Preliminary
Comments welcome

Why Do Big Cities Redistribute Income Out of Own Source Revenue?

Steven G. Craig,* Janet Kohlhase,[a,]** D. Andrew Austin,** and Stephanie Botello[+]

*Department of Economics
University of Houston
Houston, TX 77024-5019

[a]Paper Presenter
(713)-743-3799
jkohlhase@uh.edu

**Congressional Research Service

[+]EmployStats

ABSTRACT

Our paper attempts to explain why large cities in the U.S. spend about 11% of their current budget on low income assistance, despite economists' prescriptions that such behavior is extremely inefficient. We posit that urban governments act "as if" they are altruistic in this dimension, and large cities have access to greater land rents than suburbs. To test this idea, we examine central city budgetary responses to suburban fiscal changes by comparing basic expenditures to income redistribution expenditures. Using a panel sample of the 47 largest cities in the U.S. over 18 years, we estimate using instrumental variable (IV) models, the determinants of large city expenditures, revenues and taxes as a function of suburban choices. We find that large cities tend to match the changes in suburban taxes and base expenditures, however large cities respond in the opposite direction to changes in suburban transfer payments. These responses appear to be sensitive to the number of competing suburbs. We interpret our findings as being consistent with rent extraction, but where the political process results in redistributive expenditures.

December 2015

Keywords: local public finance, urban economics, city-suburb fiscal relations

Paper for presentation at the AREUEA sessions at the ASSA meetings in San Francisco, Jan. 3-5, 2016.

I. Introduction

The goal of this paper is to get a sense about whether income redistribution expenditures are of the same nature as other locally provided public goods. This question arises because it has been known for a long time that big cities in particular spend a large amount of own source revenue on local redistribution, despite the advice of economists. In the 1970s, for example, income redistribution expenditures were considered an important part of the bankruptcy of New York City. As the city has revived, however, income redistribution expenditures remain very high, amounting in our data to over $1,750 per city resident.

But, New York is not the only city with high redistribution expenditures. The largest cities in the US spend over $110 per capita on redistribution, almost one-third of which comes out of own taxes.[1] No city spends zero. Even the suburban governments around these largest US cities spend some money on income redistribution, although much less. The 3,362 suburban cities surrounding the largest cities average about $35 per capita, where over half ($22) come from their own resources. None of these numbers are that large, the average city of 655,000 would spend about $23.5 million out of its own sources to support an income redistribution budget of about $72 million, but these values are nonetheless much more substantial than a well-trained economist would expect given our theories on Tiebout competition and free riding.

[1] There are 57 cities in the union of the largest fifty cities in 1980, 1990, and 2000. We delete ten from our data. Three are consolidated with their county governments, we delete Washington DC, and the other deleted cities had responsibility for elementary and secondary schools. This last step is for identification as discussed below.

Another interesting aspect about income redistribution is to consider why a local government with a competitive political sphere would engage in providing assistance to people with low incomes. Using our narrow models of self-interested individuals, the only theoretical motivation can come from an income insurance perspective. This theory is inadequate, however, because despite the dynamic nature of the low income population it is difficult to expect that over half the population believes it is likely to fall into poverty. When this theory is discarded as a motivation, we are left with other justifications that rely on some form of "social" perspective, where individuals have concerns over the utility of others. If social concerns drive local demand for low income assistance, then an interesting question is whether local governments behave in a different fashion than they do over other locally provided public goods, such as police and fire protection services. That is, does the competitive nature of the inter-governmental environment exhibit the same Tiebout-type behaviors as would be expected over the provision of other public services?

Our test of the notion about the nature of income redistribution is very "as if" and reduced form. Specifically, we empirically test whether municipal expenditure decisions are affected by strategic interactions between a center city government and nearby suburban governments, and examine whether the nature of this interaction is identical for our traditional publicly provided goods such as police and fire protection compared to the interaction over income redistribution.[2] To the extent residential demand for income redistribution is identical to demand for police or fire, this interaction should look the same. On the other hand, if residential demand for income

[2] For other views of strategic interactions between cities and suburbs, see Sole-Olle (2006) who analyses fiscal benefit spillovers in metropolitan Spain and Allers and Elhorst (2011) who study fiscal policy interactions among Dutch cities.

redistribution is altruistic in some form, then the interaction might be quite different. Specifically, given the number of low income individuals in a metropolitan area, if suburban governments increase their income redistribution expenditures then large city governments may feel they do not have to struggle as hard to meet that perceived need.

An important part of the ability of a large city to act altruistically is for it to be able to tax residents without them fleeing to the suburbs. The economic advantages of the large cities suggest that such behavior is possible. We therefore argue that central cities may be able to extract some of the economic rents from its citizens through a form of price discrimination on the benefits (expenditure) side. The nature of property and sales taxes suggest it is difficult for cities to price discriminate on the tax side. If locally provided public goods can be differentially allocated (Behrman and Craig, 1987) towards marginal residents, however, city governments may be able to capture some of the economic rents of the city through price discrimination. Such behavior combined with technical limitations may result in governments that maximize revenue and extract rents from its citizens, which Haughwout et. al. (2004) argue is the case for a diverse set of large cities. There will nonetheless be a political competition, however, on how to spend the rents the government is able to extract. If this process or something like it occurs, the central city will be able to generate resources with which to act altruistically, and the political process may direct it to do so.

To test whether central cities respond in the same way to basic public expenditure changes as they do to changes in local redistributive expenditures, we collect government tax and expenditure data for a panel of 47 large municipal governments over the period 1980-1997 (see

footnote 2). We collect similar data for the 3,362 suburbs that surround these cities.[3] These data are merged with sociodemographic and government structure information to determine the degree to which central city governments respond to expenditure changes in the surrounding suburbs. Our thought experiment is to compare the response of the large cities to a tax financed change in expenditure, so we therefore compare the tax response to the expenditure responses. To provide focus on the nature of redistribution expenditures, we examine three expenditure categories consisting of basic expenditures (fire, police, parks and roads), income transfer expenditures (welfare, housing, medical), and other spending (central administration and criminal justice).[4]

A central empirical problem is that city tax and expenditure levels chosen by both the cities are suburbs are simultaneous. We therefore use the structural determinants of government responsibility to control for the endogenous response of suburban governments to central city changes. In particular, most large cities do not control elementary and secondary schooling, and in none of our metropolitan areas do suburbs do so.[5] Thus we restrict our sample of large cities to those that contain independent school districts, and then use state and federal aid to local education as instruments for suburban expenditure. We find that these exclusion restrictions generally yield statistically valid instruments.

The empirical results provide new insights into strategic interactions affecting the fiscal behavior of large urban governments. Specifically, we find that each additional dollar of taxes that suburbs raise is virtually mimicked by the large urban governments; our point estimate is

[3] As explained below, this number has grown slightly over time.

[4] At this point, tax favored expenditures are excluded from our data on income transfers.

[5] We omit a total of ten large cities that had control over their schools for either part of all of our sample period.

cities raise taxes by the entire amount of any suburban tax increase.[6] A considerable share of each new dollar is used to match changes in the basic services which we define as safety (fire and police), parks, and roads. In contrast, spending by suburbs on income redistribution is found to result in a statistically significant decrease in city redistribution expenditures. It is difficult to reconcile this result to a current theory of inter-governmental behavior. The qualitative as well as statistically significant difference is the response by the central urban government is robust to a wide variety of sensitivity analyses. This behavior could be explained by suburban low income support expenditures being viewed by the central urban government as a substitute for its own effort.

Consistent with this view, we also find that the central city governments are "overly" responsive to outside aid earmarked for redistribution from both states and the federal government. Specifically, we find that a $1 increase in the combination of federal and state aid for low income assistance stimulates not only $1.28 in big city transfer expenditures, but appears to generate significant budgetary increases across the board. This finding is consistent with the city government using its own employment as one of its redistributive tools as suggested in Alesina, Baqir and Easterly (2000).

Section II below sketches a framework for how urban land rents might end up in city governments, without causing exit of the big city residents. This framework is not extensive, nor does it offer proof, but it provides a way to motivate the empirical regularities uncovered here. The data section III is rather extensive, because of the institutional differences between metropolitan areas, and because the government data are far from perfect. It also describes how

[6] This is consistent with yardstick competition (Besley and Case, 1995).

we use the institutional framework to provide a method to statistically identify the potential simultaneous interaction between large urban center governments and their surrounding suburbs. The estimation results from the simultaneous model are presented in section IV, and illustrate that large urban governments expend resources on income redistribution apparently on a different basis than is apparent from their expenditures on basic public services. A final section summarizes and concludes.

II. Model and Empirical Framework

This section sketches a theory of government behavior that shows the attributes required so that central city governments are able to redistribute income without losing their population. Specifically, our model focuses on how city governments respond to suburban public fiscal changes. Our hypothesis is that urban redistribution expenditures reflect rents extracted from the population, since otherwise free riding that results from redistribution would lead to the demise of the central city. Since some residents must be on the margin of living in the central city or the suburbs, the only mechanism by which urban governments could extract rents is if they are able to price discriminate amongst residents. As most of the tax sources of urban governments cannot be adjusted for "elasticity" of specific residents, the source of discrimination must be based on the unequal allocation of publicly provided benefits.

We divide government expenditures into three broad categories. Our idea is that basic services, such as public safety from fire and crime, roads, and parks and recreation, represent benefits to most residents. Further, these types of expenditures are able to be targeted to groups of residents that might potentially exit (Shoup, 1964, Brueckner, 1981, Behrman and Craig,

1987). Alternatively, expenditures on income redistribution is presumably because taxpayers benefit to some degree, since low income people are too few to force their support. Nonetheless, due to the potential for free riding, the only way that cities could spend money on redistribution is if there is no possibility that taxes would force exit from the city.[7] The third category is the residual, which consists primarily of central services like administration and justice, but may include some categories that can be targeted to residents.

A. Model

Our framework is based on the assumption that one goal of the government, sometimes characterized as the goal of the public employees, is to maximize the size of government, while the politicians'/residents' role is to provide constraints on the employees to limit their ability to extract rents from the residents. Our model of urban government thus reduces to assuming the goal of the city government's employees is to minimize the total surplus of the residents, subject to constraints.[8] For ease of exposition, we explicitly divide fiscal surplus, defined as the willingness to pay for net-of-taxes public expenditure, from the locational surplus based on all other factors. A key constraint that will motivate our empirical work is the opportunity set in the suburbs. As suburban expenditure on basic services that can be differentially allocated between residents rises, central city expenditures in this area will also have to rise. Our interest in this

[7] Our model is implicitly assuming that services to residents are financed by taxes on residents. Thinking about business taxes in the context presented here is left for future work, but see Haughwout and Inman (2001) for a model showing taxes on firms to finance redistribution will fail.

[8] Our characterization of the distinction between the city's employees and public control over policy is simply meant to convey that the goal of the city government is not to maximize the utility of the city's residents, but has a positive weight on public expenditure (Calvo and Ujhelyi, 2014).

framework is to consider whether income redistribution expenditures in the suburbs will elicit the same type of response from the central government.

Residents have a choice among politically distinct jurisdictions within the metropolitan area. If they locate in the center city, their willingness to pay for that location is higher than for any suburb. Among the suburbs, there is at least one for which the person has a greater willingness to pay than any other. The willingness to pay by any person depends on the locational amenities, including work, leisure, and transportation costs. For the location surplus, we abstract from government behavior for the moment. The difference between an individual's willingness to pay for a specific location, W, and any other location is the locational surplus for that resident. For resident i in the central city:

$$W^i_C \geq W^i_{S1} \tag{1}$$

where C is the central city, and S1 is the most attractive suburb to that resident.[9] The locational surplus is the difference in the willingness to pay between the central city and suburb as:

$$LS^i = W^i_C - W^i_{S1} \tag{2}$$

The other attribute of the total surplus in a location is the public sector behavior, which is the net-of-taxes willingness to pay for the public services received by the individual:

$$FS^i = W^i(\text{public services}^i) - \text{taxes}^i \tag{3}$$

[9] Of course, the attractiveness of the suburban location will also depend on the fiscal surplus it generates.

Public services are indexed by person i to indicate that the city government will have some ability to differentiate services received among residents (Brueckner, 1982; Behrman and Craig, 1987; Craig and Holsey, 1989). The total surplus for an individual is therefore:

$$TS^i = FS^i + LS^i \quad (4)$$

If the locational surplus for an individual is positive, the city government can decrease the fiscal surplus, and the individual will not leave the city until the TS is negative.[10] Thus for any resident with a positive locational surplus, the big city government employees will desire to increase taxes without delivering a commensurate increase in public services, if they can do so within their constraints. The evidence in Haughwout et al (2004) for example, however, suggests that most cities do not maximize the rents for the government, which implies that how the cities respond to changes in the suburbs is important to their fiscal health.

Constraints on the ability of city employees to maximize rents come in the form of governmental public choice structure, and the quality of suburban alternatives. One constraint has been briefly introduced, which is the price discrimination ability of the city by differentiating between the levels of public services received by residents. As this is primarily based on the location of public services, the city government's ability to target benefits is imprecise. A second is the form of public choice, which we will model in the empirical work as the size of the city council, and whether council people are elected at-large or in districts. Another form of the institutional constraint is how the city government responds to changes in the fiscal environment of the suburbs. For example, the copycatting model introduced by Besley and Case (1995)

[10] Or more negative than the transaction costs. If there is an underlying degree of mobility caused by external factors, the statement in the text will be correct.

suggests that suburban taxes are important determinants of city tax levels. Applying their model would suggest the city government would view suburban tax levels as a constraint, and that tax increases in the suburbs would permit the city government to increase its tax levels. Alternatively, if the city has already maximized its total revenue, the city government will not respond to suburban tax changes.[11]

One label for behavior consistent with the above model is rent seeking, which implies that politicians are attempting to manipulate the public sector for personal gain. But as suggested above, rent seeking seems inadequate to explain all of the behavior we observe from large cities. Maybe the most striking example of what seems inefficient behavior is the persistence over time and across cities in the US of income redistribution activities at the local urban level. It is surprising because, despite the example of cities like Detroit and Washington DC, it is difficult to tell a story that low income groups are important politically in most cities. It is also difficult to understand why voting would not alter such an important part of the economic landscape. For example, the forty seven large cities in our data have average current non-education spending of $1,282 per person over the period 1980-97. The average expenditure on welfare, housing, health and hospitals in these cities is $110 per capita, or about 8.5% of that total. Intergovernmental aid directed toward income transfers is clearly important, as it amounts to $74 per capita, which nonetheless leaves a tax burden per person of over $36. This contrasts to a total of about $35 per capita in the suburbs, and $22 net of intergovernmental aid.

B. Empirical Strategy

[11] Dincer, Ellis and Waddell (2010) present a model of 'yardstick' competition in which fiscal decentralization reduces governmental corruption. The big cities here clearly have limited, but non-zero, competition.

We assume for our empirical purposes that increases in suburban government expenditure in basic services, such as police, fire, roads, and parks and recreation, represent the desires of residents. If so, and if residents are willing to pay taxes to support the expenditure changes, then these changes in suburban governments are a challenge for the big city governments. They will need to respond to the more attractive opportunities available to big city residents. Additionally, however, basic services can be differentially allocated to the "elastic" group of residents, which says that the city government can replicate the suburban fisc for a subset of its total residents. If this is true, we should find less than a $1 for $1 response to suburban basic expenditures.

On the one hand, central city response to tax financed changes in suburban support for income redistribution should be viewed in the same light. Alternatively, it is difficult to imagine why the big city government would want to respond to suburban redistribution expenditure.[12] On the one hand, increases in suburban income redistribution expenditures may be a result of the type of processes we are attributing to the big city. On the other, if the big city could 'free ride' on the suburbs it would be expected to do so (however why would suburban governments put themselves in that position?). Our work cannot differentiate this last statement from the altruistic perspective, which is that all metropolitan low income residents need support and that if the suburban governments share financing city governments can reduce their effort. The empirical expectations here are unclear, perhaps, but our objective is to demonstrate whether there is a

[12] This might be complicated by whether governments view low income distributional recipients as "theirs," compared to the potential recipients from a mobile population within a metropolitan area.

motivation to pursue this thinking further based on whether central city governments respond differently to suburban income redistribution expenditures compared to basic services.

The third empirical category we simply call other, which consists of administrative expenditures, non-localized services such as judicial services, and other local government activities. It is certainly possible some of these services are valuable to residents, although it is unlikely they can be generally targeted locationally as well as basic services. The prediction of big city response is less clear here. If the technology of price discrimination is less appropriate, then the city may need a smaller response to other spending than to basic services. Similarly, even if centralized expenditures have lower relative value to residents, there may be a 'copycatting' relative effort between jurisdictions, resulting in a larger response.

Figure 1 captures the general framework in which the empirical strategy is framed, using a standard urban monocentric model. The vertical axis is the land price. The horizontal axis is the distance from downtown (CBD). We represent the land value in the suburbs by the horizontal dotted line. The horizontal land is a simplification; it could be thought of as being representative of a large number of jurisdictions on a concentric circle. The rising land price for the city shows that the city is 'large' relative to the local economy, in which case differential land rents will occur. Only residents on the boundary between the city and suburbs will be tempted to exit if the suburbs improve the fiscal surplus they offer residents, as indicated by the higher horizontal solid line. In this case, the central city will need to improve the fiscal surplus of residents that would otherwise exit, although there are nonetheless a large number of infra-marginal residents.

III. Empirical Specification and Data

Our goal is to determine empirically the relative importance of factors that affect city spending. Specifically, we assume big city spending depends on the characteristics of residents, the political structure of the city, and the competitive environment from the suburbs.

Our data are for 47 of the largest cities in the U.S. for the years 1980-97.[13] We started in 1980 to avoid having to use the 1970 Census of Population because we must interpolate demographic and housing data between decennial censuses.[14] We define metropolitan areas using the 1989 MSA definitions which generally capture the entire economically competitive area to the central city. We choose this fixed definition of MSA's to avoid endogeneity problems. Because of entry and occasional exit of towns the set of suburbs varies slightly over time. We use 3,227 individual suburbs starting in 1980, and 3,362 starting in 1990. This is because we could not use information from new suburbs until a population estimate became available, as occurs with the release of the population census.

For total expenditure, we use total general expenditure, which is spending on all categories except trust fund, liquor stores, and utilities, and corresponding general revenue.[15] One challenge with comparing different metropolitan areas, however, is that functional responsibilities vary significantly between areas. The largest distinctions are with schools, and with counties. A few

[13] The cities were selected as the union of the 50 largest in 1980, and the 50 largest in 2000.

[14] The 1970 Census of Population and Housing was the first to employ large-scale electronic data processing which created several difficulties for data users. According to a former Census official involved in the 1970 census the local area files (5^{th} count) needed to extend our data set appear to have used zip code boundaries, so that tract level data do not correspond to the printed Census reports (Bonnette, 1999). This leaves the unattractive choice of either using data defined on approximate political boundaries or gathering data from hard copy census reports.

[15] We also divide our spending into ten categories, police, fire, parks, education, welfare, health, hospitals, housing, central general (courts and central administration), and highways. These separate regressions are not reported here.

large cities also function as the school district, although most areas have independent school districts. We exploit this institutional difference by using state and federal aid to schools in the 47 cities with independent school districts as an instrumental variable for suburban expenditure. The other adjustment is with counties, some areas are consolidated city governments that include all county functions, while most have separate county governments. We adjust for the consolidated cities by including county expenditure as "negative exogenous aid" in the spending equation, but interacted with a dummy variable that equals zero for the city-county consolidated areas. To our knowledge, no suburban government outside of Virginia is consolidated with their county governments.

One problem with the suburban data is that the Census of Governments occurs every five years, and only a sample of governments is collected between years. On average, the Census collects data from the largest suburbs, and from a sample of the smaller suburbs. To form the individual suburban expenditure variables, we interpolate the suburban expenditures for years when they are not in the Census sample. To interpolate, we use the city-specific "trend line" with the endpoints being the years of actual data, and allow the percentage change in each year to be proportional to the metropolitan average for the suburban governments for which data was available. Many suburbs were sampled at least occasionally between the Census of Government years, but all are at least every five years. We use the new endpoints for each interval, and allow the actual rate of change to vary between each category of expenditure. There exists some actual data for every metropolitan area in every year, although the sampling algorithm appears to vary over time.

The city expenditure data is collected for total expenditure and revenue, for total expenditure less elementary and secondary education spending, taxes, and for the individual categories of expenses, including capital by function. We aggregate the individual spending categories into basic expenditures, income transfer expenditures, and other. We define basic expenditures to be current spending on fire, police, parks, and roads. Transfer expenditures include current spending on welfare, housing, health, and hospitals. We define other expenditure to be a residual, which is total current spending less basic and transfer expenditures.

The remaining attribute of the competitive environment is that we include the number of suburban towns. The number of towns can be thought of as indicative of the ability of an area to capture the diversity of taste differences between residents, holding constant the average per capita fiscal choices. If the number of towns is larger, a relatively more efficient Tiebout-like outcome is more likely, which other things equal should lead to a smaller central city.[16]

The political structure of the city is modeled based on the size and composition of city council, whether the city has a separate city manager, and whether the city is able to annex neighboring areas. City councils are composed of two types of members, those representing a specific district within a jurisdiction, and those that represent the city as a whole. After passage of the 1965 Voting Rights Act the Federal government has encouraged cities to adopt district representation in city councils in order to increase minority participation where minorities are geographically segregated. This is a marked departure from the reform movement before World War II which encouraged cities to elect members of council over the city as a whole (at large) to

[16] This definition of suburban governments leaves unincorporated areas of MSAs excluded from our data set. This is appropriate for our purposes since we are examining the behavior of the local governments.

break up the ward system of political patronage and control. Further, there is some thought that the number of members of the city council may be important for the overall size of the city budget, since each member needs to show a constituency that (s)he is effective. Thus if logrolling types of decision making (or a universalist approach) is prevalent, and assuming each council member has a constituency within the city (geographic or otherwise), city expenditure will increase with the number of members.[17] Conversely, a larger council may dilute the political power of any particular member and increase the cost of logrolling decisions, in which case a larger council may restrict itself to Pareto-improving policies. We thus test these ideas by including the number of council seats that are district, and the number at large. Langbein et al.(1996), for example, finds evidence that the composition of city councils between district and at-large seats translates into differences in budgeting outcomes. District council members might be expected to vote for greater spending because the tax price for pork barrel type projects would be 1/n, where n is the number of single member districts, while the benefits would entirely accrue to each district. Thus there may be a larger number of projects that would be supported by single district council members than with at-large members. Alternatively, however, at-large members may have more political power, and so are better able to achieve their political objectives. All of these hypotheses are modulated by the possibility that council members understand the competitive arena in which their city operates, and so are sensitive to potential migration of the tax base.

[17] This view is consistent with the political science literature that shows that a given population can be divided into many constituencies, the number of which is determined in part by the number of opportunities (seats) to express particular views.

The final aspect of the institutional structure is we add a dummy variable if the city is able to annex at least some suburban areas. The dummy variable describing annexation can be expected to have both actual and potential impacts on suburban policies.[18] That is, in metropolitan areas where the city has the ability to annex, suburban areas that succeed in attracting residents and tax base may find themselves annexed by the city. Alternatively, suburban cities that are immune from annexation do not face any such threat, and so may be free to pursue policies independently of the city. All suburbs in cities without annexation powers are clearly immune to takeover by a big city. Suburban cities that are already incorporated are immune to annexation except in very unusual circumstances, so cities' annexation powers influence outcomes via their effect on new entry (Austin, 1999). We thus primarily view the annexation variable as affecting the ability of new cities to enter the polity.

We measure the characteristics of residents by a vector of sociodemographic variables including population, percent of the population white, percent under 20 years old, percent over 64, percent poor, percent non-citizens, percent with some college education, percent with a college degree or above, percent unemployed, percent self-employed, percent homeowners, percent housing vacant and per capita income. These variables are calculated for city residents and for all non-city residents within the metropolitan area. An additional element important to the role of suburban competition is the underlying mobility of the population. That is, in most Tiebout models the extent of fiscal differentials are insufficient by themselves to motivate residents to change location, but once people have decided to move the marginal cost of selecting the best fiscal package becomes very small. We measure the underlying mobility of the

[18]Austin (1999) has empirically shown that annexation is motivated by both political and economic factors.

population by the percentage of the population that has lived in the same house for the last five years. Given the potential endogeneity of the attributes of the population, we estimate models with and without the demographic controls.

A final element of our data collection effort is that we adjusted the Census population estimates, in order to calculate per capita expenditure values. Specifically, while the Census collects population each decade, it estimates population for each political jurisdiction between the Census years. These estimates are primarily constructed using vital statistic information on births and deaths, but generally exclude information on migration. The point is that the Census estimates contain positive information, but are not corrected for errors ex-post once the decennial Census counts are known.[19] We thus re-estimate population by using the Census estimate patterns, but applied to the actual trend line created by using the decennial Census population counts (see Botello, 2004, for details).[20] The resulting data set thus has information on each of the major cities, and on their suburbs, over the 18 year period 1980-1997, for a total of 954 observations.[21] Appendix I lists the included cities and Appendix II provides details on data sources.

As shown by the expenditure means in Table 1, there is a considerable disparity in spending between central cities and outlying suburban cities. Our goal in part is to ascertain whether any of these differences can be explained by the competitive environment, and by

[19] The Census has changed its algorithm in the last decade, and now re-adjusts its projections.

[20] These new estimates are available from the authors on request.

[21] Washington DC is deleted due to its unique fiscal structure (high reliance on the federal government for transfers), and Newark is omitted because we did not have the structure of the city council, leaving 954 observations in the regressions.

governmental structure, while controlling for the usual set of environmental and demographic causes of city expenditure.

Thus the set of equations that we estimate is:

$$(5)\quad BigCity\_y_{it} = \beta_o + \beta_1 \widehat{Sub\_y_{it}} + \beta_2 NumBurbs_{it} + Aid_{it}\beta_3^{'} + \beta_4 CountyExpend_{it} + \beta_5 TaxPrice_{it} + \beta_6 AtLarge_{it} + \beta_7 District_{it} + \beta_8 Manager_{it} + \beta_9 Annex_{it} + Demographics_{it}\beta_{10}^{'} + \alpha_i + \tau_t + u_{it}$$

where y_{it} *represents each of six dependent variables*: *Exp, BasicExp, TransferExp, OtherExp, Rev, Tax.*

Equation (5) describes a series of six equations (six different *BigCity_*y_{it}'s) describing the big city fiscal environment for big city *i* in time period *t*, where u_{it} is an error term. We estimate an equation for big city expenditure per capita (*Exp*), in total terms and for three categories, *BasicExp* (police, fire, parks, and roads), *TransferExp* (health, hospitals, public welfare, and housing), and *OtherExp* (total current expenditures net of basic expenditures and transfers). Two other equations are estimated for big city revenue per capita (*Rev*), and big city taxes per capita (*Tax*).[22] Each is a function of the population weighted average per capita expenditure (or revenue or tax) in the competing suburban cities ($\widehat{Sub\_y_{it}}$)[23] treated endogenously. The suburban variable corresponds to the same category for each of the six big city dependent variables. Other control

[22] As with expenditure, our revenue variable excludes trust fund, liquor store, and utility revenue.

[23] For the revenue equation we also try tax and non-tax revenue with no qualitative change in the results.

variables include the number of suburban cities in the metro area (*NumBurbs*), a vector of per capita state and federal aid (*Aid*) treated separately for roads, transfers, and other non-education purposes, county expenditures (defined analogously to the LHS variable) for cities that are not consolidated with a county government (*County*), the tax price (*TaxPrice*), the number of single district council members (*District*), the number of at large council members (*At Large*), a dummy indicating presence of a city manager (*Manager)*, an annexation possibility dummy variable (*Annex*), a vector of demographic variables (*Demographics*), MSA fixed effects (α_i) and year fixed effects (τ_t). In our estimation we include MSA fixed-effects and year fixed effects.[24]

Identification of the simultaneous determination of big city and suburban expenditure is through exclusion restrictions. We employ the federalist structure as the primary identification tool. One element is that state and federal aid to cities has virtually no matching components, thus the amounts are exogenous to governmental behavior (Chernick, 1979). Second, however, we also exploit the independence of school districts for the big cities with independent school districts, as state and federal aid for education will go the independent schools, which may interact with the local governments and thus allow us to use education aid as an independent instrument. The educational aid variable was also constructed through interpolation techniques similar to how the population variables were interpolated. The estimation results tables present the Hanson J test probability estimates, and show these instruments are sufficiently precise to serve.

[24] Our results are somewhat sensitive to clustering the errors by MSA rather than using MSA fixed effects. We believe it is more likely that the fixed effects capture systematic differences in the regulatory, functional divisions, and political structure between cities compared to assuming a systematic error process. We do allow heterogeneity by using robust standard errors.

The tax price is modeled as the ratio of population to families times taxes over current spending. The justification is that public services are oriented toward individuals, but that families are the tax paying unit. The difference between taxes and spending reflects grants in aid and other sources of government income, leading to a discount of public services for taxpayers.

IV. Estimation Results

Table 2 presents the empirical results for the basic model. The objective of our estimation is to discern the extent that the central city government responds in a different fashion to own financed changes in expenditures in basic services compared to redistribution expenses by the general suburban government environment. There are two versions of the Table, Table 2a contains a set of demographic control characteristics in addition to fixed effects for year and MSA. Table 2b omits those demographic controls over potential concerns the fiscal environment influences them. We use the federalist environment to instrument for suburban expenditures over concern that the suburban governments simultaneously react to the central city fiscal choices. This yields federal and state aid by category as the IVs, where in particular education aid is directed towards independent school districts and not the own city governments.

Each column of the table is a separate regression, where we model the own central city "big city") fiscal choice as a function of the same choice by the population weighted median suburban government. In this sense each coefficient on the suburban fiscal variable is a reduced form on the other changes that accompany its selection. The first row of the second column

shows that big cities respond to $1 of new taxes in the suburbs by raising their own taxes by $1.15, which is not significantly different from $1. If this dollar were spent by the suburbs on what we have termed basic services, however, basic services in the cities would respond by a point estimate of $0.71, also not significantly different than $1. While it is therefore possible that the entire tax increase is spent on basic services, the point estimates admit to about 38% (1-.71/1.15) of the additional revenue to be spent elsewhere in the big city budget.

The other important result is in the fifth column. It shows that if suburbs increase their spending on income redistribution programs by $1 per person that the central city is found to actually reduce its transfer spending by $.74, also not significantly different than $1. This estimate is significantly different than that for the central city response to a change in basic service spending.

These basic results are robust to alternative specifications. Table 2b shows results from the same IV estimation but with the demographic control variables. The qualitative results are identical with a small loss of precision. A $1 suburban tax change is mimicked by the big city, a $1 change in basic expenditures is matched at most, with perhaps a bit of surplus directed elsewhere. And most surprisingly, a $1 increase in income redistribution expenditures results in a drop of big city spending of about half the amount.

The other interesting results in Table 2 are those for the fiscal federalism variables. Table 2a shows that an increase in $1 per capita of federal or state aid for low income assistance results in a change in big city redistributive spending of about $1.28, which is statistically significantly greater than $1. Most aid matching programs occur between the federal and state programs, not generally at the local level. Further, we find large increases in all aspects of the big city budget,

including tax and non-tax revenue, basic spending, and other spending. One intriguing possibility for such findings is suggested in Alesina, Baqir, and Easterly (2000), which is that city governments use public employment as an additional avenue by which to achieve income redistribution in addition to the explicit provision of services to those with low income.

Table 3 presents a different sensitivity analysis. Specifically, we would expect that metropolitan areas with more elastic populations would engender larger central city budgetary responses to changes in suburban fiscal choices. We model this possibility by interacting the suburban fiscal variables with the number of suburbs in a metropolitan area (and we estimate the interaction with IV). Even holding population constant, a larger number of suburbs suggests that there are more public fiscal choices in a given area, leaving large city governments more constrained about absorbing urban land rents.[25] Using the number potential suburban public packages as an indicator of elasticity suggests that the responsiveness of central city expenditures to suburban changes should be greater, with a resulting larger coefficient.

Table 3 presents the point estimates and the marginal calculations from estimating the model with interaction effects.[26] The results are quite similar, although they show a range of possibilities that vary with the number of suburbs in a metropolitan area. As with the Table 2 results, we find that suburban tax changes are about matched in big cities with an average number of suburbs, but that in areas with few suburbs there is little central city responsiveness. Similarly, the results for both basic services where cities positively respond to suburban budgetary changes, and in income distribution transfers where cities negatively respond to suburban budgetary

[25] An alternative specification is to use the share of the population in the same house as an indicator variable for a less elastic population. Results using this specification are qualitatively similar to those reported here using the number of suburbs.

[26] Note the other coefficients are essentially identical with this interactive specification.

changes are preserved. In both cases we find that fewer suburban choices results in muted budgetary responsiveness, despite the difference in the direction of the response.

Table 4 reports the results of a falsification test, which estimates the effect of big city budgetary changes on suburban fiscal choice averages. The regressions show the responses for each of six suburban expenditure/tax/revenue variables as a function of the same big city variables (instrumented), various aid categories and county expenditures (defined analogously to the LHS variable). These results show that the process is one way, in that suburbs on average do not respond to changes in the big city fisc on the margin. This is maybe not surprising if the big city government faces considerably less competitive pressure than the suburban governments, since it has access to the economic core of the metropolitan area. This demonstration also suggests the expenditure results in Table 2 are not showing spurious correlation from unfunded state or federal mandates.

The variables describing the city's political institutions demonstrate a limited ability to explain big city expenditures and its patterns across categories. Table 2 shows that one extra at-large city council member is found to have at least double the effect of a district city council member, and that a larger council is associated with a larger city government per capita. The larger councils are associated with larger expenditures on the central other category.

V. Summary and Conclusion

The empirical results assembled here show that the large US cities seem to treat expenditures for redistribution very differently than they treat expenditures for basic public services, such as police and fire protection, roads, parks, and libraries. We show the distinction

by empirically examining how large cities respond to budgetary changes in their surrounding suburban political jurisdictions. We find that big city governments essentially match changes in the tax burden in the suburbs $1 for $1. The point estimates indicate the tax changes are larger than changes in basic service expenditures, although the standard errors admit the possibility these changes are equal. What is striking about our results, however, is that the big city response to income redistribution expenditures is the opposite. Specifically, we find that increases in average suburban redistribution expenditures lead to decreases in big city fiscal effort in this category.

On the surface, it is surprising to find that the budgetary response to basic expenditures is different from the budgetary response to income redistribution. Specifically, it is natural to believe that income redistribution is motivated by demands by taxpayers, not by recipients. Further, we find that aid from higher governments in the federalist structure is quite stimulative across the budgetary categories, the stimulus is not restricted to only the low income assistance budget. The budgetary stimulus from redistributive aid has universally larger consequences in the big city budget than does aid from any other category.

These robust empirical results suggest that income redistribution is different in nature than other public services. One possibility, although our work certainly does not distinguish this from other possibilities, is altruism. We discuss that the opportunity for price discrimination would allow city governments to capture some of the differential land rents generated by being in the core of the metropolitan economy without necessarily losing population to the suburbs. We certainly do not answer the question as to whether suburban governments operate in a similar manner with simply less opportunity. Nonetheless, if altruism motivates city government low

income assistance, it would be consistent to find that greater suburban effort in this regard leads to reduced effort by the central city government.

REFERENCES

Allers, Maarten A. and J. Paul Elhorst. “A Simultaneous Equations Model of Fiscal Policy Interactions.” **Journal of Regional Science** 51(2): 271-291.

Alesina, Alberto, Reza Baqir, and William Easterly, “Redisributive Public Employment,” **Journal of Urban Economics**, 48, September, 2000, pp 219-41.

Anas, Richard and Richard Arnott and Kenneth Small. 1998. “Urban Spatial Structure.” **Journal of Economic Literature** 34: 1426-1464.

Austin, D. Andrew. 1999. "Politics vs. Economics: Evidence from Municipal Annexation." **Journal of Urban Economics** 45:501-532.

Behrman, Jere R., and Steven G. Craig. 1987. “The Distribution of Public Services: An Exploration of Local Government Preferences.” **American Economic Review** 77:37-49.

T. Besley and A. Case. 1995. “Incumbent Behavior: Vote-Seeking, Tax-Setting, and Yardstick Competition,” **American Economic Review** 85: 25-45.

Bonnette, Robert. 2001. Private electronic communication.

Botello, Stephanie. 2004. “Population Estimates for Cities.” University of Houston working paper.

Brueckner, Jan K. 1981. “Congested Public Goods: The Case of Fire Protection." **Journal of Public Economics** 15:45-58.

Brueckner, Jan K., Jacques-Francois Thisse and Yves Zenou. 1999. "Why is Central Paris Rich and Downtown Detroit Poor? An Amenity-based Theory" **European Economic Review** 43: 91-107.

Calvo, Ernesto, and Gergely Ujhelyi. 2014. “Political Screening: Theory and Evidence from the Argentine Public Sector.” University of Houston working paper,

Chernick, H. 1979. “An economic model of the distribution of project grants.” in Mieszkowski, Peter and William Oakland (Eds.) **Fiscal Federalism and Grants-in-Aid**. Urban Institute Press, Washington. DC.

City of Vancouver. 1996. **Survey of Election Systems in Major North American Cities**, Vancouver, BC.

Dincer, Oguzhan C., Christopher J. Ellis, and Glen R. Waddell. 2010. “Corruption, Decentralization and Yardstick Competition.” Economics of Governance 11:269-294.

Craig, Steven G. and Cheryl Holsey. 1997. “Efficient Inequality: Differential Allocation in the Local Public Sector.” **Regional Science and Urban Economics** 27: 763-84.

DelRossi, Alison. 1995. "The Politics and Economics of Pork Barrel Spending: The Case of Federal Financing of Water Resources Development." **Public Choice** 85:285-305.

DelRossi, Alison and Robert Inman. 1999. “Changing the Price of Pork: the Impact of Local Cost Sharing on Legislators’ Demands for Distributive Public Goods.” **Journal of Public Economics** 71(2): 247-273.

Epple, Dennis and Arnold Zelenitz. 1981. “The Implications of Competition Among Jurisdictions: Does Tiebout Need Politics?” **Journal of Political Economy** 89 (61):1197-1217.

Epple, Dennis, Thomas Romer, and Holger Sieg. 2001. “Interjurisdictional Sorting and Majority Rule: An Empirical Analysis,” **Econometrica** 69(6): 1437-1465.

Gibson, Campbell. 1998. **Population of the 100 Largest Cities and Other Urban Places in the United States: 1790 to 1990**, Population Division Working Paper No. 27. Washington, DC: U.S. Bureau of the Census.

Gramlich, Edward M. 1976. "The New York City Fiscal Crisis: What Happened and What Is to Be Done?" **American Economic Review** 66(2): 415-429.

Haughwout, Andrew, Robert Inman, Steven Craig, and Thomas Luce. 2004. “Local Revenue Hills: Evidence from Four U.S. Cities,” **Review of Economics and Statistics** 86: 570-585.

Haughwout, Andrew and Robert Inman. 2001. “Fiscal Policies in Open Cities with Firms and Households,” **Regional Science and Urban Economics** 31:147–180.

Inman, Robert. 1978. “Testing Political Economy’s “as if” Proposition: Is the Median Income Voter Really Decisive?” **Public Choice** 33: 45-65.

Inman, Robert, “The Local Decision to Tax: Evidence from Large U.S. Cities,” **Regional Science and Urban Economics** 19, 1989, 455-491.

International City Managers'Association. 1986, 1991,1996. Municipal Form of Government Surveys 1986, 1991, 1996, unpublished proprietary data. Washington, DC.

Kurian, Thomas T. 1993. **World Encyclopedia of Cities**. Santa Barbara, CA: Abc-Clio.

Langbein, Laura, Philip Crewson and Charles Brasher. 1996. "Rethinking Ward and At-large Elections in Cities: Total Spending, the Number of Locations of Selected City Services, and Policy Types," **Public Choice** 88: 275-293.

Romer, Thomas and Howard Rosenthal. 1979. "The Elusive Median Voter," **Journal of Public Economics** 12:143-170.

Shoup, Carl. 1964. "Standards for Distributing a Free Governmental Service: Crime Protection," **Public Finance**, 19: 383-92.

Sole-Olle, Albert. 2006. "Expenditure Spillovers and Fiscal Interactions: Empirical Evidence from Local governments in Spain." **Journal of Urban Economics** 59: 32-53.

U.S. Bureau of the Census. 1980-1990. **Annual Survey of Governments: Finance Statistics**, 1980-1990 Washington, D.C: U.S Government Printing Office.

_____. 1982. **Census of Governments, 1982: Finance Statistics**, Washington, D.C: U.S Government Printing Office.

_____. 1980. **Census of Population and Housing 1980: Summary Tape File 3,** 1982 Washington, D.C: U.S Government Printing Office.

_____. 1982. **General Revenue Sharing, 1982 Population Estimates.** Washington, D.C: U.S Government Printing Office.

_____. 1987 **Census of Governments, 1987: Finance Statistics**. Washington, D.C: U.S Government Printing Office.

____. 1989**. Population (1986) and Per Capita Income (1985) Estimates [United States]: Governmental Units**. Washington, D.C: U.S Government Printing Office.

_____. 1992. **Census of Population and Housing 1990: Summary Tape File 3.** Washington, D.C: U.S Government Printing Office.

U.S. Department of Justice. Various dates. "Past and Current Submissions Report: 8/6/65 to 10/15/98." unpublished data. Washington, DC.

Figure 1: The Effect of Suburban Changes on Big City Differential Land Rents

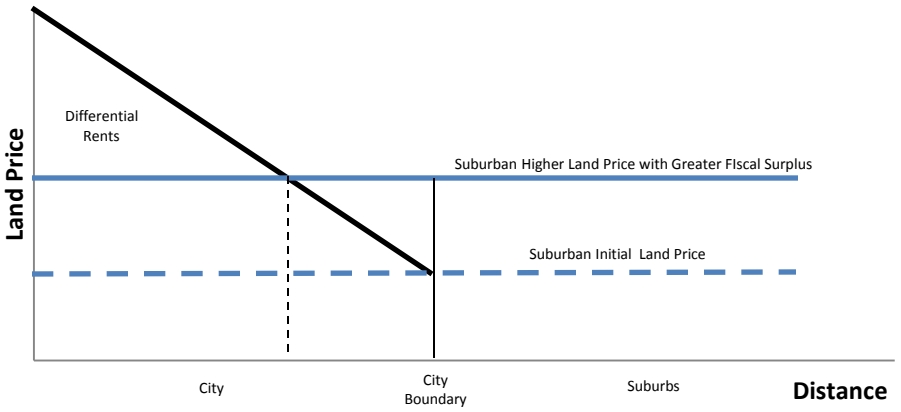

Table 1 A Comparison of the Expenditure and Aid to Large Cities and Their Surrounding Suburbs, all years and first and last year (real dollars per-capita)

Expenditure or Aid	all years			1980			1997		
	mean (std dev) city	mean (std dev) suburbs	% city exceeds suburbs	mean (std dev) city	mean (std dev) suburbs	% city exceeds suburbs	mean (std dev) city	mean (std dev) suburbs	% city exceeds suburbs
Total Exp.	1282	919	39%	732	712	3%	1803	1005	79%
	(686)	(760)		(292)	(217)		(870)	(315)	
Current Exp.	1030	762	35%	560	570	-2%	1464	823	78%
	(559)	(741)		(230)	(173)		(708)	(257)	
Base Exp.	308	267	15%	171	206	-17%	442	310	43%
	(122)	(90)		(52)	(69)		(123)	(83)	
Police	134	116	15%	70	88	-20%	198	137	45%
	(57)	(42)		(26)	(28)		(60)	(39)	
Fire	73	55	34%	41	43	-4%	102	63	62%
	(29)	(23)		(12)	(18)		(30)	(24)	
Parks	51	35	45%	29	28	4%	69	42	65%
	(30)	(24)		(13)	(19)		(38)	(24)	
Roads	38	52	-27%	24	41	-43%	56	58	-3%
	(25)	(20)		(12)	(17)		(34)	(19)	
Other Exp.	609	453	34%	327	331	-1%	847	468	81%
	(356)	(722)		(157)	(118)		(426)	(197)	
Transfer Exp.	110	35	215%	58	25	132%	172	41	322%
	(168)	(54)		(74)	(35)		(264)	(67)	
Welfare	21	1	1453%	10	1	1597%	32	2	1411%
	(63)	(4)		(33)	(1)		(91)	(5)	
Health	26	5	455%	14	3	355%	45	7	537%
	(45)	(6)		(17)	(5)		(82)	(7)	
Hospitals	29	15	94%	15	14	6%	37	15	143%
	(77)	(52)		(32)	(34)		(115)	(66)	
Housing	34	14	143%	19	7	159%	59	16	258%
	(32)	(19)		(22)	(10)		(49)	(16)	
Gov't Aid									
Other	153	116	31%	145	132	10%	190	117	62%
	(120)	(90)		(75)	(78)		(152)	(85)	
Inc. Transfer	74	13	455%	48	10	377%	113	13	752%
	(114)	(17)		(54)	(10)		(183)	(13)	

Notes: Means and standard deviations based on 47 metropolitan areas , 1980-1997 (n=843).
Newark is missing 3 observations.

TABLE 2a: Central City Response to Suburban Expenditures

(specification excludes city demographic variables)[a]

	Big City Revenue	Big City Tax	Big City Tot Exp[b]	Big City Base Exp[c]	Big City Transfer Exp[d]	Big City Other Exp[e]
Suburban Revenue[f]	0.2078 (0.457)	-	-	-	-	-
Suburban Tax[f]	-	1.1491*** (0.412)	-	-	-	-
Suburban Total Expenditure[f]	-	-	-0.1414 (0.873)	-	-	-
Suburban Base Expenditure[f]	-	-	-	0.7149*** (0.273)	-	-
Suburban Transfer Expenditure[f]	-	-	-	-	-0.7435* (0.427)	-
Suburban Other Expenditure[f]	-	-	-	-	-	0.0628 (0.116)
# Suburbs	0.0087*** (0.003)	0.0033** (0.002)	0.0021 (0.003)	0.0017* (0.001)	0.0014* (0.001)	0.0044*** (0.001)
Welfare Aid	2.8640*** -0.21	0.6665*** -0.049	3.2785*** -0.259	0.1265*** -0.042	1.2847*** -0.056	1.0789*** -0.107
Road Aid	0.3562 -0.639	-0.1711 -0.252	0.8669 -0.819	-0.2103 -0.193	-0.0365 -0.13	-0.6929* -0.374
Other Aid	0.9055* -0.476	-0.1211** -0.056	0.6062 -0.69	0.0429 -0.041	-0.1139*** -0.043	0.2494* -0.137
County Exp	-0.0129 -0.306	-0.0449 -0.039	0.2648 -0.515	0.0054 -0.025	-0.0085 -0.02	0.0221 -0.059
Tax Price	-0.0293 -0.035	0.0818*** -0.015	-0.1814*** -0.045	-0.0067 -0.008	-0.0140* -0.007	-0.1390*** -0.02
# of District Council Seats	0.0296** -0.015	-0.0012 -0.006	0.0275* -0.014	-0.0048* -0.003	-0.0042*** -0.002	0.0205*** -0.005
# At Large Council Seats	0.0825*** -0.024	0.0190*** -0.007	0.1012** -0.04	0.0049 -0.003	0.0029 -0.002	0.0634*** -0.008

R (squared)	0.508	0.783	0.744	0.818	0.758	0.762
# of Observations	843	843	843	843	843	843
# of MSAs	47	47	47	47	47	47
1st stage F	0.199	3.289	0.186	5.391	4.494	0.337

Notes: [a] Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficient ests from panel IV (2SLS) estimation with MSA and year fixed effects. Data for 1980-1997, 47 of the largest cities in the US with independent school districts (see text). Excludes demographic variables.

[b]Excludes elementary and secondary school spending.

[c]Base expenditures include police, fire, parks, libraries and roads.

[d] Transfer expenditures include welfare, housing and medical care.

[e]Other expenditures are calculated as a residual, and equal total current expenditures less base and transfers.

[f]Each suburban fiscal variable is estimated by IV. The instruments include school aid from the federal and state government to independent school districts in the suburbs for elementary and secondary education, as well as aid to the suburban governments for low income assistance, roads, and other for suburban governments.

TABLE 2b: Central City Response to Suburban Expenditures

(Specification includes Central City Demographic Variables)[a]

	Big City Revenue	Big City Tax	Big City Tot Exp[b]	Big City Base Exp[c]	Big City Transfer Exp[d]	Big City Other Exp[e]
Suburban Revenue[f]	0.0393 (0.152)	-	-	-	-	-
Suburban Tax[f]	-	0.6902** (0.321)	-	-	-	-
Suburban Total Expenditure[f]	-	-	-0.0349 (0.283)	-	-	-
Suburban Base Expenditure[f]	-	-	-	0.4637** (0.195)	-	-
Suburban Transfer Expenditure[f]	-	-	-	-	-0.473 (0.294)	-
Suburban Other Expenditure[f]	-	-	-	-	-	0.0792 (0.093)
# Suburbs	0.0108*** (0.002)	0.0034*** (0.001)	0.0026 (0.003)	0.0011 (0.001)	0.0021*** (0.001)	0.0055*** (0.001)
Welfare Aid	2.5295*** (0.176)	0.6031*** (0.048)	2.9252*** (0.232)	0.0654* (0.034)	1.1600*** (0.037)	0.9379*** (0.097)
Road Aid	1.0072* (0.547)	0.1132 (0.175)	1.6121** (0.739)	-0.0177 (0.143)	0.0921 (0.126)	-0.0119 (0.311)
Other Aid	1.2456*** (0.184)	-0.0779* (0.046)	0.6824*** (0.215)	0.0924** (0.038)	-0.0102 (0.032)	0.2340** (0.097)
County Exp	-0.0479 (0.149)	-0.0985*** (0.035)	-0.002 (0.215)	-0.0501** (0.021)	-0.0414** (0.017)	-0.0746 (0.054)
Tax Price	-0.0688** (0.030)	0.0708*** (0.011)	-0.2283*** (0.035)	-0.0210*** (0.006)	-0.0091 (0.007)	-0.1940*** (0.018)
# of District Council Seats	0.0466*** (0.012)	0.0091* (0.005)	0.0376*** (0.013)	-0.0036* (0.002)	0.0071*** (0.002)	0.0224*** (0.005)

# At Large Council Seats	0.0827***	0.0231***	0.0843***	-0.0026	0.0155***	0.0537***
	(0.023)	(0.006)	(0.018)	(0.003)	(0.004)	(0.009)
cold	-2.5817*	0.4006	-1.5047	-0.9858*	0.9502**	-1.2123
	(1.529)	(0.817)	(1.786)	(0.529)	(0.402)	(0.892)
cyng	1.8122	-0.4518	0.2657	-0.9773***	2.1620***	1.1076
	(3.002)	(0.524)	(3.729)	(0.333)	(0.480)	(1.212)
chisp	-2.3850*	-1.4007***	-1.8549	-1.2040***	-1.0584***	-0.6331
	(1.233)	(0.193)	(1.368)	(0.111)	(0.146)	(0.469)
cblk	0.5618	-0.6234*	-0.2568	-0.6758***	-0.5744***	0.9264***
	(0.569)	(0.354)	(0.621)	(0.183)	(0.147)	(0.345)
cother	-2.7785	0.066	-2.5214	0.065	-0.7245**	-1.4247**
	(1.787)	(0.280)	(2.469)	(0.194)	(0.295)	(0.682)
ccolg	1.9773**	0.3278	3.3962***	0.3788**	0.5888***	1.3218***
	(0.804)	(0.234)	(0.978)	(0.151)	(0.203)	(0.359)
cnohs	1.4449*	0.5080***	0.8374	0.5086***	0.2850***	0.5571*
	(0.838)	(0.194)	(0.871)	(0.123)	(0.106)	(0.332)
cmedinc	0	0	0	-0.0000***	0.0000**	0
	0.000	0.000	0.000	0.000	0.000	0.000
cpoor	0.527	1.3323***	1.6576	0.3823*	-0.3185	-0.1817
	(1.326)	(0.330)	(1.368)	(0.229)	(0.254)	(0.623)
crich	0.0000*	0	0	0	0	0.0000**
	0.000	0.000	0.000	0.000	0.000	0.000
cself	7.2711**	2.1752**	12.1135***	1.5671***	-0.0924	5.6993***
	(2.972)	(0.951)	(3.298)	(0.584)	(0.622)	(1.419)
cown	0.4791	0.8228***	0.922	-0.0446	0.0352	1.2066***
	(0.544)	(0.264)	(0.890)	(0.147)	(0.141)	(0.382)
cvacant	0.1693	0.2892	0.5079	-0.3691*	0.0833	-0.9769**
	(0.851)	(0.338)	(1.402)	(0.203)	(0.254)	(0.497)
csamehs	-0.6746	-1.5716***	-2.0947	-0.4817**	0.7972***	-2.2587***
	(1.247)	(0.315)	(1.499)	(0.194)	(0.241)	(0.521)

R (squared)	0.901	0.878	0.842	0.883	0.843	0.803
# of Observations	843	843	843	843	843	843
# of MSAs	47	47	47	47	47	47
1st stage F	0.258	2.454	0.729	6.518	4.627	0.329

Notes: [a] Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficient ests from panel IV (2SLS) estimation with MSA and year fixed effects. Data for 1980-1997, 47 of the largest cities in the US with independent school districts (see text).Includes demographic variables.

[b]Excludes elementary and secondary school spending.

[c]Base expenditures include police, fire, parks, libraries and roads.

[d] Transfer expenditures include welfare, housing and medical care.

[e]Other expenditures are calculated as a residual, and equal total current expenditures less base and transfers.

[f]Each suburban fiscal variable is estimated by IV. The instruments include school aid from the federal and state government to independent school districts in the suburbs for elementary and secondary education, as well as aid to the suburban governments for low income assistance, roads, and other for suburban governments.

Table 3: Alternative Specifications of Central City Response to Suburban Expenditures--Interaction Effects

			Coefficients on Interaction Terms (suburban fiscal variable x no. suburbs)	
			Demographics	
			with	*without*
TOTAL REVENUE			0.0035	0.0026
			(0.002)	(0.003)
	Impact of $1 suburb expend on Central City			
	At mean Number of Burbs	61.57	0.22	0.16
	Min	2	0.01	0.01
	Max	207	0.72	0.54
	Mean+std dev	115.57	0.40	0.30
	Mean-std dev	7.57	0.03	0.02
TAXES			0.009***	0.0149***
			(0.003)	(0.004)
	Impact of $1 burb expend on Central City			
	At mean Number of Burbs	61.57	0.55	0.92
	Min	2	0.02	0.03
	Max	207	1.86	3.08
	Mean+std dev	115.57	1.04	1.72
	Mean-std dev	7.57	0.07	0.11
TOTAL EXPENDITURES			-0.003	0.0002
			(0.003)	(0.003)
	Impact of $1 burb expend on Central City			
	At mean Number of Burbs	61.57	-0.18	0.01
	Min	2	-0.01	0.00
	Max	207	-0.62	0.04
	Mean+std dev	115.57	-0.35	0.02
	Mean-std dev	7.57	-0.02	0.00
BASE			0.0027	0.005**
			(0.002)	(0.002)
	Impact of $1 burb expend on Central City			
	At mean Number of Burbs	61.57	0.17	0.31
	Min	2	0.01	0.01
	Max	207	0.56	1.04
	Mean+std dev	115.57	0.31	0.58
	Mean-std dev	7.57	0.02	0.04

TRANSFERS			
		-0.011	-0.0159*
		(0.006)	(0.009)
Impact of $1 burb expend on Central City			
At mean Number of Burbs	61.57	-0.66	-0.98
Min	2	-0.02	-0.03
Max	207	-2.24	-3.29
Mean+std dev	115.57	-1.25	-1.84
Mean-std dev	7.57	-0.08	-0.12
OTHER EXPENDITURES		0.0038	0.0045
		(0.005)	(0.005)
Impact of $1 burb expend on Central City			
At mean Number of Burbs	61.57	0.233966	0.277065
Min	2	0.0076	0.009
Max	207	0.7866	0.9315
Mean+std dev	115.57	0.439166	0.520065
Mean-std dev	7.57	0.028766	0.034065

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficient ests from panel IV (2SLS) estimation with MSA and year fixed effects. Data for 1980-1997, 47 of the largest cities in the US with independent school districts (see text). Two versions estimated:(1) include demographics ofcentral city and (2) exclude demographics.
The specification includes an interaction term (suburban fiscal variable times number of suburbs) estimated by IV. Instruments include school aid from the federal and state government to independent school districts in the suburbs for elementary and secondary education, as well as aid to the suburban governments for low income assistance, roads, and other for suburban governments.

TABLE 4: Suburban Response to Big City Expenditures

(specification excludes suburban demographic variables)[a]

	Suburb Revenue	Suburb Tax	Suburb Tot Exp[b]	Suburb Base Exp[c]	Suburb Transfer Exp[d]	Suburb Other Exp[e]
Central City Revenue[f]	0.1723 (0.187)	-	-	-	-	-
Central City Tax[f]	-	-0.0086 (0.04)	-	-	-	-
Central City Total Expenditure[f]	-	-	0.0651 (0.079)	-	-	-
Central City Base Expenditure[f]	-	-	-	0.0829 (0.104)	-	-
Central City Transfer Expenditure[f]	-	-	-	-	-0.0032 (0.009)	-
Central City Other Expenditure[f]	-	-	-	-	-	0.1983 (0.264)
# of Suburbs	0.0025 (0.009)	-0.0032*** (0.001)	0.0024 (0.006)	-0.0019*** (0.000)	0.0015*** (0.000)	0.0017 (0.005)
Welfare Aid	-0.1706 (2.202)	0.2116 (0.188)	-0.3133 (1.353)	0.0763 (0.121)	0.3018*** (0.076)	-1.0879 (1.342)
Road Aid	-1.7202 (3.341)	0.2955 (0.262)	-0.5438 (2.082)	0.4759*** (0.146)	0.0572 (0.086)	-1.0405 (1.715)
Other Aid	-0.8624 (1.520)	0.0798 (0.084)	-0.418 (0.860)	0.0946** (0.044)	-0.0277* (0.015)	-1.1175 (0.844)
County Exp	0.8764 (0.610)	0.0663*** (0.015)	0.6492* (0.352)	0.0600*** (0.013)	-0.0017 (0.010)	0.5237 (0.339)
Tax Price	-0.4331 (0.279)	0.0441*** (0.014)	-0.4076** (0.164)	-0.0401*** (0.006)	-0.0255*** (0.006)	-0.3420** (0.145)

R (squared)	0.035	0.603	0.048	0.659	0.142	0.037
# of Observations	843	843	843	843	843	843
# of MSAs	47	47	47	47	47	47
1st stage F	90.8	43.91	73.47	6.976	207.6	51.52

Notes: [a] Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Coefficient ests from panel IV (2SLS) estimation with MSA and year fixed effects. Data for 1980-1997, 47 of the largest cities in the US with independent school districts (see text). Excludes suburban demographic variables. Excludes central city political variables.

[b] Excludes elementary and secondary school spending.

[c] Base expenditures include police, fire, parks, libraries and roads.

[d] Transfer expenditures include welfare, housing and medical care.

[e] Other expenditures are calculated as a residual, and equal total current expenditures less base and transfers.

[f] Each central city fiscal variable is estimated by IV. The instruments include aid to the central city governments for low income assistance, roads and other.

Appendix I: Cities in the Data Set

City	State	Population		
		1990	1980	1970
New York	NY	7,322,564	7,071,639	7,894,862
Los Angeles	CA	3,485,398	2,968,528	2,816,061
Chicago	IL	2,783,726	3,005,072	3,366,957
Houston	TX	1,630,553	1,595,138	1,232,802
Philadelphia	PA	1,585,577	1,688,210	1,948,609
San Diego	CA	1,110,549	875,538	696,769
Detroit	MI	1,027,974	1,203,368	1,511,482
Dallas	TX	1,006,877	904,599	844,401
Phoenix	AZ	983,403	789,704	581,562
San Antonio	TX	935,933	785,940	654,153
San Jose	CA	782,248	629,400	445,779
Indianapolis	IN	741,952	711,539	744,624
San Francisco	CA	723,959	678,974	715,674
Jacksonville	FL	672,971	571,003	528,865
Columbus	OH	632,910	565,021	539,677
Milwaukee	WI	628,088	636,297	717,099
Memphis	TN	610,337	646,174	623,530
Boston	MA	574.283	562,994	641,071
Seattle	WA	516,259	493,846	530,831
El Paso	TX	515,342	425,259	322,261
Nashville-Davidson	TN	510,784	477,811	448,003
Cleveland	OH	505,616	573,822	570,903
New Orleans	LA	496,938	557,927	593,471
Denver	CO	467,610	492,686	514,678
Austin	TX	465,622	345,890	251,808
Fort Worth	TX	447,619	385,164	393,476
Oklahoma City	OK	444,719	404,014	366,481
Portland	OR	437,319	368,148	382,619
Kansas City	MO	435,146	448,028	507,087
Tucson	AZ	405,390	330,537	262,933
St Louis	MO	396,685	452,801	622,236
Charlotte	NC	395,934	315,474	241,178
Atlanta	GA	394,017	425,022	496,973
Virginia Beach	VA	393,069	262,199	172,106
Albuquerque	NM	384,736	332,920	243,751
Oakland	CA	372,242	339,337	361,561
Pittsburgh	PA	369,879	423,959	520,117
Sacramento	CA	369,365	275,741	254,413
Minneapolis	MN	368,383	370,951	434,400
Tulsa	OK	367,302	360,919	331,638
Cincinnati	OH	364,040	385,409	452,524
Miami	FL	358,548	346,681	334,859

Appendix I (Cont)

City	State	Population		
		1990	1980	1970
Fresno	CA	354,202	217,491	165,972
Omaha	NE	335,795	313,939	347,328
Toledo	OH	332,943	354,635	383,818
Buffalo	NY	328,123	357,870	462,768
Wichita	KS	304,011	279,838	276,554
Colorado Springs	CO	281,140	215,150	135,060
Tampa	FL	280,015	271,577	277,767
Louisville	KY	269,063	298,694	361,472
Birmingham	AL	265,868	284,413	300,910
Las Vegas	NV	258,295	164,674	125,787
Rochester	NY	231,636	241,741	296,233
Baton Rouge	LA	219,531	220,394	165,963

Empirical work excluded (from the above list) cities with dependent school districts: Boston, Buffalo, Memphis, Nashville-Davidson, NYC, Rochester and Virginia Beach. There are a total of 47 cities in the final sample.

Appendix II: Construction of the Data Set

We selected cities with the fifty largest populations in the U.S. for the years 1970 or 2000. Cities near larger cities, such as Long Beach, CA, St. Paul, MN and Norfolk, VA were treated as suburbs. We used the 1989 Census Bureau PMSA and MSA definitions to define metropolitan areas for all years. Thus our geographic definitions are stable across time. In MSAs such as Boston in which Census-defined MSAs cross county boundaries, we include the whole county.

Data on expenditures and revenues for big cities, suburban municipalities and county governments in those counties were drawn from the Surveys of Government for years 1977-2000 except for the years in which a Census of Governments was conducted (1977, 1982, 1987, 1992, and 1997). These data were obtained from Mr. John Curry of the Census Bureau's Governments Division. These data are cleaner and have more observations than the files available through ICPSR. All of the big cities in our sample are so-called "jacket units" which receive special attention from the Census and are included in all years. Expenditure data for suburbs that were not in a given Survey of Government was interpolated using trend information from similar municipalities and from the adjoining Census of Government data. See Botello (2004) for details.

Demographic data were taken from the 1980, 1990, and 2000 Censuses of Population and Housing and were extrapolated for intercensal years. Additional income and population data were taken from the Census Revenue Sharing Files and from Bureau of Economic Analysis income files. Because the Census Bureau does not retroactively adjust population estimates, we adjusted intercensal population estimates. See Botello (2004) for details. Unemployment data were taken from Bureau of Economic Analysis and Bureau of Labor Statistics websites. Data available only at the county level, such as per capita income and unemployment, were calculated by first interpolating city and suburban shares using decennial census data, and then using those interpolated shares to allocate the county totals for each year.

Monetary variables were deflated using a price index constructed using CPI-U price indices for cities. Price index data for those cities and time periods not included in Bureau of Labor Statistics CPI surveys were interpolated. Relative price information across regions employed state price indices developed by Craig and Inman (1989).

Land area data were taken from Census sources and a file provided by Andrew Haughwout. Annexation data were taken from Austin (1999).

Information on the political structure of big cities were compiled using Kurian (1993), City of Vancouver (1996), ICMA (1986, 1991, 1996), DOJ (1998) and official websites of various cities.

Information was checked by calling the City Clerk or other appropriate official for each city. Several cities are consolidated or coterminous with county governments, such as San Francisco, CA; Philadelphia, PA; Nashville-Davidson County, TN; Indianapolis, IN; Jacksonville, FL and St. Louis, MO. The operational details of city consolidation are quite varied. We ignore these details for the most part. Some of these consolidated areas, such as Jacksonville and Indianapolis, have contained semi-independent towns. Cities in Virginia are independent, so are not contained in counties. According to the Census Bureau's Compendium of Government 1992, the City of Boston finances virtually all of the budget of Suffolk County, so is treated as consolidated, despite the existence of three small and poor towns that also inhabit Suffolk County.

Appendix III: Characteristics of Big Cities , Their Suburbs, and Their Metropolitan Areas[a]

variable	MSA-wide[a]	
overall msa characteristics	**Mean**	**(std dev)**
number of suburbs	62	(54)
county non-education expenditure(real per cap (in 1000's))	0.6125	(0.3808)

	City	
	Mean	**(std dev)**
city government structure		
# District Council seats	9.11	(8.63)
# At Large Council Seats	2.85	(3.37)
City Manager (1=yes)	0.38	(0.49)
City annex power (1=yes)	0.45	(0.5)

	City		**Suburb**	
	Mean	**(std dev)**	**Mean**	**(std dev)**
city and suburbs characteristics				
taxprice [b]	1.82	(0.56)	0.93	(0.54) `
population	655,189	(615,954)	801,112	(1,366,884)
% living in same house as 5 years ago	0.49	(0.07)	0.5	(0.08)
% owners	0.53	(0.09)	0.71	(0.06)
% vacant housing stock	0.09	(0.03)	0.07	(0.03)
% hispanic	0.14	(0.16)	0.1	(0.14)
% black	0.24	(0.18)	0.06	(0.05)
% other race	0.05	(0.05)	0.04	(0.04)
% college education	0.21	(0.08)	0.21	(0.08)
% no high school diploma	0.34	(0.13)	0.3	(0.16)
% self-employed	0.09	(0.03)	0.12	(0.02)
median family income	$28,565	(8,237)	$36,545	(11,204)
income of 80th percentile (in real $2000)	$80,311	(10,550)	$90,240	(13,896)
% in poverty	0.17	(0.06)	0.09	(0.05)
% over 64 years	0.12	(0.03)	0.1	(0.03)
% under 20 years	0.29	(0.03)	0.31	(0.03)

Notes: Means and standard deviations based on 47 metropolitan areas , 1980-1997 (n=843). Newark is missing 3 observations.

[a] Based on Primary Metropolitan Statistical Area 1989 delineations as defined by OMB.

[b] defined as (pop/families)*(tax revenue/current spending)