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

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ABSTRACT

This paper attempts to explain why large cities in the U.S. spend over 13% of their budget on low income assistance, despite economists' prescriptions that such behavior is extremely inefficient. We utilize explanations from urban economics that suggest cities have significant land rents. If city governments can access some of these rents, then local taxation may not be inefficient. Using a sample of the 53 largest cities in the U.S. over 18 years, we find that cities generally lower the welfare of their citizens in response to innovations in the suburbs. We interpret this evidence as being suggestive of rent extraction. We find, however, that these rents are used to support the low income assistance budgets.

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I. Introduction

Large U.S. cities spend substantial amounts on redistributive expenditure, despite the oft-repeated dictum that localities should not redistribute because people are likely to change their places of residence to avoid local taxes necessary to finance redistribution.[1] The 53 largest cities spend over $137 per capita in real terms, and New York City spent $1,750 per capita, while suburbs of these same large cities on average spend $36 per capita on redistributive expenditure. Almost half of the city redistributive expenditure comes out of own taxes. This paper attempts to explain this anomaly, one of the most surprising in public economics. Much of the tax competition literature starts with the presumption that citizens have a high propensity to avoid local taxes unless those taxes fund public services residents highly value. Thus conventional wisdom suggests neither cities nor suburbs should be spending to redistribute, whether the poor live in the city or elsewhere.

This paper attempts to suggest both how and why large urban governments attempt such a relatively high level of income redistribution, and it offers some empirical evidence consistent with the theoretical possibility advanced here. Specifically, we test whether municipal expenditure decisions are affected by strategic interactions between a center city government and nearby suburban governments, and examine ways in which these strategic interactions are informative.[2] Governments that maximize the utility of their residents (or decisive voter) would not be expected to change their behavior in response to a tax-financed change in another

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[1] We would like to thank Pablo Garofalo for excellent research assistance.

government's behavior, whether that government is a central city or a suburb.[3] On the other hand, 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, should be forced to reduce the amount of rent extraction and to provide more services when the opportunity set for their citizens improves.

To test the latter idea, we collect government tax and expenditure data for a panel of the fifty largest municipal governments over the period 1980-1997.[4] We collect similar data for the 3,362 suburbs that surround these cities.[5] 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. We then subject our data to three different tests. First, we test whether large cities respond to an internally financed change in suburban government budgets. Second, we test whether there is a differential response to change depending on the category of expenditures. We examine three categories, basic expenditures (fire, police, parks and roads), income transfer expenditures, and other spending. Third, we test whether institutional features, such as city council size and the presence of a city manager, influence urban government expenditures.

To conduct these tests, we 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 (all but four in our sample) do not control elementary and secondary

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[2] For another view of strategic interactions between cities and suburbs, see Sole-Olle (2006) who analyses fiscal benefit spillovers in metropolitan Spain.

[3] Or these effects should be mere second-order adjustments.

[4] To avoid potential bias, we use the union of the 50 largest cities at the beginning and at the end of the period, resulting in 53 total cities.

schooling, and in none of our cities do suburbs do so. Thus we use state and federal aid to local education as instruments for suburban expenditure, and show that these exclusion restrictions are 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 cities raise taxes by the entire amount of any suburban tax increase. Only $0.30, however, of each dollar is used to match changes in the basic services which we define as safety (fire and police), parks, and roads. The remaining resources are found to be directed towards other spending, defined as expenditure for non-basic services and non-income redistribution expenditures. In contrast, spending by suburbs on income redistribution is found to have no effect on city government behavior in any category. Despite the non-responsiveness to suburban behavior, we find big cities are "overly" responsive to outside aid earmarked for redistribution. Specifically, we find that a $1 increase in the combination of federal and state aid for low income assistance stimulates not only $1.49 in big city transfer expenditures, but a further $0.80 increase in other expenditures. This suggests large cities use their ability to capture land rents to respond to increases in spending by higher level governments on income redistributive programs. These results also suggest that suburban fiscal behavior limits city governments' ability to capture land rents. That is, changes in suburban tax rates lead to increases in the amount of rents that cities can

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

obtain from their residents. A test of the individual 3,362 suburbs, however, shows suburban fiscal behavior does not respond to changes big cities' fiscal behavior.

Section II below sketches a framework for how urban land rents might end up in the 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 organize 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 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 independently of the actions of the suburban governments. A final section summarizes and concludes.

II. Model and Empirical Framework

This section sketches a theory of government behavior that has the ability to suggest motivation for urban government support for redistribution of income. Specifically, our model focuses on how city governments respond to suburban public fisc 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 on the expenditure side.

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 must benefit all residents to some extent, 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.[6] 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.

Thus, our empirical test is to determine whether central city governments respond equally to suburban expenditures in these three categories: basic services, other spending, and income redistribution. We expect to find that urban government response is not uniform across the expenditure categories, but that in declining order, cities respond relatively vigorously to suburban changes in basic services, less so in other services, and will not respond at all to changes in income redistribution expenditures by suburban governments.

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[6] 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

A. Model

We assume the employees' goal 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.[7] 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.[8] Based on the model here, however, suburban expenditures on redistribution would not be expected to result in a response by central city governments.

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 for any person depends on the

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see Haughwout and Inman (2001) for a model showing taxes on firms to finance redistribution will fail.

[7] 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, 2009).

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:

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

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

$$TS^i = FS^i + LS^i \tag{4}$$

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[8] Haughwout et. al. (2004) find that even New York City and Philadelphia have not maximized the amount of surplus they can extract from their residents.
[9] Of course, the attractiveness of the suburban location will also depend on the fiscal surplus it generates.

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. 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, in that the primarily method is to discriminate between the level 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) 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.[10]

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 fifty three large cities in our data have average current non-education spending of $1,299 per person over the period 1980-97. The average expenditure on welfare, housing, health and hospitals in the fifty three cities is $175 per capita, or about 13.5% of that total. Intergovernmental aid directed toward income transfers is clearly important, as it amounts to $106.60 per capita, which nonetheless leaves a tax burden per person of over $68. This contrasts to a total of about $41 per capita in the suburbs, and $23 net of intergovernmental aid. The $23 effort in the suburbs is only about half the share of a much smaller total expenditure.[11]

B. Empirical Strategy

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[10] Ellis and Dincer (2004) present a model of 'yardstick' competition in which fiscal decentralization reduces governmental corruption. The big cities here clearly have limited, but non-zero, competition.

[11] We use total minus elementary and secondary spending because of the wide variation in jurisdictions, where some cities are responsible for education spending but many are not.

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, so that the changes in suburbs are a challenge for the big city governments, as 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. Certainly, there is no reason why the big city government would want to respond to suburban redistribution expenditure. 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. 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 larger 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, again resulting in a larger response. On the other hand, centralized services may be the result of specialized trade-offs specific to each government, and so suburban

expenditure levels may not be relevant to the big city, in which an essentially zero response will be found.

Figure 1 captures the general framework in which the empirical strategy is framed, using a standard urban monocentric model. The vertical axis is the density (or land price). The horizontal axis is the distance from downtown (CBD). V* is the land value in the suburbs, we represent it as a horizontal land as a simplification, it could be thought of as a large number of jurisdictions on a concentric circle. The rising density gradient for the city shows that the city is 'large' relative to the local economy, in which case 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 V2*. 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.
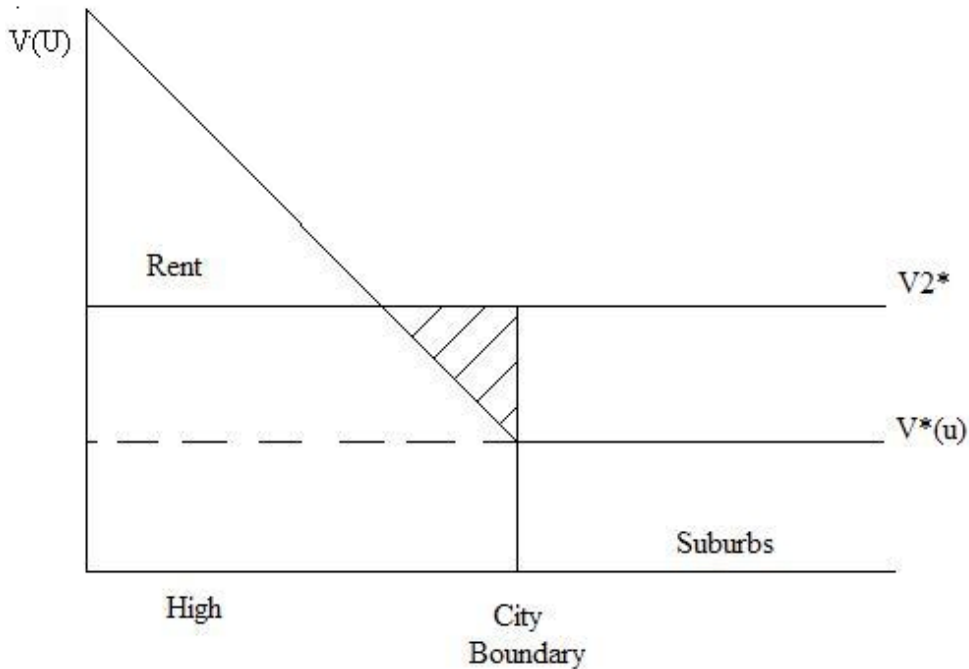
Figure 1: The Effect of Suburban Changes on Big City Expenditure

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 53 of the largest cities in the U.S. for the years 1980-97.[12] 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.[13] We stopped in 1997 because the 2002 Census of Governments had not yet been released when we started this project. 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.[14] 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 large cities also function as the school district, although most areas have independent school

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

[13] 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 (5th 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.

[14] 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.

districts. We exploit this institutional difference by using state and federal aid to schools in the 49

cities with independent school districts as an instrumental variable for suburban expenditure. To

make cities comparable with one another we also subtract elementary and secondary education

expenditures from total spending in all categories. We do not adjust revenue, however (since

separate school funds are not identified in the revenue sources). 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.

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 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.[15] 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

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[15] 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.

competitive arena in which their city operates, and so are sensitive to potential migration of the tax base.

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.[16] 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. 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 population by the percentage of the population that has lived in the same house for the last five years.

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. 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).[17] The resulting data set thus has information on each of 53 major cities, and on their suburbs, over the 18 year period 1980-1997, for a total of 954 observations.[18] 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

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

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

whether any of these differences can be explained by the competitive environment, and by 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:

$$
\left.\begin{array}{r}
Expend \\
\mathrm{Re}v \\
Tax \\
Basic\ Exp \\
Transfer\ Exp \\
Other\ Exp
\end{array}\right\} = f\left(\begin{array}{c}
SubExpend;NumBurbs;Aid;County;TaxPrice; \\
District\ seats,Atlarge\ seats;Manager;Annex;SameHouse; \\
Demographics;msa's;years
\end{array}\right)
$$

(5)

where (5) describes a series of equations, one for big city expenditure per capita (Expend), either total or three categories, Basic (police, fire, parks, and roads), Transfers (health, hospitals, public welfare, and housing), and Other (Total Current minus Basic minus Transfers). Two other equations are estimated for big city revenue per capita (Rev), and big city taxes per capita (Tax).[19] Each is a function of the number of at large council members (At Large), the number of single district council members (Dist), the population weighted average per capita expenditure in the

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[18] 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 [FIX THIS], leaving 954 observations in the regressions.

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

competing suburban cities (SubExpend)[20] treated endogenously, the number of suburban cities in the metro area (NumBurbs), a dummy indicating presence of a city manager (Manager), an annexation possibility dummy variable (Annex), the tax price, the share of the population that lived in the same house the last five years (SameHouse), the level of per capita state and federal aid (Aid) separately for roads, transfers, and other non-education purposes, (County) county expenditures (defined analogously to the LHS variable) for cities that are not consolidated with a county government, a vector of demographic variables (Demographics), and fixed effects for each metro area (MSAs) and years (Years).

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.

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

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 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 $1.35 (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 only $0.30. This leaves about 78% (1-.3/1.35) of the additional revenue to be spent elsewhere in the big city budget. What is striking is that this result suggests that the big city is making its residents worse off by 3/4 of the budgetary change when the suburbs change their behavior. This is not an equilibrium response in a metropolitan model of Tiebout equilibrium. Rather, it suggests that the city government is constrained by some element of the political choice process, and that this element is dependent on the behavior of suburban communities. Tax copycatting, as suggested by Besley and Case (1995), is one potential explanation for such a response. They find that residents are able to exercise a constraint on total taxes through examination of neighboring governments, and only if suburbs change their behavior is the city government able to increase the amount of land rents it is accruing to itself rather than residents.[21] Also consistent with this explanation is

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[21] It is also interesting that total revenue rises by far less than tax payments, which suggests that cities use part of the tax increases to finance reductions in non-tax revenue. It is possible fees are a price discrimination device as well as expenditures targeted by location.

that Haughwout et. al. (2004) find that only one city of the four large ones they study is actually maximizing its revenue, even taking into account potential migration to the suburbs.

Alternatively, suburbs could change their level of basic services by internal financial reallocation within the budget, holding taxes constant. If the internal financing reallocated expenditures away from transfer spending, the city's total expenditure would rise by the $.30 in basic services, because transfer spending would not fall at all. If the internal financing came from other spending, the $1.26 fall in other spending would be sufficient to finance the increase in basic spending, leaving significant funds to be directed towards transfer payments.[22]

Table 3 illustrates effects of big cities on the suburban averages. These results show that the process is one way, in that suburbs 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 about 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 also associated with a larger transfer budget alone of the categories, as well as with larger tax payments. The institution of a city manager is found to increase the tax burden on residents by about $100, although it is not a statistically significant finding. The only statistically

significant impact of a city manager is that transfer expenditures rise.[23] The variable describing whether the city has the ability to annex unincorporated areas is estimated to have no significant effects.

V. Summary and Conclusion

The empirical results show that big cities are not in a Tiebout equilibrium. What is surprising, however, is the results indicate big cities appear to make their residents worse off when suburbs alter their budgetary choices to make suburban residents better off. We interpret this evidence as indicative of the city government's desire to maximize revenue, and in particular to obtain the land rents from the inner city. This desire, however, must be subject to a set of institutional or other constraints, since it has not been completely realized. An interesting question, and one that requires more research than is presented here, is why do residents of the big cities tolerate being exploited to this level? One possible answer, although there are several others, is income redistribution.

Welfare aid is found to have large and significant effects on welfare spending. For example, each $1 in aid results in $1.49 in welfare expenditure from column 5 of Table 2. On the other hand, welfare aid is also found to cause other spending to rise by almost as much, $0.80 per dollar of aid. This is significantly larger than the small spill-in to basic expenditures, and may suggest that there are other forms of low income assistance implicit throughout the budget.

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[22] We also tried to estimate the effect of each category simultaneously on the big city budgets. This process preserves the results qualitatively, but with considerably more noise.

[23] City managers are usually thought to represent the bureaucracy in a city government, and it is interesting to speculate as to why bureaucrats benefit more from urban rents being spent

Alternatively, however, it may be that the administrative intensive activities are in the other part of the budget as well, and that income distribution is only part of the entire spectrum of how aid alters city government choices. The large impact on big city tax and revenues also suggest that redistribution is associated with attracting resources into the big city governments.

It is also interesting to speculate on the constraints to rent maximization that prevent the city governments from obtaining all of the land rents in the city. The relative tax rates between the cities and suburbs seem important in this regard, as only when the suburbs increase their taxes are the cities able to increase their taxes. At the same time, however, we observe that cities reduce their revenues from non-tax sources, that is the impact on total revenue is much smaller than the impact on taxes, as well spend tax money on other uses. This might suggest that non-tax revenues are a source of price discrimination in the ways that we suggest, in addition to expenditure increases.

While our model and discussion are definitely reduced form, the empirical results seem to consistently show cities that are constrained as to how much of the available land rents they are able to accrue for governmental purposes. Suburbs seem to be an important benchmark for understanding the constraint. It also appears, however, that city governments are perfectly willing to use the rents generated to construct low income assistance policies that may not be contrary to the interests of citizens. Unlike the standard utility maximization model, the totality of this thinking is that the source of revenue may impact citizens' willingness to support expenditures that benefit a small part of the population.

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on transfers than other areas. Income assessment would appear to be a reasonable first hypothesis.

**TABLE 1: A COMPARISON OF THE EXPENDITURE AND AID
TO LARGE CITIES AND THEIR SURROUNDING SUBURBS
(real dollars per capita)**

EXPENDITURES	CITIES		SUBURBS		Percent that City Exceeds Suburbs
	MEAN	(STANDARD DEV)	MEAN	(STANDARD DEV)	
TOTAL	1445	(884)	960	(747)	51%
CURRENT	1192	(780)	802	(726)	49%
BASE	310	(121)	311	(126)	0%
Police	135	(58)	115	(42)	17%
Fire	75	(30)	56	(26)	34%
Parks	49	(30)	34	(23)	44%
Roads	38	(24)	53	(20)	-28%
OTHER	475	(349)	379	(678)	25%
TRANSFERS	137	(236)	36	(55)	281%
Welfare	34	(117)	2	(5)	1600%
Health	25	(43)	5	(6)	400%
Hospitals	38	(91)	15	(51)	153%
Housing	40	(43)	15	(19)	167%
GOVT AID					
Other	229	(267)	141	(128)	62%
Income Transfer	90	(150)	14	(18)	543%

Note: Means and standard deviations were calculated using 53 metropolitan
areas with a total of 954 observations.

TABLE 2: INSTITUTIONAL EFFECTS ON BIG CITY EXPENDITURES[2]

	Big City Rev	Big City Tax	Big City Tot Exp	Big City Base Exp[3]	Big City Transfer Exp[4]	Big City Other Exp[5]
Suburban Revenue[1]	0.35* (0.19)	-	-	-	-	-
Suburban Tax[1]	-	1.35* (0.72)	-	-	-	-
Suburban Tot Exp[1]	-	-	0.17 (0.17)	-	-	-
Suburban Base Exp[1]	-	-	-	0.30* (0.14)	-	-
Suburban Transfer Exp[1]	-	-	-	-	-0.03 (0.25)	-
Suburban Other Exp[1]	-	-	-	-	-	1.26* (0.64)
# suburbs	0.0008 (0.0007)	0.0006 (0.0005)	0.0001 (0.0008)	0.0002* (0.0001)	-0.0003* (0.0001)	0.0005 (0.0005)
WelfAid	3.32* (0.29)	1.22* (0.17)	3.24* (0.30)	0.14* (0.04)	1.49* (0.05)	0.80* (0.29)
RoadAid	-0.52 (1.02)	-1.12* (0.56)	-1.05 (1.19)	0.45 (0.28)	-0.60* (0.17)	1.97 (1.88)
OtherAid	0.97* (0.15)	0.16* (0.09)	0.85* (0.15)	0.06* (0.03)	-0.04 (0.03)	0.08 (0.15)
CountyExp	-0.12 (0.09)	-0.04* (0.07)	-0.06 (0.09)	-0.04* (0.02)	-0.01 (0.02)	-0.14 (0.10)
TaxPrice	-0.22 (0.05)	0.09* (0.04)	-0.30* (0.05)	0.02* (0.01)	-0.01 (0.01)	-0.07 (0.11)
# District	0.02* (0.01)	0.007* (0.00)	0.016* (0.005)	-0.001 (0.001)	0.0026* (0.0008)	0.001 (0.005)
# At Large	0.03* (0.0100)	0.014* (0.0065)	0.03* (0.0100)	-0.001 (0.0016)	0.006* (0.0018)	(0.0003) (0.0186)

TABLE 2, CONTD. INSTITUTIONAL EFFECTS ON BIG CITY EXPENDITURES

	Big City Rev	Big City Tax	Big City Tot Exp	Big City Base Exp[3]	Big City Transfer Exp[4]	Big City Other Exp[5]
Manager (=1)	0.10	-0.02	0.16	0.01	0.03*	-0.09
	(0.11)	(0.05)	(0.10)	(0.01)	(0.017)	(0.14)
Can Annex (=1)	0.04	0.02	0.02	0.01	0.003	0.06
	(0.08)	(0.04)	(0.07)	(0.02)	(0.017)	(0.08)
R^2	0.93	0.93	0.97	0.98	0.96	0.93
# Observations	954	954	954	954	954	954
P value of Hansen J test	0.80	0.24	0.72	0.62	0.38	0.23

Coefficient estimates from 2SLS estimation, robust standard errors in parentheses, clustered by MSA.

* Indicates significance from zero at the 10% level.

Notes:

1- Each suburban expenditure variable is estimated with instrumental variables, the instruments are federal aid for base, transfer, and other expenditure, plus government aid to elementary and secondary education.

2- Excludes elementary and second spending.

3- Basic expenditures include police, fire, parks, libraries, and roads.

4- Transfer expenditures include welfare, housing, and medical care.

5- Other expenditures are calculated as a residual, and equal total current expenditures less Basic and Transfers.

TABLE 3: BIG CITY EFFECTS ON SUBURBAN EXPENDITURES[1]

	Suburban Tax	Suburban Rev	Suburban TotExp	Suburban Base Exp[3]	Suburban Transfer Exp[4]	Suburban OtherExp[5]
Big City Tax	0.029 (0.08)					
Big City Revenue		0.045 (0.099)				
Big City Total Exp			0.013 (0.07)			
Big City Base Exp				0.01 -0.15		
Big City Transfer Exp					0.011 -0.024	
Big City Other Exp						0.34 (0.25)
Welfare Aid (suburb)	0.78* (0.43)	1.14 (1.31)	0.88 (1.16)	0.22 (0.23)	0.38* (0.17)	0.36 (0.65)
Road Aid (suburb)	-0.29 (0.63)	-1.92 (1.95)	-1.23 (1.62)	1.01* (0.40)	-0.40 (0.29)	-1.77* (1.18)
Other Aid (suburb)	0.07 (0.15)	1.25* -0.48	1.45* (0.38)	0.1* (0.04)	0.08* (0.01)	-0.04 (0.30)
County Expend	-0.02 (0.04)	-0.02 (0.12)	-0.02 (0.10)	0.03 (0.02)	-0.01 (0.01)	0.03 (0.06)
R^2	0.92	0.45	0.69	0.97	0.52	0.29
P-Value Hanson J test	0.40	0.22	0.27	0.41	0.16	0.11

Coefficient estimates from 2SLS estimation, standard errors in parentheses.
* Indicates significance from zero at the 10% level.

Notes
1 Excludes elementary and second spending. All regressions include fixed effects for years, and clustered errors by MSA.
2 Big City expenditures estimated with IVS of state and federal aid (including education aid), plus the city institutional variables.
3 Basic expenditures include police, fire, parks, libraries, and roads.
4 Transfer expenditures include welfare, housing, and health and hospitals.
5 Other expenditures are calculated as equal to total current expenditures less Basic and Transfers.

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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

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.