Predicting the Impact of the Housing Crisis and the "Great Recession" on the Revenues of the Nation's Largest Central Cities

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Abstract

This paper examines the impact of the recession and the collapse in housing prices on local governments in the United States, focusing particularly on the nation's largest cities. While the fiscal condition of most state governments is slowly improving, many central cities have only recently begun to feel the full impacts of the economic slowdown and the disruptions to the housing market. The conclusions of this paper are based on a constructed forecasting model that is used to demonstrate that the revenues available to the majority of large central cities in the U.S. are likely to decline over the next couple years.

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Introduction

It is widely recognized that largely as a result of the "Great Recession" state governments have faced extraordinarily large budget gaps over the past three fiscal years.[1] While a number of states raised taxes, most states relied primarily on spending cuts to balance their budgets (Buschman and Sjoquist, 2011).

Much less attention has been paid to the impact of the recession and the fall in housing prices on local governments. In this paper, we focus on the nation's largest central cities. We will argue that while the fiscal condition of most state governments is slowly improving, many central cities have only recently begun to feel the full impacts of the economic slowdown and the disruptions to the housing market. We construct a forecasting model and use it to demonstrate that the revenues available to the majority of large central cities in the U.S. are likely to decline over the next couple years.

There is very limited data available to help shed light on the changing fiscal conditions of local governments. The most up-to-date comprehensive data that provides insight into the current fiscal situation for local governments are local government employment data from the Bureau of Labor Statistics. Since hitting a peak in August of 2008, local government employment in the U.S. has fallen by 515,000 (3.5 percent) through January of 2012.

A recent report from the National League of Cities indicates that in every year since 2008 the majority of respondents to an annual survey of city chief financial officers expect that their cities will be "less able to meet fiscal needs" than in the previous year (Hoene and Pagano, 2011). These city officials, the majority of whom represent smaller cities, also reported that real General Fund spending was on average reduced by 4.5 percent in 2010 and by 1.9 percent in 2011. The existence of reserve funds (measured as General Fund ending balances) undoubtedly prevented larger spending cuts. These reserve balances have, however, declined in each of the past three years.

To date, information on the current fiscal conditions of large central cities has been anecdotal, coming primarily from media reports on large cuts in public services. For example, severe fiscal pressure in Newark, New Jersey led to a 23 percent property tax rate increase from 2009 to 2011, large increases in water and sewer rates, an 11 percent decline in the number of municipal employees, and projected further cuts in 2012 and 2013.[2]

In this paper, we use census data to provide a picture of the fiscal environment facing nearly all of the nation's largest central cities. We focus on central cities, not only because one-fifth of the nation's total population live in its 100 largest cities, but because the prosperity of those cities is key to the economic prosperity of regions. Dense urban environments promote productivity

[1] According to analysis by the Center on Budget and Policy Priorities, state budget gaps for fiscal years 2009 through 2011 totaled about $430 billion. In these three fiscal years, these budget shortfalls averaged 15, 29, and 20 percent of states' general fund budgets in those years (McNichols, Oliff, and Johnson, 2011).

[2] These numbers were provided to us by Brendan O'Flaherty, a member of the Advisory Newark Budget Task Force.

growth through economies of scale and agglomeration. Spillovers of knowledge from one industry to another are facilitated, firms are better able adapt to changes in demand, and the quality of the matching process between the needs of businesses and the skills of workers is improved. Moreover, the economic value of density is not limited to the central city, but increasingly spills over to suburbs and the entire metropolitan region.

Economic growth does not occur in a vacuum. For cities to prosper they need to have effective local governments that provides a wide array of public services at competitive tax rates. High quality public education, clean water, safe streets, and well-maintained roads and public transit systems all provide the foundation for private-sector investments in a city's economy. Cities that fail to deliver public services that residents and businesses desire will almost certainly be at an economic disadvantage.

The ability of city governments to provide services ultimately depends on the availability of revenue. Since the advent of the Great Recession in 2007, high unemployment rates, especially in central cities, combined with high rates of foreclosures, stagnant or declining housing prices, and continued economic uncertainty have all contributed to reduced city tax revenues. The economies of many of the nation's cities remain depressed and the prospects for revenue growth are uncertain. In this paper, our goal is to forecast future revenues available to central cities. Our focus is thus on the major revenue sources available to governments serving central city residents and businesses.

Our focus in this paper is not on any particular city or region of the country, but rather on the nation's largest central cities. Thus, in order to predict changes in city revenues that are attributable to the economic downturn and the collapse of the housing market, we need to develop a comprehensive fiscal data set for the nation's largest cities. In the next section of the paper, we discuss the conceptual and practical challenges of comparing the revenues available to large central cities both over time and across cities. In the following section, we identify the major sources of revenue and demonstrate how they vary across cities. The most recent comprehensive fiscal data on central city finance are for 2009. The absence of more recent data means that to assess the ongoing impact of the economic and housing crises on central city revenues it is necessary to model fiscal changes based in part on patterns of change in earlier years. In the section which follows the data description, we describe our methods for forecasting central city revenues, with the most attention paid to the modeling of property tax revenues. We combine our results for the property tax with alternative assumptions about prospective changes in state and federal intergovernmental aid, to produce forecasts of central city revenues through 2013. This paper builds on previous work (Chernick, Langley, and Reschovsky, 2011), by expanding our sample to include many more years of data and using a more complete forecasting model for the property tax than we were able to do in the previous paper. We conclude with a brief analysis of the likely impact of revenue reductions on the ability of urban governments to maintain critical public service.

The Difficulty of Comparing the Revenues of Central Cities

The U.S. Census Bureau provides the only comprehensive source of fiscal data for cities. Data are collected separately for each types of governmental unit—general-purpose municipal governments, which include cities and towns, independent school districts, county governments, and special districts. Because the delivery of public services is organized in very different ways in different cities, direct comparison across cities of revenues by source can be highly misleading. While some municipal governments are responsible for the financing of a full array of public services for their residents, others 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. In these cities, the municipal government is responsible for providing public safety, sanitation, and other core municipal services, plus elementary and secondary education, public health, and other social services. On the other hand, municipal governments in, for example, El Paso, Las Vegas, Miami, and Wichita collect only about one-quarter of the revenues that finance the delivery of public services within their boundaries. The remaining three-quarters of the revenues are the responsibility of one or more independent governments serving city residents. These independent governments are either school districts or counties, which often serve geographical areas that stretch way beyond central city government boundaries.

To illustrate the difficulty in making revenue comparisons, census data indicate that in 2009, the city of Tucson, Arizona, which relies heavily on a local sales tax, collected just 14 percent of its total tax revenue from the property tax, while Buffalo, New York collected 88 percent of its tax revenue from the property tax. However, when we take account of the revenues paid by city residents to their overlying school districts and county governments, property taxes accounted for 68 percent of the total local tax revenue paid by the residents of Tucson, but for only 50 percent of tax revenue paid by the residents of Buffalo, New York, where county governments rely heavily on sales tax revenue.

Perhaps because it is difficult to put together data that allow for an accurate comparison of cities on both the revenue and spending side, 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.

Our approach to dealing with the variation in the organizational structure of local governments across the country is to account for all local government revenues levied on city residents and businesses. The basic idea is to include all revenues collected by a central city municipal government and by that portion of independent school districts and county governments that overlaps municipal boundaries. We refer to the result of this calculation as a *constructed* city government.

Before explaining the methodology for calculating the revenues of the *constructed* city, it is important to emphasize the rationale for this approach. Understanding the responses of local politi-

cal institutions to fiscal pressure requires an analysis of individual governments. For the small number of jurisdictions so fiscally stressed that they are facing the threat of bankruptcy, a focus on the city and it revenue streams and debt obligations is entirely appropriate. Our goal, however, is to understand the broader fiscal and economic effects of the recession on cities and their residents, and for this a more comprehensive approach to city finances is required.

The fiscal health of cities depends on the balance between public services provided and taxes imposed. On the tax side, residents and businesses are generally indifferent as to whether taxes are imposed by the city or by other overlapping political jurisdictions. What matters is the total tax burden that falls on the inhabitants of the geographic area that constitutes the city, in relation to services received. To assess the effect of the recession on the fiscal health of cities, and the potential linkage to their economic health, we need a comprehensive accounting of revenues and expenditures. For example, if schooling is provided by an overlapping and independent school district, and the state cuts aid to school districts, city residents and businesses must either be willing to offset the state aid cut with an increase in property taxes or fees, or accept the reductions in school budgets that will occur. The mix of responses to fiscal changes is likely to affect the economic competitiveness of the city. If school or county property taxes rise in response to cuts in state school aid, while city taxes remain unchanged, the *constructed* city approach automatically takes account of the effect of these policy responses on the overall tax burden in cities. If one analyzes the municipal government alone, the broader tax effects will be understated in cities where overlapping governments are more important, and the potential effect of the recession on the fiscal base of cities will be obscured. In the analysis which follows, we will make a number of direct comparisons between fiscal patterns across political units (central city municipal governments) and patterns across geographic units (*constructed* cities).

While particular methodologies differ, the general approach to capturing the effects of overlapping jurisdictions is not new. 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 revenue and spending 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 from 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.

To create *constructed* cities we took 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 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 enrollments to allocate a pro-rata share of total school revenues to the *constructed* city. For each school district serving a portion of the central city, we drew on geographical information system

(GIS) analysis of Census block group level data from the 1980-2000 decennial censuses to determine the number of students in each school district that live in the central city.[3]

The final step in calculating the revenues of *constructed* cities was to add the portion of county government revenues associated with city residents. In cases where county governments cover an area larger than the central city, revenues are allocated to the *constructed* city on the basis of the city's share of county population.[4]

The revenue allocation rules we employ are certainly not perfect. Ideally, we would like to allocate the revenue from over-lapping governments in proportion to the share of each revenue base that lies within the boundaries of the central city. For example, if 40 percent of the property tax base of an independent school district was within city boundaries, 40 percent of the property tax revenue of the school district would be allocated to the *constructed* city. Unfortunately, comprehensive data on the spatial distribution of tax bases do not exist. Thus, the only viable option is to use data on the spatial distribution of population and/or students as a basic for allocating revenues to *constructed* cities. In effect, our method allocates revenues according to the spatial distribution of the beneficiaries of services, assumed to be the general population for counties and students for school districts. If, within any given metropolitan area, the property tax is disproportionately concentrated in the central city, relative to the distribution of students or population, then our methodology will understate the property tax revenues allocated to the *constructed* city. The same caveat holds true for other local taxes. Although we have no way of systematically calibrating the bias created by following our methodology, we note that while per capita property values are higher in some central cities than in their suburbs, the opposite is true in many other metropolitan areas. We are optimistic that on average, our allocation scheme provides a reasonably accurate picture of the revenues available to *constructed* cities.

In future work, we plan to analyze the pattern of government expenditures within and across *constructed* cities. In allocating expenditures we will utilize the same methodology we have used for revenues. The methodology will lead to an under (over) estimate of *constructed* city spending to the extent that non-central city county residents receive a below (above)-average level of per capita county services. Despite these potential mis-allocations, our measure of *constructed* city finances provides the most detailed and comprehensive picture of central city finances available.

We have not included revenue 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

[3] We used census tract level data for 1980 since block level data were not available for that year.
[4] Contact the authors for a more detailed description of the methodology used to create our *constructed* city data set.

rarely provided by municipal governments.[5] Thus, failing to include special districts should do little to distort fiscal comparisons among central cities.

For this paper, we have calculated *constructed* city revenues for almost all the nation's largest central cities for the years 1988 through 2009. The source for the data is the quinquennial Census of Governments, and the Annual Surveys of State and Local Government Finances for all non-census years between 1988 and 2009. Our sample includes all cities with 2007 populations over 200,000 except those with 1980 populations below 100,000 **and** all cities with 1980 populations over 150,000 even if their 2007 population was below 200,000.[6] 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 population 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 2009, the population of the 109 central cities in our sample was 58.9 million. This number was equal to 60.3 percent of the population of all "principal" cities within U.S. metropolitan statistical areas.

The appendix table divides the 109 cities in our sample into 10 categories 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.

A number of previous empirical studies focusing on the financing of municipal governments have failed to take full account of the impact of overlapping jurisdictions. For example, Carroll (2009) utilizes census data to study revenue diversification among all municipal governments with populations above 25,000. She measures diversification by calculating a Hirschman-Herfindahl index of both tax and own-source revenue diversification. Using our central city revenue data, we find that the Hirschman-Herfindahl index is quite sensitive to the inclusion of revenue from overlapping, independent governments.[7] Other studies, for example, Inman (1979) and Sjoquist, Walker, Wallace (2009), have used dummy variables to partially adjust for over-

[5] When public utilities are provided by municipal governments, their revenues are usually included in special "enterprise" accounts. The Census Bureau treats enterprise revenues separately, and explicitly does not include them in the revenue concept, "general revenues," that we use in this paper.

[6] 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 6 cities that otherwise met our selections criteria. The only excluded city among the 50 largest cities is Washington, DC. It was excluded because it has no state government.

[7] To measure this sensitivity, we calculated Hirschman-Herfindahl indices for both tax and own-source revenues using data for municipal governments alone and for our *constructed* cities. To provide a measure of relative revenue diversification we rank the resulting index values from 1 to 109 and then compare the rankings from the index calculated using municipal revenues and the index based on *constructed* city revenues. We then calculated the absolute value of the change in rank values, and found that using *constructed* city data changed the own-source revenue rankings by between 25 and 50 places for 33 cities and by over 50 places for 24 cities. Similar results hold when we measure tax revenue diversification.

lapping 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.

Constructed City Revenues and a Comparison to Revenues of Central City Governments

In this section, we present data on the major sources of revenue in our 109 *constructed* cities. We also explore how the distribution of revenue by source in *constructed* cities differs from the revenue sources of municipal governments in the 109 central cities. Table 1 divides total general revenues of *constructed* cities into own-source and intergovernmental revenues, and, in the bottom panel, displays tax revenues by type of tax.

In fiscal year 2009, the 109 *constructed* cities in our sample had general revenues of $321.2 billion. The average *constructed* city raised 62 percent of its revenue from taxes, fees, and miscellaneous sources, and received the remaining 38 percent from higher level governments, primarily through state aid. As shown in Table 1, there is a great deal of variation in the composition of revenue among the 109 cities. At one extreme is Springfield, MA, which raised 32 percent of its general revenue from own souces, and at the other extreme is Atlanta, Georgia, which raised nearly 90 percent of its general revenue from own sources and received only 10 percent through federal and state aid.

Table 1 also shows that in the average *constructed* city, the property tax accounts for nearly 68 percent of tax revenues. A closer look at the distribution of property tax shares shows that among the 109 *constructed* cities, 24 raised 80 percent of more of their tax revenues from the property tax, including 9 cities that relied on the property tax for more than 90 percent of their total tax revenue. At the other extreme, Birmingham, Mobile, and Montgomery, Alabama all got less than 30 percent of their tax revenues from the property tax. Other than the property tax, in the 109 *constructed* cities, only the general sales tax accounted more than 10 percent of tax revenues. The low average shares of non-property tax revenues reflect the fact that most *constructed* cities either don't utilize at all or raise only small amounts of revenues from taxes other than the property tax. For example, 18 *constructed* cities generate no revenue from the general sales tax and another 34 raise less than 10 percent of their tax revenues from the sales tax. The individual income tax provides revenue in 21 *constructed* cities and the corporate income tax in only 6 cities.

The purpose of Table 2 is to decompose the *constructed* city revenue data presented in Table 1 to better understand the substantial differences in the revenue sources in the various political jurisdictions (municipalities, counties, and school districts) that are the components of *constructed* cities. The left-hand panel of the table lists for each source of revenue, the sum of revenue from that source across each type of government.

In a dozen central cities, where there are no independent school districts or overlying county government, municipal revenues are equivalent to *constructed* city revenues.

The first two columns of the table provide data on the total revenue by source collected in all of the 109 central cities. Of the $321.2 billion of total general revenue of *constructed* cities, 61.2 percent comes from central cities' municipal governments, 16.5 percent from county governments and 22.4 percent from school districts serving central city residents and businesses. These aggregate revenue data understate the importance of overlying school districts and county governments in the average central city because New York City and several other large central cities have no overlying governments, while the *constructed* cities which have the smallest share of general revenue attributable to their municipal governments are generally small. Thus, the average share of general revenues associated with municipal governments in our 109 *constructed* cities is 49.6 percent, and if we restrict our sample to the 75 *constructed* governments that have both independent school districts and overlying county governments, the municipal government share of general revenues is only 38.8 percent, with 24.1 percent associated with county governments and 37.1 percent with independent school districts serving central city residents.

The data in the left-hand panel of Table 2 also reveal that central city municipal governments rely much more heavily on certain sources of revenue compared to county governments and school districts. In particular, nearly 83 percent of all federal aid received by the 109 *constructed* cities flows to their municipal governments. Also, individual and corporate income taxes are utilized by municipal governments in central cities and almost never by overlying county governments and school districts.

The right-hand panel allows us to see how the distribution of revenue and taxes by source differs between central city municipalities and their overlying governments. The data show clearly that *constructed* cities rely much more heavily on intergovernmental revenues than central city municipal governments. Although federal aid is a more important revenue source for city governments than for county governments and school districts serving central cities, the opposite is true for state aid. It is striking that in 2009, 60 percent of the revenue of school districts serving central city residents comes from the state aid. For the nation as a whole, state governments in that year provided 46.7 percent of public school district revenues (National Center for Education Statistics, 2011). The particularly heavily reliance on state aid by central city school districts implies that the revenue of *constructed* cities will be considerably more sensitive to changes in state education aid than the revenue of central city municipal governments.

On average, the property tax accounts for 67.6 percent of the tax revenue of *constructed* cities, but only 52.3 percent of the tax revenue of city municipal governments. These differences are consistent with the fact that city governments rely much more heavily on tax revenues from taxes other than the property tax than county governments and school districts. The one exception to this pattern is that county governments serving central city residents on average get about 18 percent of their tax revenue from the general sales tax. City governments and to a lesser extent counties get a substantial share of their revenues from user fees and charges. This pattern of revenues contrasts with school districts serving central cities. On average, they rely on taxes for 87 percent of their own-source revenues, and the property tax comprises 96 percent of their total tax revenues.

The data on the distribution of revenue by source and by type of government presented in Table 2 provides an overall picture of the revenues available to the nation's largest central cities, but obscures the large variations in revenue source across governments. These inter-city differences make comparisons of revenues that rely only on data from municipal governments highly misleading. For example, consider Pittsburgh, Pennsylvania and Baltimore, Maryland. In 2009, per capita general revenue of the government of the City of Pittsburgh was $1,958, while the per capita revenue of the City of Baltimore was $5,306, 2.7 times higher. However, when we compare data for the two *constructed* cities, their per capita revenues are nearly identical. The explanation for these numbers is that only 37 percent of government revenue flowing to or paid by Pittsburgh residents is tied to the municipal government, the rest is collected by several independent school districts and the county government (Allegheny) serving central city residents and businesses. In contrast, in Baltimore the municipal government is responsible for both public education and for all county government functions. Among the nation's largest central cities, there are quite a few other examples of *constructed* cities with similar levels of per capita revenue, although their municipal governments have quite dissimilar per capita revenues.

Comparing per capita revenues across central city municipal governments overstates the differences across cities because it forces us to compare city governments that have very different sets of public service responsibilities.[8] Utilizing the concept of *constructed* cities provides the basis for more accurate inter-city comparisons. The *constructed* city concepts also allows us to incorporate revenue forecasts for the property tax and information on cuts in state aid to school districts into a comprehensive picture of the state of city revenues through the Great Recession.

Forecasting Revenues for *Constructed* Cities

To forecast general revenues for 109 *constructed* cities over the 2009-2013 period, we sum projections for five separate revenue streams: 1) property taxes, 2) non-property tax, tax revenues, 3) non-tax own source revenues, 4) state aid, and 5) federal aid. We use econometric models fitted with actual and projected metropolitan area-level data to forecast the three sources of own-raised revenue, and make a range of projections about the two sources of intergovernmental revenues based on information from surveys and published revenue estimates.

Property Tax Revenues

As revenue from the property tax is the most important source of tax revenue for most central cities, we turn first to the development of a model to forecast *constructed* city property tax revenues. As with the forecasting of nearly all taxes, changes over time in tax revenues are expected to be directly related to the growth of the relevant tax base. Predicting the exact relationship between changes in tax revenues and changes in the size of the tax base is particularly difficult in the case of the property tax. Unlike the sales and income taxes, where changes in tax rates are quite infrequent, property tax rates are generally adjusted on an annual basis to reflect both changes in tax base and in revenue needs. Predicting the revenue impacts of these tax rate responses is further complicated by the existence in some states of legislatively or constitutionally

[8] For our sample of 109 *constructed* cities, the coefficient of variation of 2009 per capita general revenue was 0.257. This compares to the coefficient of variation among the 109 central city municipal governments of 0.592.

imposed limits on tax rates, changes in tax levies, or changes in assessed values. Major changes in the fiscal relationships between state and local governments can also influence property tax revenues. For example, school funding reforms that result in large increases in state education aid are often motivated by a desire to reduce the reliance on property taxation. Conversely, cuts in state fiscal assistance might motivate local governments to replace lost state revenue with additional revenue from the property tax.[9]

Although property taxes are generally levied on all real property, comprehensive data on property values over time and across states do not exist. The absence of true tax base data has led researchers to focus on the role of changes in housing prices in explaining changes in property values (Lutz, 2008; Alm, Buschman, and Sjoquist, 2011; Chernick, Langley, and Reschovsky, 2011). Data collected in the Lincoln Institute of Land Policy's *Significant Features of the Property Tax*, indicate that in the large majority of states that report property tax base by functional class, residential property accounts for well over half of total property value.

As do Lutz (2008) and Alm, Buschman, and Sjoquist (2011), we utilize the metropolitan area housing price indices calculated by the U.S. Federal Housing Finance Agency.[10] A review of the housing price indices for the metropolitan areas that contain our 109 *constructed* cities, demonstrate very clearly that the housing boom and bust that so influenced our economy over the past few years played out very differently in different parts of the country. Figure 1 displays changes in the average housing price index for our 109 *constructed* cities for the years 1986 through the second quarter of 2011, and changes in the housing price index in the Las Vegas and in the Houston metropolitan areas. On average, housing prices in the metropolitan areas encompassing the nation's largest cities grew quite steadily from 1986 through 2000, with the rate of growth accelerating after 2000. On average, prices about doubled in the decade between 1997 and 2007, before falling by about 20 percent between 2007 and 2011. These averages, however, hide the large differences in the behavior of the market in different metropolitan areas. For example, Las Vegas experienced a tremendous housing boom, with prices peaking in 2006, followed by a steep decline. By mid-2011, housing prices had declined to levels last seen in 1996. By contrast, in the Houston metropolitan area, housing prices peaked in mid-2009 and have only fallen by four percent since then. These large differences in the performance of the housing market across the country suggest that the temporal stability of property tax revenue will vary substantially across our sample of *constructed* cities.

There are strong reasons to believe that changes in property tax revenues will follow changes in housing prices with a considerable time lag. Property taxes are levied on the assessed value of property. As property tax bills generally reflect assessed values in the previous year, there will generally be at least a one-year lag from changes in market values to observed changes in property tax revenues. If properties are not reassessed annually, or only a portion are reassessed, the delays between changes in market value and changes in assessed value are likely to stretch out

[9] Dye and Reschovsky (2008) found that on average local governments responded to cuts in state education occurring after the 2001 recession by increasing property tax revenues by approximately 25 cents for each dollar of reduced state aid.

[10] 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.

over several years. In addition, a number of cites have explicit policies that gradually phase in, over some number of years, any increase (or decrease) in assessed value that results from market-value changes.

Aggregate national data are also consistent with a substantial lag between changes in house prices and property tax revenues. The national all-transactions housing price index *constructed* by the Federal Housing Finance Agency peaked in the first quarter of 2007. Despite the decline in housing prices, Census Bureau data indicate that total state and local property tax revenues continued to rise until the end of 2009. Annual property tax revenues then declined slightly for the 12-month period ending in March 2010. Revenues then rose for three quarters until they began a steady decline after the end of September 2010. In recent research, Lutz (2008) and Lutz, Malloy, and Shan (2011) find evidence of an approximately three-year lag between changes in housing prices and changes in property tax revenues.

In order to forecast the change in property tax revenues, we estimated the following equation:

$$(1)\quad \Delta \ln(PTax_{it}) = \sum_{g=2}^{4} \alpha_g \Delta \ln(HPI_{i,t-g}) + \sum_{g=1}^{2} \beta_g \Delta \ln(Income_{i,t-g}) + \delta * \Delta \ln(StateAid_{i,t-1}) + \sum_{i=1}^{109} \gamma_i (City_i) + u_{it}$$

where *PTax* is real per capita property tax revenue for the 109 *constructed* cities, *HPI* is the annual average of the quarterly all-transaction housing price index produced by the Federal Housing Finance Agency (FHFA) adjusted for inflation, *Income* is real per capita personal income for the metropolitan area in which each *constructed* city is located, *State Aid* is real per capita state aid for the 109 *constructed* cities, and *City* represent city fixed effects. Because the model is estimated in terms of log changes, the fixed effects test for city-specific trends in the growth (or decline) of per capita property taxes.

We tested different lag lengths for each of the three explanatory variables, with Equation 1 being our preferred specification. We also tested for an asymmetric response to housing price declines, with the hypothesis that local governments may increase tax rates more aggressively to maintain revenues when home values decline. However, we excluded these variables, because the coefficients were statistically insignificant.[11] Similarly, we tried including a dummy variable indicating the years in which states imposed potentially binding property tax limits on their local governments.[12] This variable was excluded from the final specification because it was statistically insignificant. The property tax limit variable is arguably unnecessary since the city fixed effects implicitly control for the effect of these limits on property tax growth rates. Finally, we tried estimating Equation 1 with nominal values with a control for the price level in each year. This specification yielded similar results as our preferred specification that uses real values for each variable.

Because FHFA housing price index values are not available for a substantial number of metropolitan areas for the years prior to 1983 and because we specify a lag between changes in housing prices and property tax revenues, we have estimated equation (1) for the years 1988 through

[11] We did find a statistically significant coefficient estimates when estimating Equation 1 with nominal values. However, we used a composite Wald test to determine that the cumulative impact of each of a three or four-year lagged housing price decrease is not different from an equivalent housing price increase.

[12] The property tax limit data were compiled by Nathan Anderson of the University of Illinois, Chicago.

2009. For 18 out of our potential 2,398 observations, nominal per capita property tax revenue changed by more than 50 percent from one year to the next. Because these changes either reflect a major policy change or a data-reporting error, we have excluded these 18 observations. We have also had to exclude an additional 11 observations for individual years and metropolitan areas where HPI index values were missing. Our estimation of equation 1, which is presented in Table 3, is thus based on 2,369 observations.

We are particularly interested in the α_g coefficients in Equation 1, which provide estimates of the elasticity of property tax revenue with respect housing prices. Given that housing prices rose quite dramatically during the period from about 1998 through 2007, as long as the property tax elasticity is greater than zero, we would expect increases in real property tax revenues over this period.[13]

The data in Figure 2 allow us to compare average annual real percentage changes in property tax revenue in our sample of *constructed* cities for the years 1983 through 2009 to annual percentage changes in other types of taxes. The figure makes it clear that while real property tax revenues did indeed increase over the period of the entire housing boom, the annual rate of increases averaged 3.1 percent between 1998 and 2007, and never exceeded 5 percent per year. This pattern of real property tax growth over a period of rapid increases in housing prices suggests that the elasticity of revenues with respect to housing prices is likely to be positive, but substantially below unity in magnitude. The figure also illustrates clearly that property tax revenues are relatively stable, especially when compared to sales, income, and other taxes used by central city governments.

By adding up the housing price coefficients in equation (1), we can determine the overall magnitude of the long-term relationship between changes in property tax revenue and housing prices. The coefficients in Table 3 imply a four-year cumulative property tax revenue elasticity of approximately 0.25 for housing price increases. If we assume that the change in the city's total city property tax base, including both rental-residential and commercial-industrial property, is proportional to the change in metropolitan housing prices, then our estimate would imply that on average the effective property tax rate will change enough to offset about 75 percent of the changes in property tax revenues associated with changes in housing prices.[14]
The cumulative elasticity estimate near 0.25 is lower than the 0.40 found by Lutz (2008). One reason for the lower elasticity estimate in our work than in Lutz may be that his national sample includes all jurisdictions in metropolitan areas, while our sample is restricted to the largest central cities and their overlapping jurisdictions. Hence, the property tax base in our sample is likely to include a higher proportion of non-residential real estate than in the Lutz sample. Non-residential real estate values are likely to be less directly related to housing prices than residential

[13] The national FHFA housing price index, which has a value of 100 in the first quarter of 1995, rose from an average of 115 in 1998 to an average of 212 in 2007.
[14] Alm, Buschman, and Sjoquist (2011) also estimate a pooled regression of changes in property tax revenue of local governments. They report R^2 values of around 0.01, but also provide a detailed explanation of why one should expect low R^2 values in this type of equation. In comparison, we report an adjusted R^2 of 0.045. In a previous paper with a similar regression, we reported an adjusted R^2 of 0.353 (Chernick, Langley, and Reschovsky 2011). The higher R^2 is because in that paper we estimated the relationship between *levels* of housing prices and property taxes, whereas equation (1) is based on annual *changes*.

property. Moreover, city officials may attempt to maintain property tax revenues in the face of housing price declines by shifting the burden onto non-residential property.

Using the estimated results from equation (1) along with actual and projected values of metropolitan area HPI, personal income, and information about state aid, we calculate predicted values for annual changes in property tax revenues for the 109 cities in our sample. We then add these predicted changes to actual 2009 property tax revenues of each *constructed* city (relying on Census data) in order to calculate annual per capita revenue for each year between 2010 and 2013.

The average forecast change in real per capita property tax revenues between fiscal year 2009 and 2013 is a reduction of $46. This is equivalent to a 3.4 percent decrease over the four-year period.

Given our coefficient estimates and large variations across cities in changes in housing prices, personal income, and state aid, we expect that there will be large differences across cities in predicted property tax revenues for the 2010-2013 period. In Table 4, we list the five cities with the largest decreases and increases in real per capita property taxes from 2009 to 2013. For each of these cities, we display our predicted property tax changes along with actual housing price changes between 2007 and 2011.

The cities with the largest decreases are projected to face declines in real per capita property taxes of 20 percent or more. With the exception of Flint, Michigan, all of these cities are in areas of California or Arizona that experienced drops in housing prices of roughly 50 percent. By contrast, the cities with the largest increases have projected increases in property taxes of 13 to 15 percent. All of these cities are in metropolitan areas that largely avoided the housing bubble and experienced little change in housing prices over the 2007-2011 period. For the 109 cities in our sample, we predict that between 2009 and 2013, 65 cities will face declining per capita real property tax revenues, with an average decrease of 9.6 percent, while 44 cities will realize increased property tax revenues, with an average increase of 5.7 percent.

Other Own-Raised Revenues

Tables 1 and 2 document the important role played by non-property tax own-source revenue in many *constructed* cities. These revenues come from local government sales and income taxes, from user charges, fees, licenses, and from other miscellaneous sources. Our strategy for forecasting these revenues is based on the relationship between changes in personal income and the non-property tax revenues of local governments. Although we forecast separately tax revenue from taxes other than the property tax and own-source revenue from non-tax sources, both equations are of a similar form. As shown in equations (2) and (3), the dependent variables are expressed as changes in log values and the independent variables include changes in the log of metropolitan area personal income in the current and prior year, plus city fixed effects.

$$(2)\quad \Delta \ln(NonPTax_{it}) = \sum_{g=0}^{1} \beta_g \Delta \ln(Income_{i,t-g}) + \sum_{i=1}^{109} \delta_i * City_i + u_{it}$$

$$(3)\ \Delta \ln(NonTax_{it}) = \sum_{g=0}^{1} \beta_g \Delta \ln(Income_{i,t-g}) + \sum_{i=1}^{109} \delta_i * City_i + u_{it}$$

where $NonPT_{it}$ are real per capita revenues from local government taxes other than the property tax, $NonTax_{it}$ are real per capita local government own-raised revenues from non tax sources, *Income* is per capita personal income for the metropolitan area in which each *constructed* city is located, and *City* are city-specific fixed effects.

Parallel to the property tax equation, equations (2) and (3) are estimated for the years 1988 through 2009. To estimate equation (2) we dropped 37 observations with annual changes in nominal per capita non-property taxes exceeding 50 percent, and to estimate equation (3) we dropped 29 observations with annual changes in nominal per capita non-tax own-source revenues exceeding 50 percent.

Table 5 shows the results from estimating equations (2) and (3). As expected the lag between changes in income and changes in revenues is much shorter than with the property tax. The cumulative elasticity estimates after one-year are 1.1 and 0.56, which suggests that non property tax revenue will be an important source of central city revenue growth over the next couple years as long as the rate of personal income growth continues its current upward trend.[15]

Using the estimated coefficients displayed in Table 5, we are able to forecast non-property tax and non-tax own-source revenues for each *constructed* city for the period 2009 through 2013. Data on the annual changes in personal income needed for the forecasts come from metropolitan area personal income projections produced by the economics consulting firm Woods and Poole Economics, Inc.

Intergovernmental Revenues

Over the past few years, most state governments have faced very large budget shortfalls. While state tax rate increases were quite widespread, in most states the largest part of the required budget adjustments occurred on the spending side. In most states these spending reductions affected both state programs and state intergovernmental transfers to their local governments, including municipal governments, school districts, and county governments. Recent surveys suggest that a number of states will face new budget shortfalls in fiscal year 2013, suggesting that these cuts in state aid are likely to continue (McNichol, Oliff, Johnson, 2011). Major reductions in state aid programs for municipal governments and in some cases the complete elimination of these programs have occurred in some states, such as Nebraska, Ohio, and Michigan (Gurwitz, 2011). Unfortunately no comprehensive data on these aid cuts are available. A recent survey conducted by the Center on Budget and Policy Priorities does however provide data on changes in state education aid in nearly all states for the fiscal years between 2008 and 2012 (Oliff and Leachman, 2011).

[15] Since the most important non-property local tax is the sales tax, evidence to support our prediction for taxes other than the property tax comes from the most recent data on state sales tax revenues, which shows year-over-year increases of 6 and 2 percent respectively in the first and second quarters of 2011 (Dadayan and Ward, 2011).

To forecast the change in state aid to our *constructed* cities between 2009 and 2013, we utilize the data from Oliff and Leachman on percentage changes in state education aid and make three assumptions. First, we assume that the percentage change in state education aid reported by Oliff and Leachman for any given state applies to the state education aid received by the school districts in each *constructed* city in that state. Second, in the absence of comprehensive data on state aid for purposes other than education, we assume that state governments apply the same percentage change to non-education aid as to education aid. And finally, as the most recent data on state aid changes (as reported in Oliff and Leachman) are for changes between 2011 and 2012, we must predict changes in aid that will occur between 2012 and 2013. As we have no firm basis for making these predictions, we make a range of assumptions about the change in state aid between 2012 and 2013. As our base case, we assume that state aid in each city stays constant in real terms from 2012 to 2013. Our "best" case assumption is that state aid increases by three percent in real terms, while our "worst" case is that state aid changes by the same amount in real terms in 2012-2013 as in 2011-2012, i.e. an average reduction of about 6 percent.

Changes in federal spending can affect revenues of central city governments in several ways. First, and most directly, central city governments are the recipients of a number of direct federal grants. Some of these grants, such as Community Development Block Grants, provide city governments with funds that can be used to help finance a range of city government projects. A myriad of other grant programs are designed to assist local governments in providing a set of specific services, such as the education of children with disabilities, the environmental remediation of toxic sites, or the reduction of infant mortality.

A large number of other federal government programs that provide an array of benefits to central city residents have an indirect impact on *constructed* city revenues. For example, the Supplemental Nutritional Assistance Program (Food Stamps), various housing subsidy programs, the Earned Income Tax Credit, and the Low-Income Home Energy Assistance programs all provide low-income central city residents with needed resources. By effectively reducing the disposable income of recipient, cuts in these programs would negatively impact local government revenues, especially from consumption-based taxes and fees.

The Congressional agreement in mid-2011 to increase the federal debt ceiling mandated that Congress reduce spending over the next decade by $1.2 trillion. Other widely discussed proposals call for even larger spending cuts. Under every proposal, including President Obama 2013 budget proposal, non-security discretionary programs are targeted for large reductions. Most direct federal aid to local governments fall into the discretionary category. The Congressional debt ceiling agreement also includes reductions in a number of "mandatory" spending programs that provide direct benefits to central city residents. Predicting exactly which programs Congress will choose to reduce, and by how much is not possible. The best we can do is to choose a range of percentage reductions in direct federal intergovernmental aid to central cities between fiscal years 2009 and 2013. As a basis for determining a range of possible cuts we compared actual federal government outlays on intergovernmental grants to state and local governments from discretionary programs with the total outlays from these discretionary programs in the President's 2013 budget. These data indicate that if the President's budget is adopted, these outlays would decline by 37.7 percent in real terms between 2009 and 2013. As an alternative, we calculated

the reduction in outlays from a selection of intergovernmental aid programs that are targeted to local governments, such as Community Development Block Grants, and local law enforcement assistance grants. Again, assuming the enactment of the President's budget proposals, real federal aid would be reduced by 9.5 percent over the four-year period. We take the larger decline as our "worst" case estimate of the change in federal aid, the 9.5 percent reduction in aid as our "best" case, and a middle ground 15 percent as our "base" case .

Total General Revenues

Predicted changes in total general revenues are obtained by summing the predicted changes in each of the components of revenue for our *constructed* cities. Predicted changes from 2009 to 2013 for the components – local property taxes, local non-property taxes, local revenues from non-tax sources, state aid, and federal aid – are obtained starting with 2009 actual revenues for each of these categories, and multiplying by the predicted rate of change over the period 2009 to 2013.

Table 6 displays our predicted changes in *constructed* city real per capita general revenue and changes for each component, under "base" case assumptions. We predict that in the average *constructed* city real per capita general revenues will decline by $170 between 2009 and 2013. This is an average reduction of 3.5 percent. In addition to the projected property tax decline of 3.4 percent, we also forecast that on average non-property tax revenues will decline by 1.2 percent and non-tax own-source revenues will increase by 1.2 percent. Finally, state intergovernmental revenue will decline by 8.2 percent and federal aid by 15 percent (by assumption). Table 6 also presents data on the minimum and maximum percentage change in general revenue and each component of general revenue among our 109 *constructed* cities.

Table 7 summarizes our forecasts for the 2009 to 2013 period for changes in real per capita general revenues, property taxes, and state aid. The table shows both average changes and changes for the five *constructed* cities with the largest percentage decreases and the largest percentage increases in general revenues. There is a wide range of projections surrounding the average predicted decrease in general revenues of 3.5 percent. The five cities with the largest projected revenue declines are all in California, with projected declines between 14.1 and 16.8 percent. Conversely, the five cities with largest projected increases all are predicted to experience revenue growth exceeding three percent. The five California cities with the largest decreases in general revenues will experience both large property tax declines (near 20 percent) and a reduction in state aid of 20 percent over the 2009-2013 period. The five cities with the largest increases in general revenues will experience considerable growth in projected property taxes (from 3.4 to 10.7 percent), and either increases, or generally small decreases, in state aid. The exception to this pattern is Flint, Michigan. Its projected revenue increase is attributable to a large increase in non-tax revenue from user fees.

Table 8 shows the impact on projected revenues of alternative assumptions about growth in state and federal aid. In the "worst" case, general revenue would decrease by 7.6 percent in real per capita terms in our sample of *constructed* cities over the period between 2009 and 2013. Under our "best" case, central city general revenues are forecast to decrease by 1.6 percent between

2009 and 2013. Thus, even under our most optimistic assumptions, real revenues of cities are lower in 2013 than in 2009. Because federal aid makes up on average only four percent of general revenue, even large cuts in federal aid will have relatively minor impacts on the general revenue of central cities. However, because state aid on average comprises fully a third of revenues, overall revenue is quite sensitive to different assumptions about the growth rate in state aid.

The U.S. Census Bureau divides the United States into nine census divisions. In order to explore regional patterns in our revenue forecasts, we calculated the average percentage changes in predicted revenues by source between 2009 and 2013 for the *constructed* cities in each census division. The data in Table 9 illustrate clearly that there exist very distinct regional patterns in the impact of the Great Recession and the housing market crisis on central city finance. In terms of per capita general revenue, we predict that real revenues will increase by 1.1 percent in the East North Central division, remain basically unchanged in New England and in the East South Central division, but decline sharply in the western portion of the country, by an average of 6.4 percent in the Mountain division and by 8.7 percent in the Pacific division.

Looking at the changes in the components of general revenues allows us to better understand the reasons for the large regional differences in the revenue prospects of central cities in different parts of the country. In the West, large drops in property tax revenues are combined with very large cuts in state aid to produce above average reductions in general revenue. Large state aid cuts are also found in the South Atlantic and the West South Central divisions. In the West South Central division, a robust increase in property tax revenues prevents a large drop in general revenues. While the East North Central divisions is forecast to experience a large percentage cut in property tax revenues, a modest increase in state aid will result in a small increase in general revenues.

Conclusions

In this paper we have used forecasting models for local revenue sources, and the most recently available information on state and federal aid, to predict the change in revenues for the 109 largest central cities in the United States. Our unit of analysis is the *constructed* city, which includes the municipal government and revenues allocated from overlapping school districts and counties. As the most recently available comprehensive data on local government finance is for the year 2009, we use our models to forecast general revenues for the four-year period from 2009 through 2013. Our "base" case forecast is for a 3.5 percent decrease in the real general revenues of *constructed* cities over this period. Even under our "best" case assumptions, which include a three percent real increase in state aid between 2012 and 2013, central city revenues would decline by 1.6 percent in real terms between 2009 and 2013. .

While these forecasted declines may appear relatively modest, they contrast quite sharply with the real growth in local tax revenues over the period between 1988 and 2009—the period upon which we based our property tax forecasting model. Our forecast decline in real general revenues also stands in sharp contrast to the change in revenues of our 109 *constructed* cities that occurred during the four years following the end of the 1981-82 recession. During the period from 1982 through 1986, real per capita revenues grew by a robust 17 percent. Given the severity of that

recession, these contrasts highlight the unprecedented magnitude and duration of fiscal pressure on cities that has resulted from the housing market collapse and the 2007-2009 "Great Recession." Assuming that in most cities, it would be extremely hard in the short run to make cuts in employee compensation and debt payments, the projected reductions in revenue are likely to result in cuts in public services provided to central city residents. Rising costs for pensions and health insurance have been a particular source of expenditure pressure. At the same time, if projected cuts in federal programs such as Food Stamps, Medicaid, and unemployment insurance are realized, such cuts will be particular harmful to central city economies with their concentrations of low-income residents. These reductions in federal programs are also likely to increase the demand for city services.

The largest uncertainty in our forecasting model comes from the property tax. Property tax projections for 2010-2013 are based on housing prices for the 2006-2011 period, but use property tax elasticities estimated with housing price data from 1983-2007.[16] Using elasticities estimated during a period of generally stable or increasing housing prices may not provide reliable property tax projections during a period of sharply declining housing prices. For the period from 1983 to 2006, 10.1 percent of observations had year-to-year nominal declines in housing prices, with an average decline of 2.5 percent. In contrast, during the period between 2007 and 2011, 75.4 percent of observations had decreases, with an average decline of 5.6 percent. In many cities, the bursting of the housing price bubble has been accompanied by unprecedented rates of foreclosure, sharply reduced rates of sale of existing houses, and enormous reductions in the production of new housing. Although all of these factors should have a negative effect on property tax revenues, we are unable to fully capture this effect in our model. For the nation as a whole, property tax revenues declined during the last part of 2010 and the first half of 2011. This observed fall in revenue suggests that in many cities the actual reduction in property tax revenues in 2012 and 2013 is likely to exceed our forecasts.

We emphasize that our forecasts for individual cities are subject to considerable uncertainty. In addition to possible changes in the overall structural relationship between housing prices and property tax revenues, annual changes in property tax revenues are highly idiosyncratic. For example, actual growth in property taxes in New York City exceeds our forecast by a considerable amount, due to particular phase-in rules for increases in assessed value and a large increase in nominal tax rates in 2010. This uncertainty means that the confidence intervals for the property tax projections are very wide. The same holds true for other own-source revenues. As discussed above, intergovernmental aid to individual cities is based on observed state-wide patterns in some years, and a range of assumptions about state and federal aid in other years. There is no widely accepted statistical method for computing statistical confidence intervals for the sum of revenue components, when some components are forecast and some components are based on non-statistical assumptions. Our intuition is that confidence intervals for total revenue are at least as wide, and possibly wider, than for individual revenue components.

Regional patterns in our forecasts are likely to be more reliable than forecasts for individual cities, and the regional patterns are instructive. The largest predicted cuts in revenues, of six per-

[16] This range of years reflects the fact that our property tax equation includes lagged housing prices for two through four years.

cent or more, are for cities in the West. The combination of sharp declines in housing prices and large cuts in state aid help to produce this pattern. By contrast, in New England declines in property tax revenues are offset by increases in state aid. In the two South Central divisions, general revenues will be largely unchanged because state aid cuts will be offset by modest increases in property tax revenues. These striking differences in regional patterns, based on the broader fiscal concept of the *constructed* city, show the advantage of using comprehensive geographical units as the basis for fiscal analysis.

Changes in state aid are crucially dependent on changes in state revenues. While evidence from the first half of 2011 suggests a rebound in state revenues as compared to 2010, restoration of prior cuts in state aid seems unlikely, and the very latest budget predictions for states suggest a worsening of fiscal conditions in 2012 and 2013, as compared to the 2012 budgeted amounts. Federal aid will almost certainly be cut further. Hence, with pressure on both locally-raised revenues and intergovernmental aid, cities will continue to face a highly challenging fiscal environment in 2013. The cumulative impact of these forces is increasingly being reflected in budgetary crises in a number of cities, as well as sustained cuts in vital city services.

Table 1

General Revenue and Tax Revenue of *Constructed* Governments by Source of Revenue, 2009

	109 *Constructed* Governments			
	Amount	Share of General Revenues		
Type of Revenue	(in mil.$)	Average	Minimum	Maximum
Intergovernmental Revenues	119,953	37.8%	10.5%	68.1%
Federal aid	12,926	3.5%	0.5%	23.6%
State aid	107,026	34.3%	8.6%	65.2%
Own-source revenue	201,244	62.2%	31.9%	89.5%
Tax revenue	132,113	39.6%	11.6%	60.3%
User fees & charges	47,226	15.7%	2.7%	46.1%
Misc. general rev.	21,904	6.9%	1.3%	25.4%
Total general revenue	321,196	100.0%		
Type of Tax				
Property	78,650	67.6%	26.0%	98.9%
General sales	16,891	14.4%	0.0%	60.0%
Selective sales	10,380	7.6%	0.0%	27.1%
Individual income	12,343	4.8%	0.0%	41.5%
Corporate income	6,149	0.3%	0.0%	16.7%
Other taxes	7,700	5.3%	0.7%	31.5%
Total taxes	132,113	100.0%		

Source: Authors' tablulations of data from the 2009 Annual Survey of Governments, U.S. Census Bureau.

Table 2

General Revenue and Tax Revenue by Source for 109 Large Central Cities, 2009
Comparison of Revenues of *Constructed* Cities and of Their Component Governments

Type of Revenue	109 Large Central Cities							
	Amount (in mil. $)				Average Share of General Revenue and of Total Taxes			
	Municipal Gov't.	County Gov't.*	School Districts+	*Constructed* City	Municipal Gov't.	County Gov't.**	School Districts++	*Constructed* City
Intergovernmental revenue	57,158	19,607	43,187	119,953	21.4%	31.7%	60.5%	37.8%
Federal aid	10,660	1,778	489	12,926	5.1%	3.2%	0.7%	3.5%
State aid	46,499	17,830	42,698	107,026	16.2%	28.6%	59.8%	34.3%
Own-source revenue	139,278	33,279	28,686	201,244	78.6%	68.3%	39.5%	62.2%
Tax revenue	87,614	19,419	25,080	132,113	44.7%	42.0%	34.2%	39.6%
User fees & charges	35,699	10,308	1,219	47,226	23.9%	18.3%	2.1%	15.7%
Misc. general rev.	15,965	3,552	2,387	21,904	10.0%	8.0%	3.2%	6.9%
Total general revenue	$196,437	$52,887	$71,873	$321,196	100.0%	100.0%	100.0%	100.0%
Type of Tax								
Property	39,739	14,750	24,161	78,650	52.3%	74.1%	95.8%	67.6%
General sales	13,467	3,016	409	16,891	18.4%	17.9%	1.9%	14.4%
Selective sales	9,406	933	42	10,380	13.0%	3.8%	0.2%	7.6%
Individual income	12,194	31	118	12,343	8.0%	0.4%	0.6%	4.8%
Corporate income	6,115	34	0	6,149	0.4%	0.1%	0.0%	0.3%
Other taxes	6,694	656	351	7,700	7.9%	3.8%	1.5%	5.3%
Total taxes	$87,614	$19,419	$25,080	$132,113	100.0%	100.0%	100.0%	100.0%

*Dollar amounts are the share of the total revenues of overlying county government allocated to *constructed* central city, with the allocation based on the central city share of total county population.

+Dollar amounts are the share of the total revenues of overlying school districts allocated to *constructed* central cities, with the allocation based on the central city share of total students.

**Average shares calculated for the 87 central cities that have overlying county governments.

++Average shares calculated for the 85 central cities that are served by one or more independent school districts.

Source: Authors' tablulations of data from the 2009 Annual Survey of Governments, U.S. Census Bureau.

Figure 1

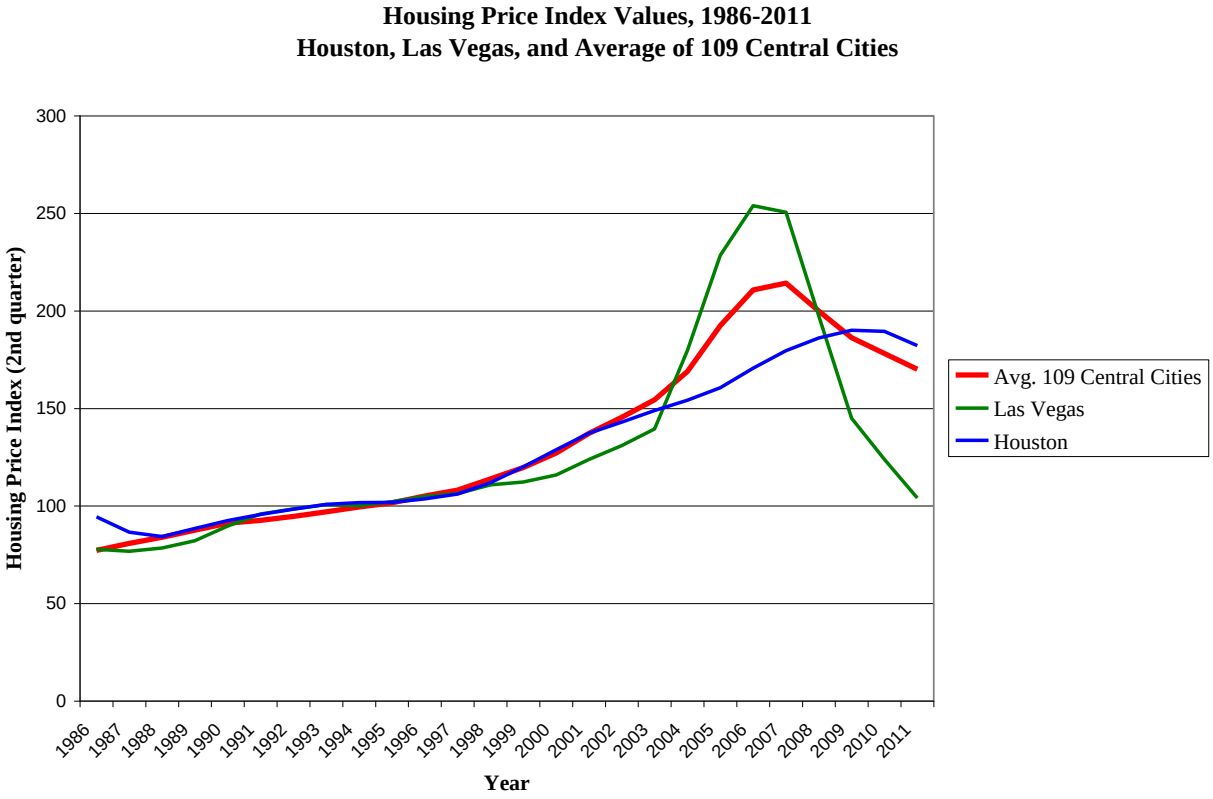
Housing Price Index Values, 1986-2011
Houston, Las Vegas, and Average of 109 Central Cities
Housing Price Index (2nd quarter)
300
250
200
150
100
50
0
1986
1987
1988
1989
1990
1991
1992
1993
1994
1995
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
Year
Avg. 109 Central Cities
Las Vegas
Houston

Figure 2

Annual Percentage Change in Real Tax Revenue of Constructed Cities, by Type of Tax, 1983 to 2009

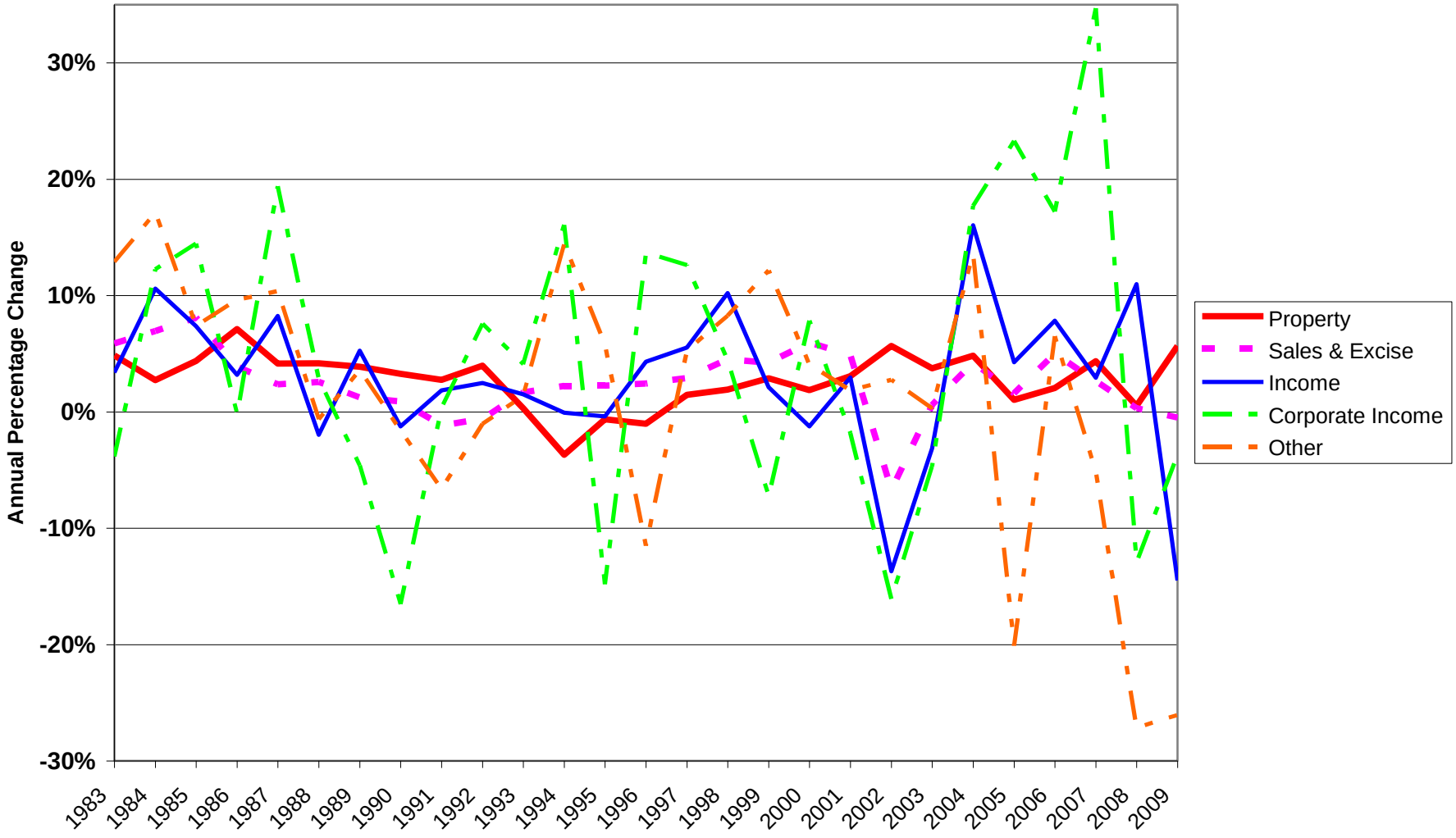

Table 3

Change in the Log of Real Per Capita Property Tax Revenue
109 Constructed Cities, 1988-2009

Independent Variables	**Coefficients**[+]
Change ln(HPI), t-2	0.0515
	(0.0412)
Change ln(HPI), t-3	0.265***
	(0.0601)
Change ln(HPI), t-4	-0.063
	(0.0445)
Change ln(Personal Income), t-1	-0.119
	(0.0794)
Change ln(Personal Income), t-2	0.161**
	(0.0707)
Change ln(State Aid), t-1	-0.0293
	(0.0184)
Constant	0.0268***
	(0.0082)

N=2,369 F=2.046 R^2=0.092 adj. R^2=0.046

[+]Robust standard errors in parentheses. ** p<.05, *** p<.01
Regression include city fixed effects.

Table 4

Predicted Change in Real Per Capita Property Tax Revenues, FY2009 - FY2013

	Housing Price Index (Pct. Chg. 2007-11)	Property Tax Revenue (Dollar Change FY09-FY13)	Property Tax Revenue (Pct. Chg FY09-FY13)
Average	-17.2%	-$46	-3.4%
Largest Percentage Reduction in Real Per Capita Property Tax Revenue			
Flint, MI	-32.2%	-$193	-29.1%
Bakersville, CA	-49.1%	-245	-22.4%
Mesa, AZ	-49.5%	-114	-21.7%
Modesta, CA	-55.3%	-177	-20.9%
Stockton, CA	-54.6%	-180	-19.2%
Largest Percentage Increase in Real Per Capita Property Tax Revenue			
Little Rock, AR	-1.5%	$74	13.3%
Lubbuck, TX	4.4%	138	13.7%
San Antonio, TX	0.3%	190	14.6%
El Paso, TX	-3.8%	146	14.8%
Lexington-Fayette, KY	-1.0%	117	14.8%

Table 5

Changes in Per Capita Real Non-Property Taxes and Non-Tax Own-Source Revenues
109 *Constructed* Cities, 1988-2009

Dependent Variables:	Equation (2) Change in ln(Non-Property Taxes)+	Equation (3) Change in ln(Non-Tax Own Source Rev.)+
Change ln(Personal Income), t	0.428***	0.194*
	(0.0917)	(0.1030)
Change ln(Personal Income), t-1	0.675***	0.368***
	(0.0923)	(0.1070)
Constant	0.0203	-0.0489
	(0.0163)	(0.0382)
	2,361	2,369
	R^2=0.074	R^2=0.031
	adj. R^2=0.029	adj. R^2=0.017
	F-1.84	F=0.79

+Robust standard errors in parentheses. * p<.10, *** p<.01

Table 6

Predicted Changes in Per Capita Real General Revenue,
by Sources of Revenue, FY2009 - FY2013

109 *Constructed* Cities, "Base" Case Forecasts

Type of Revenue	Avg. Change in Revenue 2009-2013 (Per Capita)	Avg. Change in Revenue 2009-2013 (Percentage)	% Change in Revenue 2009-2013 Smallest	% Change in Revenue 2009-2013 Largest
General Revenue	-$170	-3.5%	-16.8%	13.5%
Property Tax Revenue	-$46	-3.4%	-29.1%	14.8%
State Intergovernmental Revenue	-$129	-8.2%	-20.3%	40.3%
Federal Intergovernmental Revenue	-$25	-15.0%	-15.0%	-15.0%
Non-Property Tax Revenue	-$5	-1.2%	-24.8%	16.3%
Non-Tax Own-Source Revenue	$29	1.2%	-19.9%	16.1%

Table 7

Predicted Changes in Real Per Capita General Revenue, FY2009 - FY2013
109 *Constructed* Cities, "Base" Case Forecasts

	Change in Property Taxes (Pct. Chng. 2009-13)	Change in State Aid (Pct. Chng. 2009-13)	Change in General Revenue 2009-2013 (Per Capita)	(Percentage)
Average	-3.4%	-8.1%	-$170	-3.5%
Largest Percentage General Revenue Reductions				
Bakersfield, CA	-22.4%	-20.0%	-$922	-16.8%
Fresno, CA	-18.3%	-20.0%	-799	-16.8%
Stockton, CA	-19.2%	-20.0%	-731	-14.2%
Modesto, CA	-20.9%	-20.0%	-643	-14.2%
Santa Ana, CA	-12.3%	-20.0%	-681	-14.1%
Largest Percentage General Revenue Increases*				
Atlanta, GA	3.4%	-14.4%	241	3.7%
Cincinnati, OH	4.5%	-5.4%	226	3.7%
Flint, MI	-29.1%	-0.7%	278	3.9%
Shreveport, LA	10.7%	1.0%	173	3.9%
Chattanooga, TN	5.2%	0.9%	291	5.2%

*Indianapolis, Gary, and Fort Wayne had larger percentage increases in per capita general revenues. These changes, however, reflected major property tax and school funding reforms in Indiana that included over 50 percent increases in state education aid for Indiana's central cities combined with smaller property tax reductions.

Table 8

Impact of Alternative Intergovernmental Aid Assumptions
Changes in General and Intergovernmental Revenues, FY2009 - FY2013
109 *Constructed* Cities

	Average Change in Real Revenue 2009-2013					
	"Base" Case		"Worst" Case		"Best" Case	
	(Per Capita)	(Percentage)	(Per Capita)	(Percentage)	(Per Capita)	(Percentage)
General Revenue	-$170	-3.5%	-$375	-7.6%	-$83	-1.6%
State Intergovernmental Revenue	-129	-8.2%	-219	-13.7%	-84	-5.4%
Federal Intergovernmental Revenue	-25	-15.0%	-62	-37.7%	-16	-9.5%

Note: In the "base" case, state aid between 2012 and 2013 remains constant in real terms and federal aid declines by 15 percent in real terms between 2009 and 2013. In the "worst" case, the state aid declines by 6 percent in real terms between 2012 and 2013 and federal aid declines by 37.7 percent in real dollars between 2009 and 2013. In the "best" case, state aid between 2012 and 2013 increases by 3 percent in real terms and federal aid declines by 9.5 percent in real terms over the four-year period.

Table 9

Predicted Percentage Change in Real Revenues by Source, by Census Division, 2009-2013

Census Division	Number of Cities	Predicted Percentage Change in General Revenue 2009-2013 (Share of General Revenue by Source)				
		General Revenue	Property Tax	State Aid	Non-Property Taxes	Non-Tax Own-Source
New England	4	-0.1%	-4.1%	3.6%	3.3%	2.3%
		100.0%	35.7%	48.1%	1.7%	11.0%
Mid-Atlantic	7	-3.6%	-9.5%	-2.9%	-2.1%	1.4%
		100.0%	17.0%	47.1%	17.8%	14.3%
South Atlantic	18	-4.3%	-2.0%	-12.7%	-0.8%	1.5%
		100.0%	32.1%	28.0%	12.3%	22.4%
E. South Central	9	0.0%	7.8%	-6.5%	0.4%	-1.5%
		100.0%	24.6%	27.6%	23.2%	21.2%
W. South Central	15	-1.4%	6.8%	-11.1%	-0.9%	0.0%
		100.0%	29.9%	26.9%	14.1%	26.2%
East North Central	16	1.1%	-8.2%	3.2%	1.2%	5.3%
		100.0%	23.7%	38.5%	11.7%	23.1%
West North Central	9	-3.2%	-1.0%	-3.4%	-1.0%	-4.3%
		100.0%	27.8%	24.3%	40.2%	9.5%
Mountain	10	-6.4%	-9.3%	-10.4%	-1.7%	-1.3%
		100.0%	22.8%	32.5%	13.7%	27.6%
Pacific	21	-8.7%	-9.3%	-16.6%	-4.9%	3.2%
		100.0%	24.3%	40.2%	9.5%	23.3%
Total	109	-3.5%	-3.4%	-8.2%	-1.2%	1.2%
		100.0%	26.4%	34.3%	13.2%	22.7%

Appendix

Number of *Constructed* Cities by Type of Fiscal Organization

	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

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