**The Impact of the Great Recession and the Housing Crisis
on the Financing of America's Largest Cities**

Howard Chernick, Adam Langley, and Andrew Reschovsky

Abstract

The housing crisis and the recession have placed tremendous fiscal pressure on the nation's central cities. Cuts in state government fiscal assistance to their local governments, plus shrinking property tax bases are challenging the ability of local governments to continue their current levels of public services.

In this paper, we use data on the financing of the nation's largest central cities from 1997 to 2008 to forecast the impact of the recession and the housing crisis on central city expenditures between 2009 and 2013. Because expenditure responsibilities vary among city governments and because overlying governments play different roles, we develop the concept of constructed governments in order to allow us to compare the revenue-raising and spending policies of large central cities. We predict that real per capita spending in the average central city will be reduced by about seven percent during the forecast period, and that spending cuts will be substantially greater in cities hit hardest by the economic recession and the housing market collapse.

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Introduction

In early 2011 the media has been full of reports of substantial cuts in public services in many of the nation's largest cities. Mayor 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 five 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).

The economic 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).

Maintaining the fiscal health of the nation's major cities is important. Not only does one-fifth of the nation's total population live in its 100 largest cities, but the growth and prosperity of those cities is key to the economic prosperity of the nation. Dense urban environments engender agglomeration economies and allow business firms to more easily adapt to changes in demand, to increase the quality of the matching process between the needs of businesses and the skills of workers, and to facilitate spillovers of knowledge from one industry to another. In many cases, these economies of agglomeration are more than sufficient to offset the greater congestion costs in dense urban areas (Ciconne and Hall, 1996).

The prosperity of cities is not preordained. A necessary condition for the economic prosperity of cities is the existence of effective local governments that provides a wide array of public services at competitive tax rates. Fiscal health is a necessary condition for continued economic growth and prosperity. Public services such as clean water, safe streets, effective schools, well-maintained roads and public transit systems provide the infrastructure for private-sector investments in a city's economy. Cities that fail to provide core public services will soon lose their economic advantage.

The ability of city governments to provide services ultimately depends on the availability of revenue. Like all local governments, city government revenue comes from taxes, from other local-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 its impact on revenues. The decline in property values and the rising tide of foreclosures have impacted property tax revenues. Other sources of city tax revenue, namely income and sales taxes, have declined precipitously in many cities. An analysis by the Education Commission of the States found that in fiscal year 2011, 38 states made cuts in their state aid to K-12 education (Griffith, 2011). Although complete data are not yet available, a number of states' proposed budgets for fiscal year 2012 call for substantial cuts in aid to local governments, including additional cuts to school districts.

Our goal in this paper is to increase our understanding of how the nation's largest cities are financed and to provide a forecast of the likely impact of the recent recession and the turmoil in the housing market on the ability of central cities to continue to provide needed public services to their residents. Parallel to the situation in many states, the major cause of the fiscal problems faced by central city governments is that they face substantial reductions in their available revenues. For this reason, most of our attention in this paper will be on the revenue sources available to city governments.

In order to predict changes in the fiscal condition of city governments attributable to the economic downturn and the collapse of the housing market, we must first develop a comprehensive fiscal data set for the nation's largest cities. In the next section of the paper, we address the major challenges of developing a set of data that allows us to compare the revenues available to large central cities both over time and across cities. In the second part of the paper, we address directly the issue cited in the title of this paper, namely the impact of the Great Recession on the ability of central cities to finance public services. The most recent comprehensive fiscal data on central city finance are for 2008. The absence of more recent data means that in order to assess the impact of the economic and housing crises on central city finance it is necessary to forecast fiscal changes based on patterns of change in earlier years. With that goal in mind, we develop a simple revenue and spending forecasting model and use the model to simulate the impact of the recession on revenue and spending patterns in the nation's largest cities. We conclude with an analysis of the likely impact of revenue reductions on the ability of urban governments to maintain critical public service.

Financing U.S. Central Cities—A Comparative Analysis

The literature on the financing of the nation's central cities is extremely sparse. With the exception of the research by Bradbury (1982, 1983) and by Ladd and Yinger (1989), very few studies have taken a comprehensive look at the financing of American central cities. We suspect that an important reason for this absence of research is the difficulty of putting together a data set that allows for a fiscal comparison of cities on both the revenue and spending side.

In the U.S., the Census Bureau provides the only comprehensive source of fiscal data for cities. Data are collected separately from all types of governmental units, general-purpose municipal

governments, which include cities and towns, independent school districts, county governments, and special districts. The difficulty in putting together a comprehensive data set for cities is that cities differ substantially in their expenditure responsibilities. While some city governments are responsible for the financing of a full array of public services for their residents, other city governments share the responsibility of providing services with a set of overlying governments. For example, in 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, plus elementary and secondary education and public health and welfare services usually provided by overlying county governments. In other cities such as El Paso, Las Vegas, Miami, and Wichita, however, only about one-quarter of public spending on local government public services is done by the municipal government. Spending on other services that provide direct benefits to city residents is carried out by independent governments, either school districts or counties, which often serve geographical areas that stretch way beyond city government boundaries.

Given the large variation in expenditure responsibilities among the nation's largest cities, comparisons of both per capita spending and revenue levels across city municipal governments are meaningless. 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 overlying school district and county government, property taxes accounted 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 utilized a concept that we call *constructed* city governments. The basic idea is to compile a measure of the total taxes and other revenues paid by the taxpayers of each large city in our sample by including all revenues collected and spending undertaken by the municipal government and by the portion of independent school districts and county governments that overlaps municipal boundaries.

This is not a new idea. In a report entitled *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 their sample municipalities. We follow a similar, although somewhat simplified methodology, but apply it to nearly all large U.S. cities. Katharine Bradbury (1982), in a comparative study of fiscal distress in U.S. cities, recognizes the need to account for differences across the country in governmental structures that result in differences in city government responsibilities. To address this issue, she calculates the "combined

revenue collection in city areas" by allocating to each city area all non-municipal local government revenue within each state on an equal per capita basis. As described in the next paragraphs, our approach is to improve on the use of statewide averages by utilizing fiscal data from each non-municipal government that overlie each central city.

The creation of *constructed* cities required the following steps. For cities with independent school districts that are coterminous 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 enrollment 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 next step in determining revenues and expenditures in *constructed* cities was to add data representing the county government serving 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.[1] Appendix 1 provides a breakdown of the number of cities in ten different categories of fiscal relationships with counties and school districts, and a comparison for each category of average per capita general revenues for each city and each *constructed* city in FY 2008. For a few cities that have both a dependent school district and no county government with spending authority, it was not necessary to adjust the municipal government revenue and expenditure data available from the Census Bureau's individual unit of government files.

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 are relatively unimportant, accounting for less than 10 percent of local government general revenues. The most important (in terms of revenue) type of special district operates enterprises in the form of hospitals, electricity or water utilities, or mass transit systems. These services are provided by the private sector in many metropolitan areas and, in fact, are rarely provided by municipal governments. Thus, failing to include special districts should do little to distort fiscal comparison among central cities.

Relying only on municipal government data as the basis for making fiscal comparisons across cities can be highly distortive. For example, in 2008, city government data from the Census Bureau indicates that per capita spending in Baltimore was over three times higher than per capita spending in Milwaukee. However, when we adjust the data to account for the fact that the city government in Baltimore is responsible for public education and other county government functions, while in Milwaukee those public functions are provided by an independent school district

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[1] Contact the authors for a more detailed description of the methodology used to create our *constructed* city data set.

and county government, it turns out that spending in the two cities is practically identical.[2] Among the nation's largest cities there are many examples of similar levels of per capita spending by two *constructed* cities whereas their municipal governments have very dissimilar spending levels. As another example, the City of Houston spent $1,625 per capita in 2008 and the City of Providence spent $4,261. *Constructed* city data for these two cities in 2008, however, is nearly identical. Not surprisingly, the variation in per capita spending among the nation's largest central cities is much smaller for constructed cities compared to central city municipal governments. For our sample of 109 *constructed* cities, the coefficient of variation of 2008 per capita spending is only 0.06, while the coefficient of variation of per capita spending for the municipal governments serving the same 109 cities is 0.57.

Comparisons of revenue sources can also be distorted by looking only at municipal government data. In a sample of 109 large U.S. central city municipal governments (to be described below), we calculated that in the Northeast region of the U.S., 73 percent of tax revenue comes from the property tax compared to only 45 percent in the Western region of the country. Comparing *constructed* governments for the same 109 central cities reveals that the share of tax revenue from the property tax is identical, at 66.5 percent, in both the Northeast and Western regions of the country.

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) utilizes census data to study revenue diversification among all municipal governments with populations above 25,000. She, however, makes no adjustments 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.[3] Other studies, for example, Inman (1979) and Sjoquist, Walker, Wallace (2009), have 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) focus explicitly on municipal governments. Their focus however is not on comparing the revenue of city governments, but rather on their revenue capacity. In developing their revenue-capacity measures they adjust for the capacity "used up" by county governments and independent school districts that overly city governments.

Our data set for this study consists of fiscal data for the years 1997 to 2008 for a sample of constructed cities that includes most of the nation's largest central cities. The source of the data is the quinquennial 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.

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[2] In fact, Milwaukee's per capita spending is actually $13 higher than spending in Baltimore.

[3] We calculated a Herfindahl index for the cities in our sample using revenue data for municipal governments only and an index using *constructed* cities revenue data. For the majority of cities the two index values varied dramatically, indicating very different measures of revenue diversification.

We have defined our sample as all cities with 2007 populations over 200,000 except those with 1980 populations below 100,000 <u>and</u> all cities with 1980 populations over 150,000 even if their 2007 population was below 200,000.[4] The increase in the population cutoff from 150,000 to 200,000 reflects almost perfectly the rate of growth of the U.S. population between 1980 and 2007. Because we wanted our sample to include better representation of cities with slow or declining populations, we believe this sample selection is preferable to choosing a strict 2007 threshold of 200,000. Similarly, we excluded cities with 1980 populations below 100,000, because we do not believe that these previously small and mid-sized cities are comparable to the rest of our sample of large cities. In 2008, the population of the 109 central cities in our sample is 59.1 million. This number is equal to 61.2 percent of the population of all "principal cities within U.S. metropolitan statistical areas.

The two tables included in Appendix 1, characterize the 109 cities in our sample by their differing fiscal structures. Each city has been characterized by the geographical boundaries of its overlying school districts and county government, and in the case of school districts by their fiscal independence from the municipal government. The second table lists the average per capita general revenue of the municipal government and the constructed government by governmental category.

It should be emphasized that constructed governments are not governmental units and thus they can not be used as the foundation for conducting a traditional analysis of governmental behavior. However, they do provide us with a way of comparing fiscal conditions across American central cities. Moreover, because they combine the revenues from overlapping governments, they can be used to study the horizontal fiscal interactions between governments that share the same revenue base.

Central City Finances in 2007

To provide a foundation for our analysis of the impact of the recession and the housing market crisis on the financing of American central cities, we present an overview of the financing of local governments in fiscal year 2007.[5] Tables 1 and 2 display combined data for municipalities, townships, counties, and school districts—all local governments except for special districts. The left-hand panel includes data for these governments nationwide; the central panel contains data for revenues allocated to our sample of 109 large *constructed* governments; and the right panel presents data for revenues not allocated to the 109 constructed governments. Table 1 shows major sources of general revenue and Table 2 focuses on tax revenues by source. Although there

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[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 various data problems we excluded 7 cities that otherwise met our selections criteria.

[5] We are unable to use data for 2008 for these tables because in non-census years, the Census Bureau does not release U.S. total revenue data separately for different types of local governments.

were 52,095 general-purpose local governments and independent school districts in the U.S. in 2007, the group of 109 large constructed governments accounted for 25 percent of the $1.2 trillion of general revenue raised by all of these local governments.

Table 1 illustrates that 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 table demonstrates that while the 109 constructed governments receive only a slightly smaller share of their general revenues from intergovernmental sources than local governments serving smaller cities, they receive a much larger share in the form of federal aid and a smaller share from state government aid. Of the own-source revenue of local governments, about two-thirds come from taxes, with user fees and charges and miscellaneous revenues making up the rest.

Table 2 presents a picture of the sources of tax revenue for local governments in the U.S. Constructed governments serving the nation's largest cities rely much less heavily on the property tax than do local governments serving less populated municipalities. The property tax accounts for 56 percent of tax revenue in our sample of large *constructed* cities compared to 77 percent of tax revenue in smaller cities. In lieu of revenue from the property tax, the large constructed governments rely more heavily on the general sales tax, the individual income tax, selective sales taxes, and the corporate income tax compared with local governments serving smaller municipalities.

Because a few of the largest city governments, most notably New York City, place relatively heavy reliance on non-property tax sources of tax revenue, the data in Table 2 provides an overestimate of degree of revenue diversification that exists in the average large central city. If New York City is dropped from our data set, the average share of tax revenue from the property tax rises to 64.9 percent and the share of revenue from the individual and corporate income taxes declines to 5.0 and 0.1 percent, respectively. A more informative picture of the degree of revenue diversification away from the property tax is given in Table 3, which provides a count of the number of large *constructed* cities that use each tax and among those cities using the tax, the importance of the tax in total tax revenue. The data show that the vast majority of large central cities do not rely on revenue from either the individual or corporate income taxes. In contrast, all but 3 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 do sales tax revenues generate more than one-third of total tax revenue.

Central City Revenue Changes, 1997 to 2008

In this section, we provide a brief overview of the changes in revenues by source of our sample of large central cities between 1997 and 2008. The beginning of this 11-year period 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

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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, 2003). One way in which states closed their budget deficits during this period was to cut state aid to local government (Dye and Reschovsky, 2008). As is well known, during most of this period, until 2006, housing prices and municipal government property tax bases were growing rapidly.

Between 1997 and 2008 total general revenue in our *constructed* cities grew at an average annual rate of 5.3 percent, with own-source revenues growing at a faster rate (5.5 percent) than intergovernmental revenues (4.9 percent). On average, tax revenue growth exceeded growth from user fees and charges and miscellaneous sources. Among taxes, the property tax grew faster than revenue from general and selective sales taxes. Among intergovernmental sources, state aid grew faster than grants from the federal government. The average rate of change of individual revenue sources varied substantially among *constructed* cities. For example, the range of average changes in property tax revenue was from an annual decline of 5 percent to an average growth rate of 12 percent.

Figure 1 displays the annual average percentage changes in real revenues in the 109 constructed cities included in our sample. Real general revenue grew in every year from 1997 through 2007, although growth was markedly reduced in the couple years after the 2001 recession. Reflecting the early impact of the most recent recession, real revenues were flat between 2007 and 2008. The well-documented declines 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 figure also demonstrates clearly the stabilizing role played by taxes, and the offsetting roles played by own-source revenue and intergovernmental aid. In 2004, sharp cuts in grants were offset by a big increase in local taxes. In other years, slowdowns in the growth rate of tax revenues were matched by increases in the growth rate of intergovernmental aid.

In figure 2, we illustrate the average annual changes in real tax revenues by type of tax. The clear lesson is that the property tax plays an important role in creating tax revenue stability and in muting to some degree the strong pro-cyclical impacts of the individual and corporate income, and sales and excise taxes. We emphasize, however, that the large negative and positive percentage changes, especially in revenue from the corporate income tax, have an impact on only a relatively small number of cities that utilize the tax (see Table 3).

The Housing Crisis and City Spending

A full assessment of the impact of the housing crisis and the Great Recession on the fiscal performance of U.S. central cities will require comprehensive data on the revenues and expenditures of cities at least through fiscal year 2013. Fiscal data on local governments are generally avail-

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able from the Governments Division of the Census Bureau with a two-year lag. Thus data for fiscal year 2009 will not be available until the second half of 2011 and data for fiscal year 2013 until 2015.

Our goal in this section of the paper is to predict the impact of the housing and economic downturns on the per capita real spending in our sample of large constructed central cities. Although the translation of spending cuts into specific reductions in the delivery of public services is beyond the scope of this paper, one indicator of reductions in public services comes from national data that show that local government employment in the U.S. has been reduced by more than two percent over the past 2½ years.[6]

The ability of local governments to finance public services depends primarily on the availability of revenue. Our strategy for predicting central city spending is to forecast the magnitude of the major revenue sources utilized by the governments serving the residents of U.S. central cities. We then estimate an identity relationship between revenue sources and expenditures that incorporates lags between changes in revenues and changes in spending.

City government revenues come from property taxes, from other taxes, from non-tax locally-raised revenues, from state aid, and from federal aid. We focus particular attention on the property tax, the single most important source of locally-raised revenue by American cities. Using our sample of annual data from 1997 to 2008 for 109 constructed cities, we estimate a property tax revenue prediction equation. As the primary predictor we utilize the lagged value of the repeat-sale single family Housing Price Index calculated for most U.S. metropolitan statistical areas by the U.S. Federal Housing Finance Agency.[7]

Lags between changes in housing values and changes in property tax revenues reflect the extent to which changes in assessed values lag changes in market value, and also the degree to which to which cities respond to changes in assessed value by adjusting property tax rates. The administrative lag is due in large part to the assessment process in which properties are often not assessed annually and once re-assessed there is often a year lag until new values are reflected on property tax rolls. In addition, assessment caps that have been adopted in a number of states in recent years may slow considerably the translation of declining property values into reductions in assessed values.[8] Empirical evidence for a lag between housing price changes and property tax revenues comes from a recent empirical analysis by Lutz (2008) that finds a lag of about three years. In a recent paper, Lutz, Molloy, and Shan (2011) use data from individual states to illus-

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[6] These employment statistics plus other indicators of the fiscal challenges faced by city governments are included in a March 2011 speech by Ben Bernanke (2011).

[7] The housing price index data by metropolitan statistical area are available for downloading at the U.S. Federal Housing Finance Agency website at http://www.fhfa.gov/Default.aspx?Page=87.

[8] For example, in California, where Proposition 13 limits the annual growth of assessed values to 2 percent unless a property is sold, sharp drops in home prices for long time homeowners will fail to lead to drops in assessed values as long as market values continue to exceed assessed values. In New York City, by law changes in market value are translated into changes in assessed value over a five year period. The actual rate of phase-in varies by property class (New York City Independent Budget Office, 2011).

trate the several year lag between the peak of the housing boom and initial declines in property tax revenues.

Our property tax prediction model has the following specification:
$$\ln PTR = a_0 + a_1(\ln \text{lagged HPI}) + \text{Year Dummies} + \text{City Fixed Effects} + \text{error}, \qquad (1)$$

where PTR is property tax revenue per capita in real (2007) dollars and HPI is the lagged value of the housing price index.

This model, which is quite parsimonious, is not a structural model of property tax revenues. We estimate this highly simplified model because our goal is to predict changes in property tax revenues beyond the sample period, as a function of known changes in housing prices.[9] Differences across cities in the use of the property tax, reflecting tradeoffs between reliance on the property tax versus other taxes, non-tax revenue sources, and state and federal intergovernmental aid, are all subsumed in the fixed effects. Thus, we are in effect assuming that such differences remain constant over the forecasting period. We also tested for whether the elasticity of the property tax with respect to housing values was symmetrical for increases and decreases in housing prices, and found that there was no difference. We experimented with various lag structures for the housing price index, and found (as did Lutz) that a three year lag relationship was strongest statistically. The regression results for the estimation of equation 1 are presented in first column of Table 4.

The coefficient on the housing price index indicates that three years subsequent to a 10 percent decrease in the housing price index for a metropolitan area, constructed government property tax revenues will be 3.8 percent lower in real terms.[10] For the cities in our sample, the average value of the metropolitan area housing price index reached a highpoint of 216 in 2006. By 2009 the index had fallen by 11.3 percent, and by 2010 it had declined by an additional 1.6 percent. If we use the average value of the change in the housing price index, equation (1) predicts that this drop would be associated with a drop in property tax revenues of more than 4 percent between 2009 and 2012. Although not displayed in Table 4, we note that the year dummies for the property tax are mainly insignificant, except for 2008. The coefficient for that year indicates that, controlling for changes in housing prices, real property tax revenues are 3 percent lower, as compared to 1997. Since housing values peaked in 2006 and then began a steady decline at least until 2010, this negative coefficient suggests that by the end of fiscal year 2008 the decline in

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[9]Lutz (2008) finds that the elasticity of property tax revenues with respect to. housing prices is robust to the inclusion of other covariates. This provides additional justification for the parsimonious specification adopted in our work.

[10] In a regression of percentage changes in property tax revenues using a broad sample of local governments, Alm, Buschman, and Sjoquist (2011) also find a statistically significant positive coefficient on a housing price variable. In constrast, Doerner and Ihlanfeldt (2011) in a study of Florida cities find little relationship between changes in housing prices and city revenue. They attribute this result in part to the fact that most owner-occupied housing is subject to an stringent assessment cap and that local assessors in Florida are elected.

housing prices and the ongoing recession had already begun to have an impact on property tax revenues. Hence, our property tax predictions for 2012 are likely to underestimate the total decline in property tax revenues.

Table 5 shows the change in housing values from 2006 to 2009, and the predicted change in property tax revenues between 2008 and 2012. The predicted change in the property tax is computed as the 2012 predicted value minus the 2008 predicted value. We use predicted values for 2008, rather than the actual values, because the predictions are only valid within the structure of the model. Given the three-year lag in the estimating equation, the property tax estimate for 2008 is based on housing values for 2005, while the predicted property tax for 2012 is based on housing values for 2009. As shown in Table 5, the average predicted decline in property tax revenues is 3.2 percent.

While the average decline in property tax revenues may seem relatively small, some cities face much larger drops in revenue, while property tax revenues are predicted to increase in a few cities. Table 5 also shows the five cities with the largest predicted property tax reductions and the five cities with the smallest predicted declines. The cities with the largest declines are all in California or Nevada, states with among the sharpest drops in housing values. Among these five cities, housing values declined by 47 percent between 2006 and 2009. The average predicted decline in property taxes is equal to 21 percent. Such cuts are very large indeed, suggesting substantial pressure on revenues and spending in these cities. By contrast, some cities in the South, particularly in Texas, avoided the housing bubble, and experienced rising home values between 2006 and 2009. The increase in home values translates into an expected increase in property tax revenues of about 6.3 percent for the five least affected cities. For the entire sample, the model predicts that between 2008 and 2012, 47 cities will realize increased property tax revenues, with an average increase of 2.9 percent, while 61 cities will face declining property tax revenues, with the average decline of a much larger 7.8 percent.[11] This result reflects the differential geographic patterns of the housing bubble and subsequent decline, at least through 2009.

We are not able to specify a forecasting model for the other four sources of city government revenues. Our approach is to start with actual 2008 real per capita revenue from each source and to adjust these revenues by a given percentage change for each year between fiscal year 2009 and 2012. These percentage changes are referred to as *adjustment factors*. For federal aid, and city non-property tax revenues, and city non-tax revenues we use common national factors reflecting our best estimates based on available information.

The basis of our adjustments in state aid is the assumption that annual changes in state aid are proportional to the size of each state's annual budget shortfall. We utilize data collected by the Center on Budget and Policy Priorities on state budget gaps in each fiscal year from 2009 to

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[11] Based on data for a sample of states, Lutz, Molloy, and Shan (2011) find a large variation in changes in property tax revenues, with some states experiencing declines (in 2009) while other states had reasonably robust growth. Using census data, Alm, Buschman, and Sjoquist (2011) also report large variations across states in the growth (or decline) of property tax revenues in the 2006 to 2009 period.

2012, measured as a percentage of each state's general fund revenues in the previous fiscal year (McNichol, Oliff, and Johnson 2011). We adopt two approaches, one based on the magnitude of the average state budget shortfall and the second on the size of budget gap in each state.

In our first approach, we define each year's state aid adjustment factor as a percentage of the national average state budget gap for each fiscal year from 2009 to 2012. We assume that the intensity with which state budget gaps are translated into cuts in state aid increases steadily over the course of the fiscal crisis. Initially, states draw on reserves and utilize one-shot revenue sources to maintain state aid. As these sources of revenue are progressively exhausted, states are forced to turn increasingly to cuts in their major expenditure obligations, including state aid to local governments. Hence, in fiscal year 2009 the (percentage) cut in state aid is assumed equal to 10 percent of the national average budget gap. The percentage cut is assumed to grow to 20 percent of the budget deficit in 2010, to 30 percent in 2011, and to 40 percent in 2012.

In the second approach, we arrive at a state-specific state aid adjustment factor by using data on individual state budget gaps (again measured relative to the size of each state's general fund revenues). For example, for a city in California, the state aid adjustment factor for fiscal year 2009 is defined as 10 percent of California's fiscal year 2009 budget gap. For fiscal year 2012, the adjustment factor is 40 percent of California's fiscal year 2012 budget gap.

The spending equation has the form:
$$\ln \text{spending}_t = b_0 + b_1(\ln \text{property tax})_{t-1} + b_2(\ln \text{other taxes})_{t-1} + b_3(\ln \text{non-tax revenues})_{t-1} +$$
$$b_4(\ln \text{state aid})_{t-1} + b_5(\ln \text{federal aid})_{t-1} \qquad (2)$$

Since in the long run, revenue is equal to spending, equation (2) is essentially an identity, with a one-period lag. The lag occurs because most local governments, and especially school districts, maintain fund balances that allow them some latitude in absorbing reductions in revenue without reducing spending. Both the severity and the long duration of the Great Recession and the housing crisis have resulted in revenue declines that overwhelm any existing fund balances. The estimated coefficients of the spending regression indicate the weights on the various revenue sources in total spending. The results of estimating equation 2 are shown in the second column of Table 4.

Table 7 shows predicted changes in city spending between fiscal years 2009 and 2013. To obtain the predicted level of spending in 2009, we use predicted property tax revenues for 2008, and actual values for the other revenue sources. For 2013 spending, we use 2012 predicted property tax revenues, and adjusted values for the other revenue sources. The assumed annual changes in non-property tax revenue sources are shown in Table 6. The table shows forecasts based on the two alternative methods for adjusting state aid, as described above.

The average predicted decline in real per capita spending is about 7 percent. The largest declines in spending are between 10 and 12 percent using average state budget gaps as the basis for the state aid adjustment, and occur in the cities facing the largest decline in property tax revenues.

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When we use state-specific budget gaps, the predicted decline is 15 percent or more in cities with large declines in home values. The higher predicted decline in spending in the cities with large declines in housing prices under our state-specific budget gap method of forecasting state aid reductions reflects the fact that the decline in housing values and the magnitude of the state budget gap are positively correlated.[12] This suggests that states with relatively large declines in metropolitan housing values also face greater fiscal pressure on state income and sales taxes.

Because we assumed that nearly all cities will face cuts in non-property tax revenue sources, especially intergovernmental assistance, even those cities whose property taxes are expected to grow the most between 2008 and 2012 are expected to face spending cuts averaging about 4.6 percent. For example, while we predict that housing prices in Houston will rise by over five percent between fiscal years 2008 and 2012, real state education aid per student in Houston is more than 10 percent lower in fiscal year 2011 than it was in fiscal year 2008, and it is likely that state aid will be cut by at least an additional 10 percent in 2012.[13]

Conclusions

There is very little systematic research on the fiscal conditions of central cities. While all cities must provide a common set of services to their residents, there is enormous variation in the institutional and fiscal structure of governance in metropolitan areas. In some cities, for example New York and Boston, municipal governments are responsible for a full array of public services, including public education. In other cities, for example Phoenix, municipal governments have limited expenditure responsibilities, while overlying independent governments, principally school districts and counties, provide many services. These differences make it extremely difficult to provide valid cross-city comparisons.

To conduct fiscal analyses of the nation's largest cities, we have developed the concept of *constructed governments*. Fiscal data for each constructed governments consists of the revenues and spending of the central city municipal government plus the portion of revenues and expenditures of overlying governments that serve central city residents. While the spatial pattern of county and school district expenditures and revenues may not be uniform across space, the available data do not allow us to incorporate such variations. Hence, we assign county fiscal data to cities on the basis of population shares and school district fiscal data on the basis of pupil shares.

With these data, we are able to compare central city finance for the 109 largest U.S. cities, both across cities and over time. We are also able to construct a revenue forecasting model that we use to assess the impact of the Great Recession and the housing crisis on central city property tax

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[12] The simple correlation coefficient between the 2008 to 2009 decline in the housing price index and the state budget gap in fiscal year 2009 is 0.8.

[13] Although our forecasting model predicts state-specific state aid cuts, in some cities that have experienced particularly large reductions in state aid over the past four years, substituting actual cuts in state aid for our predictions will result in larger than predicted reductions in spending.

revenues and direct general spending. Understanding the revenue impacts of the great recession and its accompanying housing crisis is crucial to assessing the future fiscal health of cities. Central cities provide essential public services to their residents, including in many cases, heavy concentrations of the disadvantaged. These cities also serve as the engine of innovation and economic growth for their metropolitan area. For these reasons, maintaining their fiscal health of central cities should be an important national policy goal.

In the U.S. the only comprehensive source of fiscal data on state and local government public finance are the censuses and annual surveys conducted by the Governments Division of the Census Bureau. Given the inevitable lags in data collection, and the cumulative impacts on cities of the economic slowdown, it will be many years before we are able to conduct a full assessment of the fiscal impacts on cities of the recession and housing crisis. To date, the only information we have is anecdotal reports in the press of public employee layoffs, public service reductions, and cuts in spending and the results of surveys of city financial officers conducted by the National League of Cities.

Using our data on constructed cities allows us to provide a summary picture of the revenue sources used to finance the country's largest central cities. The data illustrate both the important role that the property tax continues to play in the financing of central cities, and the relative stability of the property tax as a source of central city revenue during the 11 years between 1997 and 2008. The data also indicated that in 2007, on the cusp of the economic slowdown and the housing crisis, state aid was on average the single most important source of revenue for American central cities. Our analysis also demonstrates the considerable amount of variation both across cities and over time in the level and composition of central city revenues.

Our fiscal forecasting model consists of a model of property tax revenues as a function of three-year lagged housing prices, and an identity relationship between expenditures and one-year lagged revenue sources. Other factors affecting property taxes are subsumed in a fixed effects specification. Property tax revenues are forecast for the years 2009 to 2012. We focus on the property tax because in most central cities it is by far the single most important source of own-raised revenue and because it is the tax most directly tied to conditions in the housing market. Other sources of city revenue, including state and federal aid, and non-property local taxes, are forecast using our best estimates of national trends.

Our forecasting model predicts that on average real property tax revenues will decrease by 3.2 percent between 2009 and 2012. The size of the change ranges from over 17 percent in cities hit particularly hard by the housing bubble and the subsequent crash, to small increases in cities, mainly in Texas and other parts of the South, that were relatively unaffected by the housing bubble. These differences reflect the differential regional incidence of the housing bubble and bust.

The predicted property tax declines, combined with reductions in state aid and other sources of city revenues, lead to a predicted decline in real per capita expenditures in our constructed governments of 6.5 percent. The largest cuts, of 10 percent or more, are in cities in California and

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Nevada. It should be noted however, that cuts in state aid and other revenue sources, result in predicted spending reductions of nearly 5 percent even in central cities that experienced increases in housing prices between 2006 and 2009.

For several reasons, we view these baseline estimates of spending reductions as lower-bound estimates. First, the property tax model, which includes year effects, shows a significant decline in predicted revenues in 2008, relative to the base year of 1997. This result suggests that even in 2008, factors such as the decline in new construction and the recession-related increase in joblessness had already begun to impinge on property tax revenues. Given the cumulative impact of the Great Recession, such forces are expected to become stronger over time. Economic uncertainty, persistent unemployment, rising home foreclosures, and lower property values may all contribute to increased voter resistance to property tax rate increases. The rising ratio of property tax revenues to personal income from 2.8 percent in 2000 to 3.8 percent in 2010 may also contribute to rising resistance to property tax rate increases. In a number of states, such as Wisconsin and New Jersey, the pressure on the property tax from a decline in the base is being reinforced by specific state prohibitions on raising property tax levies to offset losses in state aid.

Second, spending changes are forecast relative to a 2009 baseline, and they do not take account of increases in the real cost of providing any given level of public services. These increases stem from contractual increases in compensation, rising health care costs, as well as increases in the cost of fuel and other supplies. While cities are undoubtedly trying to minimize such cost increases, they nonetheless imply that the real reduction in public services probably exceeds the decline in real spending.

Although state government budgets for fiscal year 2012 have yet to be enacted in most states, budget proposals in a number of states call for much larger cuts in state aid to local governments than in previous years. Coupled with the impact of the withdrawal of the federal stimulus funds, these actions suggest that the drop in expenditures between 2012 and in 2013 may well be somewhat greater than our forecast.

The real impact of the recession and the housing crisis on city residents and public sector employees depends on the way in which expenditure cuts are implemented and on which public services bear the brunt of the reductions. While surveys provide some information on the pattern of and severity of public service reductions, more systematic evidence on service cuts and their impact on residents will be an important question for future research.[14]

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[14] In a study of city governments in Michigan, Skidmore and Scorsone (2011) document the types of spending cuts that have occurred between 2005 and 2009 in response to increases in city fiscal stress. Their results suggest that cuts are significant in general government, public works, parks and recreation, and especially in the "other" category. Capital expenditures are cut more than current expenditures.

Table 1

**General Revenue of Local Governments
by Type of Revenue, 2007**

Type of Revenue*	All Local Governments**		Largest 109 *Constructed* Governments***		All Other Local Governments	
	Amount (in mil.$)	Percentage of Total Revenue	Amount (in mil.$)	Percentage of General Revenue	Amount (in mil.$)	Percentage of General Revenue
Intergovernmental Rev.	493,896	40.0%	119,495	38.5%	374,401	40.6%
Federal aid	36,414	3.0%	12,638	4.1%	23,776	2.6%
State aid	434,873	35.3%	101,679	32.7%	333,195	36.1%
Local gov't transfers	22,609	1.8%	5,179	1.7%	17,430	1.9%
Own-source revenue	739,572	60.0%	191,263	61.5%	548,309	59.4%
Tax revenue	494,465	40.1%	128,153	41.2%	366,312	39.7%
User fees & charges	156,867	12.7%	42,918	13.8%	113,949	12.3%
Misc. general rev.	88,240	7.2%	23,640	7.6%	64,600	7.0%
Total general revenue	1,233,468	100.0%	310,758	100.0%	922,710	100.0%

*Includes counties, municipalities, townships, and school districts. All special districts are excluded.

**Includes the sum of municipal revenue plus county and independent school district revenues funding services for city residents.

***Includes all cities with 2007 populations over 200,000 except those whose 1980 populations were below 100,000, plus cities
   with 2007 populaitons below 200,000, but 1980 populations over 150,000. Honolulu, Jersey City, Louisville, Newark, New Orleans,
   and Washington, DC met these criteria, but are not included because of various data issues.

Source: Authors' tablulations of data from the 2007 Census of Governments.

Table 2

Tax Revenue of Local Governments
by Type of Tax, 2007

Type of Tax	All Local Governments*		Largest 109 *Constructed* Governments**		All Other Local Governments	
	Amount (in mil.$)	Percentage of Total Taxes	Amount (in mil.$)	Percentage of Total Taxes	Amount (in mil.$)	Percentage of Total Taxes
Property	353,954	71.6%	71,597	55.9%	282,357	77.1%
General sales	54,979	11.1%	16,653	13.0%	38,327	10.5%
Selective sales	25,236	5.1%	9,767	7.6%	15,469	4.2%
Individual income	23,556	4.8%	12,572	9.8%	10,983	3.0%
Corporate income	7,678	1.6%	7,090	5.5%	588	0.2%
Other taxes	29,063	5.9%	10,475	8.2%	18,588	5.1%
Total taxes	494,466	100.0%	128,153	100.0%	366,312	100.0%

*Includes counties, municipalities, townships, and school districts. All special districts are excluded.

**Includes the sum of municipal revenue plus county and independent school district revenues funding services for city residents.

***Includes all cities with 2007 populations over 200,000 except those whose 1980 populations were below 100,000, plus cities
   with 2007 populaitons below 200,000, but 1980 populations over 150,000. Honolulu, Jersey City, Louisville, Newark, New Orleans,
   and Washington, DC met these criteria, but are not included because of various data issues.

Source: Authors' tablulations of data from the 2007 Census of Governments.

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Table 3

**Number of *Constructed* City Governments by Share of Tax Revenue
from Each of the Major Taxes, 109 Large U.S. Cities*, 2007**

Type of Tax	Share of Tax Revenue from Each Tax**				
	Zero revenue	Less than 1/10	1/10 to 1/3	1/3 to 2/3	More than 2/3
Property	0	0	5	44	60
General sales	18	31	48	12	0
Selective sales (excise)	3	76	30	0	0
Individual income	88	4	12	5	0
Corporate income	105	3	1	0	0
Other taxes	0	92	17	0	0

*Includes all cities with 2007 populations over 200,000 except those whose 1980 populations were below 100,000,
with 2007 populaitons below 200,000, but 1980 populations over 150,000. Honolulu, Jersey City, Louisville, Newark,
New Orleans, and Washington, DC met these criteria, but are not included because of various data issues.

**Calculations based on sum of municipal tax revenue and county and independent school district revenues funding
services for city residents.

Source: Authors' tablulations of data from the 2007 Census of Governments.

Figure 1

Annual Percentage Change in Real Revenue of *Constructed* Cities, 1998 to 2008
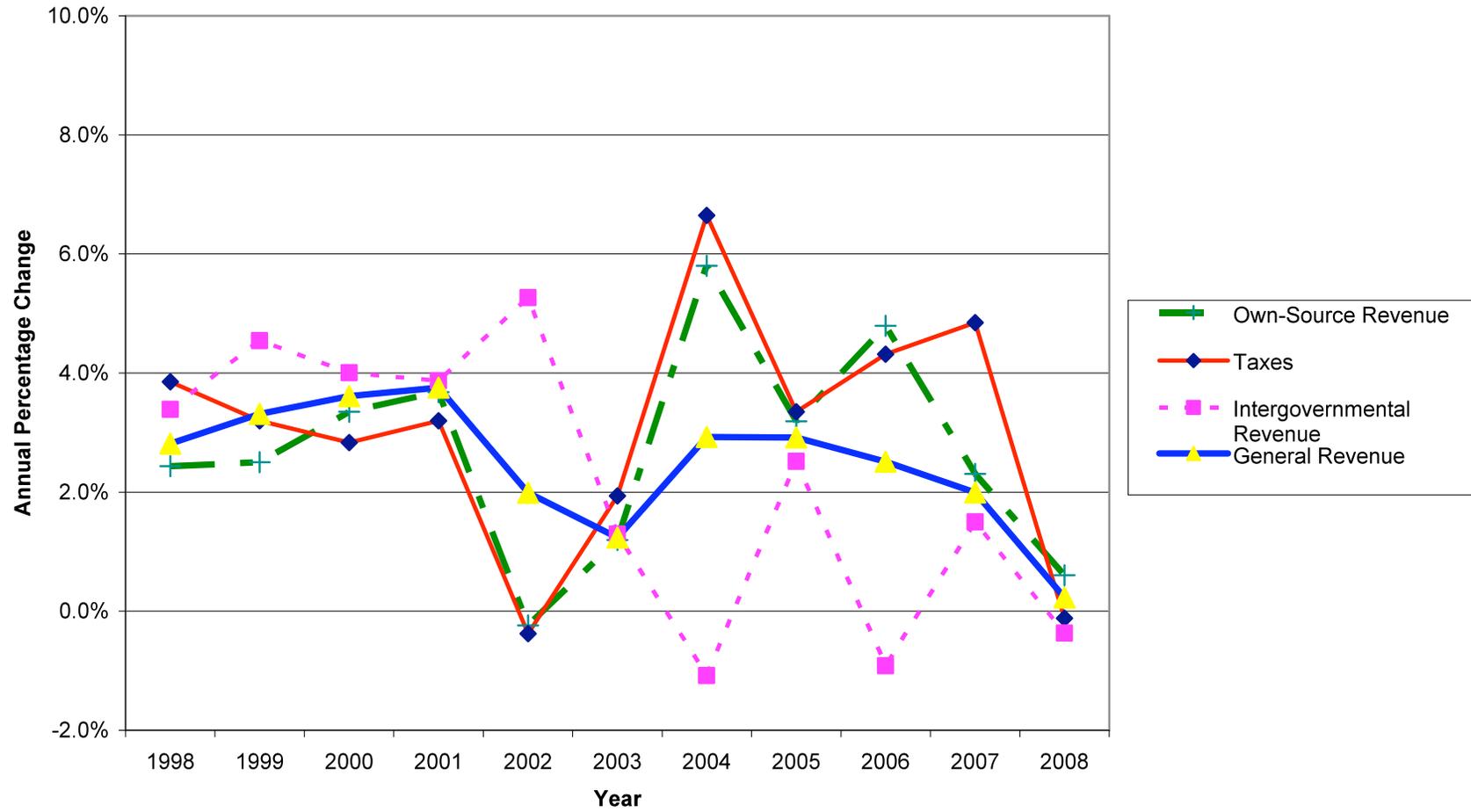
Figure 2

**Annual Percentage Change in Real Tax Revenue of *Constructed Cities*
by Type of Tax 1997 to 2008**
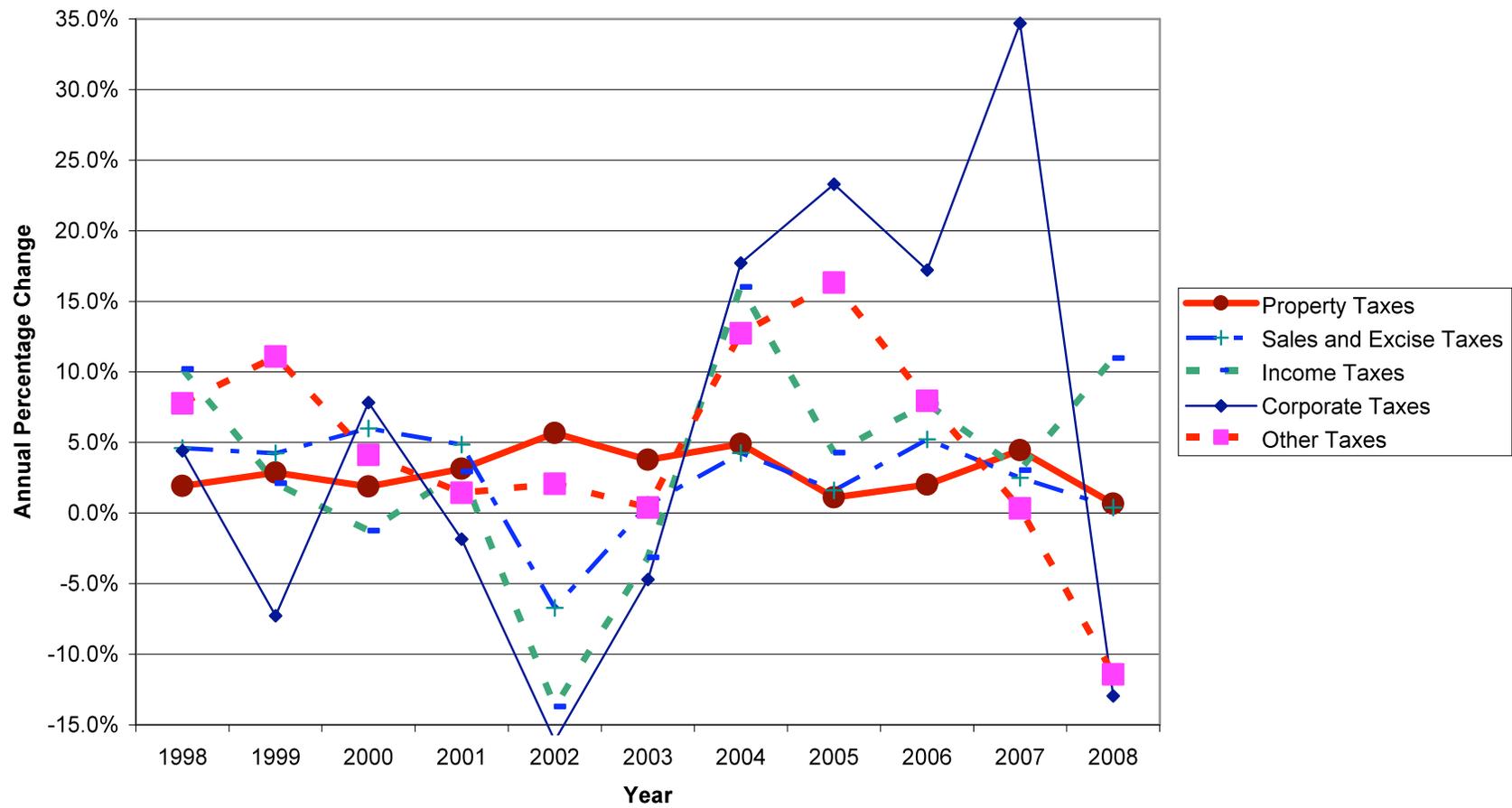
Table 4

Predicted Property Taxes and General Expenditures (Per Capita)
109 Constructed Cities, 1997-2008

	ln(Property Tax$_t$)	ln(Spending$_t$)
ln(House Price Index$_{t-3}$)	.377**	
	(13.49)	
ln(Property Tax Revenue$_{t-1}$)		.202**
		(23.71)
ln(Non Property Tax Revenue$_{t-1}$)		.0639**
		(17.52)
ln(Non-Tax Own-Source Revenue$_{t-1}$)		.229**
		(31.63)
ln(Federal Aid$_{t-1}$)		.0483**
		(11.18)
ln(State Aid$_{t-1}$)		.303**
		(40.47)
Constant	5.028**	2.604**
	(36.84)	(29.63)
Adjusted R-Square	0.353	0.836
N	967	1180

Notes: t-statistics in parenthesis: *p < .01, **p < .001
Although not shown, the property tax regression includes year dummies
and city fixed effects.

Table 5

Predicted Change in Per Capita Property Tax Revenue, FY2008 - FY2012
(in 2009 real dollars)

	Housing Price Index (Pct. Chg. 2006-09)	Property Tax Revenue (Dollar Change FY08-FY12)	Property Tax Revenue (Pct. Chg FY08-FY12)
Average	-11.3%	-$42	-3.2%
Largest Housing Price Declines			
Stockton	-52.9%	-$329	-25.1%
Modesto	-52.1%	-322	-24.4%
Las Vegas	-50.4%	-265	-21.8%
Riverside	-44.2%	-234	-17.6%
Reno	-37.8%	-209	-17.1%
Housing Price Increases			
Austin	10.0%	$75	7.2%
Mobile	3.0%	68	6.3%
Baton Rouge	7.0%	67	6.4%
El Paso	2.4%	63	6.3%
Houston	9.4%	58	5.5%

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Table 6

Adjustment Factors: Average Annual Percentage Changes in Revenue from Non-Property Tax Sources

Revenue Sources	Percentage Change from Previous Fiscal Year			
	FY2009	FY2010	FY2011	FY2012
Tax Revenue, Other than from Property Taxes	-5%	-5%	+1%	+3%
Non-Tax Own Source Revenue	-3%	-3%	+1%	+2%
State Aid				
Pct of Natl Average Fiscal Gap	.1 x (-15.2) = -1.5%	.2 x (-29.0) = -5.8%	.3 x (-18.8) = -5.6%	.4 x (-17.6) = -7.0%
Pct of State Specific Fiscal Gap	.1 x (State Gap)	.2 x (State Gap)	.3 x (State Gap)	.4 x (State Gap)
Federal Aid	+3%	+5%	-5%	-10%

Note: State aid adjustment factors based on data on state fiscal gaps collected by McNichol, Oliff, and Johnson (2011).

Table 7

Predicted Change in Per Capita General Expenditures, FY2009 to FY2013
(in 2009 real dollars)

	Change in Expenditures using National Average Cuts in State Aid		Change in Expenditures using State-Specific Cuts in State Aid	
	Dollar Change	Percent Change	Dollar Change	Percent Change
Average	-$340	-7.1%	-$342	-6.9%
Largest Housing Declines				
Stockton	-643	-11.8	-833	-15.2
Modesto	-634	-11.6	-824	-15.1
Las Vegas	-712	-11.0	-1197	-18.5
Riverside	-556	-10.1	-752	-13.6
Reno	-482	-9.9	-850	-17.6
Housing Price Increases				
Austin	-171	-5.2	-156	-4.7
Mobile	-207	-5.2	-137	-3.5
Baton Rouge	-313	-5.3	-281	-4.7
El Paso	-223	-5.3	-203	-4.8
Houston	-216	-5.4	-197	-5.0

Note: See Table 6 for adjustment factors used for state aid and other revenue sources.

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Appendix 1: Background Information about 109 Constructed Governments (FY2008)

Number of Cities by Fiscal Arrangements

	Has Overlying County	No Overlying County	Total
City-dependent school district	6	12	18
Single independent school district whose boundary is coterminous with city boundaries	10	8	18
One or more independent school districts whose boundaries extend beyond city boundaries	54	2	56
County-wide independent school district	11	0	11
County-dependent school district	6	0	6
Total	87	22	109

Unweighted Average of City Per Capita General Revenues (Top) and Constructed Government Per Capita General Revenues (Bottom)
Number of Cities by Fiscal Arrangements

	Has Overlying County	No Overlying County	Total
City-dependent school district	$4,225 6,215	$4,783 4,783	$4,597 5,260
Single independent school district whose boundary is coterminous with city boundaries	2,194 4,964	3,606 5,120	2,821 5,033
One or more independent school districts whose boundaries extend beyond city boundaries	1,729 4,415	2,895 4,671	1,770 4,424
County-wide independent school district	1,792 5,061		1,792 5,061
County-dependent school district	1,760 4,457		1,760 4,457
Total	1,964 4,687	4,184 4,895	2,412 4,729

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