Chapter 4
Local Government Fiscal Condition Before and After the Great Recession

Justin Marlowe

Abstract This chapter examines the factors that shaped the fiscal condition of local governments during the "Great Recession," with emphasis on special districts. The recent recession focused new attention on local government fiscal health and its determinants. This chapter provides the most exhaustive empirical test to date of those determinants and their relative power. It first identified more than 50 variables proposed in other frameworks of the determinants of fiscal health, then employed an "Extreme Bounds Analysis" to test the robustness of each of those variables. The results suggest ten key variables drive local fiscal condition, and the magnitude of those effects vary across different types of local governments. These findings have implications for state oversight of local governments. They also have methodological implications for future work on local government fiscal condition.

4.1 Introduction

The "Great Recession" re-introduced one of the fundamental questions in local public finance: Why are some local governments better able than others to withstand major economic shocks? This question has important implications for fiscal federalism. In the aftermath of the Recession a record number of local governments have defaulted on outstanding debts, and many others may be on the brink of default in the near future. In an effort to prevent these types of severe fiscal problems, many state governments have begun to re-examine how they monitor local government financial conditions. Some states have also taken steps to provide more tools and statutory authority to intervene in local fiscal affairs to alleviate fiscal problems in advance (Coe 2008; Kloha et al. 2005; Honadle 2003).

Following these trends, this chapter asks the question: What factors drive local government financial condition? This question is central to understanding current

J. Marlowe (✉)
Daniel J. Evans School of Public Affairs, University of Washington,
Box 353055, Seattle, WA 98195-3055, USA
e-mail: jmarlowe@uw.edu

Y. Hou (ed.), *Local Government Budget Stabilization*,
Studies in Public Budgeting 2, DOI 10.1007/978-3-319-15186-1_4

local fiscal conditions, and perhaps more important, to predicting future local government fiscal stress. That is, if we are able to understand the underlying factors that shape fiscal condition, we can predict future fiscal condition. Following Hendrick (2011; also see Jacob and Hendrick 2013) and others (Berne and Schramm 1986; Honadle and Lloyd-Jones 1998; Groves et al. 2003; Maher and Deller 2012), I focus on the "wealth to need" concept in local financial condition. That is, a local governments' long-term fiscal outlook reflects the balance, or lack thereof, between the factors that drive the need for local spending and the local economy's capacity to generate revenues to meet those needs. Local governments experience fiscal stress when the drivers of spending needs outstrip the drivers of revenue growth.

To address this question this way, we must overcome a key conceptual and methodological challenge. That is, there is no cohesive framework that explains and predicts fiscal condition for all local governments. There are several well-constructed frameworks for the determinants of fiscal condition among general purpose local governments (Hendrick 2004, 2011; Clark and Ferguson 1983), but virtually none for special districts. As the recent municipal bond defaults in Wenatchee, WA and Harrisburg, PA among others have shown, fiscal stress in a special district can have material consequences on the adjacent cities, counties, and other general purpose local governments. For that reason, it is essential that we identify the factors that drive fiscal condition across all types of local governments.

To overcome this challenge, I employ the "extreme bounds" methodology (EBM) common in the corporate finance (Butler et al. 2011), economic growth (see Sala-i-Martin 1997), health policy (Sturm and Hartwig 2012), and other literatures. In an EBM analysis the dependent variable in question—in this case a measure of fiscal condition—is regressed on every possible combination of variables from an exhaustive list of potential explanatory variables. We then evaluate the coefficients from those regressions—in this case more than 117,600 different iterations—to identify those with robust explanatory power. The data for this analysis are from more than 900 units of local government in Washington State.

The main finding is that local fiscal condition is driven by a core set of factors, mainly the structure of the local economy, but those factors have different relative effects on fiscal conditions for different types of local governments. For instance, population density is a key driver of own-source revenue collections for cities, counties, towns, and transportation districts, but not for other types of special districts such as economic development authorities, libraries, or public safety districts.

4.2 Financial Condition and the Great Recession

Figures 4.1, 4.2, 4.3 present the core motivation for this analysis. Figure 4.1 shows the build-up over time of local government surplus. Surplus is defined here as current receipts–current expenditures. The solid line is the total accumulated surplus of all US local governments from 1960 to 2010. The dashed line is the annual surpluses. These data are from the National Income and Product Accounts of the US

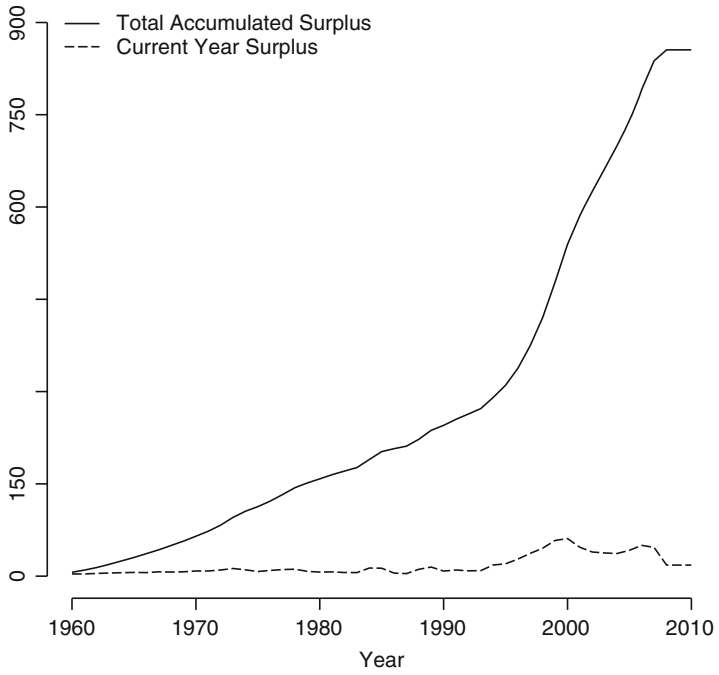

Fig. 4.1 Total Surplus of All US Local Governments, 1960–2010. This figure shows the annual total surplus of all US local governments in constant 2009 dollars. Surplus is defined here as (current receipts minus current expenditures). All data are from the National Income and Product Accounts, US Department of Commerce

Department of Commerce. This figure shows that US local governments accumulated surplus at a considerably higher rate following the recession of 1990–1991. Since then the rate of accumulation of surplus essentially doubled, such that prior to the Great Recession local governments had accumulated nearly $850 billion in surplus financial resources. At the outset of the Recession, US local governments' fiscal policy was characterized by revenues routinely in excess of expenses and a strong position of slack resources as a result.

Figure 4.2 shows the distributions of some other indicators of local government financial position immediately before and after the Great Recession. These figures are based on data from a national sample of audited financial reports from 1,869 general governments (i.e., cities, villages, towns, and counties) and 1,589 special districts such as utilities, fire districts, parks districts, and many others. This sample covers FY2005 through FY2011. These data were collected by Merritt Financial Services and are made available through Bloomberg terminals.

For the general governments, the financial position measure is unreserved general fund balance (i.e., the difference between assets and liabilities in the general fund) as a percentage of total revenues. For the special districts, the measure is total unrestricted net assets (i.e., on an accrual basis, all government assets minus all

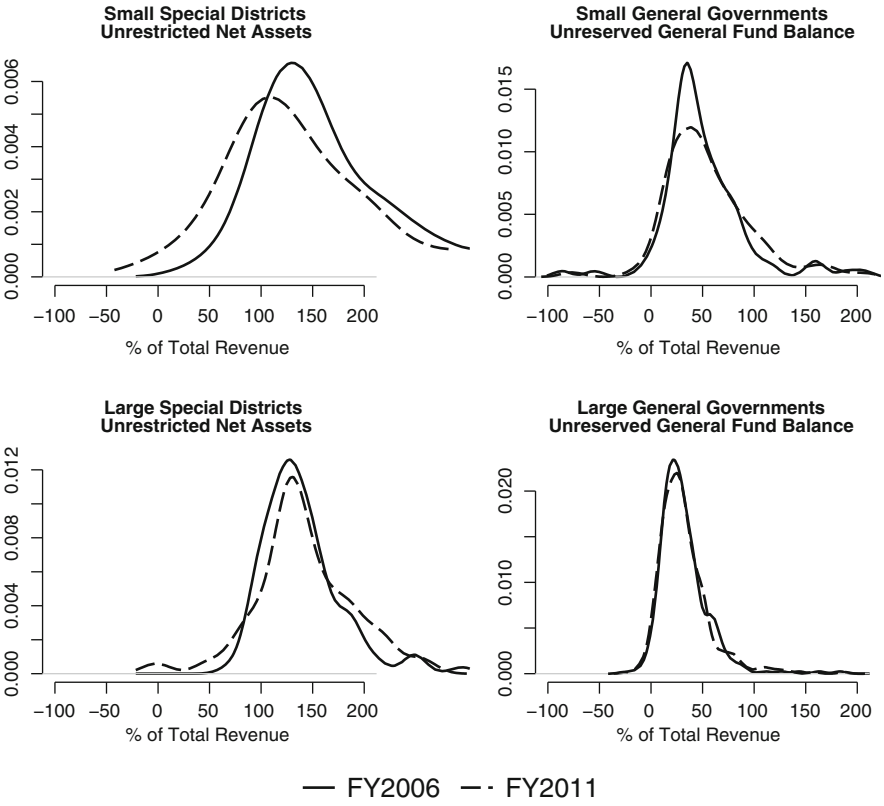

Fig. 4.2 Distributions of Financial Condition Indicators, FY2006 and FY2011. This figure shows the distributions of two key financial condition indicators immediately before the "Great Recession" in FY2006, and immediately after the Recession in FY2011. Small and large entities are in the lowest and highest quartiles by total revenue, respectively. General governments include counties, cities, villages, and towns. Special districts include utilities, fire districts, parks districts, etc. The two measures are unreserved general fund balance and total unrestricted net assets, both expressed as percentages of total revenues

government liabilities) also as a percentage of total current revenues. The left panel shows the distributions of unrestricted net assets separately for small special districts and large special districts, and the right panel shows the distributions of unreserved general fund balance separately for small and large general governments. Large entities are those in the top quartile by total revenues and small entities are those in the bottom quartile. Each quartile contains roughly 300 observations. The solid lines show the distributions for FY2006 and the dashed lines are for FY2011.

Figure 4.2 shows that, perhaps surprisingly, most local governments' overall financial positions changed little during the Recession. The peak of the distributions for unrestricted net assets in FY2006 was roughly 50 % of total revenues for both large and small special districts. For fund balance, the peak of the distributions for FY2006 was around 25 % of total revenues for both large and small governments.

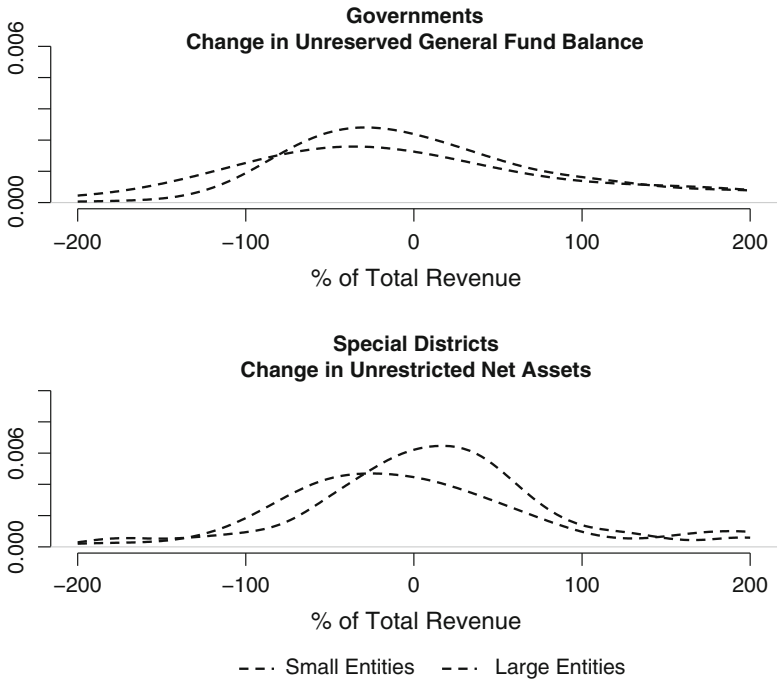

Fig. 4.3 Distributions of changes in fiscal condition indicators, FY2006 and FY2011. This figure shows the distributions of changes from FY2006 through FY2011 for two key indicators of local government financial condition. The *top panel* shows the distribution of changes—expressed as a percentage of total revenues—for unreserved general fund balance for cities, counties, villages, and towns. The *bottom panel* shows the distributions of changes in unrestricted net assets for special districts such as utilities, fire districts, parks districts, etc. The *dotted lines* show the distribution of changes—again as a percentage of total revenue—for small entities and the *dashed-and-dotted lines* show the distribution of changes for large entities, where small and large entities are those in the lowest and highest quartile, respectively, by total revenues

In FY2011, the distributions for smaller entities were slightly flatter, suggesting that a few entities had levels much higher or much lower than their FY2006 levels. But in general, overall financial position did not appear to change for these governments.

Figure 4.3 shows the distribution of the change in these levels from FY2006 to FY2011 for each jurisdiction. It provides an important contrast to Fig. 4.2. The top panel is the general governments' changes in unreserved general fund balance as a percent of total revenues, and the bottom panel is the special districts' changes in unrestricted net assets as a percent of total revenues. The dotted lines are the distributions for small entities (as defined above by total revenues) and the dot-and-dash lines are for large entities.

According to these distributions, many local governments' financial positions changed substantially during the Recession. The center of the distribution for both large and small general governments is around a 30–40 % decline in unreserved

general fund balance. For small special districts, the distribution suggests most entities' unrestricted net assets declined by 30–50 %, where for large special districts the distribution suggests a typical change was a 10–20 % increase. Also note that these distributions are quite flat, suggesting much variety in these change measures across entities.

Taken together, these figures suggest that overall local fiscal positions were quite strong and stable at the beginning and end of the Recession, but quite dynamic during the Recession for many jurisdictions. This suggests two key questions at the heart of this analysis: For what types of jurisdictions did financial position change during the Recession, and what types of jurisdictions are likely to experience similar changes during the next recession?

4.3 Drivers of Local Financial Condition

This section describes the analysis of the underlying drivers of local fiscal conditions. The first subsection defines fiscal condition and the core concepts related to measuring it. The second subsection lists and explains the variable shown so far to drive local fiscal condition. The third subsection describes the data used in this analysis. Those data are from local governments in Washington State.

4.3.1 Defining Financial Condition

Following Hendrick (2011), this analysis is based on two main assumptions about the definition and dynamics of local financial condition. First, a local government's financial condition is the state of equilibrium or disequilibrium between the demands for new spending and the ability of the local economy and local fiscal policy to generate the revenues to meet those demands. Put differently, it is the relationship of "wealth to need" (Hendrick 2011). If the underlying drivers of revenue growth are stronger than the underlying drivers of spending needs, the condition is strong. If the factors that drive spending demands overshadow the jurisdiction's ability to generate revenues, that condition will deteriorate over time.

Like any equilibrium condition, financial condition must eventually balance. If revenue collections routinely exceed spending, spending demands will presumably increase to meet the new revenues or policymakers will reduce revenue collections through tax policy changes. If spending demands exceed the ability of the "fiscal space" (Hendrick 2011; Pagano and Hoene 2010) to generate sufficient revenues, local officials can reduce spending, raise tax rates, or promote economic development efforts designed to boost economic activity and subsequent tax collections. Financial condition changes incrementally over time, but is generally stable in the near term.

Fiscal stress is a more dynamic condition where near-term spending demands exceed near-term revenue collections (Hendrick 2011:22–24). This sort of disequilibrium can

happen for a variety of reasons, including slower economic growth rates at the state or national level, changes in state or federal fiscal policies, or localized economic shocks like the departure of a large employer or a natural disaster. Local governments can and often do experience consecutive years of fiscal stress or fiscal munificence before returning to an equilibrium financial condition. Fiscal stress is often measured with near-term, current year measures such as the difference between revenues and expenditures (i.e., the operating margin). As Fig. 4.3 illustrates, during the Great Recession many jurisdictions, especially small local governments, experienced years where liabilities far exceeded assets, thus resulting in large decreases to fund balance and unrestricted net assets.

The second key assumption is that any measure of financial condition must account for both spending demands and revenue capacity. On this point there are two basic approaches. One emphasizes financial condition measures that speak to both spending needs and revenue. Perhaps the most widely cited is fund balance, or the difference between assets and liabilities in a governmental fund such as the general fund or special revenue funds (see, among others, Marlowe 2013). Fund balance is useful because it is both retrospective and prospective. A large fund balance suggests the jurisdiction has adequate financial and other assets to meet its spending needs, and, perhaps more important, that assets have exceeded liabilities in the past. Unrestricted Net Assets provide similar information about government-wide financial condition and about the financial condition of business-like entities such as utilities that use full accrual accounting.

A second approach is to model financial condition as a function of the drivers of both spending growth and revenue growth, and to identify where those drivers are out of synch. In Hendrick's recent work (2011), the basic analytical approach is to first model total spending as a function of economic and demographic factors that drive spending needs, such as an aging population or high crime rate, and of factors that proxy for higher spending in the future, such as an aging housing stock. Once the drivers of spending are established, model revenue growth as a function of wealth, such as property values, and of economic activity like taxable retail sales. With that modeling in place, the analytical goal is to identify jurisdictions where long-run spending demands are likely to outstrip the jurisdiction's long-run ability to generate revenues. In this analysis, I employ this second approach.

4.3.2 Insights from Previous Literature

The key question, then, is what factors shape local financial condition? There is a rich literature on this question.[1] Much of it is focused on the interrelated issues of how to measure fiscal condition and how to predict future fiscal conditions. This literature has grown substantially within the last few years as we sort through the

[1] See, among others, Levine et al. 1981; Hawkins 1989; Pammer 1990; Hendrick 2004; Jacob and Hendrick 2013; Justice and Scorsone 2013.

causes and effects of the Great Recession on local governments. However, it is focused almost exclusively on general purpose local governments. There has been little if any analysis on the financial condition of special districts. We know surprisingly little about the factors that drive special district financial condition, and whether those factors are similar to those for general purpose local governments. Beyond that, this literature has also shown that fiscal condition is quite difficult to measure and even more difficult to predict (Stonecash and McAfee 1981; Sharp and Elkins 1987; Chapman 1999).

Table 4.1 reports the variables included in this analysis. A full review and explanation of these variables is outside the scope of this chapter. This chapter is principally an empirical exercise to compare the relative explanatory power of these variables and to use them to predict future fiscal stress.

4.3.3 The Empirical Setting: Washington State Local Governments

This analysis is based on data from local governments in Washington State. Washington State is a good setting for this study because it has a large number and variety of local units of governments, including traditional counties and cities to conventional public authorities like library districts and ports to entities that deliver highly specialized services like dams and hydroelectric power, cable television, and mosquito abatement. Per capita, Washington State has the highest number of special districts of any state in the US. The proliferation of local units of government reflects the emphasis on local autonomy and direct citizen control over government spending that are common themes in the state's political culture (see Lundin 2007).

The Washington State Office of Financial Management (OFM, a division of the elected State Treasurer) categorizes these districts according to the following basic typology of type of district and services provided: (1) Economic Development—community facilities, arts and culture, ports, stadiums; (2) Environmental Protection—air pollution control, conservation; (3) Library Districts—libraries, multi-county libraries; (4) Public Safety—fire protection, emergency service communication; and (5) Transportation—airports, rail, ferries, regional transit, transportation improvement districts, roads, and bridges.

Most or all of the fiscal structure variables described above were available for these categories of special districts. OFM's typology includes nine other categories not included in this analysis because these entities employ a different financial reporting structure: agricultural, flood control, health related, housing, irrigation and reclamation, parks and recreation, public utilities, schools, and "other" types of districts.

These units have a variety of taxing and other statutory powers. In some geographic areas, there are multiple jurisdictions performing relatively similar functions. For instance, Snohomish County (north of the City of Seattle) has 18

Table 4.1 Variable descriptions and descriptive statistics

Variable	Description	Source	Mean	SD	Min	Max
Panel A: Demographic Characteristics						
Crime rate	Total violent and property crimes per 1,000 population	WA PCA	351	346	6	1,853
Jurisdiction's density	Number of government units within the county	MRSC	0.77	0.78	0.06	5.16
Percent income maintenance	% of population that receives food assistance, refugee assistance, etc.	WA OFM	0.53	0.27	0.12	1.69
Percent under 18	% of population under age 18	Census	27.69	5.32	17.3	47.3
Percent over 65	% of population over age 65	Census	13.91	3.89	7.5	25.1
Percent pensions	% of population that receives pension income	WA OFM	2.25	1.05	0.59	5.31
Percent social insurance	% of population that receives Medicaid or SSI	WA OFM	1.36	0.59	0.46	3.25
Per capita income	Average income per resident	WA OFM	$30,635	$4,354	$16,689	$38,211
Per capita income change	Annual change in per capita income	WA OFM	0	0.02	−0.21	0.11
Population	County population (estimate) (000 s)	Census	321	504	2	1,937
Population change	Annual change in population	WA OFM	0.01	0.01	−0.02	0.06
Population density	Population/square miles	Census	194	262	3	916
Roads per square mile	Miles of paved roads/ square mile	WA CRAB	1,012	618	143	2,541
Proprietor earnings per capita	Proprietor earnings/ population	Census	0.4	0.58	0.02	6.5
Square miles	Total square miles in county	Census	1,974	1,043	174	5,268
Within MSA	County contains at least one metropolitan statistical area	Census	0.59		0	1
Within MicSA	County contains at least one micropolitan statistical area	Census	0.23		0	1
Panel B: Fiscal Structure						
B and O % revenue	% of total revenue from the WA business and occupations tax	WA SAO	0.03	0.04	0	0.77
IGR % revenue	% of total revenue from federal and state revenues	WA SAO	0.17	0.28	−1.49	15.32

(continued)

Table 4.1 (continued)

Variable	Description	Source	Mean	SD	Min	Max
IGR change	Annual change in intergovernmental revenues received (%)	WA SAO	3	87	−159	7,236
IGR wealth	Annual change in intergovernmental revenues X % of revenue from intergovernmental sources	WA SAO	0.41	3.24	−29.05	115.68
Operational spending per capita	(Total expenditures—capital outlays)/ population	WA SAO	65	223	0	3,323
Other revenue % revenue	% of total revenue from other sources including fees, user charges, interest earnings, etc.	WA SAO	0.39	0.37	−23.9	1.05
Own source revenues change	Annual change in own source revenues	WA SAO	0.05	2.95	−2.01	259.39
Property tax collections change	Annual change in property tax collections (%)	WA SAO	15	43	−100	3,709
Property tax % revenue	% of revenues from property taxes (%)	WA SAO	29	32	0	95
Property tax wealth	Annual change in property tax collections X % of total revenues from property taxes (%)	WA SAO	0	0.03	−0.18	0.11
Property wealth density	Property tax collections/ square miles	WA SAO	0.04	0.07	−0.14	0.37
Revenue elasticity	Standardized coefficient from regressing annual changes in total revenue on annual changes in personal income	WA SAO	0.2	2.92	−18.63	87.35
Revenue HHI	Hirschman-Hirfindahl Index with categories for property tax, sales tax, B&O, IGR, and other revenues; 1 = perfect diversification	WA SAO	0.5	0.13	0.05	0.98
Sales tax change	Annual change in sales tax collections (%)	WA SAO	0.03	0.49	−1	24.54
Sales tax % revenue	% of total revenues from sales taxes	WA SAO	0.08	0.13	0	1

(continued)

Table 4.1 (continued)

Variable	Description	Source	Mean	SD	Min	Max
Sales tax wealth	Annual change in sales tax collections X % of total revenues from sales taxes (%)	WA SAO	0	0.01	−0.1	0.09
Panel C: Local Economic Structure						
Earnings per job	Total wage earnings/ total employment ($000)	BEA	38.6	8.8	19.5	66.4
Industry HHI	Hirschman-Hirfindahl Index with categories for construction; farms and forestry; Finance, insurance, and real estate; government; mining and manufacturing; trade; services; transportation and utilities; 1 = perfect diversification	BEA	0.54	0.05	0.23	0.97
Percent construction	% of total employment in construction	BEA	0.06	0.02	0	0.14
Percent farms and forestry	% of total employment in farms and forestry	BEA	0.08	0.08	0	0.32
Percent FIRE	% of employment in finance, insurance, and real estate	BEA	0.02	0.02	0	0.11
Percent government	% of employment in government	BEA	0.2	0.08	0.1	0.45
Percent mining and manufacturing	% of employment in mining and manufacturing	BEA	0.08	0.04	0	0.3
Percent services	% of employment in services	BEA	0.07	0.07	0	0.42
Percent trade	% of employment in trade	BEA	0.14	0.03	0	0.26
Taxable retail sales change	Annual change in taxable retail sales	WA OFM	0	0.06	−0.42	0.4
Unemployment rate	Unemployment rate (%)	BEA	7.23	2.29	1.6	14.6
Panel D: Local Housing Market						
Housing % post-1990	% of housing stock constructed after 1990	ACS	30.59	6.94	14.4	46.2
Housing % post-2000	% of housing stock constructed after 2000	ACS	12.9	4.28	1.9	30.1
Housing % pre-1940	% of housing stock constructed before 1940	ACS	18.73	7.49	7.7	54.6

(continued)

Table 4.1 (continued)

Variable	Description	Source	Mean	SD	Min	Max
Housing permits change	Annual change in housing permits granted (%)	UWRCRS	0.03	0.34	−1	18
Housing prices change	Annual change in median home price (%)	UWRCRS	0.01	0.06	−0.18	0.25
Housing sales change	Annual change in total housing sales (%)	UWRCRS	0.1	0.18	−0.29	2.96

The first three columns report the variable name, description, and data source. *WAPCA* Washington State Police Chiefs Association, *MRSC* WA Municipal Research and Services Commission; *WAOFM* Washington State Office of Financial Management, a division of the WA State Treasurer; *Census* US Census; *WA SAO* Washington State Auditor's Office, *BEA* US Census, Bureau of Economic Analysis, *AS* US Census American Communities Survey, *UWRCRS* University of Washington Runstad Center for Real Estate Research. All variables are 3 year moving averages except Jurisdictions Density, Square Miles, and Roads per Square Mile. All these variables are based on 2011 data only. All except the Fiscal Structure variables are reported at the county level, where the fiscal structure variables are reported at the entity level. All variables are reported as percentages unless otherwise noted

active fire districts that perform essentially the same function across similarly sized geographic areas. By contrast, many rural counties have a single fire district that performs that same function over a much broader geographic area. Entities also vary by age of incorporation. For instance, the state of Washington authorized the creation of Transportation Benefit Districts in 2007. By contrast, the state statute authorizing the formation of diking and drainage districts was passed in 1895.

Another key advantage of Washington State is that all local governments, including special districts, report annual financial information consistent with generally accepted accounting principles (GAAP) or some close variation of GAAP. Those data are available to the public through the Local Government Financial Reporting System (LGFRS) database maintained by the State Auditor's Office.

To begin this analysis, I collected all the data available on the LGFRS needed to compute the fiscal structure variables reported in Table 4.1. I then collected—from the Municipal Research and Services Committee (MRSC) of Washington—the county where each jurisdiction is located. Entities were excluded if their service area covers multiple counties, if the service area could not be identified, or if their legal name had changed and rendered them unmatchable across the entire sample. I then matched the financial data to data on county-level demographic, economic, and other variables described in the previous section. These data were gathered from a variety of sources described in the previous section. The final dataset included complete information on all 39 counties, all 210 cities, and 70 of 73 towns. For the special districts, the sample coverage is not as comprehensive but is acceptable. It includes 114 of 120 economic development districts, 53 of 70 environmental districts, 42 of 50 library districts, 365 of 374 public safety districts, and 18 of 45 transportation districts.

4.4 Empirical Estimates of Local Financial Condition

This section presents the empirical findings on the determinants of local financial conditions. Section 4.4.1 explains the extreme bounds methodology used to identify the main determinants. And Section 4.4.2 explains and reports the findings from additional modeling based on the restricted model identified by the EBM.

4.4.1 Extreme Bounds Methodology and Findings

The intuition behind the extreme bounds methodology is simple: Test the effect of each potential explanatory variable on the dependent variable in the presence of every other potential explanatory variable. This method is particularly useful when there is no clear theoretical explanation for why some explanatory variables would be robust while others would not. The method is also useful when the independent variables in question correlate with each other, thus causing potential multicolinearity problems. EBM addresses this problem by assuming that multicolinearity might cause robust variables to appear not statistically significant in some iterations of the regression model. To address this problem, we assume that variables with robust explanatory power will be statistically significant in some, but not necessarily all the model iterations.

The key challenge to EBM is computational power. Testing every possible combination of all the explanatory variables in this case would require $3.06 \times 1{,}064$ regressions. Even a much smaller set of five variables (i.e., 50!4) would require more than 11 billion regressions, far more than is feasible with standard computing methods. As a result, following past practice in other fields, I focus on combinations of three variables. This requires 117,600 regressions, a large but nevertheless manageable number.

To employ EBM for this analysis, I first specified all 117,600 possible combinations of any three of the variables from variables listed in Table 4.1. I then ran separate ordinary least squares regression with operating margin as the dependent variable and each combination of independent variables, along with fixed effects for each year. Then I repeated this process with total own source revenues per capita as the dependent variable, and then again for operational spending per capita as the dependent variable. The result of this process is a set of 352,800 regression coefficients on the independent variables.

Following past work, I apply two criteria to identify the independent variables that have a robust effect. First is the percentage of the distribution of the coefficients greater than or less than 0. The intuition here is that if a variable's impact is not robust, if its sign is sometimes positive and sometimes negative. As such, I consider a variable robust if at least 90 % of its coefficients are greater than or less than 0 according to its conditional distribution function (CDF). The second criterion is the percentage of the coefficients with *t*-test scores greater than 2 or less than −2. I consider a variable robust if at least 90 % of its *t*-test scores fall above or below 2 or −2, respectively.

Table 4.2 reports the results of this exercise. The column CDF (0) is the percentage of the coefficients above or below the mid-point on the cumulative distribution function. The column *T*-test (0) is the percentage of coefficients with a *t*-test score less than −2 or greater than 2. The third column is the mean coefficient across all 5,252 regressions that included that variable.

Two key findings emerge from this analysis. First, all three dependent variables are affected by a core set of revenue structure and economic characteristics. Key among them are population and population change, dependence on intergovernmental revenues and property taxes, and dependence on cyclical industries like agriculture/forestry, mining/manufacturing, and construction. Perhaps most surprising is the variables that did not have robust effects, such as personal income, revenue diversification, diversity of local industry, and the unemployment. The latter two are commonly cited measures by local and regional economists, but this analysis suggests those variables are less important than many others.

The net effect of this exercise is to cut the initial list of 50 independent variables down to a list of 10 that were robust determinants of at least two of the three dependent variables: population change, population density, annual change in housing permits, % employed in farming and forestry, % employed in mining and manufacturing, % employed in construction, property tax wealth, intergovernmental revenue wealth, revenue elasticity, and the crime rate.

4.4.2 Estimates by Type of Entity

I then re-estimate the equations using only the 10 variables identified by the EBA. I estimate those equations separately for each type of entity. All regressions include year-fixed effects not reported here for brevity, and the standard errors were corrected for heteroskedasticity and autocorrelation (i.e., by clustering across entities over time). Estimates are reported above the *t*-tests in parentheses. The bottom two rows of each panel also include the $R2$ and number of observations in each regression.

First, note the differences in explanatory power across the different types of entities. This model is clearly more effective at predicting financial position, revenue collections, and spending for counties, towns, environmental districts, and transportation districts than it is for cities, economic development districts, libraries, and public safety entities. The basic explanation for this is that the entities where the model performs well have access to fewer types of own-source revenues. Most transportation districts, for instance, rely on a single earmarked local sales tax. Most counties depend almost entirely on property taxes, with some limited assistance from sales taxes and intergovernmental revenues. Cities, by contrast, access property taxes, sales taxes, business and occupations taxes, various user fees and charges, and many other types of revenues. Second, revenue structure seems to affect special districts' near-term solvency (as measured by the operating margin) more than long-term financial condition, but it affects general

Table 4.2 Extreme bounds analysis

Operating margin				Own-source revenue per capita				Operations spending per capita			
	CDF	*T* Test	Mean		CDF	*T* Test	Mean		CDF	*T* Test	Mean
	(0)	(0)	Coefficient		(0)	(2)	Coefficient		(0)	(2)	Coefficient
Revenue elasticity	100.00	100.00	0.05	**Proprietor earnings**	100.00	100.00	59.53	**Proprietor earnings**	100.00	100.00	166.36
Population change	100.00	100.00	4.69	% **Mining and manuf.**	100.00	100.00	−372.83	**IGR change**	100.00	100.00	−0.93
% **Ag and forestry**	100.00	100.00	0.74	**Total crime rate**	100.00	100.00	−0.07	% **Mining and manuf**	100.00	99.28	−691.56
B and O %	100.00	100.00	−1.44	**IGR change**	100.00	99.71	−0.65	**IGR wealth**	100.00	95.31	−5.20
IGR wealth	100.00	100.00	0.05	**IGR wealth**	100.00	95.31	−3.49	**Total crime rate**	100.00	92.61	−0.10
Population density	100.00	99.71	0.00	Revenue elasticity	100.00	0.00	−0.86	Revenue HHI	100.00	26.42	0.03
Personal income	100.00	84.92	0.00	% Income maintenance	99.71	70.54	−43.05	Revenue elasticity	100.00	0.00	−1.02
Sales tax wealth	100.00	84.07	4.12	**Earnings per job**	99.57	95.30	0.00	**Property tax wealth**	99.43	89.62	−587.76
Personal income change	100.00	49.22	1.23	% **Construction**	99.15	97.15	502.36	**Population change**	99.04	89.47	−2,253.72
Housing prices change	100.00	14.56	0.42	Industry HHI	99.15	74.50	239.90	% Income maintenance	98.44	58.63	−67.43
% Pensions	99.85	89.47	−0.05	**Property tax** %	97.36	100.00	−94.29	**Property tax percent**	97.36	100.00	−131.02
Housing permits change	99.24	1.00	−0.05	**Jurisdictions density**	96.01	94.48	39.40	**IGR** %	97.23	95.15	69.17
% **Mining and manuf.**	98.98	93.60	0.32	**Housing permits change**	94.52	90.10	42.84	**Jurisdictions density**	95.60	94.45	109.15
IGR %	98.54	97.50	0.14	**Population**	94.03	88.15	0.00	Housing permits change	94.23	94.31	137.37

(continued)

Table 4.2 (continued)

Operating margin				Own-source revenue per capita				Operations spending per capita			
Jurisdictions density	98.45	36.42	0.04	**Percent trade**	94.03	90.41	−486.95	**Earnings per job**	91.61	93.69	−0.01
Revenue HHI	98.29	37.50	0.00	**Property tax wealth**	92.46	89.92	−391.59	% **Trade**	89.61	97.15	−976.18
Property tax wealth	98.13	2.50	0.32	**Other revenue** %	91.95	89.74	41.21	**Other revenue** %	89.60	92.15	25.34
Housing sales change	97.45	0.00	0.08	B and O %	90.01	80.48	134.55	% Ag and forestry	89.20	95.15	248.67
% Income maintenance	96.24	38.40	0.11	Population change	88.34	8.69	−373.50	B and O %	88.47	37.15	−176.83
Industry HHI	95.45	25.89	−0.41	Housing prices change	87.43	0.00	22.27	% Construction	85.63	49.35	−275.93
Population	95.16	85.21	0.00	Sales tax wealth	85.75	0.00	−285.93	Roads per square mile	85.34	65.29	−14.65
IGR change	94.64	94.83	0.00	Population density	85.04	77.46	−0.04	Population	85.06	84.48	0.00
% Services	91.32	57.61	−0.59	Percent pensions	84.64	67.15	−8.41	% Social insurance	85.03	91.25	−35.60
Total crime rate	90.90	53.77	0.00	Personal income change	83.54	0.00	82.87	% Services	84.07	79.15	−340.01
Roads per square mile	90.46	12.94	−0.03	% Social insurance	81.36	72.19	−17.09	Unemployment rate	83.80	61.25	6.24
% Construction	88.76	3.27	−0.44	Roads per square mile	76.53	10.19	−2.74	% Government	83.70	66.85	60.85
% FIRE	88.34	65.72	−1.60	Housing sales change	75.67	0.50	−7.90	Population density	83.64	85.85	−0.06
Property tax %	86.25	94.35	0.02	% Government	74.53	39.45	−32.42	Personal income change	82.65	6.15	122.77
% Trade	84.92	0.43	−0.24	Revenue HHI	73.30	20.19	−0.26	Sales tax wealth	82.50	0.00	−230.57
% Social insurance	80.81	65.15	−0.03	Unemployment rate	68.42	12.26	0.98	% Pensions	80.36	67.42	−12.95

Other revenue %	80.23	5.33	−0.02	IGR %	68.21	18.46	0.88	Housing prices change	73.40	5.68	22.76
Earnings per job	79.94	63.16	0.00	% Ag and forestry	67.15	57.48	14.74	Industry HHI	73.23	38.35	−53.20
Proprietor earnings	70.48	4.84	0.01	% FIRE	63.72	74.46	−118.40	% FIRE	71.72	67.22	−584.09
Unemployment rate	63.18	94.31	0.00	% Services	62.01	48.15	−16.68	Housing sales change	56.23	3.15	4.77
% Government	61.32	3.20	0.02	Personal income	37.41	59.23	0.00	Personal income	49.30	69.15	0.00

Figures reported are proportions of coefficients from regressions with combinations of any three from the list of independent variables, a total of 117,600 regressions for each dependent variable. The left columns are the coefficients from regressions where operating margin was the dependent variable. The middle columns are the coefficients from regressions where total own-source revenue per capita was the dependent variable. The right columns are the coefficients from regressions where per capita spending on operations was the dependent variable. CDF(0) is the percentage of coefficients on one side (either above or below) the midpoint (0) on the conditional distribution function for all the coefficients on each respective dependent variable. *T*-test (2) is the percentage of the coefficients with *t*-test scores greater than 2 or less than negative 2. Variables in bold have at least 90 % of their coefficients on one side of the distribution and at least 90 % of their *t* tests above 2 or below −2

governments' long-term financial condition much more than their near-term solvency. This is also likely related to the diversity of revenue sources available to different types of districts. Third, intergovernmental revenues affect different types of entities in very different ways. Some of this is by design, as certain state grants and other shared revenues are explicitly designed to improve financial condition of certain entities and not others.

4.5 Conclusion

The objective of this chapter was to provide an integrated, parsimonious framework of the determinants of local government financial condition. Unlike previous work, this analysis includes both general purpose local governments and special purpose governments. The results suggest a core group of 10 variables shape local government near-term solvency and long-term spending and revenue patterns. Most of those variables are related to fiscal structure and to the structure of the local economy. A follow-up analysis suggests these factors matter in different ways and at different magnitudes on different types of local governments. The findings also underscore the finding from previous literature that financial condition is difficult to predict, especially for general purpose cities and traditional special purpose districts in service areas like public safety.

These findings suggest several directions for future research. First, a follow-up to this analysis will use the estimates presented in Table 4.3 to predict future fiscal stress. By examining the predicted levels of both revenues and spending, we can identify local governments where revenues and spending are likely to have disequilibrium in the event of another recession or other macroeconomic shock. These findings also have implications for our understanding of state-local fiscal federalism (see Oates 1972). The key finding here is that many of the current state monitoring systems to prevent local government fiscal stress are either too complex given that only ten variables seem to affect financial condition, or too uniform given that different factors seem to affect financial condition differently for different types of governments. In the future, the findings presented here could help recalibrate these state oversight systems.

Table 4.3 Estimates of financial condition indicators, restricted models

	Cities	Counties	Towns	Economic development	Environment	Library	Public safety	Transportation
Panel A: Operating Margin								
Intercept	0.96	1.16	1.13	0.14	0.84	0.92	1.12	0.22
	(1.07)	(21.39)	(2.72)	(0.02)	(6.86)	(1.06)	(4.43)	(0.61)
Population change	3.80	1.19	2.50	9.02	−3.25	6.60	−0.36	−2.32
	(3.95)	(2.07)	(0.61)	(0.11)	(−2.46)	(0.55)	(−0.11)	(−0.56)
Population density	0.00	0.00	0.00	−0.01	0.00	0.00	0.00	0.00
	(2.01)	(0.74)	(−0.17)	(−0.86)	(−0.30)	(2.14)	(−2.98)	(−1.22)
Housing permits change	0.04	−0.02	0.02	−0.53	−0.01	−0.29	−0.11	0.00
	(1.01)	(−3.36)	(0.46)	(−0.20)	(−0.22)	(−0.58)	(−0.67)	(−0.03)
% Farm and forestry	0.84	−0.12	0.48	−4.43	0.23	2.01	0.64	1.98
	(4.95)	(−1.27)	(0.88)	(−0.24)	(1.19)	(0.79)	(1.33)	(2.16)
% Mining and manufacturing	−0.09	0.02	1.05	6.08	0.48	2.41	−1.55	−0.79
	(−0.48)	(0.18)	(1.39)	(0.27)	(1.33)	(1.05)	(−2.27)	(−1.47)
% Construction	0.42	1.13	1.46	−1.05	−0.10	4.49	0.35	8.44
	(0.66)	(3.93)	(0.83)	(−0.02)	(−0.16)	(0.98)	(0.25)	(2.86)
Property tax wealth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(−3.61)	(−0.91)	(−1.25)	(−0.08)		(−0.82)	(0.70)	.
Inter-governmental revenue wealth	0.16	−0.01	0.09	0.09	−0.03	−0.03	0.02	−0.32
	(19.71)	(−0.25)	(14.48)	(0.15)	(−0.79)	(−0.65)	(5.10)	(−1.79)
Revenue elasticity	−0.02	0.02	−0.11	13.21	0.02	−0.03	0.05	−0.02
	(−0.77)	(1.39)	(−0.63)	(4.88)	(1.50)	(−0.98)	(10.02)	(−0.46)
Crime rate	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(−1.82)	(0.34)	(−1.30)	(−0.19)	(−3.29)	(−0.22)	(−0.60)	(1.46)

(continued)

Table 4.3 (continued)

	Cities	Counties	Towns	Economic development	Environment	Library	Public safety	Transportation
R^2	0.15	0.51	0.21	0.05	0.05	0.09	0.11	0.51
N	3,261	655	1,125	770	445	211	1,759	179
Panel B: Own-Source Revenue Per Capita								
Intercept	194.53	109.69	−39.36	55.54	2.43	37.17	10.58	105.94
	(8.27)	(2.83)	(−5.27)	(3.42)	(2.86)	(4.27)	(4.46)	(7.77)
Population change	857.71	−2,151.80	169.46	367.61	−6.09	−43.32	−182.83	427.19
	(2.15)	(−3.15)	(0.88)	(1.66)	(−0.34)	(−0.19)	(−3.44)	(1.58)
Population density	19.45	−61.62	−33.96	−32.09	0.08	0.17	−0.18	10.56
	(1.95)	(−4.25)	(−4.14)	(−4.22)	(0.53)	(0.22)	(−2.11)	(1.97)
Housing permits change	75.50	94.49	46.14	41.26	3.28	−5.08	8.36	−69.97
	(9.31)	(10.82)	(15.95)	(10.16)	(12.40)	(−1.31)	(7.90)	(−3.43)
% Farm and forestry	22.87	18.18	6.55	−10.88	0.87	−5.82	9.15	23.89
	(1.31)	(2.41)	(3.12)	(−1.39)	(1.36)	(−0.60)	(3.17)	(1.76)
% Mining and manufacturing	−479.40	346.65	−34.98	−306.30	−7.92	69.89	−36.05	−290.63
	−6.75	2.99	−1.44	−6.14	−2.94	1.53	−4.19	−4.08
% Construction	−321.83	406.99	−326.70	192.81	−4.69	−150.76	−72.32	−236.06
	(−4.04)	(2.89)	(−9.52)	(3.00)	(−0.98)	(−3.47)	(−6.29)	(−4.16)
Property tax wealth	−390.33	4,657.89	1,458.78	69.29	−35.12	55.62	169.80	61.50
	(−1.45)	(13.98)	(19.38)	(0.56)	(−4.61)	(0.80)	(7.36)	(0.33)
Inter-governmental revenue wealth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(−2.49)	(4.73)	(1.83)	(−5.72)		(2.50)	(0.09)	
Revenue elasticity	−17.05	−108.45	−0.54	−2.55	−0.48	0.44	−0.08	−1.83
	(−4.96)	(−3.43)	(−1.87)	(−1.62)	(−1.09)	(0.49)	(−0.99)	(−0.75)
Crime rate	−0.03	0.01	0.00	0.03	0.00	−0.01	−0.01	0.00
	(−2.41)	(0.42)	(−0.11)	(2.38)	(0.86)	(−1.01)	(−3.12)	(0.18)

R^2	0.09	0.41	0.44	0.23	0.44	0.17	0.16	0.58
N	3,261	655	1,125	806	445	214	1,760	179
Panel C: Operational Spending Per Capita								
Intercept	210.63	368.42	−38.52	−15.79	9.44	39.71	11.03	13.96
	(8.31)	(5.46)	(−5.28)	(−1.10)	(1.53)	(4.62)	(4.57)	(1.59)
Population change	479.60	−4,997.27	63.06	264.97	−48.93	74.77	−152.07	147.09
	(1.12)	(−4.20)	(0.34)	(1.35)	(−0.38)	(0.34)	(−2.81)	(0.85)
Population density	25.60	−134.61	−30.97	−24.66	1.28	0.18	−0.19	−3.98
	(2.38)	(−5.33)	(−3.87)	(−3.66)	(1.14)	(0.23)	(−2.12)	(−1.15)
Housing permits change	97.98	430.94	47.66	35.78	37.25	−5.66	5.33	−20.64
	(11.21)	(28.33)	(16.86)	(9.92)	(19.37)	(−1.48)	(4.95)	(−1.57)
% Farm and forestry	25.86	1.77	6.80	−15.20	−0.71	−6.41	8.99	25.55
	(1.37)	(0.14)	(3.32)	(−2.19)	(−0.15)	(−0.67)	(3.07)	(2.93)
% Mining and manufacturing	−519.52	631.48	−15.47	−261.40	−44.87	55.00	−36.07	−47.61
	(−6.79)	(3.13)	(−0.65)	(−5.91)	(−2.29)	(1.22)	(−4.12)	(−1.04)
% Construction	−290.98	639.07	−288.47	147.67	−32.29	−170.80	−71.18	−8.96
	(−3.39)	(2.61)	(−8.60)	(2.59)	(−0.93)	(−3.98)	(−6.09)	(−0.25)
Property tax wealth	−426.10	2,544.76	1,327.06	139.51	−106.99	23.24	169.26	−95.43
	(−1.47)	(4.39)	(18.05)	(1.26)	(−1.93)	(0.34)	(7.22)	(−0.79)
Inter-governmental revenue wealth	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	(−2.83)	(2.14)	(1.42)	(−4.86)		(1.46)	(−0.76)	
Revenue elasticity	−14.71	−181.86	−0.52	0.11	3.67	0.75	−0.08	−1.09
	(−3.97)	(−3.31)	(−1.83)	(0.08)	(1.14)	(0.86)	(−0.95)	(−0.69)

(continued)

Table 4.3 (continued)

	Cities	Counties	Towns	Economic development	Environment	Library	Public safety	Transportation
Crime rate	–0.02	–0.03	0.00	0.03	0.01	0.00	–0.01	–0.01
	(–2.20)	(–0.66)	(–0.35)	(2.37)	(1.32)	(–0.67)	(–3.36)	(–0.71)
R^2	0.09	0.71	0.44	0.23	0.62	0.16	0.13	0.90
N	3,261	655	1,125	806	445	214	1,760	179

Figures reported are the coefficients from regressions of operating margin, per capita own-source revenue, and per capita operations spending on the independent variables identified in the left column. *T*-tests are in parentheses. Each set of estimates is for a subset of entities. All regressions are panel data estimates that include year fixed effects (not reported here) and *t*-tests based on standard errors corrected for autocorrelation and heteroskedasticity

References

Berne R, Schramm R (1986) The financial analysis of governments. Prentice-Hall, Englewood Cliffs

Butler AW, Keefe MO, Kieschnick RL (2011) The robust determinants of initial IPO returns and their implications for IPO cycles. Available at SSRN: http://ssrn.com/abstract=1361314

Chapman J (1999) Local government fiscal autonomy and fiscal stress: the case of California. Lincoln Institute of Land Policy, Cambridge, WP99JC1

Clark TN, Ferguson LC (1983) City money: political processes, fiscal strain, and retrenchment. Columbia University Press, New York

Coe CK (2008) Preventing local government fiscal crises: emerging best practices. Public Adm Rev 68(4):759–767

Groves SM, Godsey M, Nollenberger RK (2003) Evaluating financial condition: a handbook for local government, 4th edn. International City/County Management Association, Washington, DC

Hawkins BW (1989) A comparison of local and external influences on city strategies for coping with fiscal stress. In: Clark T, Fitzgerald R (eds) Decisions on urban dollars, research in urban policy, vol 3. JAI, Greenwich, pp 73–90

Hendrick R (2004) Assessing and measuring the fiscal health of local governments: focus on Chicago suburban municipalities. Urban Aff Rev 40(1):78–114

Hendrick R (2011) Managing the fiscal metropolis: the financial policies, practices, and health of suburban municipalities. Georgetown University Press, Washington, DC

Honadle BW (2003) The states' role in US local government fiscal crises: a theoretical model and results of a national survey. Int J Pub Adm 26(13):1431–1472

Honadle BW, Lloyd-Jones M (1998) Analyzing rural local governments' financial condition: an exploratory application of three tools. Pub Budget Finance 18(2):69–82

Jacob B, Hendrick R (2013) Assessing the financial condition of local governments: what is financial condition and how is it measured? In: Levine H, Justice J, Scorsone E (eds) Handbook of local government fiscal health. Jones & Bartlett, Burlington

Justice JB, Scorsone EA (2013) Measuring and predicting local government fiscal stress. In: Levine H, Justice J, Scorsone E, Levine H, Justice J, Scorsone E (eds) Handbook of local government fiscal health. Jones & Bartlett, Burlington

Kloha P, Weissert CS, Kleine R (2005) Developing and testing a composite model to predict local fiscal distress. Public Adm Rev 65(3):313–323

Levine CH, Irene R, George GW (1981) The politics of retrenchment: how local governments manage fiscal stress. Sage Publications, Beverly Hills

Lundin S (2007) The closest governments to the people: a complete reference guide to local governments in Washington state. Washington State University Press, Pullman

Maher C, Deller SC (2012) Measuring municipal fiscal condition: do objective measures of fiscal health relate to subjective measures? J Pub Budg Account Financ Manag 23(3):427–450

Marlowe J (2013) Fiscal slack, reserves, and rainy day funds. In: Levine H, Justice J, Scorsone Burlington E (eds) Handbook of local government fiscal health. Jones & Bartlett, Burlington

Oates WE (1972) Fiscal federalism. Harcourt Brace Jovanovich, New York

Pagano MA, Hoene C (2010) States and the fiscal policy space of cities. In: Bell M, Brunori D, Youngman J (eds) The property tax and local autonomy. Lincoln Institute of Land Policy, Cambridge

Pammer WJ (1990) Managing fiscal strain in major American cities: under- standing retrenchment in the public sector. Greenwood, New York

Sala-i-Martin XX (1997) I just ran two million regressions. Am Econ Rev 87(2):178–190

Sharp EB, Elkins D (1987) The impact of fiscal limitations: a tale of seven cities. Public Adm Rev 47(5):387–392

Stonecash J, McAfee P (1981) Ambiguities and limits of fiscal strain indicators. Pol Stud J 10:379–395

Sturm J-E, Hartwig J (2012) An outlier-robust extreme bounds analysis of the determinants of health-care expenditure growth. KOF working papers no. 307. Available at SSRN: http://ssrn.com/abstract=2122412