing environment.

It is sometimes argued in the literature that local governments use few if any strategies to resolve apparent structural problems in budgeting. Rather, when a crisis strikes or when a

budget revenues fall short of the expected, finance administrators act ad hoc and do not systematically learn from the past.[26] This study proceeds from the assumption that an increase in local financial management capacity – as measured by the percent of financial administration employees among total government employees – should be associated with better fiscal sustainability indicators for the governments in all three dimensions: pension liability funding, debt burden and current operations deficit. Besides the simple overarching mechanism for this effect on all three dimensions (more resources – better outcomes) there is a possibility for an additional secondary mechanism for the pension funding aspect. As the share of full-time financial employees increases, so does their vigilance over adequate pension plan funding, assuming that these employees will become beneficiaries of the local pension plans after retirement.

Outsourcing Fire, Solid Waste, Sewerage

Reviewing the likely developments in local governments over the next decade Joyce and Pattison (2010) foresee that the governments will increase the extent of privatization of public functions. "Outsourcing will also become more common among governments, as they will want to have projects done without bringing on lots of new employees who are permanent, costly, and difficult to get rid of either for political or contractual reasons. Therefore, budget offices in 2020 should expect to be dealing much more with oversight of contracts and contract management." (Joyce and Pattison, 2010: S30)

[26] They may use four main strategies: buy time; rely on intergovernmental revenues; increase own-source revenues; reduce expenditures (Holley, 1983 as cited in Cooper, 1996).

The benefits of service outsourcing may extend beyond the savings resulting from fewer pension plan beneficiaries. Niskanen's public choice theory of good and service supply suggests that conventional government organizations with large degrees of monopoly over service provision (bureaus) provide goods and services tend to provide public goods inefficiently and uneconomically: they tend to grow too fast, become too large, and use too much capital (Niskanen, 1971). Bel, Fadega, Warner (2010) examine the rationale of public choice literature as a potential normative orientation for local contracting out. One of the main mechanisms through which privatization of public services may produce cost savings is by replacing monopoly with competition which will lower the costs and restrict excessive supply of the services (Bel, Fadega, Warner, 2010). The underlying logic of cost savings is that public service delivery happens in a monopoly, politicians and bureaucrats will act as self- interested utility maximizes and manage the services to extract political power and material rents. When competition is not strong, as is the case with public services – which are often "quasi-markets with a limited number of private suppliers" (555), the cost savings mechanism breaks down. So, governments still need to play a role in either creating competition in these markets or monitoring service delivery to realize cost savings (Bel, Fadega, Warner, 2010). Yet, a meta-analysis of the literature on outsourcing of waste management and water provision conducted by Bel, Fadega, Warner (2010) finds no convincing evidence that contracting out is a less expensive option of service provision at the local level than through direct government involvement. Their main conclusion is that effects of privatization depend on the characteristics of the service in question (potential technological developments), the characteristics of the

contract (transaction costs), characteristics of the market (competition), and the overall managerial and policy setting.

The outsourcing variable is operationalized in this dissertation as follows. Local governments assigned the value of 1 for the binary measure of outsourcing services if they have zero payrolls on fire, solid waste and sewerage in the U.S. Census Bureau Database.

Utility Operations

A large majority of local governments run some kind of utility operations and have non-zero utility revenues. As these business-type activities usually generate revenues that exceed their program costs, governments may either keep the revenues in the enterprise funds or transfer them into government activity funds. When such transfers happen, they are usually lumped with resources that may be transferred to localities from other local governments (e.g. counties) and are recorded as local intergovernmental aid (for example, Phoenix, AZ CAFR 2007).

Local governments that run utility operation businesses may be more likely to be fiscally sustainable, as defined in this dissertation, because the enterprise fund revenues may provide additional resources for meeting pension funding obligations, avoiding high debt, and current budget deficits. Utility programs (gas, electricity, water), airports, parking garages, public transportation systems are enterprise fund activities that are usually reported on the full-accrual basis of accounting. Sometimes local governments take advantage of these operations and temporarily raise fees and charges to supplement their

general fund revenues. But these raises may or may not result in additional revenues because users respond to price hikes by reducing the use of the services.

Intergovernmental Control

State governments provide aid to local governments based on their assessments of local needs. Some states regularly monitor local performance may exert corrective actions to help local governments navigate fiscal challenges. Coe (2008) discusses state strategies to detect local fiscal distress in nine different states and shows that their level of involvement in local affairs varies greatly. Some states monitor local conditions very closely and use independent financial auditors to review local performance (Florida); others do it through separately established commissions like North Carolina's, where a Local Government Commission that was created in response to municipal bond defaults during the Great Depression and still reviews local financial reports extensively. Other states, like Maryland, only have a small number of professionals to perform local oversight. (In the case of Maryland there are only two accountants who review annual financial reports of localities, enter the data in Microsoft Excel spreadsheets and make sure that they correspond to accounting and auditing standards). Besides differences in the degree of fiscal oversight, states have different degrees of authority over local governments if their financial condition deteriorates. So, Kentucky can order local governments to raise taxes and reduce expenditures, Florida, Ohio and Pennsylvania may recommend a course of action to local governments, while New Hampshire and Maryland have no authority to intervene into local affairs. Coe's analysis illustrates a fascinating heterogeneity of state-local oversight arrangements and distinguishes two

pragmatic reasons for state governments to keep an eye on municipalities: 1) to make sure that state mandates are adequately budgeted; 2) to prevent local governments' financial conditions from affecting state credit ratings. Importantly, the analysis points out that state oversight policy may have a strong effect on how local governments manage their finances. At the same time, it would be incorrect to relate the degree of state oversight with an improved local condition. Coe (2008) mentions that in spite of state controls, some local units remain in fiscal emergencies for lengthy periods.[27] The implication of Coe's (2008) analysis for econometric models of local sustainability is potential unobserved heterogeneity. One approach to controlling for it is the use of fixed effects.

[27] So, for example, in Ohio the average fiscal emergency for all cities in this status was 3.7 years, with East Cleveland being an outlier - 17 years; Coalton – 13 years, Manchester – 8 years.

Chapter 4

DATA

Increasing public expectations of accountability and transparency as well as integration of local governments into capital markets through debt issuance force the governments to standardize and improve their financial reporting. Joyce and Patisson (2010) envision that data collection and use of data-driven solutions to problems will be happening over the next decade and that this shift has already been initiated by the federal government. And yet, in spite of the available technology and associated pressures of the information age, local governments are far from uniformly providing researchers with financial and socio-economic information in a format that would lend these data for statistical analysis. While many local CAFRS are available on government websites, the data are not easily amenable to research as the information is presented in the format of PDF files, quite often not even searchable. As a result, documents are, perhaps, of most value to users, such as credit rating agencies that assess local government conditions on a case by case basis but not to quantitative academic analysis. The pressures of information economy have not affected all governments equally; yet, it is certain that sweeping changes need to take place before local comparative and comprehensive government research can take off. Specifically, local government reporting practices need to incorporate a form of electronic reporting that would yield reports in a spread sheet format and allow analysts to construct their own financial ratios based on available pieces of information.

The dataset for this dissertation is an unbalanced panel of city records for fiscal years 2003-2007. It includes variables from five data sources that are detailed in Table 4.

Table 4: Data Sources

Variable	Variable Construction	Data Source
Population	Linear interpolation for years 2003-2007 **	U.S. Census Bureau, Decennial
Population over 65	Linear interpolation for years 2003-2007 **	U.S. Census Bureau, Decennial
Occupied property	Linear interpolation for years 2003-2007 **	U.S. Census Bureau, Decennial
Mean income	Linear interpolation for years 2003-2007 **	U.S. Census Bureau, Decennial
Unemployment rate	Average for 12 months	Bureau of Labor Statistics
Employees	Total employees excluding school employees/ population	U.S. Census Bureau, Annual Survey, Employment
Full-time employees	Full-time employees/Total employees	U.S. Census Bureau, Annual Survey, Employment
Financial administration employees	Financial administration employees/Total employees	U.S. Census Bureau, Annual Survey, Employment
Long-term debt	Long-term debt/Population	U.S. Census Bureau, Annual Survey, Finances
Difference	(Total revenue-total expenditure)/Total expenditure	U.S. Census Bureau, Annual Survey, Finances
Deficit	If Difference <0, then Deficit=1; else Deficit=0	U.S. Census Bureau, Annual Survey, Finances
Severe Deficit	If Difference <-0.1, then Deficit=1; else Deficit=0	U.S. Census Bureau, Annual Survey, Finances
Contracts fire, waste, sewerage	Equals 1 if fire or solid waste or sewerage contracted out	U.S. Census Bureau, Annual Survey, Finances
Operates water facility	Equals 1 if water utility revenue is non-zero	U.S. Census Bureau, Annual Survey, Finances
Operates transit company	Equals 1 if transit company revenue is non-zero	U.S. Census Bureau, Annual Survey, Finances

Operates gas company	Equals 1 if gas company revenue is non-zero	U.S. Census Bureau, Annual Survey, Finances
Operates electric company	Equals 1 if electric company revenue is non-zero	U.S. Census Bureau, Annual Survey, Finances
Total revenue	Total revenue / Population	U.S. Census Bureau, Annual Survey, Finances
Intergovernmental aid	Intergovernmental aid/ Total revenue	U.S. Census Bureau, Annual Survey, Finances
Capital outlays	Capital outlays/ Total expenditures	U.S. Census Bureau, Annual Survey, Finances
Bond fund cash	Cash stored in bond fund/ Total cash securities	U.S. Census Bureau, Annual Survey, Finances
Revenue effort	Own-source revenue/ Total property value	U.S. Census Bureau, Annual Survey, Finances and GFOA
Own revenue diversity	1- (property tax revenue+sales tax revenue)/ total-own-source revenue	U.S. Census Bureau, Annual Survey, Finances
Private long-term debt	Long-term debt for private purposes/ long-term debt	U.S. Census Bureau, Annual Survey, Finances
Number of pension plans	as is	GFOA
Pension Funding	Pension assets/Pension Liabilities	GFOA
Self-support	Government activity fee revenue/ Government activity total expenditure	GFOA
Overlapping debt	Overlapping debt/ Population	GFOA
Change in net assets	Change in net assets/Total expenditure	GFOA
Government assets	Government activity assets/ Population	GFOA
Business-type assets	Business-type activity assets/ Population	GFOA

Data source details:

Bureau of Labor Statistics, Monthly unemployment statistics for cities

Government Finance Officers Association (**GFOA**) Municipal Financial Indicators Database (2003-2007).

**Formulas for linear interpolation:

if var2000<var2010 then var200n=var2000 + (var2010-var2000)*n, where n=year;

if var2000>var2010 then var200n=var2000 + (var2000-var2010)*n, where n=year.

U.S. Census Bureau, Annual Survey of State and Local Government **Employment** and Census of Governments (2003-2007).

U.S. Census Bureau, Annual Survey of State and Local Government **Finances** and Census of Governments (2003-2007).

U.S. Census Bureau, Decennial Census (2000-2010).

Depending on the model, the sample size ranges from 900 to 1100 observations. It is important to acknowledge that the data used in this study (and most financial research) do not meet strict standards of randomized experimental data. Neither do they comply with statistical sample design principles.[28] The dataset are limited to the governments who applied for and received the GFOA Financial Reporting Award for years 2003-2007. From the perspective of financial reporting, the sample is self-selected. However, financial reporting excellence may or may not be related to financial performance excellence in any systematic way.[29] The GFOA has been granting financial reporting awards without any regard for local financial performance. The single main goal of the Awards that were in place since 1946 was to standardize financial reporting. So, for

[28] Historically, the U.S. Census survey of local governments is based on a sampling methodology that selects survey participants based on the probability of their selection into the sample. Thus, the sample is self-weighted. But because the Census data were merged with the Bureau of Labor Statistics and the GFOA data, only the cities that had records for variables from al l the data sources were retained. The initial sampling design was, therefore, not preserved.

[29] Even if a positive correlation exists, the findings of the study show that within these potentially better performing governments there is significant and sufficient variation.

example, Flint, Michigan received the GFOA award for 10 consecutive years since its first fiscal emergency in 2001-2002 and even after the beginning of the second financial emergency in 2011.[30] In spite of the above mentioned shortcomings, the data used in this study is a unique and probably the largest dataset of local government CAFR information combined with financial and employment data from the U.S. Bureau of the Census and the Bureau of Labor Statistics. Years 2003-2007 were chosen because FY 2003 was the first year in the database with government-wide data on net assets and FY 2007 is the last year of data released by the GFOA to date.

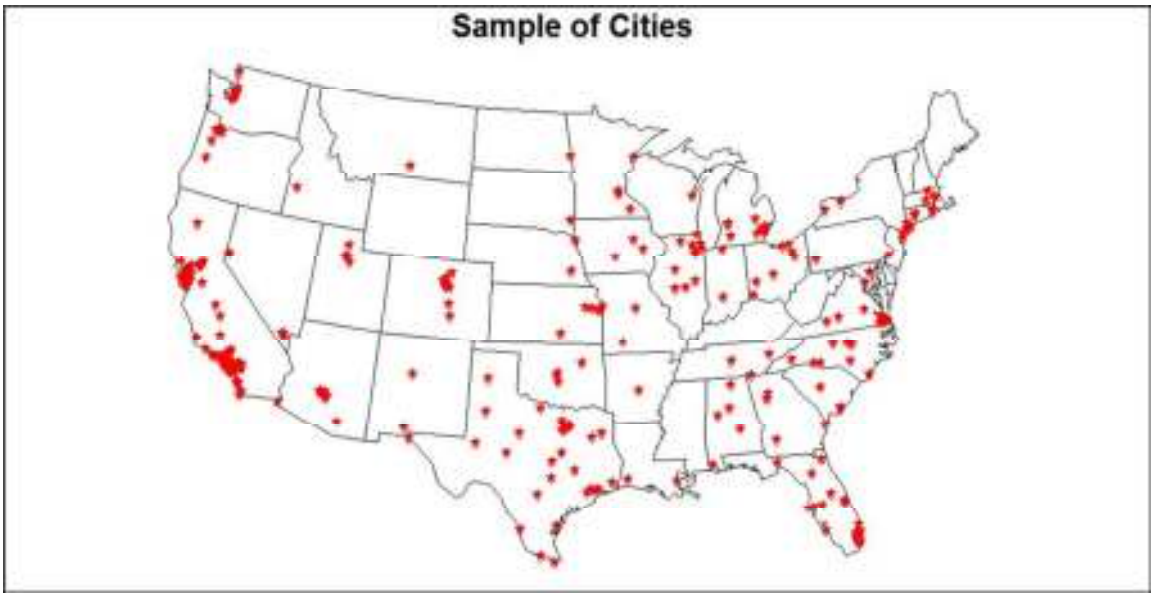
The uniqueness of the GFOA data is not only in the fact that it reflects information from government wide statements but also in presenting data that are not available elsewhere. For example, pension liability data disaggregated by city are not easily available. Often researchers collect the data manually. So, for example, Rauh (2010) manually worked with CAFRs of 115 pension plans sponsored by states to create the dataset. Actual value of all property, both real and personal that is taxable by the government is also a unique variable. Property value is a good measure of local tax base and allows for the creation of measures of revenue effort.

[30] "We are pleased to report that the Government Finance Officers Association of the United States and Canada (GFOA) awarded a Certificate of Achievement for Excellence in Financial Reporting to the City of Flint for its Comprehensive Annual Financial Report for the fiscal year ended June 30, 2011. The City has now received this award ten years in a row. In order to be awarded a Certificate of Achievement, a government must publish an easily readable and efficiently organized Comprehensive Annual Financial Report. This report must satisfy both generally accepted accounting principles and applicable legal requirements." Flint, Michigan, CAFR 2012.

Spatial Map of the Sample

The dataset includes cities from all U.S. regions and from most U.S. states. The least represented region is Mid-West, which reflects two phenomena: the fact that the number of cities in this region is naturally smaller, and the tendency of Mid-West cities not to engage with the GFOA initiatives. The total number of distinct cities included in the analysis is 353. All cities are repeated in the dataset at least twice across 2003-2007. The spatial map of the sample is presented in Figure 1.

Figure 1: Spatial Map of the Sample



Deflators

The dataset is a five-year panel that needs to be adjusted for inflation. There are several different price indexes available for this purpose that were developed by the Bureau of Economic Analysis, as part of the National Income and Product Accounts (NIPA)

reports. The most widely publicized are the Consumer Price Index, the GDP price Deflator, the Producer Price Index and a very large number of the CPI and GDP Deflator component indices. The choice between them usually depends on the data series that is being analyzed. The State and Local Purchases Deflator – a version of the GDP Price Deflator that is based on price changes in goods and services purchased by governments – is used for this analysis. This index is also applied to adjusting mean per capita income for inflation. The CPI might be a better option for this variable because it is based on the consumer basket of goods and services but it uses a different set of base years which would complicate the interpretation of model results.

Table 5. State and Local Government Purchases Deflator

Year	State and Local Government Purchases Deflator[31]	Implicit Price Deflator
2003	90.425	94.099
2004	94.062	96.769
2005	100.000	100.000
2006	105.276	103.260
2007	111.112	106.220

[31] http://www.economagic.com/em-cgi/data.exe/nipa/A301504-B829RG - Series Title: State and local: Other economic affairs: Income security: Price Indexes for Government Consumption Expenditures and Gross Investment by Function**.**

Descriptive statistics

Table 6 presents descriptive statistics. The mean pension funding ratio is 84 percent - the level exceeding the optimum level of 80-percent threshold that is largely deemed healthy by credit rating agencies (Brainard and Zorn, 2012). At the same time, a large standard deviation suggests that some governments have significantly lower funding levels than others. The average long-term debt per capita is 2.5 thousand dollars. This mean changes to 2.35 when Waco, TX – an outlier with very high levels of debt – is excluded from the sample. The mean difference between total revenues and expenditures is positive though small, suggesting that there is a large share of governments with a negative balance. As the next variable shows, 44 percent of the sample have a negative balance and 16 percent of the sample have severe deficits – a negative balance exceeding 10 percent of total expenditures. Population and mean incomes appear to be right-skewed due to the presence of New York, NY and Newport Beach, CA in the sample. These variables are log-transformed when they enter the econometric models. The average number of employees per 1000 residents is 11 but a large standard deviation suggests a significant variation of the size of government across cities. Thirty percent of the cities outsource one of the following government operations: fire, sewerage, solid waste. The mean proportion of financial department employees as a percent of total is 0.044 and the standard deviation is 0.02. On average, cities have 83 percent of their employees employed full-time, with 43 percent being the minimum ratio of full-time employees and 100 percent being the maximum. Eighty four percent of the sample run water utility business, thirty seven percent fund transit operations, seventeen percent run electric facilities and seven percent – gas companies. The mean of intergovernmental aid as a

share of total revenues is 17.8 percent, with some localities being fully self-sufficient and others, though few, highly dependent on higher intergovernmental transfers. Capital outlays constitute 17.6 percent of total expenditures on average. The mean revenue diversity – a share of own revenues from sources other than the property and sales taxes – is 58.9 percent. The statistics are right-skewed due to the presence of governments that have no sales or property tax revenues. Overlapping debt is slightly over one thousand dollars per capita but the standard deviation is as large as the mean, suggesting a considerable variation in the amount of local overlapping debt. Average government activity assets per capita are 2.5 thousand dollars and exceed business-type activity assets by one thousand dollars per capita on average.

Table 6: Descriptive Statistics

Variable	**N**	**Mean**	**SD**	**Min**	**Max**
Pension Funding Ratio	900	0.848	0.201	0.18	1.538
Long-term debt (per capita)*	1100	2.535	3.600	0	68.940
Difference (% Tot Exp)	1100	0.014	0.125	-0.578	0.826
Deficit (binary)	1100	0.438	-	0	1
Severe Deficit (binary)	1100	0.160	-	0	1
Population	1100	275761	665736	65269	8214426
Population over 65 (%)	1100	0.116	0.043	0.041	0.691
Occupied property (%)	1100	0.926	0.037	0.721	0.980
Mean income (per capita)	1100	25004	7427	10306	81768
Unemployment rate	1100	5.117	1.736	1.7	14.7

Employees (per 1000 residents)	1100	11.348	5.765	0.502	59.336
Full-time employees (% total)	1100	0.833	0.114	0.430	1
Finance employees (% total)	1100	0.044	0.020	0.003	0.230
Number of Pension Plans	924	2.113	1.058	1	7
Contracts fire, waste, sewerage	1100	0.305	-	0	1
Operates water facility	1100	0.841	-	0	1
Operates transit company	1100	0.375	-	0	1
Operates gas company	1100	0.066	-	0	1
Operates electric company	1100	0.168	-	0	1
Total revenue (per capita)*	1100	2.134	1.507	0.229	13.044
Intergovernmental aid (% total)	1100	0.178	0.118	0.000	0.747
Capital outlays (% expenditure)	1100	0.176	0.094	0.000	0.496
Bond fund cash (% total cash)	1069	0.157	0.146	0.000	0.740
Rev. Effort (Own rev/prop. value)	1100	0.029	0.037	0.000	0.065
Own revenue diversity (index)	1100	0.587	0.164	0.147	1.000
Fee-Support (Fees/Expend)	1100	0.170	0.105	0	1.546
Private long-term debt (% total)	1100	0.120	0.184	0	0.976
Overlapping debt (per capita)*	1100	1.137	1.068	0	9.055
Change in net assets (% expend)	1100	0.156	0.188	-0.688	2.032
Government assets (per capita)*	1100	2.550	2.351	-10.189	25.387
Business-type assets (per capita)*	1100	1.593	1.404	-0.172	12.190

*- measured in thousands of dollars

Outliers

In 2007, the year with the largest number of observations, there are 9 cities in the dataset with the population over 1,000,000 people (Phoenix, Los Angeles, Sacramento, Chicago, New York, Philadelphia, Dallas, Houston, San Antonio); 14 cities with the population over 500,000 but below 1,000,000; 22 cities with the population between 300,000 and 500,000 and the rest of the sample are cities with the population under 300,000. It is advantageous to work with the full sample as a larger number of observations means a larger number of degrees of freedom. Yet, it is important to be aware of potential differences between large and small cities due to size and complexity of operations that may mediate the relationships between variables in the model.

New York is such an influential observation for the descriptive statistics that are not scaled by population, personal income or another appropriate variable that it alone introduces a pronounced skew into the data. However, while New York statistics inflate the means of many variables, they do not affect variables that are in the form of percentages. New York is therefore not excluded from the sample.

Chapter 5

REGRESSION ANALYSIS

> "Sustainability must move from being a concept that it debated and analyzed to one that guides decision making and action at all scales of governance and across policy sectors."
>
> Fiorino, 2010

The analysis of data with spatially clustered repeated measurements on the same subjects over time presents several econometric challenges. First, these repeated measurements may be non-independent. As a result, the errors in the models may be auto-correlated. In this case, it is important to model the covariance structure of the repeated measurements by indicating that one subject (city) repeats across time (years). Thus, the amount of information (data variability) and degrees of freedom used in calculations is reduced. For example, the correct modeling of covariance acknowledges that the dataset has only 110 subjects measured over 5 years each, rather than 550 independent subjects. To estimate the equations, SAS **PROC MIXED** is used to take into account the dependence among the repeated observations. The restricted maximum likelihood estimation is used to produce robust standard errors.[32] The option **Ar (1)** was also used to run a first-order autoregressive model (one period lag) for the error structure. The models errors did not

[32] Adjusted for heteroscedasticity.

display error correlation properties as the estimate for the autocorrelation covariance parameter returned a zero.

The second challenge is that spatially clustered subjects may have more things in common among each other than subjects outside of the cluster. This problem is quite common in survey research and often handled through methods that allow for nesting subjects within groups. **PROC MIXED** models local finances as multilevel data taking into account prospective differences among cities that are nested in counties and then in states. Cities located in geographical proximity to each other may be benchmarking their performance against their neighbors and, as a result, exhibit higher similarities between each other than between cities in other county clusters. One anecdotal example of comparisons to neighbors that do take place may be the fact that the city of Peoria, AZ posts on its official website information on debt burdens of other five large cities in the Maricopa county (Avondale, Chandler, Gilbert, Glendale, Scottsdale).[33] Through the nesting of counties within states I account for error correlations at the state level.

State fixed effects are used to partial out the effects of unobserved state level variables – besides time-varying state aid that is included in the models – that may affect local finances. Collectively, state fixed effects explain a small share of variation in all three dependent variables of interest. The implication of this finding is that the role of states in local government affairs beyond state aid disbursements is not highly pronounced on average.

[33] For more detailed information, please see http://www.peoriaaz.com/TAPE2008/indicators_debt.asp

Besides state fixed effects I also include time fixed effects for each of the five years. I acknowledge that the number of time periods is very small. The downside of such data is its relatively small variability. The upside of the data is that it offers more uniform financial data than would a panel analyzing government finances, for example, for three decades. The composition of financial ratios would be likely to be different across time due to changes in reporting standards. Besides time fixed affects that control for potential year specific effects, I perform a common adjustment of all variables that are expressed in dollars: adjustment for inflation using the State and Local Government Purchases Deflator (See Table 5). A visual examination of revenue and expenditure ratios, and pension liability funding levels does not witness non-stationarity of the panel.

Model for Pension Liability Funding

The objective of the pension liability model is to identify factors that affect pension liability funding. The factors are grouped in three categories: variables that characterize the administration of government operations, variables that reflect a government's financial structure and performance, and variables that measure local economic base.

The first group of variables includes the number of employees scaled by city population, the number of full-time employees as a percent of total government employment, the number of financial management employees as a percent of total employment, the number of pension plans that a city participates in, an indicator variable for whether a government outsources either fire or solid waste or sewerage (these are most commonly outsourced operations), and indicator variables for whether a city runs such business-type activities such as water, transit, gas or electricity company. I expect to see that the

number of employees per capita, the number of full-time employees per capita and the number of pension plans will be negatively associated with pension liability funding. The lower the number of beneficiaries and plans, the lower the obligations and the easier it is to satisfy them. The higher the number of financial administration employees as a percent of total city employees, the higher the level of pension liability funding. There are at least two mechanisms that would explain this effect. First, the amount of human resources available for managing finances might result in higher specialization and a better oversight of pension plan management. And second, financial administrators may be self-interested in maintaining high levels of plan funding because they are future beneficiaries of the retirement systems. Governments outsourcing operations should have higher levels of pension liability funding as they do not have to be responsible for additional retirement benefits. Governments running utility operations may have higher levels of pension liability funding given the potential for using business type activity for funding pension plans.

The second group of variables reflects a government's financial structure and performance. I construct a measure of own revenue diversity by modifying the approach of Chernick et al. (2011). The authors created a revenue diversity measure as a percent of own-source revenues from sources other than the property tax. I take into account that a vast majority of governments habitually use sales taxes as a major revenue source. Therefore, I create a revenue diversity measure as a percent of own-source revenues from sources other than the property and sales tax. Effects of revenue diversity may have either positive or negative association with the dependent variable. Intergovernmental aid may also be either positively or negatively related to pension liability funding: if aid

compensates for fiscal disparities then it may be negatively associated with pension liability funding; if state aid acts as a hard budget constraint then it is likely to exert a positive effect on the funding levels.

Revenue effort, revenue per capita, a change in net assets, and cash securities measure the financial performance of a government. They should all be positively associated with pension liability funding as they provide resources for making annual required contributions (ARCs) in full. Similarly to Munnell (2011) who suggests that a locality with fiscal problems may meet its non-current debt obligations by cutting back on pension plan contributions, I expect local debt to be negatively associated with the dependent variable. Capital outlays are also expected to display a negative association with pension liability funding because these expenditure items are also likely to be substitutes for pension contributions for governments in the era of fiscal stress.

The third group of variables are measures of local demography and economic conditions which translate into the tax base. Income per capita and the percentage of occupied housing units are expected to exert a positive influence on pension liability funding through their effects on the revenues.

TABLE 7

Pension Liability Funding Ratio (Log), Regression Parameter Estimates
(robust standard errors clustered by city, county, and state in parentheses)

Predictors and Controls	No Fixed Effects	With state and year fixed effects
Government Structure		
Employees (per capita, log)	-0.048 (0.0368)	-0.059 (0.0346)$^{+}$
Full-time employees (% of total, log)	-0.182 (0.0890)*	-0.047 (0.0784)
Financial administration employees (% of total, log)	-0.006 (0.724)	-0.016 (0.0158)
Number of pension plans	-0.011 (0.010)	-0.014 (0.0092)
Outsource fire, or solid waste, or sewerage	0.024 (0.0211)	0.012 (0.0190)
Runs water utility company	0.063 (0.0414)	0.047 (0.0341)
Runs transit operations company	0.004 (0.0207)	0.010 (0.0182)
Runs gas company	0.077 (0.0833)	0.033 (0.0562)
Runs electric utility company	-0.014 (0.0451)	-0.021 (0.0353)
Financial Structure and Performance		
Own-source revenue diversity (log)	-0.013 (0.0458)	0.017 (0.0439)
Intergovernmental aid (% of total revenue, log)	-0.005 (0.0060)	-0.006 (0.0062)
Total revenue (per capita, log)	0.017 (0.0296)	0.053 (0.0163)

Revenue effort (% of property value, log)	-0.002 (0.0062)	-0.005 (0.0059)
Fee-funding of government activities (log)	-0.020 (0.0177)	-0.030 (0.0163)$^{+}$
Local Economic Base		
Income (per capita, log)	-0.095 (0.057)$^{+}$	0.000 (0.051)
Population (log)	-0.020 (0.025)	0.000 (0.018)
Population over 65 (%)	0.215 (0.387)	-0.186 (0.259)
Occupied (%, log)	1.236 (0.442)**	0.536 (0.393)
Unemployment (%, log)	0.084 (0.031)**	0.016 (0.034)
Overlapping Debt (per capita)	-0.001 (0.005)	0.003 (0.005)
Intercept	6.766 (0.943)**	5.046 (0.788)**
-2 Restricted Log Likelihood	-815.1	-975.2
N	793	793

** - significant at the 0.01 level; * - significant at the 0.05 level; $^{+}$ - significant at the 0.1 level.

Results

The number of full-time employees is, as expected, negatively associated with pension liability funding levels: the higher the number of full-time employees the more difficult it is for a government to fund its retirement obligations. Since both most predictors and the response variable are in logarithms, most coefficients may be interpreted as elasticities. A one percent increase in the full-time employment is associated with a 0.18 percent decrease in the level of pension liability funding. This effect becomes smaller in the fixed effect model and loses statistical significance. The number of financial administration employees, contrary to the expectations, is not a significant predictor of pension liability funding. The number of pension plans that a local government participates in has a consistently negative effect but does not reach conventional statistical significance levels.

Outsourcing of government operations such as fire, sewerage, and solid waste does not have any direct effect on pension funding levels. Importantly, as further models will confirm, outsourcing is not positively associated with any of the indicators of sustainability examined in this work. Governments offering services in-house appear just as equipped to be fiscally sustainable as governments that make decisions to outsource.

Similarly, utility company operation is not associated with better fiscal sustainability status. The use of business-type activity revenues to bridge budget gaps that is documented by Hendrick (2004) does not seem to extend beyond haphazard temporary actions. Systematic effects of entrepreneurship are non-existent.

Financial structure and performance variables – revenue diversity, revenue effort, and overall revenue wealth – do not reach conventional statistical significance levels in predicting pension liability funding. The effects of the degree of fee-funding of government operations are present only in the fixed effects model.

Income per capita is negatively associated with pension liability funding levels though the coefficient is on the border of statistical significance. In wealthier communities, governments appear to be underfunding pensions more than in poorer communities. It may be so because wealthier communities face higher expenditure pressures to satisfy expectations of the electorate or because government officials tend to avoid increasing already high absolute levels of taxes and which might displease the residents. It may also be the case that poorer communities may be more frugal and disciplined about using their resources and planning ahead, knowing that they do not have a rosy financial outlook for the future. The poverty of the tax base may make governments more conservative and disciplined in making financial choices. The elasticity between pension liability funding and the extent to which housing units are occupied in a locality is strong. A one percent increase in occupancy rates is associated with a 1.2 percent increase in pension liability funding. The effect is twice as small and non-significant in the fixed effect model but the direction of the effect remains the same.

Model for Debt Burden

Besides the three types of variables described in the pension funding model, additional variables of interest are included in the debt model. These variables are the overlapping debt of a jurisdiction and the government's business-type activity and government

activity assets. It is expected that the higher the level of the overlapping debt of a jurisdiction, the lower will be its own level of debt. Given that local governments report the levels of overlapping debt in their financial statements, the information on overlapping debt burden should be part of the economic environment analysis and should be taken into consideration by managers who make decisions about issuing debt.

Government assets that are used as predictors in the model are pieces of information from local CAFRs and are calculated using the full accrual method of accounting and the economic resources management basis. The level of total assets of government and business-type activities is expected to be negatively associated with the level of debt. The higher the level of existing assets per capita, the lower should be the need for issuing debt to acquire additional assets. At the same time, a high level of a government's assets per capita, which comprise not only capital plan assets but also equipment and more liquid assets such as cash and securities convertible into cash, may increase local government confidence in the ability to repay debt and contribute to the decision to issue it.

The effects of government administration structure on debt may be either positive or negative. A higher number of financial administration employees may provide the government with additional resources for capital management and planning. A more efficient planning may lead to lower debt burdens. On the other hand, the number of a government's employees may be associated with higher debt levels as government's assets that are funded with debt are often populated by government employees. So, the higher the level of employment is, the higher will be the need for plant and equipment assets and the higher the resulting debt.

Utility companies of a government may be more or less demanding of capital assets and infrastructure. So, they may exert differential pressures on a government's debt burden. Revenue effort should be positively associated with a debt burden: localities with higher levels of debt may need to extract higher levels of revenues from their tax base. The revenue effort is calculated as own source revenues divided by the actual property value of a jurisdiction, both real and personal. Lastly, the importance of the tax base should again come through in the debt model: the higher the level of local income per capita, the higher the debt, the higher the population, the higher may be the pressures on government expenditures.

TABLE 8

Debt Level per Capita (log-transformed), State and Year Fixed Effects Regression Parameter Estimates (robust standard errors clustered by city, county, and state in parentheses)

Predictors and Controls	No Fixed Effects	With State and Year Fixed Effects
Government Structure		
Employees (per capita)	0.015 (0.0045)**	0.015 (0.0048)**
Full-time employees (% of total)	0.620 (0.2211)**	0.526 (0.2322)**
Financial administration employees (% of total)	-0.411 (0.7457)	-0.448 (0.7667)
Outsource fire, or solid waste, or sewerage	-0.006 (0.0407)	0.001 (0.9658)
Runs water utility company	0.084 (0.0753)	0.079 (0.4200)
Runs transit operations company	0.067 (0.1102)	0.051 (0.0244)
Runs gas utility company	0.145 (0.2410)	0.070 (0.1264)
Runs electric utility company	0.309 (0.0928)**	0.350 (0.0974)**
Financial Structure and Performance		
Own-source revenue diversity	0.208 (0.2194)	0.241 (0.1966)
Intergovernmental aid (% of total revenue)	0.116 (0.1862)	0.168 (0.2159)
Total revenue (per capita, logged)	0.074 (0.0213)**	0.083 (0.0259)**
Revenue effort (% of property value)	0.019 (0.0126)	-0.019 (0.0128)

Fee-funding of government activities (%)	-0.000 (0.0015)	-0.001 (0.0015)
Government activity assets (per capita, log)	0.007 (0.0169)	0.007 (0.0173)
Business-Type activity assets (per capita, log)	0.032 (0.0184)$^{+}$	0.035 (0.0189)$^{+}$
Local Revenue Base		
Income (per capita, logged)	0.311 (0.0964)**	0.366 (0.1270)**
Population (logged)	0.255 (0.0480)**	0.266 (0.0490)**
Population over 65 (%)	-0.039 (0.7321)	-0.500 (0.7360)
Occupied (%)	-1.079 (0.8970)	-1.084 (1.1880)
Unemployment rate	0.009 (0.0110)	0.015 (0.0133)
Overlapping debt (per capita, logged)	-0.017 (0.0091)$^{+}$	-0.017 (0.0093)$^{+}$
Intercept	-5.8833 (1.588)**	-6.081 (1.9103)**
-2 Restricted Log Likelihood	378.4	371.7
N	929	929

** - significant at the 0.01 level; * - significant at the 0.05 level; $^{+}$ - significant at the 0.1 level

Results

The number of employees per capita and the number of full-time employees are both significant predictors of debt levels. A one person increase in the total number of employees per capita is associated with a 0.015 percent increase in the level of debt. The percentage of full-time employees, however, has a much more pronounced effect: a one percentage point increase in the number of full-time employees as a share of total employees is associated with a 0.62 percent increase in the average level of debt.

The operation of electric utility companies appears to exert a positive effect on local debt burdens. As expected, the higher the level of revenue per capita, the higher the level of debt per capita will be as governments need to have adequate resources to make debt service payments and pay out debt. What is surprising is the lack of a similar effect for the variable referring to revenue effort. It is measured as the amount of own-source revenue as a share of property value. It would be expected that governments harboring higher debt would exert higher revenue efforts. Neither the baseline nor the fixed effect models warrant such a conclusion.

The size of business-type activity assets tends to be associated with a higher level of debt: cities with the richer assets tend to issue more debt. The effect is not present for government activity assets.

Local economic base - income and population – is statistically significant for predicting debt levels. The elasticities are moderate: a one percent increase in income per capita is associated with a 0.37 percent increase in the debt per capita measure; a one percent increase in population is associated with a 0.27 percent increase in the debt level (according to the fixed effect model).

The overlapping debt does exert a negative pressure on local government own debt levels, however, the substantive effects of this variable are so small in both models that it may warrant a policy recommendation to financial managers to consider the jurisdictional debt more seriously. Vertical externalities, such as increased issuance costs of debt in heavily debt burdened areas are only one of the outcomes of a capital management strategy that does not take into account the debt levels of overlapping jurisdictions. As the information on overlapping debt is reported in CAFRs, this information is always available to debt management specialists in local governments.

Models for Budgetary Balance and Deficit

Measures of operating position are the most widely used indicators of local governments' financial position. They may be extracted from the annual operating budget, annual financial report, or interim financial reports. The measures abound. So, for example, Kleine, Kloha and Weissert (2005) analyze metrics of detecting local fiscal distress in 15 states and find 48 different measures of operating position (Coe, 2008). Two of the most commonly used variables for constructing a measure of operating position are total government revenues and total government expenditures. The measures of budgetary balance between revenues and expenditure that are used in this study come from the U.S. Census Bureau Annual Survey of Governments data.

The difference between local revenues and expenditures may be positive (surplus) or negative (deficit). The U.S. Bureau of the Census, which is the source of the data for constructing the dependent variable, acknowledges that the data are statistical in nature and cannot be viewed as either surplus or deficit in accounting terms. Yet, the use of

negative balances as a measure of deficit is still an approximation of budgetary solvency and has been widely used as such by the academic community (Hou and Smith, 2010; Wang et al. 2007).

Whereas local governments that incur a deficit can cover it with resources from the reserves, a deficit, especially a severe one makes it more difficult for a government to manage another potential revenues shortfall or expenditure increase in the future.

Local budgetary balance indicators are operationalized in three ways at detailed in Table 3. First, I examine the total difference between revenues and expenditures. It is a continuous variable that can take both positive and negative values. Variables that are associated with an increase in this measure are viewed as the ones that contribute to strengthening local fiscal sustainability.

Then, I focus on the negative balance between revenues and expenditures. I construct a binary variable "Deficit" equal to one if a local government has any negative balance. Also, I construct a binary variable "Severe Deficit" that is equal to one if a local government has a negative balance that exceeds 10% of total expenditures. The choice of 10% is guided both by theory and data. A level of 5-15% reserves as a percent of total expenditures is often cited in the professional literature as the optimum level of fiscal slack to cover prospective budget gaps (Marlowe, 2006). Even though some scholars dispute the utility of this 5-15% heuristics and suggest that the level of slack resources should be determined based on the level of fiscal risk (Hendrick, 2002, Kriz, 2003), other researchers defend the 5% rule citing that the probability of a local deficit beyond the level of 5% is quite small (Cornia and Nelson, 2003). Marlowe (2006) points out that in

spite of these recommendations, the mean of general fund balances of local governments is between 31 and 39 percent. In the data I use, the mean general fund balance is 7.5 percent of the general fund expenditures with the standard deviation of 22 percent; the mean total balance is only 1.4 percent of total expenditures with the standard deviation of 12.4 percent. The mean sinking fund balance in the data I use is 30 percent (though 11 influential observations positively skew the mean by 8 percentage points).[34] The sinking fund is a very broad measure of slack and it should be noted that governments maintain sinking funds not only to cover operating deficits but also to maintain credit ratings, have flexibility in budget decision making and service provision. Sinking funds are accumulated by governments over many years. I view a revenue and expenditure gap below 10% as the level of financial stress that can be comfortably accommodated by governments from their available slack resources. It represents roughly one standard deviation from the mean (|1.4%-12.4%|=11%). A level of deficit beyond this threshold is not only more difficult for governments to fill in for but it also may send a warning signal to the finance community about the scope of local financial imbalance.[35]

As in the previous models, I am interested in the effects of three groups of factors on the total difference between revenues and expenditures and on the likelihood of a deficit and a severe deficit: government organization and administration, financial structure and performance, and local demographic and economic variables.

[34] These high sinking fund reserve holders are Olathe, KS, Rochester, MS, Waco, TX. Waco holds such high reserves as a strategy to maintain high credit rating (S&P:AA) on its very high debt of over 40 thousand dollars per capita.
[35] Ten percent may also act as a psychological threshold.

The number of employees per capita and the proportion of full-time employees are proxies for the size and organization of government. Differences between larger and smaller governments, governments with more traditional contracts and more entrepreneurial management (via part-time employment) may be informative. Financial administration employment is a proxy for the amount of financial human resources and should be negatively associated with a deficit. The direction of the effects of outsourcing and utility company operation is uncertain because the effects may go both ways. By outsourcing, a government may benefit from having fewer retirement plan beneficiaries. Alternatively, in-house service provision may be more economical than outsourcing.[36] In the private arrangement of service provision, principal-agent problems may drive the costs up and lead governments to weaker budgetary balances. Effects of utility company operation may also go both ways: business-type activities typically have their fee-based revenues higher than expenditures so that the surpluses may be used to supplement government activity resources (Hendrick, 2004); or, the operation of business type activities may create a type of soft-budget constraint and a disincentive for local government management to avoid operating deficits.

Financial structure and performance are key variables of interest in all three deficit equations. Specifically, the effects of own-source revenue diversity are important to determine. If diversification leads to lower deficits, this finding needs to guide policy recommendations for governments seeking to strengthen their financial position. If revenue diversification leads to higher deficits, then governments attempting to diversify

[36] This assumption, however, would not be supported by public choice theorists.

should be aware of this effects and may want to weigh the benefits of diversification (additional revenue) against its costs (potential deficits) more carefully.

Like in the previous equations, intergovernmental aid may act either as a compensatory device for mitigating effects of relatively poorer tax bases or as a soft budget constraint for local budgets. In the first case, it is likely to be associated with higher deficits if the aid does not counteract fiscal disparities fully or, if it does counteract the disparities and prevents deficits - its effects may be masked with a lack of statistical significance. If the effect of state aid is so strong that it not only mitigates fiscal disparities and reduces deficits but also contributes to higher positive balances, then this variable should have a positive effect in the model with the total difference as the response.

Long-term debt is expected to have a positive effect on the size of the deficit. The proportion of private debt as a share of total debt may also have implications for governments' operating deficits. Since private purpose principal and interest payments are often made using specifically designated revenue sources and often by entities other than the governments, the effects of private purpose debt of local deficits should be negative: as the share of private purpose debt goes up, the likelihood of a deficit should go down.

Capital outlays as a percent of total expenses and the percent of cash securities held in the bond fund are two other variables of interest in the group of financial performance variables. The effects may be negative if we proceed from the assumption that the wealthier the government, the higher will be its capital outlays and bond fund balances. Alternatively, if the effects are positive, it would mean that both bond fund securities

(that are often set by external authorities for local debt issuers) and capital outlays act as a type of pressure on governments' budgets that conditions deficits. If that is the case, then a conclusion follows that local governments tend to be far from ideal capital resource managers.

Change in net assets of a government as a percentage of total expenditures is expected to have a negative effect on the likelihood of the deficits. It acts as an important control in all the deficit models.

Mean income per capita should have a negative effect on local deficits and it is also expected that as local unemployment increases, the governments should face higher expenditure pressures, lower revenues, and may have higher likelihoods of deficits as a result.

The tables below present a visual summary of the variable that measures the difference between total revenues and expenditures as a percent of expenditures and a visual summary of the deficit variable that focuses on the size of the deficit. The latter set of plots provides also provides information on the severe deficit variable.

FIGURE 2

Difference between Total Revenues and Expenditures as a Percent of Total Expenditures by year

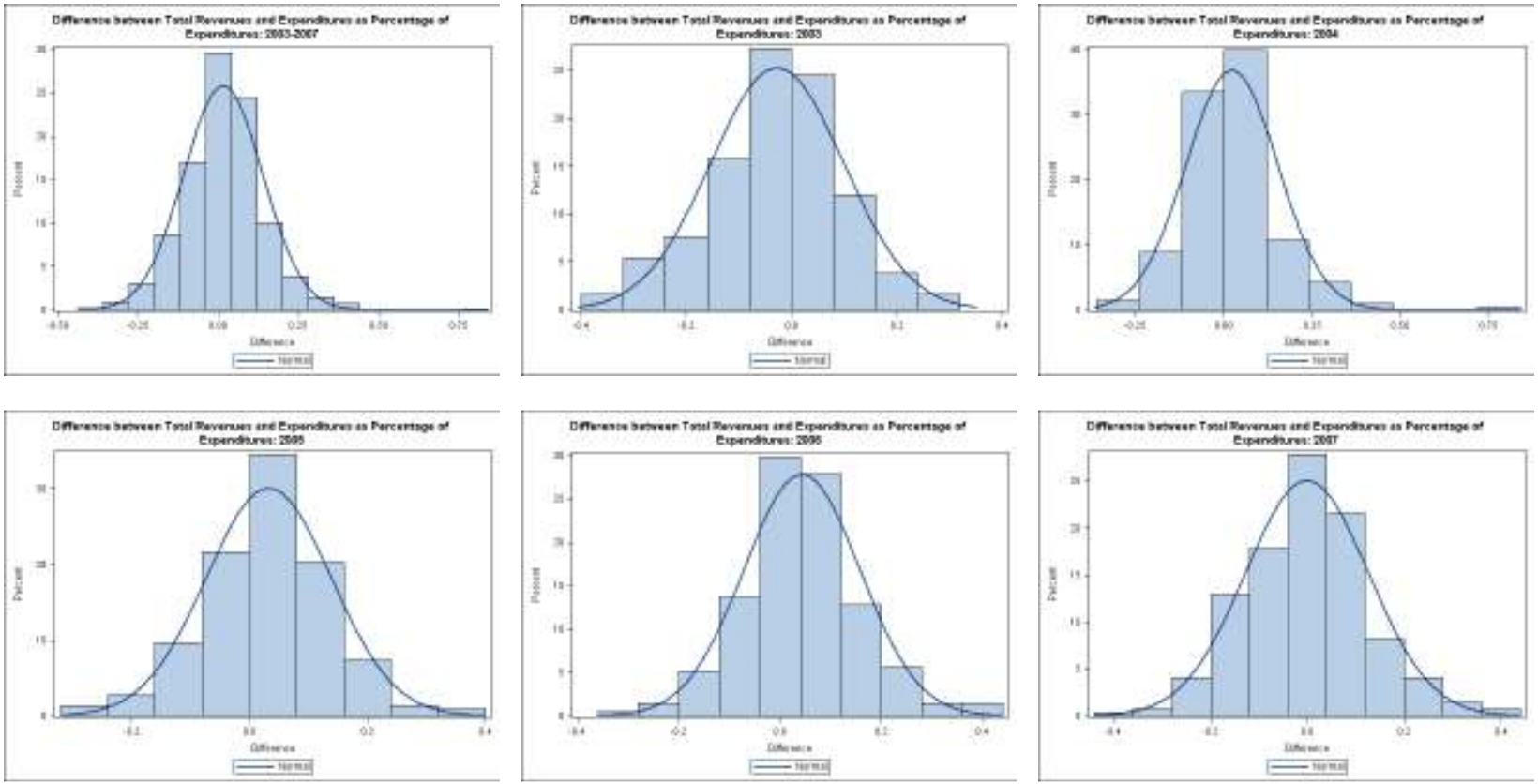
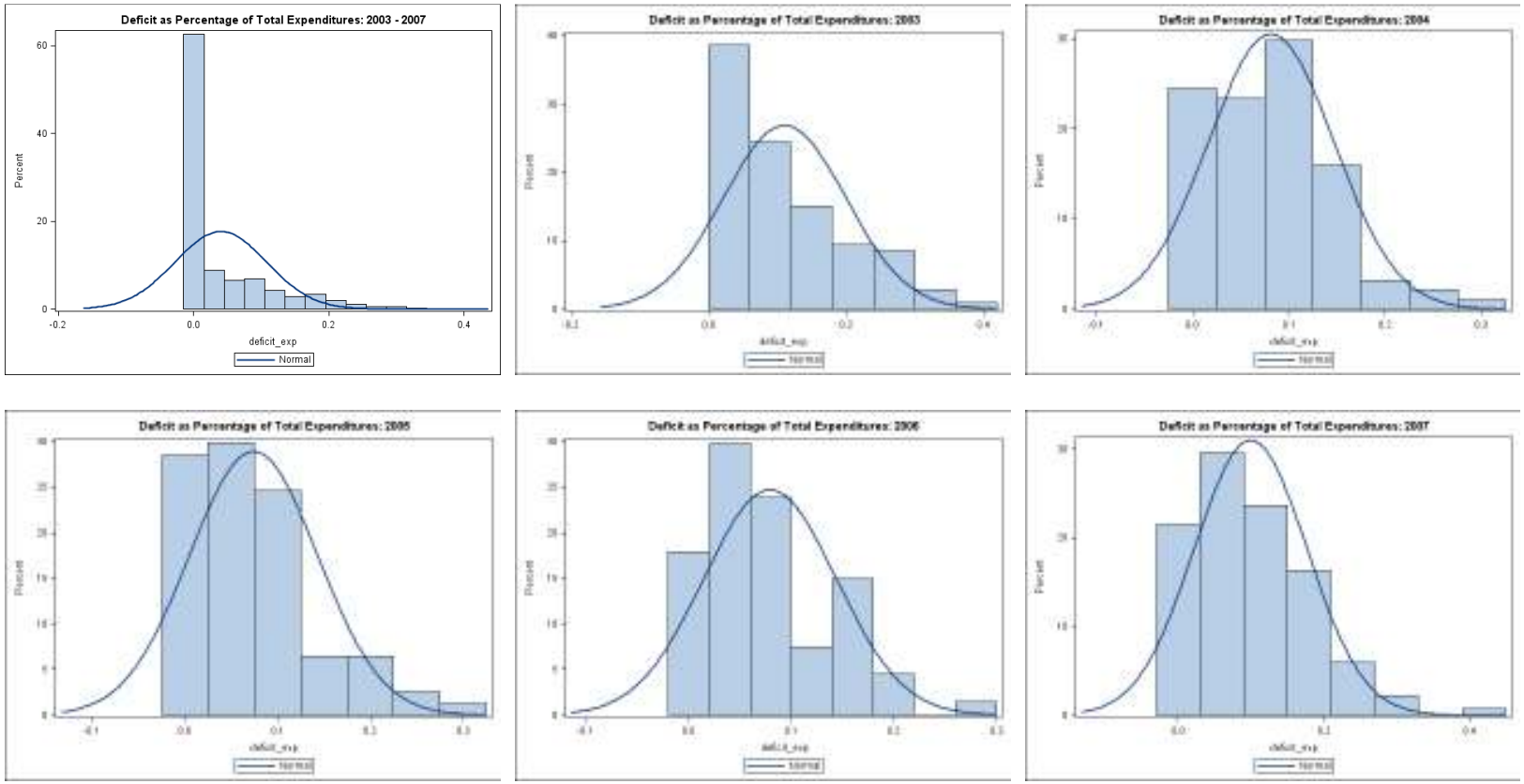


FIGURE 3

Deficit between Total Revenues and Expenditures as percent of Total Expenditures



Cities with deficits above 30 percent in any given year: Fresno CA (2004), Santa Monica CA (2004), Santa Clarita CA (2006), Elk Grove CA (2005), Norwalk CT (2007), Gainesville FL (2003), Sunrise FL (2004, 2007), Tampa FL (2004), Tampa FL (2006), Cape Coral FL (2004), Boca Raton FL (2007), Roswell GA (2006), Champaign IL (2004), Southfield MI (2004), Henderson NV (2004,2007), North Las Vegas, NV (2006), Albuquerque NM (2006), Federal Way WA (2006).

TABLE 9

Difference between Revenues and Expenditures as a Percent of Expenditures, Regression Parameter Estimates (robust standard errors clustered by city, county, and state in parentheses)

Predictors and Controls	**No Fixed Effects**	**with State and Year Fixed Effects**
Government Structure		
Employees (per capita)	-0.004 (0.0013)**	-0.010 (0.0014)**
Full-time employees (% of total)	-0.043 (0.0487)	- 0.124 (0.054)*
Financial administration employees (% of total)	0.430 (0.2302)$^{+}$	0.435 (0.240)$^{+}$
Outsource fire, or solid waste, or sewerage	0.013 (0.0110)	0.0146 (0.1809)
Runs water utility company	-0.030 (0.0140)*	-0.021 (0.0148)
Runs transit operations company	0.014 (0.0099)	0.013 (0.010)
Runs gas utility company	-0.0415 (0.0211)*	-0.058 (0.0216)**
Runs electric utility company	-0.0900 (0.0160)**	-0.115 (0.0165)**
Financial Structure and Performance		
Own-source revenue diversity	0.272 (0.0384)**	0.315 (0.0511)**
Intergovernmental aid (% of total revenue)	-0.028 (0.0455)	-0.020 (0.0624)
Total revenue (per capita, logged)	0.017 (0.0051)**	0.049 (0.0070)**
Revenue effort (% of property value)	0.005 (0.0050)	0.004 (0.0043)

Level of fee-funding of government activities (%)	0.000 (0.0007)	0.000 (0.0007)
Long-term debt (per capita in thousands)	-0.002 (0.0193)	-0.004 (0.0013)**
Private debt (% of total debt)	-0.050 (0.074)$^{+}$	-0.038 (0.0173)
Capital Outlays (% of total expenditures)	-0.577 (0.0420)**	-0.820 (0.0424)**
Change in Net Assets (% of total expenditures)	0.132 (0.0219)**	0.119 (0.0207)**
Bond Fund Cash (% of total cash securities)	-0.082 (0.0281)**	-0.042 (0.0278)
Revenue Capacity and Spending Needs (controls)		
Income (per capita, logged)	-0.084 (0.0234)**	-0.037 (0.1026)
Population (logged)	0.001 (0.0069)	0.011 (0.0074)**
Population over 65 (%)	0.153 (0.1145)	0.053 (0.1143)
Occupied (%)	0.138 (0.1560)	-0.336 (0.2145)
Unemployment rate	-0.014 (0.003)**	-0.015 (0.0042)**
Intercept	0.844 (0.2986)**	0.671 (0.3618)$^{+}$
-2 Restricted Log Likelihood	-1663.4	-1705.9
N	1064	1064

** - significant at the 0.01 level; * - significant at the 0.05 level; $^{+}$ - significant at the 0.1 level

Results for Budgetary Balance

The three most prominent variables that affect the size of the total difference are financial administration employment, own-source revenue diversity and capital outlays. In the fixed effects models, one percentage point increase in the employment of financial staff as a percent of total employment is associated with a 0.44 percentage point increase in the budgetary balance. One percentage point increase in own-source revenue diversity is associated with a 0.32 percentage point increase in budgetary balance. A one percentage point increase in capital outlays as a percent of total expenditures is associated with a 0.82 percentage point decrease in the level of budgetary balance. Other variables that are substantively smaller but highly significant are overall government size – measured through the number of public officials per 1000 residents - which reduces budgetary balance; the operation of gas and electric facilities which also affects budgetary balance negatively; revenue per capita and change in net assets which increases the balance and the unemployment rate which, as expected, decreases the balance. Effects of some other variables – full time employment, long term debt per capita, proportion of private debt, and mean income - are not robust as they are not significant in either the baseline or the fixed effect model.

TABLE 10

Deficit (Negative Difference between total Revenues and Expenditures),
Severe Deficit (Negative Difference between Total Revenues and Expenditures exceeds 10% of Expenditures)
Logistic Regression Parameter Estimates, (robust standard errors clustered by city, county, and state in parentheses)

Predictors and Controls	**Deficit**	**Deficit With State and Year Fixed Effects**	**Severe Deficit**	**Severe deficit with State and Year Fixed Effects**
Government Structure				
Employees (per capita)	0.014 (0.0051)**	0.030 (0.0062)**	0.008 (0.0038)*	0.020 (0.0046)**
Full-time employees (% of total)	0.048 (0.1847)	0.287 (0.2171)	-0.205 (0.1380)	-0.072 (0.1606)
Financial administration employees (% of total)	-0.866 (0.9009)	-0.745 (0.9967)	0.075 (0.6721)	-0.511 (0.7373)
Outsources fire, or solid waste, or sewerage	-0.020 (0.0424)	-0.027 (0.0441)	-0.014 (0.0316)	-0.015 (0.0327)
Runs water utility company	0.017 (0.0524)	-0.004 (0.0577)	0.009 (0.0392)	0.005 (0.0426)
Runs transit operations company	-0.033 (0.0376)	-0.016 (0.0410)	-0.007 (0.0281)	-0.003 (0.0303)
Runs gas utility company	0.096 (0.0778)	0.151 (0.0816)$^{+}$	0.079 (0.0582)	0.122 (0.0603)*
Runs electric utility company	0.269 (0.0602)**	0.357 (0.0645)**	0.128 (0.0450)**	0.172 (0.0477)**
Financial Structure and Performance				
Own-source revenue diversity	-0.573 (0.1472)**	-0.687 (0.2106)**	-0.372 (0.1099)**	-0.408 (0.1558)**

Intergovernmental aid (% of total revenue)	0.073 (0.1756)	-0.098 (0.2603)	-0.057 (0.1311)	-0.221 (0.1925)
Total revenue (per capita, logged)	-0.063 (0.0206)**	-0.172 (0.0298)**	-0.037 (0.0154)*	-0.111 (0.0221)**
Revenue effort (% of property value)	-0.023 (0.0205)	-0.025 (0.0203)	-0.033 (0.0152)*	-0.026 (0.0150)$^{+}$
Fee-funding of government activities (%)	-0.001 (0.0033)	0.000 (0.0031)	0.000 (0.0024)	0.000 (0.0023)
Long-term debt (per capita in thousands)	0.007 (0.0055)	0.016 (0.0056)**	0.007 (0.0041)$^{+}$	0.014 (0.0041)**
Private debt (% of total debt)	0.215 (0.1074)*	0.165 (0.1139)	0.107 (0.0802)	0.115 (0.0843)
Capital Outlays (% of total expenditures)	1.745 (0.1784)**	2.494 (0.1902)**	1.303 (0.1324)**	1.874 (0.1408)**
Change in Net Assets (% of total expenditures)	-0.412 (0.0928)**	-0.345 (0.0929)**	-0.176 (0.0689)**	-0.166 (0.0688)*
Bond Fund Cash (% of total cash securities)	0.280 (0.1156)	0.116 (0.1219)	0.213 (0.0860)**	0.159 (0.0903)$^{+}$
Revenue Capacity & Spending Needs				
Income (per capita, log)	0.203 (0.0900)*	0.173 (0.1039)$^{+}$	0.168 (0.0072)**	0.078 (0.0769)
Population (log)	0.019 (0.0255)	-0.018 (0.0282)	0.021 (0.0191)	-0.007 (0.0209)
Population over 65 (%)	-0.300 (0.4268)	-0.114 (0.4353)	-0.077 (0.3191)	0.238 (0.3217)
Occupied (%)	-0.228 (0.5446)	1.515 (0.8291)$^{+}$	-1.218 (0.4370)**	0.066 (0.6129)
Unemployment rate	0.038 (0.0127)**	0.058 (0.0175)**	0.032 (0.0095)**	0.037 (0.0130)**
Intercept	-2.118(1.1208)$^{+}$	-2.916 (1.4334)*	-1.086 (0.8379)	-1.070 (1.0599)
-2 Restricted Log Likelihood	1399.7	1333.6	776.2	815.1
N	1064	1064	1064	1064

Results for Deficit

Consistent with the previous model where government size affects budgetary balance negatively, an increase in government size increases the likelihood of a deficit. The effect persists in the severe deficit model. The effect of financial human resources increase is not associated with a change in the likelihood of a deficit. The implication of this finding and the finding in the previous model is that an increase in the proportion of financial administration employees does improve an already positive balance of a government but does not prevent it from incurring a deficit. The variable that does have a strong effect on the likelihood of a deficit is local revenue diversity. The more diversified own source revenues are, the lower the probability of a severe deficit and any deficit. An increase in capital outlays as a percentage of total expenditures increases the probability of a government to incur a severe deficit and also any deficit. A positive change in net assets of a government leads to a decrease in the probability of both a severe deficit and any deficit. A higher revenue effort reduces the likelihood of a severe deficit but is not associated with a change in the probability of any deficit.

The unemployment rate is the only variable from the group of demographic and economic variables that has a robust, though not very strong effect across all the models. Importantly, the effect of revenue base wealth, while present in baseline models, disappears in the fixed effect models. Deficits and severe deficits are not the prerogative of communities with less fortunate revenue base.

Chapter 6

CONCLUSION

This dissertation has reviewed existing definitions of fiscal sustainability and relevant literature on adjacent concepts of fiscal health and fiscal stress to create a working definition of fiscal sustainability and an empirical framework for the analysis of sustainability at the local level.

Theoretical definitions of fiscal sustainability at the local level are still a matter of debate. PriceWaterhouseCoopers describes it as the ability to manage expected financial requirements and financial risks and shocks over the long term without the use of disruptive revenue and expenditure measures (PwC, 2006). Chapman defines it as "the long-run capability of a government to consistently meet its financial responsibilities." (Chapman, 2008: S115) GASB argues that fiscal sustainability is characterized through "a government's ability and willingness to generate inflows of resources necessary to honor current service commitments and to meet financial obligations as they come due, without transferring financial obligations to future periods that do not result in commensurate benefits." (GASB, 2011: x) Dollery and Grant suggest that "fiscal sustainability could be defined to comprise the programs, expenses and other activities a local council must fund to meet the measurable environmental and social components of sustainability." (Dollery and Grant, 2011: 44)

As a construct for empirical research, fiscal sustainability is subject to an even larger controversy. The national fiscal sustainability research framework suggests that sustainability be examined through simulations and risk assessment models (Burnside,

2003; Burnhill and Kopits, 2003; Hagist and Vatter, 2009). This approach finds resonance with local finance scholars who study local fiscal slack (Marlowe, 2004, 2006; Kriz, 2003; Cornia and Nelson, 2003). Accounting-oriented researchers advocate the use of simple financial ratios and trend analysis (Brown, 1983; Mead 2006; Nollenberger 2003; Kloha et al., 2005). Believers in latent factors behind fiscal behavior stand for the use of composite indices for fiscal sustainability, viability, and health (Hendrick, 2004; Joyce, 2001). And researchers who do not put much trust in financial data conclude that no single 'holy grail' set of financial performance indicators can be constructed with any confidence. "The old computer adage 'garbage in, garbage out' perhaps best describes the difficulties data problems present to the calculation of satisfactory indicators of financial sustainability" (Dollery, Grant and Crase, 2007: 130).

Fiscal sustainability is defined in this study as a state of government finances that allows a government to continuously provide services and to satisfy existing obligations without compromising its ability to provide services and satisfy future obligations. Compared with the concept of fiscal condition, fiscal sustainability has the inter-temporal dimension in that it relates to the government's ability to satisfy service requirements not only now but also in the future.

This study is focused on the three key dimensions of sustainability - pension liability funding, debt position, and budgetary balance. It presents three types of linear regression methods that model the nesting of localities within counties and states and take into account the time-series nature of data. Three groups of factors are hypothesized to affect the government's fiscal sustainability: government organization and management, local

financial structure and financial performance, and local revenue base that may influence both revenue capacity and service needs.

The findings suggest that an increase in the amount of full-time employees is negatively associated with the levels of pension liability funding. Governments with abundant staffing in the finance department do not appear to manage pension plan assets more successfully than governments with more modest staffing. Specialization and a higher level of oversight over the use of resources for different programs do not increase efficiency. As expected, the number of pension plans in which a government participates and the percentage of full-time employees in total local employment exerts a negative pressure on the funding levels of pension plans. Surprisingly, financial structure and performance do not have strong effects on pension liability funding. Local economic base measured through the percentage of occupied housing units in a city is strongly and positively associated with pension liability funding, while mean personal income shows a negative effect. It is possible that wealthier local governments tend to have higher current service obligations and, as a result, tend to short-fund pensions.

The effects of local demography and economy are prominent in the model of debt burden. Government asset wealth - total assets of government activities – is not associated with local debt levels whereas business-type activity asset wealth is, though its positive effects are small. The most interesting finding in the debt burden models is that a jurisdictions' overlapping debt – the information on which is presented in government CAFRs – exerts a negative effect on local debt issuance. The effect is robust through the non-fixed and fixed effect models. However, the substantive effects of overlapping debt

are too small for it to be viewed as an important externality of debt issuance by overlapping jurisdictions.

The findings in the deficit model suggest that infrastructure financing is a major culprit in local budgetary imbalances. Local demographic composition and revenue base do not appear to be significant predictors of large deficits. Local revenue diversity is identified as a strong predictor of deficits. The association is negative: the higher the local revenue diversification away from property and sales taxes is, the lower will be the probability of a government to incur a deficit. This effect is strong and significant across all four deficit models.

The exploration of local fiscal conditions that are sustainable is still ahead for the public finance profession. The debate over methods and definitions just indicates that local fiscal reality is complex. Some researchers view existing systems of fiscal analysis as too difficult to comprehend. In my view, many of the approaches are not complex enough to reflect interrelationships among multiple factors. Simplicity should not come at the price of accuracy. Modern statistical methods offer a rich toolset of approaches that sustainability research may benefit from: structural equations, principal component analysis, stochastic process modeling of risks, etc. Some of these approaches would allow addressing the problem of endogeneity that current fiscal sustainability research does not seem to tackle (Burnside, 2003).

We also need to expand the discussion of fiscal sustainability by placing it into the social and environmental context. And yet, we need to distinguish fiscal administration from overall governance of a public entity and carry out analysis aiming for parsimony that

translates into scientific elegance. The predicament of fiscal sustainability research – which may also be seen as a sign of its high relevance – is the interconnectedness of the fiscal policy with all the other policies of a government. Financial decisions do not exist in a vacuum but have a direct impact on current and future service provision. We should also acknowledge the tension between fiscal management and service objectives: to be sustainable a government might benefit from being fiscally stringent but to be a better service provider it might need to be more generous.

We need to find ways to measure changes in technology and include them into the fiscal sustainability model. Factoring in expectations of technological advances might be risky, but ignoring effects of technological development on government service delivery and fiscal sustainability would be myopic.

We also need to move beyond fearful scenarios of future unfunded liabilities. Pronouncements about grossly unfunded liabilities at any level of government do not always detail assumptions on which they are based: the assumption that taxing and spending policies will remain constant and that the probability of fulfillment of a liability in the future is equal to 100 percent (Davig, Leeper and Walker, 2009). These assumptions tend to be inaccurate, and so are the resulting pronouncements[37]. Fiscal policies and liabilities do change, and it is an important task for policy makers to be able to navigate financial management and make changes in the right directions.

We should keep in mind that fiscal sustainability analysis is not an end in itself and that it should not become an ivory tower. Rather, it is important because it serves a function: it

[37] For example, claims about inevitable bankruptcy of the Social Security system.

enables governments to provide services in a continuous manner. This capacity is incremental and defies a binary classification. So does fiscal sustainability. Instead, it may be conceptualized as a continuum, a characteristic of a government similar to the credit score of an individual. The key outcome of maintaining fiscal sustainability is to ensure that the government has available resources to cover service needs. Just like a good credit score, this goal may be achieved in different ways and with various degrees of success.

And finally, we might try to incorporate spatial analysis in the research on local fiscal sustainability more comprehensively, building on the research that has already been attempted by mapping fiscal health status of governments through GIS maps (Hendrick, 2004). This research could be taken further by modeling patterns of resident responses to municipal fiscal stress (reviving interest to the Tieboutian arguments) and spatial relationships among neighboring municipalities with various degrees of fiscal sustainability.

Warner (2010) predicts that to sustain economic development and high quality of life, local governments will need to rebuild their capacity over the next decade by rethinking revenue sources, renegotiating labor relations and rebuilding citizen's view of society. One of Warner's implications is that with more flexibility of labor contracts governments should be able to introduce more innovation and achieve a better balance between labor costs and service demands and implement cost savings. This study empirically confirms Warner's prediction by identifying the relationship between the size of local labor force and pension funding levels. It also points out the positive effects of revenue

diversification on budgetary balance and it emphasizes the role of the demography in the decisions about levels of debt by local governments.

This study has not focused on institutional arrangements that may impose a variety of constraints on local governments (TELS, BBRs, debt limits, home-rule status). Whereas these constraints matter, they do not straightjacket governments into decisions: financial administrators still have discretion over funds that they manage. It is through the power of leadership and vision that institutional constrains may be lifted. From this perspective, the only set of variables that are not under the control of governments are demographic and socio-economic characteristics of the residents who form the local revenue base. Yet, even here negative effects of demography and economy may be mitigated: local governments receive intergovernmental aid that may compensate for fiscal disparities and revenue challenges resulting from an impoverished revenue base. What local financial managers need is to know the directions of changes that would lead their jurisdictions to higher fiscal sustainability. These directions, such as for example, the positive impact of revenue diversification of fiscal health, are to be identified through quantitative data analysis. In addition, financial officers and other local decision makers need to be inspired to make changes, be courageous to make hard choices, and committed to engage in a meaningful dialog with the people they serve. Warner posits that "citizens need to be reengaged in the governance process to recognize the value of public services and to understand the need to balance service demands with revenue generation." (Warner, 2010:146) For local governments that want to ensure fiscally sustainable futures it means that citizens should acknowledge that governments need to be able to raise sufficient revenues for accommodating increasing expenditure needs.

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APPENDIX A

CITIES SORTED BY POPULATION AND INCOME, YEAR 2007

SORTED BY POPULATION

Name	Population	Income
Kenner city, Louisiana	66592	22878
Waterloo city, Iowa	68747	20663
Lynchburg city, Virginia	68758	21002
Bloomington city, Indiana	69247	18488
Wyoming city, Michigan	70155	20492
Lorain city, Ohio	70592	18642
Bryan city, Texas	70744	17596
Gastonia city, North Carolina	71349	22028
Lake Charles city, Louisiana	71741	21951
Baytown city, Texas	72215	20165
New Britain city, Connecticut	72395	20602
Evanston city, Illinois	74239	40376
Bellingham city, Washington	75220	21797
Alameda city, California	75254	37385
Champaign city, Illinois	75254	22365
Albany city, Georgia	75394	18476
Asheville city, North Carolina	75947	26549
Sugar Land city, Texas	76228	39612
Edmond city, Oklahoma	76680	35836
Longview city, Texas	76918	21853
Kalamazoo city, Michigan	77145	18670
Melbourne city, Florida	78386	23478
Canton city, Ohio	78924	16592
Danbury city, Connecticut	79285	31231
Suffolk city, Virginia	79524	26692
Farmington Hills city, Michigan	80392	39254
Baldwin Park city, California	81146	13778

SORTED BY INCOME

Name	Income	Population
Newport Beach city, California	81768	84218
Santa Monica city, California	58315	91124
Alexandria city, Virginia	51301	139000
Boca Raton city, Florida	50423	86600
Scottsdale city, Arizona	47527	238270
Stamford city, Connecticut	47196	122261
Carlsbad city, California	44049	101337
Bellevue city, Washington	44011	118100
Thousand Oaks city, California	42589	127739
Naperville city, Illinois	42489	141698
San Mateo city, California	42481	95510
Irvine city, California	41043	202079
Sunnyvale city, California	40944	135721
Evanston city, Illinois	40376	74239
Plano city, Texas	40297	257600
Cambridge city, Massachusetts	40086	101355
Troy city, Michigan	39911	87594
Huntington Beach city, California	39884	194436
Livermore city, California	39826	82845
Norwalk city, Connecticut	39715	84344
Sugar Land city, Texas	39612	76228
Farmington Hills city, Michigan	39254	80392
Seattle city, Washington	39011	586200
Mission Viejo city, California	38697	98483
Miami Beach city, Florida	38594	92145
Roswell city, Georgia	38318	88465
Alameda city, California	37385	75254

San Leandro city, California	81466	28722
Cranston city, Rhode Island	81479	26020
Decatur city, Illinois	81860	21372
Buena Park city, California	82452	22249
Ogden city, Utah	82843	18269
Livermore city, California	82845	39826
Tuscaloosa city, Alabama	83376	21170
Newport Beach city, California	84218	81768
Beaverton city, Oregon	84270	28493
Norwalk city, Connecticut	84344	39715
Hillsboro city, Oregon	84480	23531
Duluth city, Minnesota	85170	23446
Bloomington city, Minnesota	85389	32580
Longmont city, Colorado	85762	28571
Boca Raton city, Florida	86600	50423
Kent city, Washington	86660	25993
Whittier city, California	87190	25856
Warwick city, Rhode Island	87365	30163
Federal Way city, Washington	87390	27730
North Charleston city, South Carolina	87492	17870
Las Cruces city, New Mexico	87542	18021
Troy city, Michigan	87594	39911
San Angelo city, Texas	88300	20024
Roswell city, Georgia	88465	38318
Citrus Heights city, California	88477	24667
Lakewood city, California	89293	26666
Santa Barbara city, California	89456	34841

Overland Park city, Kansas	37226	168673
Pasadena city, California	36415	147262
Fremont city, California	36050	211662
Edmond city, Oklahoma	35836	76680
Santa Clara city, California	35380	110771
Torrance city, California	35214	148558
Santa Barbara city, California	34841	89456
Henderson city, Nevada	34324	265589
Berkeley city, California	34195	106347
Boulder city, Colorado	34059	103000
Atlanta city, Georgia	33670	451600
Simi Valley city, California	33034	125840
Roseville city, California	32790	106266
Bloomington city, Minnesota	32580	85389
San Jose city, California	32487	974000
Richardson city, Texas	32018	97720
Santa Clarita city, California	31601	177158
Rancho Cucamonga city, California	31386	170479
Danbury city, Connecticut	31231	79285
Burbank city, California	30996	107921
San Buenaventura city, California	30986	105919
Rochester city, Minnesota	30977	100845
Charlotte city, North Carolina	30848	664342
Coral Springs city, Florida	30722	129766
Nashua city, New Hampshire	30566	90998
Chandler city, Arizona	30515	259510
Boston city, Massachusetts	30371	547773

Alhambra city, California	89488	23473
Sunrise city, Florida	89633	23222
Redding city, California	90045	24037
Lawrence city, Kansas	90311	23310
Santa Maria city, California	90333	16990
Nashua city, New Hampshire	90998	30566
Greeley city, Colorado	91109	19321
Santa Monica city, California	91124	58315
Sparks city, Nevada	91360	24744
Lewisville city, Texas	91550	26278
Miami Beach city, Florida	92145	38594
Yuma city, Arizona	92160	19557
Orem city, Utah	92212	19338
Roanoke city, Virginia	92328	21767
Murfreesboro city, Tennessee	92559	25016
Westminster city, California	92870	22645
Lakeland city, Florida	93428	23674
Columbia city, Missouri	94428	23684
Vista city, California	94962	21927
Sandy city, Utah	95449	28261
San Mateo city, California	95510	42481
Kenosha city, Wisconsin	95530	21430
Vacaville city, California	96489	26682
Richardson city, Texas	97720	32018
Mission Viejo city, California	98483	38697
Wilmington city, North Carolina	98529	26262
Portsmouth city, Virginia	98733	21412

Orange city, California	30229	138640
Ann Arbor city, Michigan	30185	114328
Warwick city, Rhode Island	30163	87365
Santa Rosa city, California	29981	157985
Costa Mesa city, California	29893	113805
Charleston city, South Carolina	29831	118492
Concord city, California	29746	125203
Olathe city, Kansas	29621	123286
Arvada city, Colorado	29589	107050
Elk Grove city, California	29560	136318
Raleigh city, North Carolina	29490	367995
Virginia Beach city, Virginia	29354	433628
Fullerton city, California	29302	137367
Austin city, Texas	28999	732381
Westminster city, Colorado	28897	109724
Lakewood city, Colorado	28801	147023
Glendale city, California	28774	207157
West Palm Beach city, Florida	28774	105068
San Leandro city, California	28722	81466
New York city, New York	28610	8214426
Longmont city, Colorado	28571	85762
Minneapolis city, Minnesota	28515	387970
Beaverton city, Oregon	28493	84270
Pembroke Pines city, Florida	28384	153300
Huntsville city, Alabama	28316	173189
Little Rock city, Arkansas	28300	183133
Sandy city, Utah	28261	95449

Dearborn city, Michigan	99089	21941
Gresham city, Oregon	99225	21101
Odessa city, Texas	99459	21362
Antioch city, California	100150	25949
Fargo city, North Dakota	100477	26105
Rochester city, Minnesota	100845	30977
Pompano Beach city, Florida	101128	26041
Carlsbad city, California	101337	44049
Cambridge city, Massachusetts	101355	40086
Billings city, Montana	101650	24037
Palm Bay city, Florida	101793	20408
Everett city, Washington	101800	23876
West Jordan city, Utah	101915	20008
Boulder city, Colorado	103000	34059
Killeen city, Texas	103210	19454
Green Bay city, Wisconsin	104020	22346
Pueblo city, Colorado	104193	18330
West Palm Beach city, Florida	105068	28774
South Bend city, Indiana	105540	19147
San Buenaventura city, California	105919	30986
Roseville city, California	106266	32790
Berkeley city, California	106347	34195
Arvada city, Colorado	107050	29589
Elgin city, Illinois	107631	21995
Wichita Falls city, Texas	107635	21221
Tyler city, Texas	107802	23753
Burbank city, California	107921	30996

Tampa city, Florida	28253	334550
Peoria city, Arizona	28245	153592
Corona city, California	28112	146164
Yonkers city, New York	28013	197852
Portland city, Oregon	27941	562690
Springfield city, Illinois	27743	111454
Federal Way city, Washington	27730	87390
Chesapeake city, Virginia	27560	221282
Hollywood city, Florida	27404	142943
Las Vegas city, Nevada	27155	602697
Colorado Springs city, Colorado	27076	390581
Boise City city, Idaho	26994	213503
Oceanside city, California	26892	176644
Suffolk city, Virginia	26692	79524
Vacaville city, California	26682	96489
Lakewood city, California	26666	89293
Sterling Heights city, Michigan	26628	128914
Reno city, Nevada	26575	219516
Asheville city, North Carolina	26549	75947
Lewisville city, Texas	26278	91550
Wilmington city, North Carolina	26262	98529
Orlando city, Florida	26253	228765
Fargo city, North Dakota	26105	100477
Pompano Beach city, Florida	26041	101128
Cranston city, Rhode Island	26020	81479
Cape Coral city, Florida	26012	167572
Kent city, Washington	25993	86660

Fairfield city, California	108649	25257
Westminster city, Colorado	109724	28897
Norman city, Oklahoma	109837	23918
Beaumont city, Texas	109856	22411
Norwalk city, California	110040	17344
Clearwater city, Florida	110469	25647
Santa Clara city, California	110771	35380
Springfield city, Illinois	111454	27743
Downey city, California	113587	22524
Denton city, Texas	113800	22040
Costa Mesa city, California	113805	29893
Ann Arbor city, Michigan	114328	30185
Abilene city, Texas	115981	19168
Flint city, Michigan	117068	15992
Visalia city, California	117744	23157
Bellevue city, Washington	118100	44011
Charleston city, South Carolina	118492	29831
Cedar Rapids city, Iowa	120758	25832
Peoria city, Illinois	121170	25753
Gainesville city, Florida	121497	19122
Stamford city, Connecticut	122261	47196
Olathe city, Kansas	123286	29621
Hartford city, Connecticut	124512	16982
Concord city, California	125203	29746
Simi Valley city, California	125840	33034
Thousand Oaks city, California	127739	42589
Sterling Heights city, Michigan	128914	26628

Antioch city, California	25949	100150
Dallas city, Texas	25904	1280500
Whittier city, California	25856	87190
Cedar Rapids city, Iowa	25832	120758
Los Angeles city, California	25798	4018080
Peoria city, Illinois	25753	121170
Sioux Falls city, South Dakota	25743	151300
Durham city, North Carolina	25664	215287
Clearwater city, Florida	25647	110469
Richmond city, Virginia	25397	192490
Vancouver city, Washington	25270	160800
Fairfield city, California	25257	108649
Chicago city, Illinois	25193	2896016
Tulsa city, Oklahoma	25056	380000
Murfreesboro city, Tennessee	25016	92559
Albuquerque city, New Mexico	24897	511008
Sacramento city, California	24787	1406804
Jacksonville city, Florida	24761	897974
Sparks city, Nevada	24744	91360
Citrus Heights city, California	24667	88477
Montgomery city, Alabama	24618	201568
Tacoma city, Washington	24575	202000
Irving city, Texas	24488	205600
Chula Vista city, California	24253	227723
Greensboro city, North Carolina	24222	244610
Lincoln city, Nebraska	24214	241167
Houston city, Texas	24177	2144491

Coral Springs city, Florida	129766	30722
McAllen city, Texas	130700	17552
Savannah city, Georgia	132985	18866
Sunnyvale city, California	135721	40944
Elk Grove city, California	136318	29560
Fullerton city, California	137367	29302
Lancaster city, California	138392	18431
Orange city, California	138640	30229
Alexandria city, Virginia	139000	51301
Bridgeport city, Connecticut	139529	19696
Naperville city, Illinois	141698	42489
Hollywood city, Florida	142943	27404
Palmdale city, California	145468	18774
Hampton city, Virginia	145708	23026
Joliet city, Illinois	145803	22642
Corona city, California	146164	28112
Pasadena city, Texas	146769	19701
Lakewood city, Colorado	147023	28801
Pasadena city, California	147262	36415
Hayward city, California	147845	23980
Torrance city, California	148558	35214
Eugene city, Oregon	148595	23254
Salem city, Oregon	149305	21165
Rockford city, Illinois	150115	21044
Sioux Falls city, South Dakota	151300	25743
Springfield city, Missouri	151580	20638
Pembroke Pines city, Florida	153300	28384

Arlington city, Texas	24116	364300
Redding city, California	24037	90045
Billings city, Montana	24037	101650
Hayward city, California	23980	147845
Norman city, Oklahoma	23918	109837
Everett city, Washington	23876	101800
Wichita city, Kansas	23866	362187
Des Moines city, Iowa	23864	198682
Tallahassee city, Florida	23828	176429
Tyler city, Texas	23753	107802
Columbia city, Missouri	23684	94428
Aurora city, Colorado	23676	309416
Lakeland city, Florida	23674	93428
Mesa city, Arizona	23600	460155
Worcester city, Massachusetts	23537	175454
Hillsboro city, Oregon	23531	84480
Melbourne city, Florida	23478	78386
Alhambra city, California	23473	89488
Duluth city, Minnesota	23446	85170
Phoenix city, Arizona	23369	1595260
Lawrence city, Kansas	23310	90311
Eugene city, Oregon	23254	148595
Sunrise city, Florida	23222	89633
Modesto city, California	23166	209174
Visalia city, California	23157	117744
Hampton city, Virginia	23026	145708
Chattanooga city, Tennessee	22936	155190

Peoria city, Arizona	153592	28245
Chattanooga city, Tennessee	155190	22936
Santa Rosa city, California	157985	29981
Dayton city, Ohio	158873	16564
Vancouver city, Washington	160800	25270
Grand Prairie city, Texas	161550	20305
Pomona city, California	162140	16060
Cape Coral city, Florida	167572	26012
Overland Park city, Kansas	168673	37226
Rancho Cucamonga city, California	170479	31386
Brownsville city, Texas	172437	11161
Ontario city, California	172701	19387
Garden Grove city, California	172781	20702
Huntsville city, Alabama	173189	28316
Fayetteville city, North Carolina	173898	22027
Worcester city, Massachusetts	175454	23537
Tallahassee city, Florida	176429	23828
Oceanside city, California	176644	26892
Santa Clarita city, California	177158	31601
Moreno Valley city, California	180466	18114
Fontana city, California	181640	18950
Knoxville city, Tennessee	182337	20935
Little Rock city, Arkansas	183133	28300
Newport News city, Virginia	186000	22271
Amarillo city, Texas	187609	21890
Richmond city, Virginia	192490	25397
Oxnard city, California	192997	19839

Kenner city, Louisiana	22878	66592
Westminster city, California	22645	92870
Joliet city, Illinois	22642	145803
Columbus city, Ohio	22610	773277
Downey city, California	22524	113587
Pittsburgh city, Pennsylvania	22512	334563
Cincinnati city, Ohio	22478	332252
Bakersfield city, California	22460	323213
Beaumont city, Texas	22411	109856
Glendale city, Arizona	22383	246000
Champaign city, Illinois	22365	75254
Green Bay city, Wisconsin	22346	104020
Newport News city, Virginia	22271	186000
Buena Park city, California	22249	82452
Anaheim city, California	22222	329780
Denton city, Texas	22040	113800
Gastonia city, North Carolina	22028	71349
Fayetteville city, North Carolina	22027	173898
Norfolk city, Virginia	22025	241727
Elgin city, Illinois	21995	107631
Lake Charles city, Louisiana	21951	71741
Dearborn city, Michigan	21941	99089
Vista city, California	21927	94962
Amarillo city, Texas	21890	187609
Longview city, Texas	21853	76918
Bellingham city, Washington	21797	75220
Riverside city, California	21795	295730

Grand Rapids city, Michigan	194341	19593
Huntington Beach city, California	194436	39884
San Bernardino city, California	196300	15223
Yonkers city, New York	197852	28013
Des Moines city, Iowa	198682	23864
Montgomery city, Alabama	201568	24618
Tacoma city, Washington	202000	24575
Irvine city, California	202079	41043
Irving city, Texas	205600	24488
Glendale city, California	207157	28774
Rochester city, New York	208123	16679
Modesto city, California	209174	23166
Fremont city, California	211662	36050
Lubbock city, Texas	212365	20878
Boise City city, Idaho	213503	26994
North Las Vegas city, Nevada	214971	20763
Durham city, North Carolina	215287	25664
Akron city, Ohio	217074	19285
Reno city, Nevada	219516	26575
Chesapeake city, Virginia	221282	27560
Garland city, Texas	224988	21441
Waco city, Texas	226189	16901
Chula Vista city, California	227723	24253
Orlando city, Florida	228765	26253
Laredo city, Texas	231470	12872
Hialeah city, Florida	231500	14372
Scottsdale city, Arizona	238270	47527

Roanoke city, Virginia	21767	92328
Garland city, Texas	21441	224988
Baltimore city, Maryland	21440	640961
Kenosha city, Wisconsin	21430	95530
Portsmouth city, Virginia	21412	98733
Decatur city, Illinois	21372	81860
Odessa city, Texas	21362	99459
Mobile city, Alabama	21352	403000
Wichita Falls city, Texas	21221	107635
Tuscaloosa city, Alabama	21170	83376
Salem city, Oregon	21165	149305
Gresham city, Oregon	21101	99225
Rockford city, Illinois	21044	150115
Lynchburg city, Virginia	21002	68758
Corpus Christi city, Texas	21001	295594
Knoxville city, Tennessee	20935	182337
Lubbock city, Texas	20878	212365
North Las Vegas city, Nevada	20763	214971
Garden Grove city, California	20702	172781
San Antonio city, Texas	20688	1312286
Waterloo city, Iowa	20663	68747
Springfield city, Missouri	20638	151580
New Britain city, Connecticut	20602	72395
Wyoming city, Michigan	20492	70155
Palm Bay city, Florida	20408	101793
Grand Prairie city, Texas	20305	161550
Baytown city, Texas	20165	72215

Lincoln city, Nebraska	241167	24214
Norfolk city, Virginia	241727	22025
Birmingham city, Alabama	242820	18581
Greensboro city, North Carolina	244610	24222
Glendale city, Arizona	246000	22383
Plano city, Texas	257600	40297
Chandler city, Arizona	259510	30515
Henderson city, Nevada	265589	34324
Buffalo city, New York	276059	18534
Stockton city, California	289789	19932
Corpus Christi city, Texas	295594	21001
Riverside city, California	295730	21795
Aurora city, Colorado	309416	23676
Bakersfield city, California	323213	22460
Anaheim city, California	329780	22222
Cincinnati city, Ohio	332252	22478
Tampa city, Florida	334550	28253
Pittsburgh city, Pennsylvania	334563	22512
Santa Ana city, California	353428	15968
Wichita city, Kansas	362187	23866
Miami city, Florida	362470	18840
Arlington city, Texas	364300	24116
Raleigh city, North Carolina	367995	29490
Tulsa city, Oklahoma	380000	25056
Minneapolis city, Minnesota	387970	28515
Colorado Springs city, Colorado	390581	27076
Mobile city, Alabama	403000	21352

San Angelo city, Texas	20024	88300
West Jordan city, Utah	20008	101915
Stockton city, California	19932	289789
Tucson city, Arizona	19878	547316
Philadelphia city, Pennsylvania	19875	1448394
Oxnard city, California	19839	192997
Pasadena city, Texas	19701	146769
Bridgeport city, Connecticut	19696	139529
Grand Rapids city, Michigan	19593	194341
Yuma city, Arizona	19557	92160
Killeen city, Texas	19454	103210
Ontario city, California	19387	172701
Orem city, Utah	19338	92212
Greeley city, Colorado	19321	91109
Akron city, Ohio	19285	217074
Abilene city, Texas	19168	115981
South Bend city, Indiana	19147	105540
Gainesville city, Florida	19122	121497
Fresno city, California	19029	481035
Fontana city, California	18950	181640
Savannah city, Georgia	18866	132985
Miami city, Florida	18840	362470
Palmdale city, California	18774	145468
Kalamazoo city, Michigan	18670	77145
Lorain city, Ohio	18642	70592
Birmingham city, Alabama	18581	242820
Buffalo city, New York	18534	276059

Virginia Beach city, Virginia	433628	29354
Atlanta city, Georgia	451600	33670
Mesa city, Arizona	460155	23600
Fresno city, California	481035	19029
Albuquerque city, New Mexico	511008	24897
Tucson city, Arizona	547316	19878
Boston city, Massachusetts	547773	30371
Portland city, Oregon	562690	27941
Seattle city, Washington	586200	39011
Las Vegas city, Nevada	602697	27155
Baltimore city, Maryland	640961	21440
Cleveland city, Ohio	652641	15907
Charlotte city, North Carolina	664342	30848
Austin city, Texas	732381	28999
El Paso city, Texas	767814	16465
Columbus city, Ohio	773277	22610
Jacksonville city, Florida	897974	24761
San Jose city, California	974000	32487
Dallas city, Texas	1280500	25904
San Antonio city, Texas	1312286	20688
Sacramento city, California	1406804	24787
Philadelphia city, Pennsylvania	1448394	19875
Phoenix city, Arizona	1595260	23369
Houston city, Texas	2144491	24177
Chicago city, Illinois	2896016	25193
Los Angeles city, California	4018080	25798
New York city, New York	8214426	28610

Bloomington city, Indiana	18488	69247
Albany city, Georgia	18476	75394
Lancaster city, California	18431	138392
Pueblo city, Colorado	18330	104193
Ogden city, Utah	18269	82843
Moreno Valley city, California	18114	180466
Las Cruces city, New Mexico	18021	87542
North Charleston city, South Carolina	17870	87492
Bryan city, Texas	17596	70744
McAllen city, Texas	17552	130700
Norwalk city, California	17344	110040
Santa Maria city, California	16990	90333
Hartford city, Connecticut	16982	124512
Waco city, Texas	16901	226189
Rochester city, New York	16679	208123
Canton city, Ohio	16592	78924
Dayton city, Ohio	16564	158873
El Paso city, Texas	16465	767814
Pomona city, California	16060	162140
Flint city, Michigan	15992	117068
Santa Ana city, California	15968	353428
Cleveland city, Ohio	15907	652641
San Bernardino city, California	15223	196300
Hialeah city, Florida	14372	231500
Baldwin Park city, California	13778	81146
Laredo city, Texas	12872	231470
Brownsville city, Texas	11161	172437

APPENDIX B

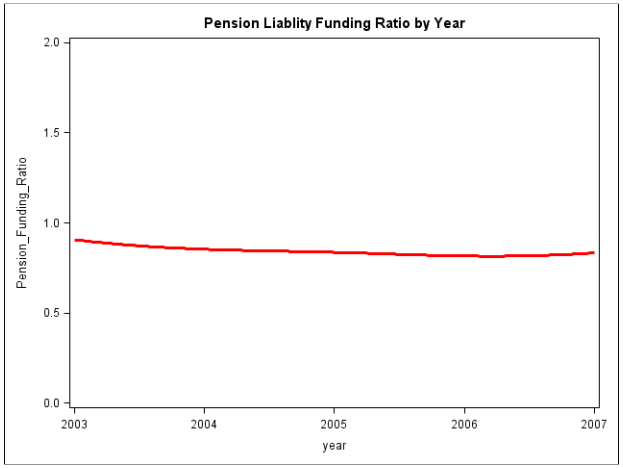
CORRELATION MATRIX

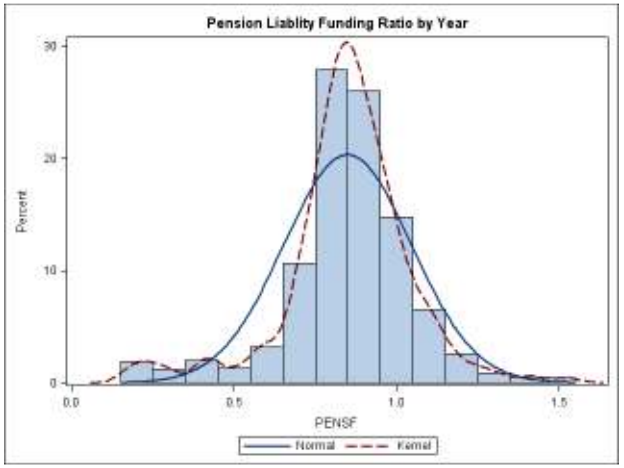
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
Pension Funding Ratio	**1**	**1.00**	-0.06	0.14	-0.08	-0.09	0.01	-0.05	0.17	0.11	0.04	-0.08	-0.21	0.15	-0.06	0.15	0.00	0.00	-0.02	0.02	0.03	-0.09	0.10	-0.01	0.00	-0.01	-0.05	0.07	0.02	0.07	0.16	0.07
Long-term debt (per capita)	**2**	-0.06	**1.00**	-0.01	0.02	0.03	0.19	0.07	-0.14	-0.02	0.02	0.24	0.16	-0.07	0.04	-0.14	0.09	0.14	0.05	0.15	0.37	0.01	-0.04	-0.12	0.18	0.25	-0.11	0.37	-0.02	-0.04	-0.04	0.15
Difference (% Tot Exp)	**3**	0.14	-0.01	**1.00**	-0.75	-0.66	0.00	0.04	-0.05	0.04	-0.14	-0.01	-0.03	0.07	-0.01	0.06	-0.04	0.02	0.03	-0.08	0.09	0.03	-0.33	-0.10	0.00	0.03	0.06	-0.03	-0.03	0.14	0.02	-0.01
Deficit (binary)	**4**	-0.08	0.02	-0.75	**1.00**	0.49	0.00	-0.04	0.05	-0.01	0.10	-0.03	0.02	-0.05	0.02	-0.03	0.01	0.00	-0.02	0.08	-0.10	-0.05	0.30	0.10	-0.01	-0.01	-0.02	0.05	0.05	-0.09	-0.02	0.01
Severe Deficit (binary)	**5**	-0.09	0.03	-0.66	0.49	**1.00**	0.01	-0.01	-0.03	0.00	0.10	-0.03	-0.03	0.00	0.00	-0.01	-0.01	-0.01	-0.04	0.03	-0.11	-0.06	0.32	0.09	-0.03	-0.01	0.08	0.02	0.05	0.00	-0.01	0.04
Population	**6**	0.01	0.19	0.00	0.00	0.01	**1.00**	-0.02	-0.05	-0.03	0.13	0.25	0.18	-0.17	0.12	-0.14	0.08	0.08	0.02	0.05	0.34	0.06	0.01	-0.09	0.17	0.15	-0.08	-0.01	0.00	-0.16	-0.26	-0.06
Population over 65 (%)	**7**	-0.05	0.07	0.04	-0.04	-0.01	-0.02	**1.00**	-0.27	0.13	-0.07	0.21	0.10	0.01	0.11	-0.09	0.08	0.03	0.08	0.06	0.15	-0.01	-0.13	-0.14	0.11	0.08	-0.10	-0.02	-0.15	-0.13	0.00	0.12
Occupied property (%)	**8**	0.17	-0.14	-0.05	0.05	-0.03	-0.05	-0.27	**1.00**	0.19	-0.19	-0.41	-0.40	0.05	-0.08	0.22	-0.14	0.08	-0.17	0.00	-0.23	-0.10	0.12	0.12	-0.25	-0.28	0.04	0.00	0.14	0.02	0.08	-0.16
Mean income (per capita)	**9**	0.11	-0.02	0.04	-0.01	0.00	-0.03	0.13	0.19	**1.00**	-0.50	0.05	-0.24	0.14	0.14	0.01	-0.11	-0.12	-0.12	-0.02	0.14	-0.16	0.01	0.00	-0.20	-0.20	0.01	0.00	0.31	0.18	0.50	0.14
Unemployment rate	**10**	0.04	0.02	-0.14	0.10	0.10	0.13	-0.07	-0.19	-0.50	**1.00**	0.04	0.14	-0.13	0.02	-0.02	0.05	0.00	-0.06	-0.06	-0.06	0.13	0.08	-0.03	0.18	0.15	-0.03	-0.04	-0.07	-0.18	-0.25	-0.07
Employees (per 1000 residents)	**11**	-0.08	0.24	-0.01	-0.03	-0.03	0.25	0.21	-0.41	0.05	0.04	**1.00**	0.24	-0.22	0.08	-0.35	0.21	0.06	0.22	0.19	0.76	0.14	-0.25	-0.20	0.28	0.34	-0.24	0.01	-0.16	-0.23	-0.03	0.30
Full-time employees (% total)	**12**	-0.21	0.16	-0.03	0.02	-0.03	0.18	0.10	-0.40	-0.24	0.14	0.24	**1.00**	0.03	0.07	-0.34	0.21	0.07	0.15	0.08	0.21	0.06	-0.05	-0.06	0.17	0.25	-0.10	0.12	-0.13	-0.18	-0.23	0.12
Finance employees (% total)	**13**	0.15	-0.07	0.07	-0.05	0.00	-0.17	0.01	0.05	0.14	-0.13	-0.22	0.03	**1.00**	-0.07	0.12	-0.11	-0.12	0.02	-0.05	-0.07	0.03	0.07	0.02	-0.09	-0.12	0.20	-0.05	0.03	0.22	0.12	0.07
Number of Pension Plans	**14**	-0.06	0.04	-0.01	0.02	0.00	0.12	0.11	-0.08	0.14	0.02	0.08	0.07	-0.07	**1.00**	-0.08	-0.02	-0.04	-0.05	0.05	0.11	-0.10	-0.03	-0.14	0.06	-0.03	-0.12	0.02	0.00	-0.09	-0.01	0.05
Contracts fire, waste, sewerage	**15**	0.15	-0.14	0.06	-0.03	-0.01	-0.14	-0.09	0.22	0.01	-0.02	-0.35	-0.34	0.12	-0.08	**1.00**	-0.23	-0.07	-0.10	-0.24	-0.25	0.10	0.07	0.07	-0.16	-0.30	0.08	-0.03	0.07	0.10	0.06	-0.23
Operates water facility	**16**	0.00	0.09	-0.04	0.01	-0.01	0.08	0.08	-0.14	-0.11	0.05	0.21	0.21	-0.11	-0.02	-0.23	**1.00**	0.11	0.12	0.12	0.10	-0.16	0.02	-0.11	0.08	0.36	-0.11	0.07	-0.08	-0.10	-0.06	0.31
Operates transit company	**17**	0.00	0.14	0.02	0.00	-0.01	0.08	0.03	0.08	-0.12	0.00	0.06	0.07	-0.12	-0.04	-0.07	0.11	**1.00**	0.04	0.17	0.08	-0.06	0.08	-0.03	0.04	0.14	-0.01	0.18	-0.10	0.00	-0.04	0.11
Operates gas company	**18**	-0.02	0.05	0.03	-0.02	-0.04	0.02	0.08	-0.17	-0.12	-0.06	0.22	0.15	0.02	-0.05	-0.10	0.12	0.04	**1.00**	0.25	0.20	-0.09	-0.11	-0.08	0.21	0.30	-0.09	0.02	-0.12	-0.06	-0.05	0.07
Operates electric company	**19**	0.02	0.15	-0.08	0.08	0.03	0.05	0.06	0.00	-0.02	-0.06	0.19	0.08	-0.05	0.05	-0.24	0.12	0.17	0.25	**1.00**	0.27	-0.31	-0.02	-0.03	0.19	0.52	-0.04	-0.06	-0.03	-0.05	0.08	0.39
Total revenue (per capita)*	**20**	0.03	0.37	0.09	-0.10	-0.11	0.34	0.15	-0.23	0.14	-0.06	0.76	0.21	-0.07	0.11	-0.25	0.10	0.08	0.20	0.27	**1.00**	0.23	-0.28	-0.17	0.34	0.24	-0.26	-0.01	-0.16	-0.17	0.02	0.26
Intergovernmental aid (% total)	**21**	-0.09	0.01	0.03	-0.05	-0.06	0.06	-0.01	-0.10	-0.16	0.13	0.14	0.06	0.03	-0.10	0.10	-0.16	-0.06	-0.09	-0.31	0.23	**1.00**	-0.16	-0.06	0.12	-0.30	-0.22	-0.08	-0.26	-0.13	-0.16	-0.27
Capital outlays (% expenditure)	**22**	0.10	-0.04	-0.33	0.30	0.32	0.01	-0.13	0.12	0.01	0.08	-0.25	-0.05	0.07	-0.03	0.07	0.02	0.08	-0.11	-0.02	-0.28	-0.16	**1.00**	0.18	-0.09	0.02	0.21	0.01	0.18	0.28	0.10	0.12
Bond fund cash (% total cash)	**23**	-0.01	-0.12	-0.10	0.10	0.09	-0.09	-0.14	0.12	0.00	-0.03	-0.20	-0.06	0.02	-0.14	0.07	-0.11	-0.03	-0.08	-0.03	-0.17	-0.06	0.18	**1.00**	-0.08	-0.10	0.20	-0.24	0.12	0.15	0.06	-0.08
Rev. Effort (Own rev/prop. value)	**24**	0.00	0.18	0.00	-0.01	-0.03	0.17	0.11	-0.25	-0.20	0.18	0.28	0.17	-0.09	0.06	-0.16	0.08	0.04	0.21	0.19	0.34	0.12	-0.09	-0.08	**1.00**	0.24	-0.14	0.04	-0.14	-0.10	-0.10	0.08
Own revenue diversity (index)	**25**	-0.01	0.25	0.03	-0.01	-0.01	0.15	0.08	-0.28	-0.20	0.15	0.34	0.25	-0.12	-0.03	-0.30	0.36	0.14	0.30	0.52	0.24	-0.30	0.02	-0.10	0.24	**1.00**	0.11	0.06	0.04	-0.03	-0.02	0.46
Fee-Support (Fees/Expend)	**26**	-0.05	-0.11	0.06	-0.02	0.08	-0.08	-0.10	0.04	0.01	-0.03	-0.24	-0.10	0.20	-0.12	0.08	-0.11	-0.01	-0.09	-0.04	-0.26	-0.22	0.21	0.20	-0.14	0.11	**1.00**	-0.07	0.17	0.32	0.08	-0.01
Private long-term debt (% total)	**27**	0.07	0.37	-0.03	0.05	0.02	-0.01	-0.02	0.00	0.00	-0.04	0.01	0.12	-0.05	0.02	-0.03	0.07	0.18	0.02	-0.06	-0.01	-0.08	0.01	-0.24	0.04	0.06	-0.07	**1.00**	0.05	0.08	0.08	0.00
Overlapping debt (per capita)*	**28**	0.02	-0.02	-0.03	0.05	0.05	0.00	-0.15	0.14	0.31	-0.07	-0.16	-0.13	0.03	0.00	0.07	-0.08	-0.10	-0.12	-0.03	-0.16	-0.26	0.18	0.12	-0.14	0.04	0.17	0.05	**1.00**	0.28	0.35	0.12
Change in net assets (% expend)	**29**	0.07	-0.04	0.14	-0.09	0.00	-0.16	-0.13	0.02	0.18	-0.18	-0.23	-0.18	0.22	-0.09	0.10	-0.10	0.00	-0.06	-0.05	-0.17	-0.13	0.28	0.15	-0.10	-0.03	0.32	0.08	0.28	**1.00**	0.37	0.12
Government assets (per capita)*	**30**	0.16	-0.04	0.02	-0.02	-0.01	-0.26	0.00	0.08	0.50	-0.25	-0.03	-0.23	0.12	-0.01	0.06	-0.06	-0.04	-0.05	0.08	0.02	-0.16	0.10	0.06	-0.10	-0.02	0.08	0.08	0.35	0.37	**1.00**	0.26
Business-type assets (per capita)*	**31**	0.07	0.15	-0.01	0.01	0.04	-0.06	0.12	-0.16	0.14	-0.07	0.30	0.12	0.07	0.05	-0.23	0.31	0.11	0.07	0.39	0.26	-0.27	0.12	-0.08	0.08	0.46	-0.01	0.00	0.12	0.12	0.26	**1.00**

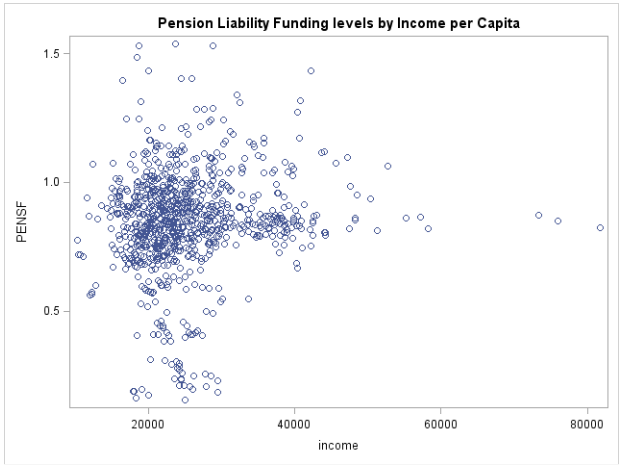
APPENDIX C

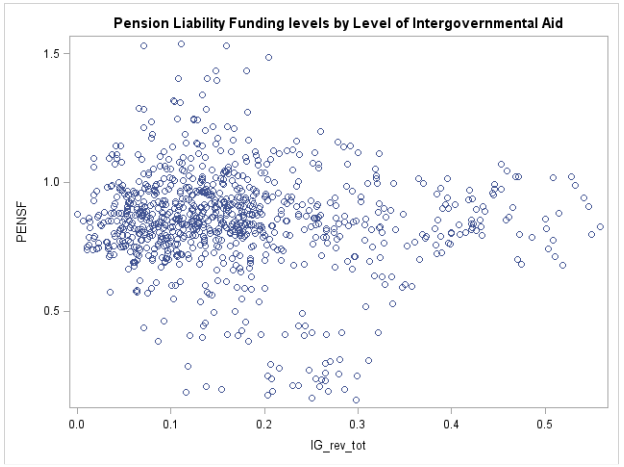
PENSION FUNDING LEVELS

Exploratory Analysis of Pension Funding Levels









Cities with Pension Funding Ratios below Fifty Percent		
City Name	**Year**	**Pension Funding Ratio (%)**
Little Rock city, Arkansas	2006	49
Vacaville city, California	2006	41
Bloomington city, Indiana	2005	31
Bloomington city, Indiana	2006	31
Bloomington city, Indiana	2007	41
South Bend city, Indiana	2003	**19**
South Bend city, Indiana	2004	**19**
South Bend city, Indiana	2005	**16**
South Bend city, Indiana	2006	**17**
South Bend city, Indiana	2007	**20**
Fayetteville city, North Carolina	2006	45
Fayetteville city, North Carolina	2007	44
Durham city, North Carolina	2003	31
Durham city, North Carolina	2004	30
Durham city, North Carolina	2005	**26**
Durham city, North Carolina	2007	**21**
Greensboro city, North Carolina	2003	**28**
Greensboro city, North Carolina	2004	**27**
Greensboro city, North Carolina	2005	**24**
Greensboro city, North Carolina	2006	**29**
Greensboro city, North Carolina	2007	**29**
Wilmington city, North Carolina	2003	**24**
Wilmington city, North Carolina	2004	**21**
Wilmington city, North Carolina	2005	**21**
Wilmington city, North Carolina	2006	**23**
Wilmington city, North Carolina	2007	**25**
Raleigh city, North Carolina	2003	**26**
Raleigh city, North Carolina	2004	**25**
Raleigh city, North Carolina	2005	**23**
Raleigh city, North Carolina	2006	**21**
Raleigh city, North Carolina	2007	**19**
Portland city, Oregon	2003	40
Portland city, Oregon	2004	41
Portland city, Oregon	2005	42
Portland city, Oregon	2006	40
Pittsburgh city, Pennsylvania	2003	41
Pittsburgh city, Pennsylvania	2004	41
Pittsburgh city, Pennsylvania	2005	44
Pittsburgh city, Pennsylvania	2006	44
Pittsburgh city, Pennsylvania	2007	42
Cranston city, Rhode Island	2004	42
Cranston city, Rhode Island	2005	42
Cranston city, Rhode Island	2006	**16**
Cranston city, Rhode Island	2007	**20**
Vancouver city, Washington	2004	50
Vancouver city, Washington	2005	38
Vancouver city, Washington	2006	46
Vancouver city, Washington	2007	44
Everett city, Washington	2006	46
Bellingham city, Washington	2004	38
Bellingham city, Washington	2005	41