Effects of the Form of Government and Property Tax Limits on Local Finance in the Context of Revenue and Expenditure Simultaneity

JEFFREY CHAPMAN AND EVGENIA GORINA

This paper examines the impact of the form of government and state-imposed property tax limits on municipal finance. We suggest that municipal revenues and expenditures are determined concurrently and estimate revenue and expenditure functions as simultaneous equations. We use the instrumental variable approach and fixed effects to address revenue and expenditure endogeneity. By testing the model on a cross-section of rich municipal data for fiscal year 2002, we find evidence that revenues and expenditures are simultaneously determined, that potentially binding state-imposed property tax limits effectively restrict local revenues and that the form of government is a significant predictor of local expenditures.

INTRODUCTION

This paper examines effects of the form of government and state-imposed property tax limits on municipal finance. We estimate local revenue and expenditure functions using three-stage least squares (3SLS) regression and test the model on a cross-section of municipal data for fiscal year 2002. The results suggest that potentially binding state-imposed property tax limits effectively restrict local revenues and that city managers are, on average, more frugal administrators of direct general expenditures than mayors. In the first part of the paper, we review theories of fiscal decision making at the local level, develop a theoretical argument of revenue and expenditure simultaneity, and outline our approach to studying effects of the form of government and tax limits on local finance. In the second part of the paper, we specify the model, describe the dataset, and discuss estimation results. The third part of

Jeffrey Chapman is a Foundation Professor of Applied Public Finance at the School of Public Affairs, Arizona State University. 411 N. Central Ave., Suite 450, Phoenix, AZ 85004-0687. He can be reached at *jeffrey.chapman@asu.edu.*

Evgenia Gorina is a Ph.D. candidate at the School of Public Affairs, Arizona State University. 411 N. Central Ave., Suite 450, Phoenix, AZ 85004-0687. She can be reached at *egorina@asu.edu.*

the paper considers policy implications of the findings and suggests directions for future research.

There are two broad traditions of thought on how local governments make their expenditure and revenue decisions. The first tradition embraces demand-side theories in which residents determine budget decisions by directly indicating their preferences for public goods and services through their willingness to pay. Government actors, who are either elected officials or appointed public administrators, are assumed to be simple conduits that provide public goods and set tax rates in response to resident desires. Demand-side theories often ignore institutional constraints.

Theories developed from the supply-of-service perspective emphasize institutional factors and often argue that the budget is set through political and bureaucratic expansionist tendencies or through strategic management. In this framework, residents are rather irrelevant in local fiscal decisions. Both types of models contain subsets, some examples of which follow.[1]

Demand-Side Models

A substantial literature approaches municipal finance with the assumption that budgets are determined through the influence that residents have on budgetary decision makers.[2] Four types of demand-side models reflect this approach. The median voter model assumes that the median voter of the community determines levels of revenues and expenditures and that elected decision makers aim at maximizing the utility of the median voter to increase their chances of re-election. Under these assumptions, the voter determines the Pareto efficient level of public and private goods and indicates this level to the local government. Empirically, this model is often tested by predicting some variant of expenditures on demographic and economic characteristics of the community, including tax rates (Borcherding and Deacon 1972; Bergstrom and Goodman 1973). Typical findings demonstrate that as income increases, the demand for public expenditures also increases and as tax prices increase, public expenditures decrease. Median voter models tend to ignore such strategic behaviors as rent seeking, leviathan concerns, or fiscal illusion and assume that the representative voter has perfect information to make rational decisions on public sector activities. Turnbull and Chang (1998) suggest, however, that a median voter model may predict budget decisions accurately, especially after taking into account state-specific effects, the form of local government, and population density.

The second set of demand-side models stems from the Tiebout model, in which, under stringent assumptions, mobile households reveal their preferences for local public revenue and expenditure bundles by moving to the jurisdiction which best meets their needs. There

---

1. There is also considerable literature on the politics of budgeting, logrolling, and deal making that this paper will ignore.

2. This paper uses "budget" as a synonym for the outcome of the joint expenditure and revenue decisions of the jurisdiction.

is a large empirical literature that demonstrates capitalization of both taxes and public expenditures into home values, which many interpret as evidence of the validity of the Tiebout model. Note that in this model, the bundle of expenditures and taxes offered by the jurisdiction is taken as a given, so its salience to this discussion is somewhat limited.[3]

The third type of demand-side models includes models of public rent seeking by special interest groups. These groups engage in opportunistic behavior to promote special government programs that support their particular interests. Special group behavior in this case is a local level analog of Olson's seizing behavior (Olson 1982).

Finally, there are fiscal illusion models, which argue that residents of a jurisdiction may not be aware of the total revenues raised to finance directly targeted expenditures since tax sources are widely varied. The residents may thus be under the illusion that certain targeted programs are cheaper than they appear to be. Fiscal illusion may lead to an expansion of government activities (Oates 1988; Young 2009) and potentially decrease national economic growth rates (Mourão 2008).

Supply-Side Models

The other approach to public finance is supply-focused and concentrates on the government and politics in the determination of the size and composition of the budget. In supply-side models, elected officials and public administrators engage in strategic behavior and institutions play an important moderating role. There are at least three general types of supply models.

The first is the traditional "Leviathan" model developed by Brennen and Buchanan (1980). It suggests that the local government acts as a monopolist, maximizing tax revenues and overexpanding. In such a situation, voters do not have any control over the local government; hence, the term from Hobbes -"Leviathan" (Hobbes 1651). Leviathan theorists often suggest that local governments are too big and that fiscal competition is an efficiency increasing technique. Recent cross-country empirical work suggests that decentralization is associated with a smaller public sector (in part, because of tax competition among jurisdictions) but if the central government provides interjurisdictional grants—thus softening local governments' budget constraints—there does exist a faster growth in government (Rodden 2003).

Strategic management concepts underlie the second set of supply models.[4] In these models, conservative government officials deliberately lower tax rates to cause deficit hoping to constrain spending decisions of possible successors, minimize the political transaction costs of lowering expenditures or raising taxes, and reduce capital flight because of tax competition. Strategic management models differ from all of the above because they explain the motivation behind reducing government expenditures rather than increasing them.

---

3. For a summary of the current state of the Tiebout model, see Fischel (2006).
4. For a more in-depth discussion of supply models, see Siebel and Pitsoulis (2009).

The third set of models stems from Niskanen's work. Niskanen (1971) challenged the then-traditional view that monopoly bureaus were the best way to organize the public sector and concluded that most bureaus were too large, grew too fast, used too much capital, and exploited their sponsor. He argued that more competition among bureaus would be beneficial.[5]

In moving from the generalized models as described above to our specification, as described below, we note that the generalized models are not always consistent. For example, in the median voter model, the voter is assumed to have enough information about the benefits and costs of specific services to determine their efficient set of preferences. Yet, the fiscal illusion models assume that the voter does not understand the true costs of the services. Further, Tiebout models assume that the bundle of services and the tax mechanism already exist and voters reveal their preferences not by voting but by moving. To a lesser degree, inconsistencies exist in the generic supply models. For example, the strategic management models assume deliberate deficits, which, in the long run, are not consistent with either leviathan or monopolistic behavior.

We try to avoid these controversies by simultaneously estimating expenditure and revenue equations. Our key assumption is that government is the decision maker and has the power to make decisions. The expenditure and revenue equations, as described below, include variables that reflect important components of the above models: the government structure, fiscal illusion, costs (as implied in expenditures), and voter preferences.

Generalized Model of Local Government Expenditures and Revenues

We propose the following generalized model of local government expenditures:

$$E = f(R, G, FI, D), \tag{1}$$

where **E** are local government direct general expenditures, **R** are local government own source revenues, **G** is a vector of governance related variables including state aid, **FI** is fiscal illusion, and **D** is a vector of demographic variables.

Similarly, we propose a model for local government revenues:

$$R = g(E, FL, G, D), \tag{2}$$

where **FL** is the existence of a fiscal limit.[6] We estimate the equations simultaneously and address endogeneity through the use of instrumental variables (IV) and fixed effects. A more specific discussion of econometric challenges and solutions is presented in the model estimation section.

---

5. See also Orzechowski (1977).

6. Thus, the traditional cost equations, which underlie expenditure estimates are implicit in both the revenue and expenditure functions. See, for example, Oates, Bradford, and Malt (1969).

MODEL SPECIFICATION

Joint Determination of Revenues and Expenditures

An underlying assumption in many budgetary process models is that the tax rate is a crucial expenditure determinant. For example, the median voter maximizes utility (which comes from the consumption of both public and private goods) subject to tax prices and an income constraint. Alternatively, government officials, either elected or appointed, do not want to alienate voters by raising taxes, and so their first move is to cut expenditures.[7] However, in a more complex world, it is not the tax rate but the overall revenues raised by government that act as the constraint on the government's expenditures. For example, many local government revenues come from either the state or federal government, which may not be visible to the citizen or from user fees and charges that are increasing in importance. We thus have the situation in which expenditures are constrained not only by the government's perception of the median voter's response to taxes but also by the existence of alternative revenue sources.

Simultaneously, to the extent that local jurisdictions wish to maintain a particular level of expenditures, the amount of revenue they need would be a function of that expenditure level. Prior to tax and expenditure limits (TELs) in many jurisdictions, the revenues raised from nonproperty tax sources were subtracted from the desired expenditure levels. Then, with the assessed value exogenously determined by an assessor, the property tax rate would be set to equalize expenditures and available revenues. In this instance, expenditure needs determined revenues. Since TELs were sometimes justified by the claims that expenditures were out of control, this last rationale has a good deal of importance. Currently, this process may be less obvious, but, especially during the most recent recession, jurisdictions were explicitly raising taxes (and user charges) to maintain some, often minimal, level of desired expenditures. Given the above arguments, it seems reasonable to argue that any estimation of expenditure and revenue equations must involve the use of the simultaneous equation framework.[8]

There is a reason why so much time has been spent in justifying the assumption of simultaneity. Out of 15 empirical articles recently published in *Public Budgeting and Finance* that have studied revenue or expenditure functions, only one used the assumption of simultaneity (Krishnakumar, Martin, and Soguel 2010). Furthermore, one of these 15 articles cited additional empirical work in the same area, none of which used the assumption of simultaneity (Springer et al. 2009).

---

7. At the national level, Young (2009) references studies that do not support a causal relationship between revenues and expenditures, studies that support pending-tax relationships, and studies that support tax-spending relationships. Young's work, again at the national level, finds evidence of fiscal illusion, with increases in revenues leading to increases in the perceived cost of government, which leads to a fall in government expenditures.

8. A typical anecdotal example is the argument of the Arizona Citizens Finance Review Commission that "expenditures . . . should determine the level of revenues" (Arizona Citizens Finance Review Commission 2008, 4).

Property Tax Limits

Fiscal constraints exist at all levels of government. Forty-nine states have balanced budget requirements—although often there are no formal provisions for enforcing these rules (Poterba 1996)—and 43 states have some form of additional TELs on local governments (Anderson 2007). These constraints are primarily on property tax rates and assessments as well as on setting super-majority requirements for revenue increases; less often the limits apply directly to expenditures. There is evidence that at both state and substate levels, these constraints affect fiscal behavior, although different constraints have different effects (Alt and Lowry 1994; Besley and Smart 2007; Besley and Case 2003; Bae and Gais 2007; Shadbegian 1998, 1999; Mullins 2004; Mullins and Wallin 2004). The effects may be asymmetric, with respect to the core and disadvantaged populations, and may be associated with either improved local government efficiency or rising fiscal stress (Stallmann 2007). Because the restrictions involve formal institutional constraints, some authors argue that public choice models are at least as relevant as median voter models, if not more so (Besley and Case 2003).

We develop this argument in several dimensions. We recognize the difference between a tax limitation and an expenditure limitation—the acronym TEL combines two very different phenomena. We also acknowledge the problem of TEL heterogeneity. No two TELs are exactly alike because they vary in design, scope, and restrictiveness.[9] Following existing traditions of empirical analysis, we could operationalize a limit in three ways: (1) disregard limit heterogeneity and create an indicator variable equal to 1 for states with a limit and 0 otherwise; (2) develop a stringency index based on the characteristics of the limit (use a continuous numeric variable); (3) classify the constraints into broad yet distinct categories depending on their type and stringency. Having studied available data sources, we followed the third approach and created our variable of interest—a state-imposed property tax limit—based on the limit classification by Hoene and Pagano (2008).[10]

Governance

U.S. local governments exist in a complex federalist system, in which the state often shares in the local government's fiscal decision making. The literature on soft-budget constraints tends to concentrate on relations between national governments and state governments or on the state and the private sector relationships (Kornai, Maskin, and Roland 2003). In this research, a soft-budget constraint occurs when the state government continually aids a local jurisdiction when the latter cannot meet its financial obligations under the current set of financial rules. For example, the fiscal aid (often called a bailout) given by the California state government to local jurisdictions after the passage of the property tax limiting Proposition 13 is a soft-budget constraint. Local government budget constraints may vary not only across localities but also across time. Though local government defaults

---

9. For a recent comprehensive theoretical analysis of tax and expenditure limit codification in states see Kioko (2011).

10. We did not consider local limits that are self-imposed. For an example of such limits see Brooks and Phillips (2009).

rarely materialized during the most recent great recession, the governments that did not receive the full amount of anticipated state funds saw the soft-budget constraint harden.[11] Consistent with this argument, Wildasin (1997) suggests that central authorities will aid local governments as long as they believe that the local public services provided with this aid generate benefits for society. Though monetary transfers may flow to local governments from both federal and state levels, state transfers constitute a lion's share of this aid (an average of 85 percent in FY 2002). We posit that to the extent that local governments receive state government aid, they will feel less constrained in their expenditures and use the aid to expand programs.[12] We also believe that state intergovernmental aid may act as a substitute for own source revenues: if a local government has consistently discovered that state aid is coming, that is, a soft-budget constraint exists, then it will not attempt to raise as much money from its local voters.

The second governmental structure variable of interest is the local form of government. It reflects our interest in effects of political institutions on public decision outcomes. The discussion of such effects began over 40 years ago (Booms 1966; Lineberry and Fowler 1967) and continued through the 1990s. For example, Duffy-Deno and Dalenberg (1990) argued that intuitively local government fiscal incentives should differ for city-manager administered jurisdictions and those governed by a directly elected mayor. Empirically, that would translate into differences in expenditures and wages. The authors found, however, that there was "little consensus in the empirical literature concerning the existence, let alone the direction of differences" between these two types of governance (Duffy-Deno and Dalenberg 1990, 207). This controversy continues into the present. For example, Hou and Smith (2010) find that, at the state level, informal governance norms affect whether the state government is running a surplus or not. At the local level, Feiock and Kim (2001) use transaction costs and high-powered incentives as a theoretical base and demonstrate empirically that the form of government may affect local economic development strategic planning. Hendrick (2002) argues that professionalized governments may be more efficient and finds that governments managed by city managers have lower total tax effort. In the same vein, Avellaneda (2009) finds that in Colombia, mayoral quality is associated with greater property tax collections. Kwon, Berry, and Feiock (2009) find that city managers are more likely to use economic development tools to retain their current businesses and attract new businesses, while mayors adopt policies based on "getting on the bandwagon" (Kwon et al. 2009, 982) rather than on addressing an actual need.[13] Zhang and Feiock (2010) find that the mayor's political experience and the city manager's professionalism have effects on the city manager's potential policy leadership, but again they do not directly examine budget decisions. MacDonald (2008) finds that there is no statistical relationship between the form of government and expenditures. Coate and Knight (2011) as well as Baqir (2002)

---

11. For a more detailed explanation of the soft budget system, involving the political, social and economic environment, the motivation of the soft-budget organization and then the behavioral effects of the soft budget syndrome, see Kornai et al. (2003).

12. This is consistent with the Inman's (2008) soft-budget argument.

13. It is important to note that the papers cited above analyze economic development strategies rather than revenue and expenditure decisions.

suggest that jurisdictions governed by council-management systems spend more that those governed by strong mayor systems. For hypothesis testing, we will join the cohort of public administration researchers who see a qualitative difference in fiscal management outcomes of the city manager and mayor-council forms of government.

Our third government structure variable that can affect local expenditures is the composition of the city council. Earlier research shows that council members set and approve policy decisions but refrain from direct involvement in implementation and service delivery (Svara 1999). Other research indicates that the juxtaposition of politics and administration may not be useful in this case because governance often involves shared responsibility rather than a clearly defined separation of powers (Svara 1985). Ebdon (2000) determines that cities that have council members elected by districts might have more open decision processes. Since the size of a budget is a policy decision and since the decision-making process is open, each council member would want to demonstrate to the residents of the district that they are getting their fair share of services.

Finally, our last governance variable relates to the independence that a jurisdiction might have in arranging its affairs. One measure of this might be the ability of a jurisdiction to structure their revenue and expenditure activities. We believe that home rule, a measure of self-government established by legislation, is a good proxy for this ability.

Fiscal Illusion

Fiscal illusion may also play an important role in local fiscal policy. Fiscal illusion may well be a by-product of a government attempting to diversify its revenue sources to avoid volatility and to compensate for property tax limits.[14] We suggest that the greater the diversity of the entire tax revenue system, the easier it is to increase the total amount of revenue collected, since each revenue increment is small. We also test the fiscal illusion argument for the expenditure side: we develop an expenditure diversity index and suggest that the more diverse the core expenditures are, the greater voters' desire for additional expenditures should be. Voters may believe that an increase in total expenditures may still yield them potential marginal increases in benefits. In addition, voters, as members of special interest groups, could identify the panoply of government services that others are receiving. Then, they could expect additional government services so they can have a fair share coming from an increase in total expenditures.

DATA AND HYPOTHESES

The dataset for testing the hypotheses is a cross-section of municipal data for fiscal year 2002. It includes 378 U.S. cities from 44 states with population over 50,000.[15] Table 1

---

14. There is mixed evidence that fiscal illusion exists at the local level (Hendrick 2002; Jordan and Wagner 2008; Carroll 2009).

15. The dataset was compiled by merging data from six different sources. Records with any missing data were omitted. As a result, the dataset does not include municipalities from Alaska, Hawaii and Vermont, North Dakota, Virginia and West Virginia.

describes the variables and data sources. Table 2 presents variable summary statistics. For expositional ease, we divide the tables into subsections with fiscal variables, governance variables, and demographic variables.

TABLE 1
Variable Description and Data Sources

Variable	Description and data source
Fiscal variables	
Direct general expenditures[a]	Direct general expenditures per capita in 2002. Source: Annual Survey of Local Government Finances and Census of Governments (2002).
Own-source revenues[a]	Own source revenues per capita in 2002. Source: Annual Survey of Local Government Finances and Census of Governments (2002).
Tax revenue diversity	Hirschman-Herfindahl index of tax revenue diversity. The index is based on three revenue sources: property tax, sales tax, and other taxes. It is a continuous variable in the range from 0 to 1. Source: Annual Survey of Local Government Finances and Census of Governments (2002).
Expenditure diversity	Hirschman-Herfindahl index of expenditure diversity. The index is based on four expenditure categories: fire protection, highways, police protection, and sanitation. It is a continuous variable in the range from 0 to 1. Source: Annual Survey of Local Government Finances and Census of Governments (2002).
Potentially binding state property tax limit	Dichotomous variable equal to 1 if a municipality has a potentially binding property limit in place and 0 otherwise. A limit is potentially binding if a property tax rate limit is coupled with a limit on assessments increase. Source: Hoene and Pagano (2008).
Governance variables	
Council-manager government	Dichotomous variable equal to 1 if a municipality has the council-manager form of government and 0 if the municipality has the mayor-council form of government. Source: ICMA dataset refined by Nelson and Svara (2010).
Number of councilmen elected by district	Number of council member elected by district. Source: ICMA dataset refined by Nelson and Svara (2010).
Home rule	Dichotomous variable equal to 1 if a municipality is from a home rule state and 0 otherwise. Source: ICMA dataset refined by Nelson and Svara (2010).
State aid[a]	State intergovernmental transfers per capita in 2002. Source: Annual Survey of Local Government Finances and Census of Governments (2002).

We use per capita direct general expenditures and own source revenues as the simultaneously determined variables. We chose this measure of expenditures over other measures because it is subject to governmental actions more than any other measures of municipal

TABLE 1 (Continued)

Variable	Description and data source
Demographic variables	
Crime rate[a]	Crime rate per 1,000 residents in 2002. Source: The Federal Bureau of Investigation.
Population under 18	Percentage of population under 18. Source: U.S. Census Bureau, Census 2000.
Population over 65	Percentage of population over 65. Source: U.S. Census Bureau, Census 2000.
Population with a bachelor's degree	Percentage of population over 25 with a bachelor's degree. Source: U.S. Census Bureau, Census 2000.
Mean income[a]	Average income per capita in 2002. Source: U.S. Census Bureau, Census 2000.
Unemployment rate	Unemployment rate in 2001. Source: U.S. Bureau of Labor Statistics.
Population density[a]	Density of population per square mile. Source: U.S. Census Bureau, Census 2000.
Ethnic fragmentation	Ethnic diversity index. It is a continuous variable in the range from 0 to 1. Source: U.S. Census Bureau, Census 2000.
State voted Republican in 2000	Dichotomous variable equal to 1 if a state voted Republican in the 2000 presidential election and 0 otherwise. Source: Dave Leip's Atlas of U.S. Presidential Elections. (http://www.uselectionatlas.org/RESULTS/data.php?year=2000&datatype=national&def=1&f=0&off=0&elect=0)

[a]The variable was transformed into a natural logarithm at the estimation stage.

expenditures.[16] The same reasoning applies to the choice of own source revenues rather than total revenues.[17] In addition, by using direct general expenditures and own source revenues we mitigate the econometric problem that would occur because most jurisdictions, by law, must present a budget balanced over all funds, in which total revenues would equal total expenditures. We convert values to logarithms to calculate elasticities, and hypothesize positive effects in each equation.

The tax revenue diversity measure is a Hirschman-Herfindahl index (HHI) of the diversity of a tax revenue structure. We calculate the measure following Carroll (2009):

$$Tax\ revenue\ diversity = \frac{1 - \sum_{i=1}^{n} R_i^2}{1 - \left(\frac{100}{n}\right)},$$

---

16. Direct general expenditures include capital outlay, education, social services, transportation, public safety, environment and housing, governmental administration, and miscellaneous general expenditures.

17. Own source revenues consist of taxes, current charges, and miscellaneous revenues.

where R is the proportion of the own source revenue provided by a revenue source i and where n is the number of revenue categories selected for measuring diversification. A large value indicates that the city has a diversified and balanced tax base. Tax revenue diversity may produce fiscal illusion with respect to overall revenues collected. We expect the diversity index to be positively associated with own source revenues.

The second fiscal illusion variable is a HHI of expenditure diversity. We construct it using a formula similar to the one that defines tax revenue diversity.

$$Expenditure\ diversity = \frac{1 - \sum_{i=1}^{n} E_i^2}{1 - \left(\frac{100}{n}\right)},$$

where E is the proportion of the direct general expenditures consumed by an expenditure category i and where n is the number of expenditure categories selected for measuring diversification. Four largest municipal expenditure categories form the index: fire protection, highways, police protection, and sanitation. Index values range from 0 to 1, with higher values indicating increased diversification of expenditures. As argued above, we hypothesize that a more diverse expenditure pattern should correspond to a higher level of expenditures.

A potentially binding state property tax limit is an indicator variable assigned the value of 1 if a municipality has a potentially binding state-imposed property tax limit in FY 2002, according to the Hoene and Pagano's classification of limits and 0 otherwise.[18] We hypothesize that a binding limit will be negatively related to own source revenues.

Governance variables include the form of government, election of council members by district, home rule ability, and state aid. As argued above, we believe that the form of government should have an impact on budget decisions, with city-manager governments being less overtly political and thus spending less money. Council manager government is an indicator variable set to 1 if a city is headed by a city manager in FY 2001 and set to 0 if the city has the mayor-council form of government. Similar to Coate and Knight (2011), we assume that the 2001 government was responsible for setting and executing the FY 2002 budget. None of the cities in the dataset had changed their form of government since 1996.

Number of council members elected by district measures the number of municipal council members who were directly elected by city districts at the time of the ICMA survey in 2001. Following supply-side expansionary theories, we posit that a district-elected council member wishes to satisfy public service needs of the electorate, and is therefore positively

---

18. If a municipality has a nonbinding state-level property tax limit or no limit in place, it is assigned the value of 0. A limit is potentially binding if a property tax rate limit is coupled with a limit on assessments increase. We do not construct a similar variable for municipal expenditure constraints because we can find no reliable data.

related to expenditures. Home rule is an indicator variable equal to 1 if a city is from a home rule state and 0 otherwise. This variable is used to gauge impacts of home rule provisions that may be exploited by cities to structure revenues and expenditures.[19] As argued above, we hypothesize that state intergovernmental aid will represent a soft budget constraint for expenditure determination and should be positively related to expenditures. For revenues, we hypothesize that the local jurisdiction will attempt to substitute state revenues for locally raised revenues, which will be reflected in a negative association between the variables.

We use demographic variables from the 2000 decennial census, the Federal Bureau of Investigation (FBI), and data for 2001 from the U.S. Bureau of Labor Statistics (BLS).

To control for resident characteristics, we include in the model a percentage of population under 18, a percentage of population over 65, and a percentage of population with a bachelor's degree at the age of 25 or above. We also include mean income, unemployment rate, population density, ethnic fragmentation, and state political orientations as controls. Ethnic fragmentation is an index of municipal ethnic diversity. It is based on percentages of populations of different races from the decennial census and calculated using a formula developed by Alesina, Baqir, and Easterly (1999):

$$Ethnic\ Fragmentation = 1 - \sum_i (RACE_i)^2,$$

where *RACE* is a percentage of population self-identified as belonging to one of the following races: white, black, Asian and Pacific Islander, American Indian, other. Population classification categories used by the Census Bureau are arbitrary but, as Alesina et al. (1999) note, they reflect politically relevant population groupings. It is important to note that "other" is a race category that is highly correlated with the self-identification "Hispanic." We use a state-level indicator variable of the 2000 election results to control for relative political orientations of populations within a state.[20] We expect that cities from more conservative states should display lower revenues and expenditures on average than cities from more liberal states.

Demographic and political orientation variables were available only for 2000—the year of the decennial census and presidential elections. A merit in using lagged demographics is that it provides conservative estimates and potentially captures impacts of factors that take time to reflect in government finances.

---

19. The number of council members elected by district and the home rule variables come from a dataset created by Svara and Nelson (see Nelson and Svara 2010). The dataset is based on the ICMA Survey of Governments (2001) and complemented by the authors' analysis of city charters and official municipal websites. The dataset is available from Kimberly L. Nelson, Division of Public Administration, Northern Illinois University.

20. The variable is based on Leip's Atlas of U.S. Presidential Elections (2010).

TABLE 2
Summary Statistics

Variable	Mean	SD	Min	Max
Fiscal variables				
Direct general expenditures ($1,000s per capita)[a]	1.42	0.87	0.25	7.17
Own-source revenues ($1,000s per capita)[a]	1.35	0.87	0.21	8.90
Tax revenue diversity	0.92	0.04	0.61	1.00
Expenditure diversity	0.83	0.14	0.24	1.00
Potentially binding state property tax limit	0.76	0.43	0.00	1.00
Governance variables				
Council-manager government	0.62	0.49	0.00	1.00
Number of councilmen elected by district	4.35	5.90	0.00	50.00
Home rule	0.39	0.49	0.00	1.00
State transfers ($1,000s per capita)[a]	0.31	0.50	0.00	3.64
Demographic variables				
Crime rate (per 1,000 residents)[a]	54.93	23.19	13.19	124.34
Population over 65 (%)	11.97	3.69	4.20	30.10
Population under 18 (%)	25.17	12.11	4.50	74.40
Mean income ($1,000s per capita)[a]	20.86	6.56	9.34	63.02
Unemployment rate (%)	5.15	1.81	1.9	12.6
Population density (1,000 residents per square mile)[a]	4.35	3.49	0.54	26.40
Ethnic fragmentation	0.44	0.17	0.08	0.77
State voted Republican in 2000	0.29	0.46	0.00	1.00

[a]The variable was transformed into a natural logarithm at the estimation stage.

MODEL ESTIMATION

A potential source of bias in estimating the effect of revenues on expenditures and of expenditures on revenues is endogeneity, which may exist due to the variable interdependence (simultaneity) and/or their joint dependence on a hidden factor. We believe that models of local fiscal behavior must take into account these sources of bias, and in particular, the simultaneity of revenues and expenditures. We address this problem by estimating revenue and expenditure functions as a system of equations with IVs and fixed effects.

  Both two-stage least squares (2SLS) and 3SLS are viable IV estimation methods for dealing with endogeneity in simultaneous equations.[21] 2SLS estimates equations of the

---

  21. Simultaneous equations may be efficiently estimated with ordinary least squares (OLS) only when all explanatory variables are distributed independently of the disturbance term, that is, when there is no endogeneity. (When equations are estimated with OLS, neither the information on excluded instruments is used, nor a distinction is made between included exogenous and explanatory endogenous variables.) Otherwise, OLS estimates do not approach population parameters (are biased). Instrumental variable methods offer an improvement over OLS for estimating simultaneous equations with endogenous variables because they purge the system of the endogenous source(s) of variation.

system one at a time. 3SLS estimates the equations at the same time and corrects for the interrelations among the cross-equation error terms. Belsley (1988) suggests that in the case of high pairwise error correlations between the equations of the system, 3SLS be used. If the error correlation is low, 2SLS should be preferred. The pairwise error correlation between the models of our system is high (0.57), which makes 3SLS the theoretically preferred model. We focus the discussion on the interpretation of the 3SLS estimates with fixed effects. [22]

We examine the following local revenue and expenditure functions:[23]

$$LDirect\ general\ expenditures_i$$
$$= \alpha_0 + \alpha_1 LOwn\ source\ revenues_i + \boldsymbol{\alpha_2 Expenditure\ diversity_i}$$
$$+ \alpha_3 City\ manager_i + \boldsymbol{\alpha_4 Councilmen\ by\ district_i} + \alpha_5 Home\ rule_i$$
$$+ \alpha_6 LState\ aid_i + \alpha_7 \boldsymbol{LCrime_i} + \alpha_8 Under\ 18_i + \alpha_9 Over\ 65_i + \alpha_{10} Bachelor_i$$
$$+ \alpha_{11} LIncome_i + \alpha_{12} Unemployment_i + \alpha_{13} LPopulation\ density_i$$
$$+ \alpha_{14} Ethnic\ fragmentation_i + \alpha_{15} Voted\ Republican\ 2000_i + \alpha_{16-104}\phi + \varepsilon$$

$$LOwn\ source\ revenues_i$$
$$= \beta_0 + \beta_i LDirect\ general\ expenditures_i$$
$$+ \boldsymbol{\beta_2 Tax\ revenue\ diversity_i} + \boldsymbol{\beta_3 Property\ tax\ limit_i} + \beta_4 City\ manager_i$$
$$+ \beta_5 Home\ rule_i + \beta_6 LState\ aid_i + \beta_7 Under\ 18_i + \beta_8 Over\ 65_i + \beta_9 Bachelor_i$$
$$+ \beta_{10} LIncome_i + \beta_{11} Unemployment + \beta_{12} LPopulation\ density_i$$
$$+ \beta_{13} Ethnic\ fragmentation_i + \beta_{14} Voted\ Republican\ 2000_i + \beta_{15-103}\phi + \varepsilon$$

To identify the revenue equation, we use three exogenous predictors of expenditures that are causally unrelated to revenues: the number of municipal council members elected by district, the crime rate, and the index of expenditure diversity. We expect every additional district-elected council member to exert an upward pressure on local expenditures as part of their strategy to improve chances for re-election or as a result of their motivation to improve public good and service provision. We cannot identify direct causal links between council member election by district and municipal revenues. The second instrument is a city's 2001 crime rate measured as a number of crimes per 1,000 residents.[24] A higher crime rate should be associated with higher police force spending, which is an important part

---

22. It should be acknowledged that, as a full-information method, 3SLS is sensitive to specification errors in any part of the system because it uses the cross-correlation matrix of all models to produce estimates. If one of the models is misspecified, the bias of its estimates may enter the system and bias the estimates of other models. Given concerns about 3SLS robustness and acknowledging that our simultaneity hypothesis may spur interest in the comparison of the IV results, we present 2SLS and 3SLS estimates with and without fixed effects. We note that many parameter estimates are similar across the methods, which speaks in favor of relying on 3SLS results. First-stage estimates for 2SLS and 3SLS are available in the Appendix.

23. L indicates a natural logarithm transformation. Instruments that identify the equations are in bold. The first stage estimation predicts the endogenous variable on all exogenous variables including the instruments that identify the other equation.

24. The FBI crime statistics that we used include murder, rape, robbery, assault, burglary, larceny, and vehicle theft.

of local expenditures. We have not identified any direct causal link between crime rates and local revenues. A correlation but not causation between crime rates and revenues may exist because higher crime rates often characterize poor areas with a less advantageous tax base. However, controlling for the mean income per capita and the unemployment rate we separate the effect of crime on local expenditures from the effects of resident socioeconomic factors. The third expenditure instrument is the HHI of expenditure diversity. We posit that the index is not casually related to revenues: when a government crafts the revenue part of the budget, it does not base its decision on the number of expenditure categories or their relative weights in total expenditures. The three instruments act as exogenous predictors of expenditures that have no partial effect on revenues. Conventionally, a set of instruments is considered strong if a joint F-test statistic is larger than 10. A joint-significance F-test for the expenditure instruments in the OLS model without fixed effects supports their use as strong IVs ($F(3, 378) = 31.6$).

To identify the expenditure equation, we use two variables as sources of exogenous variation in revenues: the Hirschman-Herfindahl tax revenue diversity index and a potentially binding state-imposed property tax limit. The joint-significance F-test for the revenue instruments demonstrates that the variables are strong revenue predictors ($F(2, 378) = 28.71$). We see tax revenue diversity as an exogenous instrument for revenues because we do not identify causal links of the index with expenditures. When a government makes spending decisions, it considers overall projected revenues that will be available in the coming year and not the number of revenue categories or their relative weights.

Locally adopted property tax limits cannot serve as valid instruments for local revenues because they are likely to be conditioned on the same unobserved factors that affect both revenues and expenditures (ex. voter preferences, informal governance institutions, etc.). However, property tax limits that are adopted at the state level and apply to local revenues are viable instruments: they directly influence local revenues but do not target local expenditures and are exogenously imposed on localities by a higher level of government. Prior literature suggests that at the time of tax limit adoption, endogeneity may exist between state voter preferences for a tax limit and voter preferences toward state finances (Rueben 1997; Shadbegian 1999). However, endogeneity between state-imposed tax limits and local finance in our dataset is unlikely as the last property tax limit we consider was adopted in South Dakota in 1997, four years before the adoption of the FY 2002 budget. The majority of property tax limits had been in place for many years by FY 2002.

We acknowledge, however, that preferences of Arizona city dwellers may be systematically different from preferences of New York City residents. To control for potential state-level political ideologies, we use a state-level indicator variable that is equal to 1 if the state voted Republican in the 2000 presidential elections and 0 otherwise.

Since cross-sectional data do not allow for the use of city fixed effects, we use the next best proxy for differences among cities: county-fixed effects.[25] The dataset includes cities from 89 counties and allows us to separate potential endogenous variation in the data that occurs because of varying characteristics of different counties.

---

25. The number of parameters would exceed the number of observations.

FINDINGS

Tables 3 and 4 present estimation results of four models: 2SLS without and with fixed effects and 3SLS without and with fixed effects.[26] Many parameter estimates are similar across the models, which speaks in favor of relying on 3SLS results.[27]

TABLE 3
Effects of the Form of Government on Local Expenditures

Predicted: Direct general expenditures	2SLS	2SLS FE	3SLS	3SLS FE
Fiscal variables				
Own-source revenues ($1,000s/capita, logged)	0.083	0.225**	0.086	0.229**
	(0.12)	(0.11)	(0.12)	(0.09)
Expenditure diversity (index from 0 to 1)	4.412***	3.637***	4.421***	3.665***
	(0.58)	(0.57)	(0.57)	(0.49)
Governance variables				
Council-manager government (binary)	−0.116***	−0.086**	−0.117***	−0.087***
	(0.04)	(0.04)	(0.04)	(0.03)
Number of councilmen elected by district (continuous)	0.006**	0.005*	0.006**	0.005**
	(0.00)	(0.00)	(0.00)	(0.00)
Home rule state (binary)	−0.031	−0.003	−0.032	−0.004
	(0.03)	(0.03)	(0.03)	(0.03)
State transfers ($1,000s/capita, logged)	0.113***	0.107***	0.113***	0.107***
	(0.01)	(0.01)	(0.01)	(0.01)
Demographic variables				
Crime rate (per 1,000 residents, logged)	0.199***	0.209***	0.192***	0.199***
	(0.05)	(0.06)	(0.05)	(0.05)
Population under 18 (%)	−0.016**	−0.008	−0.016**	−0.008
	(0.01)	(0.01)	(0.01)	(0.01)
Population over 65 (%)	−0.004	−0.007	−0.004	−0.007
	(0.01)	(0.01)	(0.01)	(0.01)
Population with bachelor degree (%)	0.003	0.003	0.003	0.003
	(0.00)	(0.00)	(0.00)	(0.00)
Mean income ($1,000s/capita, logged)	0.323***	0.260**	0.319***	0.255**
	(0.12)	(0.13)	(0.12)	(0.11)

---

26. The Durbin-Wu-Hausman test confirmed endogeneity between revenues and expenditures. We predicted each endogenous explanatory variable on its unique instruments and all the other exogenous variables of the structural equation. Then, we included the residuals from these estimations in each of the structural equations to see whether the residuals (acting as predictors) would yield statistically significant coefficients. The coefficients were significant in both equations, which indicated endogeneity.

27. Usually, if the coefficients of 2SLS and 3SLS are very different, misspecification is likely to have occurred. In this case, 2SLS coefficients are more robust estimates because they do not transfer the bias of one equation into the other. If there is no misspecification, the coefficients of 2SLS and 3SLS are similar and 3SLS results are more efficient (precise).

TABLE 3 (Continued)

Predicted: Direct general expenditures	2SLS	2SLS FE	3SLS	3SLS FE
Unemployment rate (%)	0.020	0.010	0.020[*]	0.010
	(0.01)	(0.01)	(0.01)	(0.01)
Population density (1,000 residents/square mile)	0.041	0.112[***]	0.041	0.112[***]
	(0.04)	(0.04)	(0.04)	(0.03)
Ethnic fragmentation (index from 0 to 1)	0.098	0.060	0.101	0.067
	(0.13)	(0.14)	(0.13)	(0.12)
State voted Republican in 2000 (binary)	−0.046	−0.073	−0.044	−0.071[*]
	(0.05)	(0.05)	(0.05)	(0.04)
Constant	−5.406[***]	−5.358[***]	−5.378[***]	−5.323[***]
	(0.72)	(0.76)	(0.70)	(0.64)

Note: N = 378, standard errors are in parentheses.
*p < 0.10; **p < 0.05; ***p < 0.01.

TABLE 4
Effects of the Form of Government and State-Imposed Property Tax Limits on Local Revenues

Predicted: Own-source revenues	2SLS	2SLS FE	3SLS	3SLS FE
Fiscal variables				
Direct general expenditures ($1,000s/capita, logged)	0.841[***]	0.832[***]	0.833[***]	0.821[***]
	(0.08)	(0.09)	(0.08)	(0.08)
Tax revenue diversity (index from 0 to 1)	0.938[***]	0.922[***]	0.928[***]	0.900[***]
	(0.13)	(0.14)	(0.12)	(0.12)
Potentially binding state property tax limit (binary)	0.013	−0.054	−0.010	−0.096[**]
	(0.05)	(0.06)	(0.05)	(0.05)
Governance variables				
Council-manager government (binary)	0.050	0.044	0.051	0.048
	(0.04)	(0.04)	(0.04)	(0.04)
Home rule state (binary)	−0.045	−0.073[*]	−0.046	−0.079[**]
	(0.03)	(0.04)	(0.03)	(0.03)
State transfers ($1,000s/capita, logged)	−0.039[*]	−0.032	−0.037[*]	−0.030
	(0.02)	(0.02)	(0.02)	(0.02)
Demographic variables				
Population under 18 (%)	−0.020[***]	−0.023[***]	−0.020[***]	−0.024[***]
	(0.01)	(0.01)	(0.01)	(0.01)
Population over 65 (%)	−0.008	−0.002	−0.009	−0.003
	(0.01)	(0.01)	(0.01)	(0.01)
Population with bachelor degree (%)	−0.000	−0.006[*]	−0.000	−0.006[**]
	(0.00)	(0.00)	(0.00)	(0.00)
Mean income ($1,000s/capita, logged)	0.125	0.282[**]	0.127	0.290[**]
	(0.12)	(0.14)	(0.12)	(0.12)

TABLE 4 (Continued)

Predicted: Own-source revenues	2SLS	2SLS FE	3SLS	3SLS FE
Unemployment rate (%)	−0.002	0.009	−0.001	0.011
	(0.01)	(0.01)	(0.01)	(0.01)
Population density (1,000 residents/ square mile)	−0.168***	−0.193***	−0.167***	−0.195***
	(0.03)	(0.03)	(0.03)	(0.03)
Ethnic fragmentation (index from 0 to 1)	0.341***	0.339**	0.329***	0.327***
	(0.12)	(0.14)	(0.12)	(0.12)
State voted Republican in 2000 (binary)	−0.010	0.071	−0.021	0.056
	(0.05)	(0.06)	(0.05)	(0.05)
Constant	0.573	0.536	0.606	0.601
	(0.50)	(0.59)	(0.49)	(0.50)

Note: $N = 378$, standard errors are in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

The results demonstrate a statistically significant association between own-source revenues and direct general expenditures and vice versa. The coefficients have the theoretically expected signs and suggest that revenues and expenditures are determined simultaneously. The estimated direct expenditure elasticity on own-source revenues is 0.229. Apparently, if local governments increase their own source revenue, they will spend it, although the estimated elasticity is relatively small. The elasticity estimated by the 3SLS model with fixed effects is statistically significant and is 62.5 percent higher than the 3SLS estimate without fixed effects.

The elasticity estimate for the effects of expenditures on revenues is quite large and significant, although still less than 1. A 10 percent increase in per capita expenditures is on average associated with an 8.2 percent increase in local own-source revenues. The finding is consistent with the simultaneity hypothesis. Note that the 3SLS fixed effects estimate is slightly smaller than the estimates of the other models; asymptotically the estimates are equally efficient (standard errors are the same).

The form of government coefficient is significant and negatively associated with direct expenditures. City-manager governed jurisdictions have on average 8.3 percent lower direct general spending than cities with the mayor-council form of government.[28] In the 3SLS estimation without fixed effects, the form of government is still significant, has the theoretically expected sign, and a 2.7 percentage point larger effect ($\exp(−0.117) − 1 = −0.11$). Across all model specifications, the form of government is not statistically significant in the revenue equation.

Local governments facing a state-imposed property tax limit, have about 9.5 percent lower own-source revenues than governments without the limit ($\exp(−0.10) − 1 = −0.095$). The detected effect is slightly higher than Dye and McGuire's finding that a property tax

---

28. The estimated coefficient (−0.087) must be transformed before its effects can be determined, since the predictor is a binary variable and the response is in the logarithmic form: $\exp(−0.087) − 1 = −0.083$.

limit restrains property tax growth by an amount between four and eight percent (Dye and McGuire 1997). The number of council members elected by districts is positively related to direct expenditures and statistically significant at the 0.05 level. Each additional council member elected by district is associated with an average of 0.5 percent increase in municipal direct expenditures. We find that municipal crime rates are positively associated with local expenditures. A ten percent increase in crime is on average associated with a two percent increase in local direct general expenditures.

As anticipated, both the expenditure diversity and tax revenue diversity coefficients are positive and significant. Expenditure diversity has an approximately four times stronger effect on expenditures than tax revenue diversity on revenues. State intergovernmental aid is consistently positive and significant in the expenditure equations, which supports our soft-budget constraint hypothesis. The coefficients on state aid are negative across all revenue equations. Though the sign is theoretically correct, the coefficients are barely significant and small. It appears that state aid, even when it is statistically significant, does not act as a major incentive for local governments to reduce own-source revenues.

The percentage of population under 18 is negatively related to revenues and statistically significant, though the effect size is small. Negative association is expected since under-age population marginally participates in the labor market and local revenue production. The percentage of population under 18 is negatively associated with expenditures, not statistically significant in fixed effect models and barely significant in the models without fixed effects.[29] The percentage of seniors and the municipal unemployment rate in 2001 are not statistically significant for either revenues or expenditures, although the variable has a theoretically correct sign in all the revenue equations. Mean income per capita is positive and significant for both revenues and expenditures. A 10 percent increase in the mean income per capita is associated with a 2.9 percent increase of government revenues and a 2.55 percent increase in expenditures. Population density per square mile is positively associated with local expenditures so that a 10 percent increase in density increases local expenditures by 1.12 percent. At the same time, population density increase is negatively related to revenues with an average elasticity of −0.2. A possible explanation of this effect, which is consistent across all the revenue equations, might be that as families grow larger, the new family members do not participate in the local revenue production function on par with working-age adults. Another explanation might be that high population density produces less desirable environmental conditions for high-income earners, reflects in lower land values, and results in lower tax revenues.[30] Educational attainment is negatively associated with revenues while positively associated with expenditures in the 3SLS fixed effects model. Higher educated people might on average be more demanding concerning public services while also being less willing to see the government tax.

Ethnic fragmentation is not a statistically significant predictor of local expenditures, contrary to findings by Alesina et al. (1999). The variable coefficient is significant in the

---

29. Note that city financials for FY 2002 were reported net of school district revenues and expenditures.
30. Highly populated east-coast cities would be an obvious exception from this pattern.

revenue equation. Perhaps, the higher the ethnic fragmentation is in a city, the less politically united the groups are to exert a downward pressure on local revenues. In addition, minority populations may be less willing to participate in politics and less aware of their roles in restraining government growth or effective ways to do it. As expected, cities from states that voted for the Republican G.W. Bush in the 2000 presidential election spend on average less than cities from states that did not vote for the Republican candidate. The effect of political ideology is consistently negative across all the expenditure equations, while only significant in the 3SLS fixed effect specification. Interestingly, local political orientation is not a significant predictor of the size of government coffers.

Cities from states with the home rule provision do not display any differences in direct general expenditures when compared with cities from nonhome rule states. However, the fixed effect models demonstrate a negative relationship between the home rule status and local own-source revenues. It may be that the home rule ability, holding everything else constant, enables jurisdictions to control their revenue flows more tightly.

CONCLUSION

In this paper, we attempted to integrate three concepts in the econometric modeling of municipal public finance. First, we argued theoretically that an appropriate estimation technique for either direct general expenditures or own source revenues should recognize their simultaneity. Second, we posited that given this simultaneous relationship, state-imposed property tax limits affect the level of local own-source revenues. Third, we suggested that the form of governance should have an effect on local government revenue and expenditure policies.

Several important results come from our analysis. It appears that the revenue and expenditure simultaneity hypothesis holds. An important implication of this finding is that future municipal finance determinant literature must consider this simultaneity in modeling and estimating revenue and expenditure functions. Otherwise, estimates are likely to be biased. State-imposed property tax limits do seem to be effective in restraining municipal revenues though this effect is not consistent across model specifications. It also appears that city managers, as professionally trained administrators, tend to be a bit more frugal in budgeting for direct general expenditures. These results are partially consistent with prior empirical work. The difference may be the result of the structural equation approach.

This article identifies several areas in which additional work would greatly add to our understanding of local government finance. For example, total revenue and expenditure diversity effects should be further studied since these may be important determinants of local budgets. Further tests of the effects of the form of government are important, especially since the strong-mayor form seems to be popular with some public economics researchers (Baqir 2002; Inman 2008). In addition, the results of this study may serve as guidance for further research of the effects of institutional factors on local revenue and expenditure structures. For example, it would be interesting to study effects of the form of government

and tax limits in cities with smaller populations. A potential research direction would be to test the theory on panel data including records from the most recent decennial census.

Finally, some elements of this analysis may be applicable to other levels of government. It should be noted though that the substantive meaning of the same fiscal and governance variables may differ among levels of government. For example, balanced budget requirements for states are much less constraining than they are at the municipal level. Some local jurisdictions such as special districts may not enjoy the same governance visibility as cities. Smaller jurisdictions may have different fiscal structures. The simultaneity concept, however, is likely to provide a useful framework for analysis of all local governments' budgetary decisions.

REFERENCES

Alesina, Alberto, Reza Baqir, and William Easterly. 1999. "Public Goods and Ethnic Divisions." *Quarterly Journal of Economics*. 114 (4): 1243–1284.

Alt, James E. and Robert C. Lowry. 1994. "Divided Government, Fiscal Institutions, and Budget Deficits: Evidence from the States." *American Political Science Review*. 88 (4): 811–828.

Anderson, Nathan B. 2007. "Property Tax Limitations: How, What, Where, and Why." *State Tax Notes*. (January 15): 93–98.

Arizona Citizens Finance Review Commission. 2008. A Fiscal Tool Box. Accessed October 4, 2008. http://www.azcfrc.az.gov/documents/040221.pdf

Avellaneda, Claudia N. 2009. "Mayoral Quality and Local Public Finance." *Public Administration Review*. 69 (3): 469–486.

Bae, Suho and Thomas Gais. 2007. "The Effects of State-Level Tax and Expenditure Limitations on Revenues and Expenditures." *Rockefeller Institute Policy Brief* (May 21).

Baqir, Reza. 2002. "Districting and Government Overspending." *Journal of Political Economy*. 110 (6): 1318–1354.

Belsley, David A. 1988. "Two- or Three-Stage Least Squares?" *Computer Science in Economics and Management*. 1: 21–30.

Bergstrom, Theodore C. and Robert P. Goodman. 1973. "Private Demands for Public Goods." *American Economic Review*. 63 (3): 280–296.

Besley, Timothy and Anne Case. 2003. "Political Institutions and Policy Choices: Evidence from the United States." *Journal of Economic Literature*. 41 (1): 7–73.

Besley, Timothy and Michael Smart. 2007. "Fiscal Restraints and Voter Welfare." *Journal of Public Economics*. 91 (4): 755–773.

Booms, Bernard H. 1966. "City Governmental Form and Public Expenditure Levels." *National Tax Journal*. 10 (3): 187–199.

Borcherding, Thomas E. and Robert T. Deacon. 1972. "The Demand for the Services of Non-Federal Government." *American Economic Review*. 62 (4): 891–901.

Brennen, Geoffrey and James Buchanan. 1980. *The Power to Tax: Analytic Foundations of a Fiscal Constitution*. Cambridge, MA: MIT Press.

Brooks, Leah and Justin Phillips. 2009. "Municipally Imposed Tax and Expenditure Limits." *Lincoln Institute of Land Policy*. Accessed March 10, 2010. http://www.economics.utoronto.ca/bleah/papers/2009-04-23_final_landlines_article.pdf

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

Coate, Stephen and Brian Knight. 2011. "Government Form and Public Spending: Theory and Evidence from US Municipalities." *American Economic Journal: Economic Policy*. 3 (3): 82–112.

Duffy-Deno, Kevin T. and Douglas R. Dalenberg. 1990. "Do Institutions Matter: An Empirical Note." *National Tax Journal*. 43 (2): 207–215.

Dye, Richard and Therese McGuire. 1997. "The Effect of Property Tax Limitation Measures on Local Government Fiscal Behavior." *Journal of Public Economics*. 66 (4): 469–487.

Ebdon, Carol. 2000. "The Relationship between Citizen Involvement in the Budget Process and City Structure and Culture." *Public Productivity and Management Review*. 23 (3): 383–393.

Feiock, Richard C. and Jae-Hoon Kim. 2001. "Form of Government, Administrative Organization, and Local Economic Development Policy." *Journal of Public Administration Research and Theory*. 11 (1): 29–49.

Fischel, William. 2006. "Footloose at Fifty: An Introduction to the Tiebout Anniversary Essays." In *The Tiebout Model at Fifty*, edited by William A. Fischel, 1–20. Cambridge, MA: Lincoln Institute of Land Policy.

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

Hobbes, Thomas. 1651. *Leviathan or The Matter, Forme and Power of a Common Wealth Ecclesiasticall and Civil*. Alternative source: Hobbes, Thomas. 2007. Leviathan. E-books: University of Adelaide. Accessed March 2011. http://ebooks.adelaide.edu.au/h/hobbes/thomas/h68l/chapter17.html

Hoene, Christopher and Michael A. Pagano. 2008. *Cities & State Fiscal Structure*. Washington, DC: National League of Cities Research Report.

Hou, Yilin and Daniel L. Smith. 2010. "Informal Norms as a Bridge between Formal Rules and Outcomes of Government Financial Operations: Evidence from State Balanced Budget Requirements." *Journal of Public Administration Research and Theory.* 20 (3): 655–679.

Inman, Robert P. 2008. "Financing Cities." In *A Companion to Urban Economics*, edited by Richard J. Arnott and Daniel P. McMillen, 311–331. Malden, MA: Blackwell Publishing.

Jordan, Meagan M. and Gary A. Wagner. 2008. "Revenue Diversification in Arkansas Cities: The Budgetary and Tax Effort Impacts." *Public Budgeting and Finance.* 28 (3): 68–82.

Kioko, Sharon N. 2011. "Structure of State-level Tax and Expenditure Limits." *Public Budgeting and Finance.* 31 (2): 43–78.

Kornai, János E., Eric Maskin, and Gérard Roland. 2003. "Understanding the Soft Budget Constraint." *Journal of Economic Literature.* XLI (4): 1095–1136.

Krishnakumar, Jaya, Marc-Jean Martin, and Nils C. Soguel. 2010. "Explaining Fiscal Balances with a Simultaneous Equation Model of Revenue and Expenditure: A Case Study of Swiss Cantons Using Panel Data." *Public Budgeting and Finance.* 30 (2): 69–94.

Kwon, Myungjung, Frances S. Berry, and Richard C. Feiock. 2009. "Understanding the Adoption and Timing of Economic Development Strategies in US Cities using Innovation and Institutional Analysis." *Journal of Public Administration Research and Theory.* 19: 967–988.

Leip, David. 2010. "D.Leap's Atlas of U.S. Presidential Elections." Accessed February 20, 2010. http://www.uselectionatlas.org/RESULTS/data.php?year=2000&datatype=national&def=1&f=0&off=0&elect=0

Lineberry, Robert L. and Edmund P. Fowler. 1967. "Reformism and Public Policies in American Cities." *American Political Science Review.* 61: 701–716.

MacDonald, Lynn. 2008. "The Impact of Government Structure on Local Public Expenditures." *Public Choice.* 136: 457–473.

Mourão, Paulo Reis. 2008. "The Consequences of Fiscal Illusion on Economic Growth." *Journal of Tax Research*. 6 (2): 82–89.

Mullins, Daniel R. 2004. "Tax and Expenditure Limitations and the Fiscal Response of Local Government: Asymmetric Intra-Local Fiscal Effects." *Public Budgeting and Finance.* 24(4): 111–147.

Mullins, Daniel R. and Bruce A. Wallin. 2004. "Tax and Expenditure Limitations: Introduction and Overview." *Public Budgeting and Finance.* 24 (4): 2–15.

Nelson, Kimberly L. and James H. Svara. 2010. "Adaptation of Models versus Variations in Form: Classifying Structures of City Government." *Urban Affairs Review.* 45 (4): 544–562.

Niskanen, William A., Jr. 1971. *Bureaucracy and Representative Government*. Durham, NC: Duke University Press.

Oates, Wallace, D. Bradford, and R. Malt. 1969. "The Rising Cost of Local Public Services: Some Evidence and Reflections." *National Tax Journal.* 22: 185–202.

Oates, Wallace. 1988. "On the Nature and Measurement of Fiscal Illusion: A Survey." In *Taxation and Fiscal Federalism: Essays in Honour of Russell Mathews*, edited by G. Brennan, B.S. Grewal, P. Groenewegen 65–82. Sydney, Australia: Australian National University Press.

Olson, Mancur. 1982. *The Rise and Decline of Nations*. New Haven, CT: Yale University Press.

Orzechowski, William. 1977. "Economic Models of Bureaucracy: Survey, Extensions, and Evidence." In *Budgets and Bureaucrats: The Sources of Government Growth*, edited by Thomas E. Borcherding, 229–259. Durham, North Carolina: Duke University Press.

Poterba, James M. 1996. "Balanced-Budget Rules: Budget Institutions and Fiscal Policy in the United States." *American Economic Review.* 86 (2): 395–400.

Rodden, Jonathan. 2003. "Reviving Leviathan: Fiscal Federalism and the Growth of Government." *International Organization.* 57: 695–729.

Rueben, Kim. 1997. "Tax Limitations and Government Growth: The Effect of State Tax and Expenditure Limits on State and Local Governments." San Francisco, CA: Public Policy Institute of California.

Shadbegian, Ronald J. 1999. "The Effect of Tax and Expenditure Limitations on the Revenue Structure of Local Government, 1962–87." *National Tax Journal.* 52 (2): 221–238.

———. 1998. "Do Tax and Expenditure Limitations Affect Local Government Budgets? Evidence from Panel Data." *Public Finance Review.* 26 (2): 118–136.

Siebel, Jens Peter and Athanassios Pitsoulis. 2009. "Capturing Four Budget Deficit Theories in a Simple Geographical Model." Accessed March 3, 2010. http://ssrn.com/abstract=1511282

Springer, Job D., Aaron K. Lusby, John C. Leatherman and Allen M. Featherstone. 2009. "An Evaluation of Alternative Tax and Expenditure Limitation Policies on Kansas Local Governments." *Public Budgeting and Finance.* 29 (2): 48–70.

Stallmann, Judith I. 2007. "Impacts of Tax & Expenditure Limits on Local Governments: Lessons from Colorado and Missouri." *Journal of Regional Analysis and Policy.* 37 (1): 62–65.

Svara, James H. 1985. "Dichotomy and Duality: Reconceptualizing the Relationship between Policy and Administration in Council-Manager Cities." *Public Administration Review.* 45 (1): 221–232.

———. 1999. "The Shifting Boundary between Elected Officials and City Managers in Large Council-Manager Cities." *Public Administration Review.* 59 (1): 44–53.

Turnbull, Geoffrey K. and Chinkun Chang. 1998. "The Median Voter According to GARP." *Southern Economic Journal.* 64 (4): 1001–1010.

Wildasin, David E. 1997. "Externalities and Bailouts: Hard and Soft Budget Constraints in Intergovernmental Fiscal Relations." Policy Research Working Paper No. 1843, November 1997. Washington, DC: The World Bank, Development Research Group.

Young, Andrew T. 2009. "Tax-Spend or Fiscal Illusion?" *Cato Journal.* 29 (3): 469–484.

Zhang, Yahong and Richard C. Feiock. 2010. "City Mangers' Policy Leadership in Council-Manager Cities." *Journal of Public Administration Research and Theory.* 20 (2): 461–476.

TABLE A1
Effects of the Form of Government on Local Expenditures, OLS

Predicted: Direct general expenditures	OLS	OLS FE
Fiscal variables		
Own-source revenues ($1,000s/capita, logged)	0.449***	0.432***
	(0.03)	(0.04)
Expenditure diversity (index from 0 to 1)	3.088***	2.829***
	(0.34)	(0.39)
Governance variables		
Council-manager government (binary)	−0.118***	−0.092**
	(0.03)	(0.04)
Number of councilmen elected by district (continuous)	0.005*	0.004
	(0.00)	(0.00)
Home rule state (binary)	−0.002	0.017
	(0.03)	(0.03)
State transfers ($1,000s/capita, logged)	0.097***	0.096***
	(0.01)	(0.01)
Demographic variables		
Crime rate (per 1,000 residents, logged)	0.122***	0.154***
	(0.04)	(0.05)
Population under 18 (%)	−0.003	0.001
	(0.01)	(0.01)
Population over 65 (%)	0.001	−0.004
	(0.01)	(0.01)
Population with bachelor degree (%)	0.001	0.004
	(0.00)	(0.00)
Mean income ($1,000s/capita, logged)	0.190**	0.146
	(0.10)	(0.11)
Unemployment rate (%)	0.010	0.004
	(0.01)	(0.01)
Population density (1,000 residents/square mile)	0.110***	0.149***
	(0.03)	(0.03)
Ethnic fragmentation (index from 0 to 1)	−0.078	−0.052
	(0.10)	(0.12)
State voted Republican in 2000 (binary)	−0.022	−0.077*
	(0.04)	(0.05)
Constant	−4.363***	−4.579***
	(0.55)	(0.62)
R^2	0.77	0.85

Note: $N = 378$, standard errors are in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE A2

Effects of the Form of Government and State-Imposed Property Tax Limits on Local Revenues, OLS

Predicted: Own-source revenues	OLS	OLS FE
Fiscal variables		
Direct general expenditures ($1,000s/capita, logged)	0.792***	0.747***
	(0.04)	(0.05)
Tax revenue diversity (index from 0 to 1)	0.935***	0.950***
	(0.12)	(0.14)
Potentially binding state property tax limit (binary)	0.001	−0.076
	(0.05)	(0.06)
Governance variables		
Council-manager government (binary)	0.040	0.028
	(0.04)	(0.04)
Home rule state (binary)	−0.051	−0.084**
	(0.03)	(0.04)
State transfers ($1,000s/capita, logged)	−0.030*	−0.017
	(0.02)	(0.02)
Demographic variables		
Population under 18 (%)	−0.021***	−0.025***
	(0.01)	(0.01)
Population over 65 (%)	−0.009	−0.003
	(0.01)	(0.01)
Population with bachelor degree (%)	−0.000	−0.006*
	(0.00)	(0.00)
Mean income ($1,000s/capita, logged)	0.142	0.319**
	(0.11)	(0.13)
Unemployment rate (%)	0.001	0.014
	(0.01)	(0.01)
Population density (1,000 residents/square mile)	−0.168***	−0.188***
	(0.03)	(0.03)
Ethnic fragmentation (index from 0 to 1)	0.351***	0.368***
	(0.12)	(0.14)
State voted Republican in 2000 (binary)	−0.011	0.071
	(0.05)	(0.06)
Constant	0.584	0.449
	(0.50)	(0.58)
R^2	0.68	0.78

Note: $N = 378$, standard errors are in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

First-Stage Estimation for Direct General Expenditures

Predicted: Direct general expenditures	2SLS/3SLS	2SLS FE/3SLS FE
Expenditure diversity (index from 0 to 1)	4.483***	4.346***
	(0.40)	(0.44)
Council-manager government (binary)	−0.108***	−0.084**
	(0.04)	(0.04)
Number of councilmen elected by district (continuous)	0.005	0.005*
	(0.00)	(0.00)
Home rule state (binary)	−0.045	−0.039
	(0.04)	(0.04)
State transfers ($1,000s/capita, logged)	0.123***	0.127***
	(0.01)	(0.02)
Crime rate (per 1,000 residents, logged)	0.214***	0.254***
	(0.05)	(0.06)
Population under 18 (%)	−0.019**	−0.017**
	(0.01)	(0.01)
Population over 65 (%)	−0.007	−0.010
	(0.01)	(0.01)
Population with bachelor degree (%)	0.003	0.003
	(0.00)	(0.00)
Mean income ($1,000s/capita, logged)	0.357***	0.410***
	(0.12)	(0.13)
Unemployment rate (%)	0.025**	0.019
	(0.01)	(0.01)
Population density (1,000 residents/square mile)	0.030	0.077***
	(0.03)	(0.03)
Ethnic fragmentation (index from 0 to 1)	0.053	0.126
	(0.13)	(0.15)
State voted Republican in 2000 (binary)	−0.115**	−0.109*
	(0.05)	(0.06)
Revenue instruments excluded from second stage		
Tax revenue diversity (index from 0 to 1)	0.009	0.186
	(0.13)	(0.14)
Potentially binding state property tax limit (binary)	−0.147**	−0.132**
	(0.05)	(0.06)
Constant	−5.429***	−6.100***
	(0.68)	(0.74)

Note: $N = 378$, standard errors are in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.

TABLE A4
First-Stage Estimation for Own-Source Revenues

Predicted: Own-source revenues	2SLS/3SLS	2SLS FE/3SLS FE
Tax revenue diversity (index from 0 to 1)	0.972***	1.09***
	(0.16)	(0.174)
Potentially binding state property tax limit (binary)	−0.110*	−0.163**
	(0.06)	(0.7)
Council-manager government (binary)	−0.046	−0.028
	(0.05)	(0.05)
Home rule state (binary)	−0.089**	−0.111**
	(0.04)	(0.05)
State transfers ($1,000s/capita, logged)	0.066***	0.073***
	(0.02)	(0.02)
Population under 18 (%)	−0.038***	−0.038***
	(0.01)	(0.01)
Population over 65 (%)	−0.014*	−0.010
	(0.01)	(0.01)
Population with bachelor degree (%)	−0.002	−0.004
	(0.00)	(0.00)
Mean income ($1,000s/capita, logged)	0.410***	0.61**
	(0.145)	(0.16)
Unemployment rate (%)	−0.023	0.028
	(0.02)	(0.02)
Population density (1,000 residents/square mile)	−0.148***	−0.133***
	(0.04)	(0.04)
Ethnic fragmentation (index from 0 to 1)	0.416***	0.477***
	(0.16)	(0.18)
State voted Republican in 2000 (binary)	−0.098	0.011
	(0.07)	(0.07)
Expenditure instruments excluded from second stage		
Expenditure diversity (index from 0 to 1)	3.932***	3.762**
	(0.506)	(0.55)
Number of councilmen elected by district (numeric)	−0.003	0.003
	(0.004)	(0.04)
Crime rate (%)	−0.139**	0.177**
	(0.06)	(0.07)
Constant	−3.777***	−4.47***
	(0.858)	(0.918)

Note: $N = 378$, standard errors are in parentheses.
*$p < 0.10$; **$p < 0.05$; ***$p < 0.01$.