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Revenue  
Diversification  
in Large U.S. Cities

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*By*

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# Revenue Diversification in Large U.S. Cities<sup>1</sup>

Howard Chernick, Adam Langley  
and Andrew Reschovsky

## **Abstract**

The housing crisis and the Great Recession have placed tremendous fiscal pressure on the United States' central cities. Cuts in state government fiscal assistance to local governments, combined with shrinking property tax bases, make it hard for local governments to maintain current levels of public services. Although the property tax remains the single most important own source of municipal government revenues, the decline in property values and the rising tide of foreclosures suggests that relying on more diversified local tax bases may strengthen the ability of cities to provide a range of public services for their residents. In this paper, we use a panel of data on the financing of the nation's largest central cities from 1997 to 2008 to explore the role of revenue diversification in determining the level of general revenues of the United States' largest central cities. Because expenditure responsibilities vary among city governments and because different levels and types of government play different roles, we develop the concept of *constructed governments* in order to allow us to compare the revenue-raising policies of large central cities across time and space. Our empirical results provide strong support for the hypothesis that a more diversified revenue structure generates more revenues than one that relies primarily on the property tax.

Key words: property tax, local government revenues, tax base, revenue diversification, constructed governments

JEL Classification: H71, R51

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1. Based on a longer working paper titled "Revenue Diversification and the Financing of Large American Central Cities," prepared for the 32nd Annual Research Conference for Public Policy Analysis and Management, Boston, Massachusetts, November 4–6, 2010, and published on the Lincoln Institute of Land Policy website at <https://www.lincolninst.edu/pubs/>

## Revenue Diversification in Large U.S. Cities

### I. Introduction

This paper focuses on revenue diversification in the United States' largest central cities, and its effect on the adequacy and stability of city finance. This question takes on heightened importance in the context of the fiscal pressure cities are facing in the Great Recession.<sup>2</sup> The recession, the depressed housing market, and the fiscal crises facing many states all raise concerns about the continued ability of large U.S. city governments to function effectively. In a recent survey of city government chief financial officers conducted by the National League of Cities, nearly 90 percent of respondents reported that their cities are "less able to meet fiscal needs in 2010 than in the previous year" and 80 percent predicted that they would be even less able to meet their cities' needs in 2011 than in 2010 (Hoene and Pagano 2010).

The ability of city governments to provide adequate services ultimately depends on revenue availability. Like all local governments, city government revenue comes from taxes, from other locally raised sources, such as fees, and from intergovernmental sources. In the United States, the property tax remains the single most important source of city government tax revenues. The Great Recession and the housing crisis have influenced the fiscal position of cities primarily through their impact on revenues. After a lag of several years, the decline in property values and the rising tide of foreclosures have begun to take their toll on city property tax revenues (Chernick, Langley, and Reschovsky 2011).

Although the property tax remains the single most important own source of municipal government revenues, there is a longstanding trend among municipal governments to move away from the property tax towards alternative revenue sources. In 1992, the property tax accounted for 58.5 percent of the tax revenue and 36.8 percent of own-source general revenue of all municipal governments.<sup>3</sup> By 2007, these property tax shares had fallen to 53.3 percent and 33.6 percent, respectively (U.S. Census Bureau 2009).

2. The media have been full of reports of cuts in public services in many of the nation's largest cities. Mayor Michael Bloomberg of New York City stated that in response to a proposed cut of more than \$2 billion in state education aid, he may have to lay off as many as 4,700 school teachers (Hernandez 2011). In Houston, the mayor has told her police and fire departments to plan for 5 percent budget cuts for fiscal year 2012, while budgets for all other municipal services, including parks, libraries, city planning and administration, may face reductions of 27 percent (Moran and Glenn 2011). Newark, New Jersey, which has been hard hit by a decline in state aid and a reduction in its property tax base, is facing the prospect of laying off between 800 and 1,500 municipal employees or increasing property tax levies by at least 15 percent (Newark Budget Task Force 2010).

3. These percentage calculations are based on revenues from all governments classified as municipalities and townships by the Census Bureau.

The impact of local government revenue diversification away from the property tax has attracted relatively limited interest among economists. During the 1970s, several papers focused on local government revenue diversification by analyzing the benefits and shortcomings of the property tax relative to the merits of alternative sources of revenue. Gabler (1975) made the case for increasing the use of local sales and income taxes in the financing of local governments. Reischauer (1975) defended the reliance on the property tax as the mainstay of local government finance by arguing that although the property tax is hardly an ideal tax, it is preferable to alternative sources of local tax revenue. Based on a study of four metropolitan areas, Bowman and Mikesell (1978) found that while the utilization of non-property taxes increased fiscal disparities within the four metropolitan areas, it tended to benefit the central cities relative to their suburbs.

Several more recent papers have also addressed local government revenue diversification. Sjoquist, Walker, and Wallace (2005) investigated whether local governments that diversify their revenue base away from full reliance on the property tax end up with lower levels of property taxation or higher levels of spending. They found evidence for both effects. Property taxes were lower, but overall spending was higher. Carroll (2009) studied whether increased local government revenue diversification led to greater instability in city government revenues over time. She found some evidence that both tax diversification and non-tax diversification reduce revenue volatility.

Simply determining what share of the own-raised revenues of central cities comes from sources other than the property tax is by no means straightforward. The measurement problems arise because governmental structures within American metropolitan areas are both complex and varied. In a few metropolitan areas, municipal governments finance and provide a full array of public services, including elementary and secondary education. In most metropolitan areas, however, residents of central cities are served by an array of overlapping independent governments, generally with boundaries that do not correspond to the geographic boundaries of the central city.

After describing the varied sources of government revenue in the nation's largest central cities, we will use a panel of data covering the years from 1997 through 2008 to explain differences in city general revenues per capita across time and space and to explore the role of revenue diversification in determining the level of general revenues.

## **2. Fiscal Relationships between State and Local Governments**

State governments play a crucial role in the financing of cities. Most state legislatures retain control over the sources of revenue, especially the taxing authority, available to their local governments. Even when local governments are authorized to use a tax, the state government retains control over the definition of the tax base and the rates that can be used.

In addition to granting revenue authority and expenditure responsibilities to local governments, states influence city government finances through the amount



of intergovernmental assistance they provide. A state that assigns more expenditure responsibilities to its local government reduces its own direct expenditure obligations, and may substitute higher levels of state intergovernmental grants to its local governments. Alternatively, a state that grants its local governments authority to use a broader range of revenue sources may provide its local governments with less financial assistance in the form of direct grants. Yinger and Ladd (1989), in their study of 70 major American central cities, found a systematic trade-off between grants and institutional assistance.

The next section describes the data sample and the method used to analyze the role of counties and non-overlapping school districts in city finance. The descriptive section is followed by a multivariate analysis of the role of revenue diversification in explaining city revenues. The last section summarizes results and discusses policy implications.

### **3. The Financing of Large Central Cities**

The source of the data used in this study is the Census of Governments for 1997, 2002, and 2007, and the Annual Surveys of State and Local Government Finances for all non-census years between 1997 and 2008. The sample of 109 cities is all cities with populations over 200,000 in 2007—except cities with 1980 populations below 100,000—plus all cities with populations in 1980 over 150,000, even if their 2007 populations were below 200,000.<sup>4</sup> The increase in the population cut-off from 150,000 to 200,000 reflects almost perfectly the rate of growth of the U.S. population between 1980 and 2007.

Comparative fiscal analysis of large American cities has not been very illuminating, in part because of the large variation across cities in expenditure responsibilities. For a handful of large American cities, including Boston, New York City, Baltimore, and Nashville, there are no independent school districts or county governments serving local residents, and thus the municipal government is responsible for core municipal services as well as elementary and secondary education and public health and welfare services usually provided by a county government. In other cities—for example, El Paso, Las Vegas, Miami, and Wichita—only about one-quarter of public spending on local government public services is the responsibility of the municipal government. Other services that provide direct benefits to city residents are funded by independent governments, either school districts or counties, which often serve geographical areas that stretch beyond municipal boundaries. These independent governments have their own legislative bodies and the ability to levy taxes on city residents.

4. Our sample has 74 cities with 1980 populations above 150,000 and 2007 populations above 200,000; 24 cities with 1980 populations above 150,000 and 2007 populations below 200,000; and 11 cities with 1980 populations between 100,000 and 150,000 and 2007 populations above 200,000. Because of data problems, we excluded six cities that otherwise met our selection criteria.

Given the large variation in expenditure responsibilities among the nation's largest cities, comparisons of per-capita spending levels across cities are meaningless. Likewise, comparisons across cities of revenue from various sources make no sense unless account is taken of the range of public services for which each municipal government is responsible. For example, municipal government data indicate that in 2008, Tucson, Arizona, which relies heavily on a local sales tax, collected just 13 percent of its total tax revenue from the property tax. However, when we take account of the revenues paid by city residents to the school district and county government, property taxes account for 64 percent of the total local tax revenue paid by the residents of Tucson. Conversely, in Buffalo, New York, 88 percent of city government tax revenues come from the property tax, but because county governments in New York rely heavily on sales taxes, only about half of the total tax revenue paid by Buffalo residents to the local governments that provide them with public services comes from the property tax.

As a means of dealing with heterogeneity in municipal government expenditure assignments and the variation in the organizational structure of local governments across the country, we have used a concept we call *constructed* city governments. This is a measure of the total taxes and other revenues paid by the taxpayers of each large city in our sample that includes all revenues collected by the municipal government and by the overlapping portion of independent school districts and county governments. This is not a new idea. In a report titled *Composite Finances in Selected City Areas*, the U.S. Census Bureau (1974) compared fiscal and debt burdens for the central city and a single suburban municipality in five large metropolitan areas by compiling fiscal data from all overlapping local governments that served the residents of each of the sample municipalities. We have used a similar method, although somewhat simplified, and applied it to the large U.S. cities in our sample.

For a few cities, such as Boston, which has a dependent school district and no county government, it was not necessary to adjust the municipal government revenue and expenditure data from the Census of Governments' individual unit files. For cities with independent school districts that correspond to city boundaries, we combined the school district and municipal values of all revenues and expenditure variables. For school districts that cover a geographical area larger than the city, and for cities served by multiple school districts, we use data on the spatial distribution of enrolment to allocate a portion of total school revenues and spending to the constructed city. For each school district serving a portion of the central city, we employed geographical information system (GIS) analysis of Census-block group-level data from the 2000 decennial census to determine the number of students in each school district that live in the central city.

The final step in determining revenues and expenditures in constructed cities is to add data representing county governments that serve city residents. In cases where county governments cover an area larger than the central city, expenditures

and revenues are allocated to the constructed city on the basis of the city's share of county population.<sup>5</sup>

We have not included revenue and expenditure data from special districts in our definition of constructed cities, because information on the geographic boundaries of special district is not readily available, and fiscal data for many special districts are not available on an annual basis. For the country as a whole, special districts account for less than 10 percent of local government general revenues, although they are much more important in a few states. In the regression analysis that follows, we include a state-level variable that accounts for the share of local government revenue that comes from special districts. Thus, failing to include special districts should do relatively little to distort fiscal comparison among central cities.

Some previous empirical studies focusing on the financing of municipal governments have failed to take full account of the impact of overlapping jurisdictions in their analysis. For example, Carroll (2009) uses census data to study revenue diversification among all municipal governments with populations above 25,000, but makes no adjustment for variations in expenditure responsibilities, despite the fact that her measure of revenue diversification, a Herfindahl index, is quite sensitive to the inclusion of revenue from overlapping, independent governments.<sup>6</sup> Inman (1979) and Sjoquist, Walker, and Wallace (2005) used dummy variables to partially adjust for overlapping jurisdictions. In their well-known study of the fiscal condition of large central cities, Ladd and Yinger (1989) focused explicitly on municipal governments. In developing their revenue-capacity measures, they adjust for the capacity "used up" by county governments and independent school districts that overlap city governments.

### *3.1 Central City Finances in 2007*

On average, local governments raise 60 percent of their general revenues from their own sources and rely on other governments for the remaining 40 percent. The 109 constructed governments receive only a slightly smaller share of their general revenues from intergovernmental sources than local governments serving smaller cities. However, the constructed governments receive a much larger share of intergovernmental aid in the form of federal aid and a smaller share from state governments than smaller governments. Of the own-source revenue of local governments, about two-thirds comes from taxes, with user fees and charges and miscellaneous revenues making up the rest.

The property tax accounts for 56 percent of tax revenue in our sample of large constructed cities compared to 77 percent of tax revenue for local governments

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5. Contact the authors for a more detailed description of the method used to create our constructed city data set.

6. When we calculated Herfindahl indices for the cities in our sample, first using revenue data for the municipal governments only and then using revenue data for our constructed cities, we found the relative degree of revenue diversification changes dramatically for many cities.

serving smaller cities. In lieu of revenue from the property tax, the large constructed governments rely more heavily on the general sales tax, individual income tax, selective sales taxes, and corporate income tax compared with local governments serving smaller municipalities.

The data indicate that the vast majority of large central cities do not rely on revenue from either individual or corporate income taxes. In contrast, all but three cities—Birmingham, Alabama; Warren, Michigan; and Milwaukee, Wisconsin—raise tax revenue from selective sales taxes, although in the majority of cities, excise taxes account for less than 10 percent of total tax revenue. All but 18 of the 109 constructed cities raise revenue from the general sales tax; however, in only 12 cities do sales tax revenues generate more than one-thirds of total tax revenue.

### *3.2 Changes in Constructed City Revenues between 1997 and 2008*

The beginning of the 11-year period between 1997 and 2008 was one of robust economic growth, with real GDP growth in excess of 4 percent per year through 2000. The economy suffered a mild recession in 2001 from which it began to emerge in 2002. After a sharp decline in 2001, the real GDP growth rate accelerated through 2004, although it remained below 4 percent. Thereafter, growth slowed until the economy slipped into recession in late 2007. As the recession intensified, there was zero economic growth in 2008. Despite the mildness of the 2001 recession, the fiscal condition of most state governments weakened dramatically during 2002, 2003, and 2004, with many states facing large budget gaps (Johnson, Schiess, and Llobrera 2003). One way in which states dealt with their budget deficits during this period was to cut state aid to local government (Dye and Reschovsky 2008). Meanwhile, during most of this period until 2006, housing prices and municipal government property tax bases were growing rapidly.

Total general revenue in our constructed cities grew at an average annual rate of 5.3 percent, with own-source revenues growing faster than intergovernmental revenues, 5.5 percent compared with 4.9 percent. On average, tax revenue growth exceeded growth from user fees and charges and miscellaneous sources. Among intergovernmental sources, state aid grew faster than grants from the federal government. The large range of growth rates demonstrate the considerable variation among constructed cities in revenue growth over the period.

Real general revenue grew in every year from 1997 through 2007, although growth was markedly reduced for several years after the 2001 recession. Reflecting the early impact of the most recent recession, real revenues were flat between 2007 and 2008. The decline in state aid to municipal governments and school districts is illustrated by the very small growth of intergovernmental revenues in 2003, followed by a decline in real revenues in 2004 (Reschovsky 2004). The cuts in grants in 2004 were offset by a big increase in local taxes. In other years, a slowdown in the growth rate of tax revenues was matched by an increase in the growth rate of intergovernmental aid.

Although we are unable to distinguish between the impact of economic conditions and tax rate changes on total tax revenues, it appears likely that in

2004, cities increased local taxes and other forms of own-raised revenues in order to compensate for sharp cuts in intergovernmental grants. The clear lesson from the data is that the property tax plays an important role in creating tax revenue stability and in muting to some degree the strong cyclical impacts of individual and corporate income taxes and sales and excise taxes.

As a measure of the degree of reliance that constructed cities place on the property tax, we define a *diversity index* as 1.0 minus the share of own-source revenues coming from the property tax. Thus, higher values of the index indicate a more diverse revenue structure. In Figure 1, we illustrate changes in the (population-weighted) average diversity index over the 1997 to 2008 period. Interestingly, after peaking in 2001, average revenue diversity declined for several years following the 2001 recession, reflecting the decline in revenue from non-property tax revenue sources and the relative stability of the property tax. Although the scale in Figure 1 makes the tax changes appear to be rather large, our diversity index, which provides a summary measure of the reliance on own-source revenue sources other than the property tax, was relatively stable over the 1997–2008 period. The average value of the index was 0.596 in 1997 and declined to 0.573 in 2008.

The dotted line in Figure 1 shows the weighted average value of the ratio of own-source revenue to total general revenue. The ratio fell until 2002 and rose after 2003. The decline in the importance of own-source revenues in the earlier period reflects the slower rate of growth of own-source revenues relative to intergovernmental revenues. The growth in the importance of own-source revenues after 2003 reflects both the faster growth of tax revenue and the markedly slower growth in intergovernmental grants and transfers to constructed city governments that started in 2003 and continued through 2008.

#### **4. Revenue Diversification and the Financing of Central Cities**

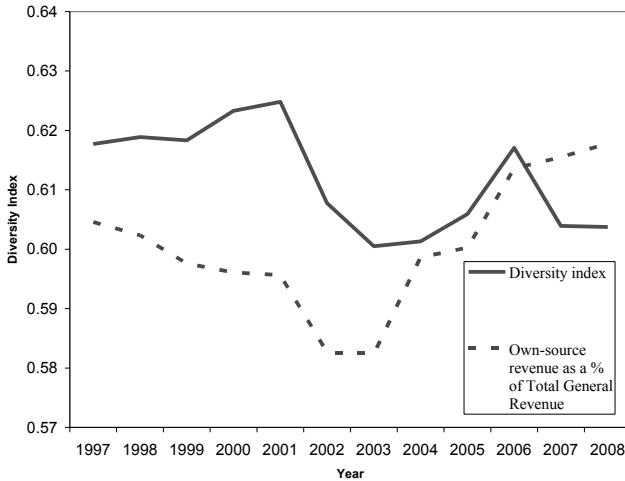
In this section of the paper, we explore the question of whether central cities that draw on a more diversified mix of revenue sources have higher levels of per-capita revenue. Although it is possible that every dollar raised from non-property tax sources could be used to reduce property tax revenues, for several reasons discussed below, we expect per-capita general revenues to be higher in central cities that rely on a more highly diversified set of revenue sources.

To raise any given level of revenue, relying on multiple sources implies that a city can set lower rates of taxation (or fees) for any single revenue base. There are a number of reasons to expect that a more diversified revenue system will allow a city to raise more revenue.

First, because the excess burden of taxation rises with the square of the tax rate increase, a more diversified tax system should yield any given amount of revenue more efficiently, i.e., with a smaller negative effect on the overall tax base in the city.

Second, greater revenue diversity is likely to be associated with more complexity in the tax system, and complexity may be associated with greater spending if it is more difficult for voters to determine total tax burdens, thereby muting resistance to taxation (Carroll 2009).

Figure 1  
Revenue Diversity in Constructed Cities 1997-2008



Third, greater revenue diversity may be associated with higher expenditure needs, due to factors such as higher costs of living, or higher poverty or crime rates. If greater need requires a revenue system that can yield more revenue, then such cities are likely to try to diversify their revenue sources more than cities with average or below-average needs.

Because of the long-standing unpopularity of the property tax, both state and local governments have pursued policies designed to reduce property tax payments by various groups of taxpayers defined by income level, demographic characteristics (e.g., the elderly), type of business, or even geographic areas within cities. In many states, circuit breakers or other forms of property tax abatements, deductions, or credits provide targeted property tax relief to the elderly and to low-income households (Bowman et al. 2009).

Within cities, geographically targeted property tax relief may reflect deliberate economic development policies, for example, tax abatements for new construction in “enterprise” or other targeted areas of the city. Alternatively, spatially differentiated property tax burdens may arise from property tax assessment procedures that implicitly or explicitly favour particular groups or neighbourhoods (Edelstein 1981; Engle 1975). In New York City, for example, owners of single-family homes receive property tax breaks not available to residents of multi-family dwellings (New York City Independent Budget Office 2006).

A consequence of tax relief policies is that local governments that use them raise less revenue from the property tax at any given tax rate. The revenue yield of the property tax is further diminished because property owned by non-profit organizations and governments is exempt from property taxation, and central cities

generally have large concentrations of tax-exempt properties (Kenyon and Langley 2010). One mechanism for city governments to address erosion in the property tax base is to add sales and/or income taxes and user fees or licences to their portfolio of revenue instruments.

#### 4.1 Regression Model and Variables

In order to explain the relationship between revenue diversity and the revenues of central cities, we carried out a regression analysis for our sample of constructed cities for each year of the 1997 to 2008 period. In cities with coterminous dependent school districts and no overlapping county (e.g., New York City and Boston), revenue levels reflect the fiscal choices of a single political unit, albeit constrained by state rules. In cities with independent school districts, or in which counties play a role in providing services to city residents, decisions about revenues and tax levels reflect the fiscal choices of multiple units of government, each drawing on the same tax base within city boundaries.

The general form of the regression model we estimate is displayed in the equation shown below.<sup>7</sup> The dependent variable (REV) is defined as per-capita general revenues for each constructed city. The independent variables are defined below. All dollar variables are in nominal prices, with year dummies used to account for inflation in government revenues over the 12-year period.

$$\text{REV} = a_0 + a_1(\text{REV DIVER}) + a_2(\text{STATE AID}) + a_3(\text{HHINC}) + a_4(\text{SHR EMPLOY}) + a_5(\text{POVERTY}) + a_6(\text{REV SHR}) + a_7(\text{INC DISTR}) + a_8(\text{PCT DEM}) + a_9(\text{ST FISC CHAR}) + a_{10}(\text{REGION}) + \text{error term}$$

**REV DIVER:** We define revenue diversification as the percentage share of own-source revenue which comes from sources other than the property tax. A value of zero for REV DIVER would imply that a city's sole source of own-source revenue was the property tax. Conversely, a city that raised no revenue from the property tax would have a REV DIVER value of 100 percent. Revenue diversification can arise because of tax diversification or because of a heavy reliance on non-tax revenue sources such as user fees, licences, and miscellaneous revenues.

**STATE AID:** State aid (measured in per-capita terms) includes both aid to education and aid in support of municipal and county functions. Since a large empirical literature has found evidence of positive grant elasticities, we expect STATE AID to have a positive effect on per-capita general revenues.

**HHINC:** This variable measures average household income and provides a measure of city fiscal capacity. It is expected to have a positive effect on per capita revenues.

7. Year and city subscripts are suppressed. The appendix describes the sources of all the data used in the regression.

SHR EMPLOY: This variable is calculated as employment divided by population. It provides another measure of city fiscal capacity and is also expected to have a positive effect on per-capita revenues.

POVERTY: This variable is the official poverty rate for individuals. Higher poverty rates are expected to result in higher costs of providing public services, and thus we expect a positive sign on the POVERTY variable (Ladd and Yinger 1989; Pack 1998).

REV SHR: This variable provides a measure of the extent to which the revenues used to provide services to city residents are raised by counties and non-overlapping school districts (e.g., districts serving parts of the central city and parts of adjacent municipalities). It is defined as the share of total constructed city general revenues provided by the overlapping county or school district(s). The values of REV SHR range from zero in 22 cities that do not have any revenues from overlapping governments, to 83 percent in Hialeah, Florida.

The revenue-sharing variable is a measure of jurisdictional assignment, rather than an indication of the ability of a city to obtain fiscal resources from non-residents. If there is no fiscal illusion, and the effective tax price is accurately perceived by all residents, regardless of the jurisdiction providing the service, then REV SHR would have a positive effect on revenues only if it lowered the tax price for city residents. This would be the case if the overlapping jurisdiction(s) had a greater per-resident fiscal capacity than the city.

If fiscal illusion is important, then dividing fiscal responsibility among multiple governmental units may lead taxpayers to underestimate the real tax price of a given bundle of services. This bias could lead to higher revenues, even in the absence of implicit fiscal transfers from counties or school districts.

Measures of the spatial flow of taxes and benefits across jurisdictional lines for even a single city are extremely difficult to measure. While city residents may benefit more from county hospitals, for example, than non-city residents, such flows cannot be incorporated in any systematic manner into the revenue-sharing data. Therefore, as discussed in Section 3, revenues from overlapping jurisdictions were allocated to city residents on a simple per-capita basis. Thus if a city comprises one-third of the population of its county, it is assigned one-third of the revenues of the county.

INC DISTR: the ratio of the mean to the median household income. Under the median voter model, the higher this ratio, the lower the tax price facing the median voter, and the higher the level of public services demanded. Corcoran and Evans (2010) find some evidence supporting this proposition for school districts, as do Boustan et al. (2010) for all local governments.

PCT DEM: This variable measures the percentage point difference between each county's vote for the Democratic presidential candidate minus the national average



in 1996, 2000, 2004, and 2008. It is included as a measure of preference for public expenditures.

ST FISCAL CHAR: Constructed city revenues may also be affected by statewide fiscal characteristics. We include three variables. The first is LOCAL SHR, which is calculated as total local government general revenues in the state as a percentage of state plus local general revenues. The greater the extent to which a state relies on local versus state finance, the higher the expected local revenues for all jurisdictions in the state. The second is PTAX LIM, a dummy variable for the presence of a statewide property tax limit, which may act as a constraint on property tax revenues (Anderson 2006). The third is SPEC DISTR REV SHR, which is used to take account of differences across states in the importance of special districts, whose revenues are not included in our analysis. It is defined as the statewide total of revenues from special districts as a share of local government general revenue. While special districts are growing in overall importance in local government finance, they remain heavily concentrated in only a few states (Mullin 2009). Hence, the statewide measure used should be an adequate control. It is expected that in states that rely more heavily on special districts, constructed cities will have lower general revenues.

REGION: The United States is divided into four major regions—Northeast, South, Midwest, and West. We have included dummy variables for the latter three regions.

#### *4.2 Estimation*

The model is estimated using ordinary least squares, with a pooled cross-section of 109 constructed cities over 12 years, from 1997 to 2008. For all years not ending in “2” or “7,” the Census Bureau surveys only a sample of local governments; fortunately, almost all cities, counties, and school districts in our sample are included each year in the census surveys. However, for eight constructed cities, data are missing for at least one year, for a total of eleven missing observations. Thus, our regression sample has 1,297 observations.

While the models include year and region indicators, they do not include city fixed effects, i.e., dummy variables representing each city. The models are able to explain a very high proportion of the variance in city revenues, implying that unobserved factors associated with individual cities are relatively unimportant.

#### *4.3 Results*

Table 1 shows the results for the estimation of the equation. We report five different specifications, all of which include revenue diversification, state aid, revenue sharing, the statewide local government share, and regional dummies. Each of the first four specifications adds additional variables. We focus on the fourth specification because it includes the fullest set of explanatory variables. For comparison, in column (5) we present a specification that includes city fixed effects.

Revenue diversification has a positive and significant effect in all regressions, with a coefficient centred on 24 in the first four specifications. At the mean, this coefficient implies that an increase of one standard deviation in revenue diversification (13 percentage points) is associated with a 7.2 percent increase in general revenue (\$312). From the 25<sup>th</sup> percentile of revenue diversification to the 75<sup>th</sup> percentile (51 percent to 69 percent), the difference in revenue is about 10 percent. Under the fixed-effect specification, the effect remains significant, but the magnitude is much smaller. This decrease reflects the fact that the within-city variation in revenue diversification over time is small, and therefore likely to be highly correlated with city fixed effects.

Our results support the proposition that a more diversified revenue system allows city areas to raise more revenue. However, while revenue diversification does matter, the magnitude of the estimated effect indicates that a relatively large change in revenue structure would be required to have an economically significant impact on the level of revenue. Over time, as noted above, revenue diversity remained very similar for each particular city.

The coefficient on state aid is close to one, implying that for large cities, a dollar of state aid leads to almost an additional dollar of revenue. This result holds for a wide variety of specifications. The result implies that an additional dollar of greater state aid is additive to local spending, and does not significantly reduce own-source local revenues.

In our sample, about 62 percent of state aid goes to education. Our estimate of the revenue effect of grants is higher than most estimates of the stimulative effect of education aid. Fisher and Papke (2000) report on a number of older studies, which found that the increase in spending per additional dollar of education aid is substantially less than a dollar (for example, 30 to 70 cents in one study). More recent studies have found that in states subject to court-ordered education finance reform, a higher proportion of the increase in education aid to low-wealth school districts goes for increased spending. However, none of the studies find stimulative coefficients as high as the estimates in the present study.

Spending estimates well below 1.0 imply that a substantial proportion of the marginal dollar of education aid goes either for tax reduction or leaks into other parts of the budget. The emphasis in the school finance literature has been on the tax reduction effects. Because ours is the first national study to create a comprehensive measure of revenue raised by all overlapping jurisdictions, we are better able to capture potential leakages than previous studies. Our larger stimulative estimate suggests that, while education aid may stimulate education spending at a rate less than dollar for dollar, at least in big cities the local school district resources that are released by state aid are used mainly to support increased spending in other functions and/or other governmental units, rather than for tax cuts. This is an important finding.

Other variables may be noted briefly. An increase of one standard deviation in EMPLOY SHR (the employment to population ratio) would represent about a five-percentage-point increase in the employment share, and would increase revenue by

*Table 1. Impact of Revenue Diversification on Financing of Central Cities*  
*Dependent Variable: Real General Revenues for Constructed Cities (Per Capita)*

	(1)	(2)	(3)	(4)	(5)
Revenue Diversification (REV DIV) [100 - (Prop Tax as % of Own Source Rev)]	23.81*** (1.72)	24.19*** (1.59)	24.85*** (1.52)	23.92*** (1.54)	5.603** (1.89)
State Aid to Constructed City (STATE AID)	0.924*** (0.05)	1.028*** (0.04)	0.897*** (0.04)	0.814*** (0.05)	0.964*** (0.04)
Inter-Jurisdictional Revenue Sharing (REV SHARE) (O = No Revenue Sharing)	-2.19 (1.21)	-1.88 (1.07)	-0.05 (1.04)	-0.27 (1.04)	-12.10*** (3.56)
Local Gen Revenues as % of Local + State Gen Revenues (Statewide) (LOCAL SHARE)	30.57*** (3.62)	27.54*** (3.21)	39.97*** (3.48)	43.27*** (3.49)	8.475*** (2.11)
Average Household Income (\$1000) (HHINC)		13.01*** (2.72)	2.98 (2.71)	4.27 (2.70)	-10.25*** (3.21)
Employment/Population Ratio (SHR EMPLOY)		38.11*** (5.18)	44.35*** (4.97)	44.95*** (4.94)	-7.07 (4.27)
Poverty Rate (POVERTY)		19.79** (7.11)	8.90 (6.87)	16.02* (6.90)	-33.42*** (5.22)
Income Inequality in City (INC DISTR) [(Mean HH Income) / (Median HH Income)]		2008.8*** (200.10)	1925.9*** (191.50)	1839.9*** (189.80)	310.4* (146.00)
County Vote for Dem President (PCT DEM) (% Points Above/Below National Vote)			20.29*** (1.94)	20.21*** (1.93)	
State Property Tax Limit (1 = Yes) (PTAX LIMIT)				-263.1*** (50.77)	
Special District Gen Rev as % of Local Gov't Gen Rev (Statewide) (SPEC DIST REV SHR)				-10.37* (4.02)	-14.04* (7.04)
Constant	122.00 (212.30)	-5689.9*** (391.40)	-5706.9*** (394.70)	-5585.0* (390.90)	3213.2*** (376.00)
N	1,297	1,297	1,285	1,285	1,285
Adjusted R <sup>2</sup>	0.541	0.655	0.691	0.698	0.627

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

Note: All variables are measured in real dollars. Year dummies were included in all regressions; region dummies were included in the first four regressions.

5 percent. This suggests that the four percentage point decline in the national average ratio of employment to population between 2008 and 2010 period will put significant pressure on city revenues. REV SHR was not statistically significant, suggesting that a greater role for overlapping jurisdictions in city finance is not associated with higher revenues or spending.

INC DISTR, a measure of inequality defined as the ratio of average to median household income, has a robust positive effect on revenues. Evaluated at the mean, an increase of one standard deviation in income inequality raises revenue by between 5 and 10 percent. This result could reflect the nature of local tax systems, if it were the case that cities with a concentration of high-income households were more likely to have taxes that are structured to capture proportionally more revenue from high-income households.<sup>8</sup> Our data suggest, however, little or no correlation between income inequality and reliance on particular types of taxes. Hence, we interpret the inequality result as reflecting a lower tax price faced by the median voter in more unequal cities, raising demand for public spending and increasing revenue.

Finally, we briefly mention some other results. LOCAL SHR is consistently positive and statistically significant. An increase of one standard deviation in the local share of total state and local revenues increases city revenues by at most about 5 percent. PCT DEM is also positive and statistically significant. Both statewide property tax limits (PTAX LIM) and special districts (SPEC DISTR) have the expected negative signs.

Under the fixed-effect specification, a number of the explanatory variables have the same sign, but are smaller in magnitude, while others change sign. For example, EMPLOY SHR and INC DISTR are about one-sixth of their magnitudes in the specifications without city fixed effects. Both POVERTY and HHINC go from positive to negative. These changes under the fixed-effect specification are primarily a reflection of the limited intra-city variation in the data. Many of these variables were available for only two years within our sample period, and therefore we were forced to interpolate for missing years.

## 5. Conclusion

The financing of large American cities is characterized by a wide variety of institutional arrangements. Such variation is perhaps not surprising, given the vast size of the United States, and the differences in population, age, physical geography, and economic functions of cities in different regions of the country. While a few cities are responsible for the financing of most or all public services provided to their residents, in most cities fiscal responsibility is divided among cities, counties, and school districts. Because of these differences, revenues and expenditures of city governments alone cannot provide the basis for meaningful fiscal comparisons.

In this paper, we take explicit account of this institutional and fiscal diversity, by assigning to cities a share of revenues from overlapping counties and

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8. For example, New York City has a high degree of income inequality—the mean to median ratio is in the 80th percentile of inequality—and a local income tax with some modest degree of progressivity. An increase in the income of top-income households would therefore generate proportionally more revenue. However, there are very few cities with local income taxes, so this is not a general result.

independent school districts, based on population and student enrolment shares. Thus, we are in effect measuring total revenues raised per city resident. To our knowledge, no other study has made such systematic adjustments for a national sample of large cities.

An analysis of constructed government revenues for 109 central cities shows substantially greater uniformity in revenues, and presumably in service levels, than would be suggested by a comparison of municipal central city governments only. Nonetheless, even after standardizing for the role of counties and school districts, both a simple comparison of regional averages and the region variables in the multivariate analysis indicate that central cities in the northeast have substantially higher revenues per capita than cities in the rest of the country.

In almost all cities, the most important local revenue source is the property tax. However, cities and their overlapping counties and school districts vary substantially in their use of other taxes and fees and charges. The principal hypothesis investigated in this paper is that a more diverse revenue structure—i.e., one that is less reliant on the property tax—allows a city to raise more revenue. Our empirical results provide strong support for the hypothesis that a more diversified revenue structure generates more revenues than one that relies primarily on the property tax. Over a 12-year period, and controlling for other variables likely to influence revenue levels, revenues in a relatively diversified city (at the 75<sup>th</sup> percentile of diversity) are about 10 percent higher than in a city at the 25<sup>th</sup> percentile.

State aid is the largest single revenue source for our constructed governments, and it plays an important role in city finance. We find that state aid to constructed governments is highly stimulative, with a dollar of state aid leading to an increase in total revenue of almost a dollar. This estimate is larger than previous estimates of the effect of state aid on individual governments, particularly school districts, and suggests that the displacement of own-source revenues induced by state aid may be offset by greater city and county spending, as opposed to reduced taxes. This result shows the importance of the fuller accounting for local revenues and spending provided by our constructed government approach.

The Great Recession poses stark fiscal challenges for local government in the United States. Between September 2009 and September 2010, local government employment decreased by 1.5 percent, with a drop of 76,000 local government jobs between August and September 2010 alone (Bureau of Labor Statistics, 2010). This employment decline is consistent with the strong contemporaneous relationship between economic capacity and city revenues shown by our statistical analysis.

While our results demonstrate that a more diversified revenue structure supports higher revenues over the long run, an important policy question is whether diversification will help cities maintain revenues and service levels in the current recession. Our data indicate that the property tax is by far the most stable of all taxes used by cities. This fact suggests that revenues would be more stable over time in less diversified cities. However, we did not find any difference in revenue stability as a function of revenue diversity. This finding may reflect the fact

that our sample period includes only a single economic downturn—the mild recession in 2001. While that recession led to declines in income and sales tax revenues, it coincided with a strong sustained boom in real estate values.

By contrast, the current recession, marked by a sharp drop in housing values, is likely to put increasing pressure on local property tax revenues over the near term. Even as state and local income and sales tax revenues began to rebound in 2010 (Rockefeller Institute 2010), property tax revenues are likely to fall, as assessed values gradually adjust to reflect changes in market value (Chernick, Langley, and Reschovsky 2011). Hence, although in the past property taxes have been the most stable source of tax revenues for local governments, we expect that in the aftermath of the Great Recession, cities that have experienced significant declines in property values are likely to face greater revenue pressure if they have a heavier reliance on the property tax than if they have a more balanced portfolio of taxes and fees.

### **Appendix: Data Sources**

The Census of Governments and the Annual Surveys of State and Local Government Finances was the source of data for cities, counties, and independent school districts for the following variables: general revenues, property taxes, sales taxes, own-source revenues, state aid, statewide special district revenues, statewide local government revenues, state government general revenues, and population.

Data on average household income (city), poverty rate (city), employment, median household income (city and county), came from the *City and County Data Book* (2000 and 2007) and from the Census Bureau's *American Fact Finder*.

Data on county-level vote for President were derived from Dave Leip, *Atlas of Presidential Elections*, available at <http://www.uselectionatlas.org/>.

Anderson (2006) was the source of data on state property tax limitations. A state is considered to have a binding property tax limit if it limits tax levies, or tax rates and assessments.

Data for economic and demographic variables were interpolated, because data were not available in all years. Data on city and county population were available for 1996, 1998, 2000, 2002, 2005, 2007, and 2008. Data on counties' vote for President was collected for 1996, 2000, 2004, and 2008. A linear trend line was used to interpolate population and Presidential vote estimates for the other years in the sample.

Data for all other economic and demographic variables was collected for only two years, generally 1999/2000 and 2005, and the interpolation was done in two steps. First, a linear trend line was fitted for each city using the two years of available data. Second, this linear line was adjusted to reflect national trends. This was done by calculating a weighted average of the variable for the cities in the sample, using national data to calculate the ratio of the variable in the given year and the year when data are available for all cities, and then calculating a target weighted average

for the cities in the sample by assuming all cities in the sample have the same ratio as that calculated with national data. Then an adjustment factor was calculated for each year equal to the target weighted average divided by the weighted average from the initial linear interpolation. Finally, this adjustment factor was multiplied by the initial linear estimate for each city. This procedure results in interpolated data that allows for city-by-city variation, but also reflects national trends.

National data on household income are from the U.S. Census Historical Income Tables H-6. <http://www.census.gov/hhes/www/income/data/historical/household/index.html>.

Poverty rate data are from *Poverty in the United States* (1997, 1998, 1999, 2000, 2001) and *Income, Poverty, and Health Insurance Coverage in the United States* (2003, 2004, 2006, 2008). 2008 poverty data can be found at <http://www.census.gov/prod/2009pubs/p60-236.pdf>.

Non-farm employment data came from the Bureau of Labor Statistics' *Current Employment Statistics Survey*. Annual data are calculated from monthly data available at: <http://data.bls.gov/cgi-bin/surveymost?ce>.

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