Preliminary
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Cities and Suburbs: Expenditure Patterns in the Urban Fiscal System

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ABSTRACT

This paper attempts to explain why large cities in the U.S. spend over 11% 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 spent over $157 per capita in real terms, and New York City spent $1,750 per capita, while suburbs of these same large cities of $41 on per capita on redistributive expenditure. Almost half of the city redistributive expenditure came 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 explain 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 view. Urban economics has shown that land rents in the center of metropolitan economies are higher than rents in the suburbs, which in turn exceed the base land value for agricultural use. If large urban governments are able to discriminate between their residents with tax and expenditure policies, then these urban governments may be able to acquire some land rents. The interesting implication of this behavior is that to the extent these extra revenues derive from rents there will not be any associated dead-weight loss.

Just because large urban governments can acquire land rents does not explain why they

do offer income redistribution to the residents.[2] The next step of the argument is that city residents may care how cities spend funds derived from land rents. Even though economists typically model city governments' choice as maximizing residents' utility, most economists recognize that major urban governments are woefully inadequate at providing bundles of taxes and services that maximize their residents' well-being (Haughwout, et. al, 2004). Some models of large city governments model the mayor as maximizing "slack," or a similar label for the degree of inefficient provision of publicly provided services. We argue below, however, that much of what economists call "slack" may instead be motivated by compassion. Our evidence on this will be to show that citizens appear to offer an effective constraint to government activity in the large cities, since we find that cities do not maximize the amount of rents they extract from their citizens, despite that governments may desire to do so.

The basic empirical test in this paper is whether big cities can access some of the differential land rents available due to their preferred location in the center of the metropolitan economy. They could do so by a combination of differential provision of local public goods and differential provision of taxation. Local governments allocate differential service levels to different residents (Behrman and Craig, 1987) and citizens on the margin of exiting the city may receive disproportionately better services. On the taxation side differential property tax assessment rates are easy to imagine, although this would be difficult to implement in at least some cities.[3] Furthermore, many of the urban rents are due to commercial and industrial

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

[2] While low income residents are the recipients, we assume that taxpayers are the ones who actually receive the services of income redistribution policies, either through the insurance properties, or because of the service from the "social welfare function."

[3] This depends on details of the property tax administration in each jurisdiction. In

property, and it may be relatively easy to shortchange the amount of public services received by these entities.

Suburban governments also have access to some land rents relative to the price of agricultural land on the urban fringe. Nonetheless suburban and large city governments face different environments. The median voter model provides a more plausible description of suburban governments because suburban citizens can get information more easily, political organizations are usually less developed, and entry barriers for insurgent politicians are lower. For example, neighboring suburbs provide voters with valuable information that can be used to assess the relative performance of their suburb's government (Besley and Case, 1995). That is, other suburbs serve as a better model for each other than does the central city, and thus provide citizen/voters with a better measure of relative performance; hence the label 'yardstick' competition. Ellis and Dincer (2004) present a model of 'yardstick' competition in which fiscal decentralization reduces governmental corruption. Furthermore, the Tiebout or 'voting with ones' feet' mechanism probably affects suburbs more than central cities, in that other suburban governments are generally closer substitutes in amenities and other locational attributes than are available for the urban core, even if the Tiebout process itself cannot guarantee efficiency.

The research idea in this paper is that the municipal expenditure decisions are affected by strategic interactions between a center city government and nearby suburban governments, and that these strategic interactions are informative.[4] We measure the extent to which spending

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Houston, a unit independent of other local governments performs tax assessments. Other areas appear to offer more leeway, and California's state constitution requires lower assessments for long time owners.

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

patterns of suburbs affect how core urban governments spend their resources. 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 government's behavior, whether that government is a central city or a suburb.[5] On the other hand, governments that maximize revenue and extract maximal 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 this idea, we collect government tax and expenditure data for a panel of the fifty largest municipal governments over the period 1980-1997.[6] We collect similar data for the 3,362 suburbs that surround these cities.[7] These data are merged with sociodemographic, income and unemployment data. 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.

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

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

[6] 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.

cities raise taxes by the entire amount of any suburban tax. However only $.30 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 distribution 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 $1.22 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 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.

As a city government is able to increase its expenditure, through intergovernmental aid, through higher land rents or through changes in suburban spending patterns, much of that increase seems to flow towards the low income assistance budget. Our results can be explained in several different ways, but we are unable to find a way to show that government officials in general directly benefits from this activity. For that reason we call it compassion. That many cities engage in income redistribution and that their mayors are not replaced by urban residents

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

suggests local redistributive efforts are efficient in the sense that cities seem to be doing the bidding of their residents.

The modeling framework is discussed in section II below. The data section III is rather extensive, because of the institutional differences between metropolitan areas, and because the government data are far from perfect. The estimation results from the simultaneous model are presented in section IV. A final section summarizes and concludes.

II. Model and Empirical Framework

A typical model of large urban government would model the mayor as maximizing slack, or similar term to describe the source of inefficient behavior. The usual idea is that the mayor would use funds diverted from the provision of publicly provided goods on private consumption, or close substitutes for private consumption, such as more luxurious offices, travel, and entertainment. In other words, the mayor may control the administration of city government to extract resources for private enjoyment. Alternatively, diverted funds could be used to support superfluous public employees, who in return for employment yield the mayor additional political power. Similarly, the mayor may divert resources to associates or allied interest groups in return for solidified political support. We do not deny that any of these activities may occur, nor do we believe they occur exclusively in large urban governments. What is important, however, is how little these activities would personally benefit the mayor. Even in a tightly run organization, it might not be unusual for a chief executive to plan travel for personal benefits. But public employees are, in most jurisdictions, a small percentage of the electorate, and would be expected to support government provision in any case. Similarly, most mayors would be expected to

receive support from contractors for the public sector, but again the marginal benefits seem small relative to the total size of government. And these benefits seem really small to the extent that achieving them would be at the expense of public support if the government grew very much larger than that desired by the decisive voter.[8] In this scenario, what is required to understand public behavior is an understanding of public support for expenditures that seem high in the context of economic analysis.

One label for behavior endemic to the above story 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 a couple 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 total real expenditures of $1,445 over the period 1980-97. The average expenditure on welfare, housing, health and hospitals in the fifty three cities is $137 per capita, or about 11.5% of current non-education spending of $1,192 per person. This contrasts to about $36 per capita in the suburbs, which is about 4.5% of the total non-education spending of $802 per person.[9] Many observers of low income assistance assert that redistribution is an activity best taken by higher level

[8] Inman's logrolling model is that legislators are constrained so that the net benefit of government is no worse than zero.

[9] We use total minus elementary and secondary spending because of the wide variation

governments. If residents have a high taste for "compassion," however, and if residents properly perceive that income redistribution can be financed from land rents without significant dead-weight losses, they may be willing to support such expenditures.

A. Model

Imagine a metropolitan area in Tiebout equilibrium, which implies that at least one resident is exactly indifferent between being located in this community, or another in the metropolitan area. In this scenario of featureless communities, residents are indifferent as to where they live, since their utility is maximized wherever they live. The utility of taxes lost at the margin equals the marginal utility to be gained from a marginal change in publicly provided goods. Thus we see that, for the marginal resident:

$$V_i^j (U(t, g, L, \text{tastes, amenities})) \quad = \quad V^* \qquad (1)$$

where i indexes towns and j indexes individuals. V(U) is the value of utility, and V* is the value to the marginal person in the next best town. t is the tax price in town i, g is the level of publicly provided goods to individual i (although we will allow the level of publicly provided goods to vary by individual, see Behrman and Craig, 1987 or Craig and Holsey, 1989), L is the location of person i, and amenities describes the interesting attributes of location L.

If the value of utility in the neighboring town changes, say because of an exogenous increase in technology lowering the price of a given level of g, town i will have to respond by an

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in jurisdictions, where some cities are responsible for education spending but many are not.

equal amount if there is not to be a redistribution of population between towns.[10] If the improvement is not in the marginal town (V*), it may be that the improving town now becomes the marginal town. In this case however, all towns will end up responding, and so town i will have to improve in any case.

For the big city, however, assume there is a distribution of utility in the city. In this case, while there is a person who is indifferent between the city and at least one of the suburbs, there may be other people who have utility greater than the utility of the person that is marginally mobile. Thus:

$$V(U_C^1) > V(U_C^2) > \ldots > V(U_C^M) = V^*(U_j) \qquad (2)$$

where M indicates the marginal resident, who is the lowest utility person in the city. It is this last person for whom the Tiebout equilibrium constraint holds. The assumption is that the other residents of the city have a utility greater than the marginal person, perhaps because they have earned some of the land rents from agglomeration economies. The difference in the value of utility of the non-marginal residents and that of the marginal resident is one measure of the land rents accruing to an urban area. The interesting question is whether the big city government is able to access any of the land rents. To do so, it will have to be able to price discriminate between residents in some fashion, because the utility of the marginal resident cannot be lowered without that person exiting the city. Thus the rent accruing to the city government is:

$$\text{City Rent} = (V(U \text{ pre tax/g})) - (V(U \text{ post tax/g})) \qquad (3)$$

The point is that if taxes and the value of publicly provided benefits can be varied between

[10] In this formulation, the government has no independent utility. Thus the median voter is indifferent to living in this town or moving, absent any transactions costs. If the town is following a median voter type criterion, however, it will choose to implement the new

residents, then some citizens can lose and still not exit the city. If a city government were able to capture all land rents, then the utility of all residents in the city would be equal, and equal to the utility of the marginal resident. In this case, the city would look just like a suburb, and a $1 improvement in the value of utility by the marginal resident of the suburb would have to be matched by a $1 improvement in the value of utility for the city resident.

On the other hand, assume that the city government has been unable to capture all land rents. In this case, the utility of all residents will not be equal, but will still have a dispersion such as (3), although the values will be reduced to the extent the city has captured part of the land rents. The important distinction in this case is that the city will not have to completely respond to a tax-financed change in the suburbs. When V(U*) rises, it will rise to be above only some of the residents:

$$V(U_C^1) > V(U_C^2) > \ldots > V(U_C^k) = V(U_C^*) = V(U_j^J) > \ldots > V(U_C^M) \qquad (4)$$

In this case, the value of utility for resident M (the previously just indifferent resident) will have to be raised by the city by $1. For the residents whose utility has fallen below $V(U_C^*)$ their utility will have to be raised, but by less than $1. For residents whose utility remains above the level $V(U_C^*)$, their utility will not have to be raised. On average, therefore, the city will respond by less than $1 per capita for each $1 change in the suburbs, depending on the extent to which its residents already have utility above the marginal Tiebout equilibrium level. A measure of the city's response, therefore, provides measure of the extent to which its residents have utility above the marginal level, since that determines the extent to which the population must be

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technology.

compensated (or the share of the population that must be compensated).

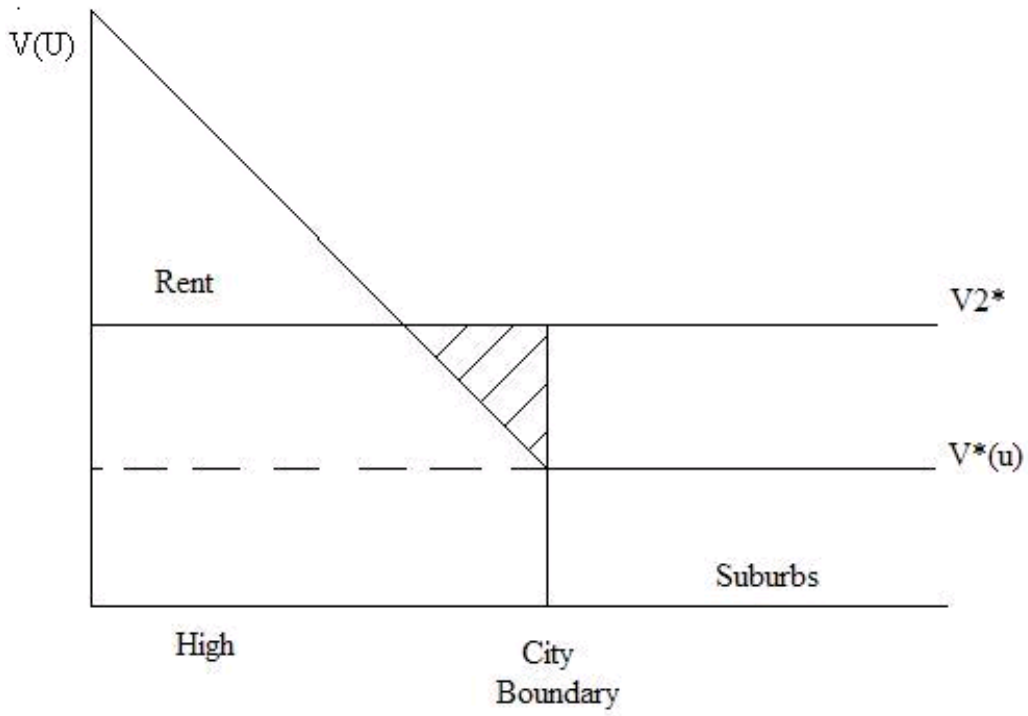

Figure 1: The Effect of Suburban Changes on Big City Expenditure

Now assume one community changes its behavior through an internally financed change. The other communities will ignore this change if the opportunity set of their residents does not change. If the opportunity set of their residents does change in a meaningful way, it can only be

because their opportunity set improves (if the opportunity set did not improve, the community will not change). Thus, the community would have to respond by improving the status of their own residents if they can. If not, the community would leave the public fisc unchanged.

As discussed below, our empirical results show that the opposite conclusion. That is, changes in suburban communities cause changes in the big city government that make residents of the big city worse off. If this is true, we can conclude that we were not in a Tiebout equilibrium. Instead, another constraint must be binding on the city government, and the suburban changes caused a relaxation of this constraint.

B. Empirical Strategy

The goal of the estimation strategy is to determine whether, and how much, large city governments respond to internally financed changes in expenditures by suburbs. We interpret response as a measure of the extent of inefficiency in public provision. Our test has three parts. First, we estimate the effect on city taxes and city spending of changes in average suburban expenditure. Second, we differentiate among these expenditure changes by category. Our hypothesis is that if a government is maximizing the utility of its residents, it will not change its expenditures in response to changes by other governments. Conversely, however, if a government is discriminating between its residents and is maximizing its revenue, then an internally financed change by competing governments will change the opportunity set of residents, necessitating a change by the own government in the tax and expenditure package it offers residents. We conduct these two tests both ways. That is, we test whether internally financed changes by the big city government affects each suburban government, and we test

whether the population weighted average suburb affects the big city. The third test is whether the institutional features of city government affect its expenditure patterns.

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.[11] 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.[12] 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 captures the entire economically competitive area to the central city. We choose this fixed definition of MSAs 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

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

[12] 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.

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.[13] 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. Some large cities also function as the school district, although most areas have independent school districts. To make cities comparable with one another we therefore 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

[13] 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.

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.[14] 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

[14] 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.

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.

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.[15] 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

[15]Austin (1999) has empirically shown that annexation is motivated by both political and

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).[16]

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.[17] 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

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economic factors.

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

[17] 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.

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 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:

$$\left.\begin{array}{c} Expend \\ Rev \\ Tax \\ Basic\ Exp \\ Transfer\ Exp \\ Other\ Exp \end{array}\right\} = f\left(\begin{array}{c} Atlarge\ seats, District\ seats; SubExpend; NumBurbs; \\ Manager; Annex; Tax\text{Price}; SameHouse; Aid; County \\ Demographics; msa's; years \end{array}\right) \quad (5)$$

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).[18] 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 competing suburban cities (SubExpend)[19] 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

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

[19] For the revenue equation we also try tax and non-tax revenue with no qualitative

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).

Estimation is by instrumental variables, using federal aid for base, transfer, and other expenditure, plus government aid to elementary and secondary as the instruments for the endogenous right hand side variables, which are the suburban revenue and expenditure outcomes. This econometric structure implies that governments may respond to each other, but that the population is unmoved by strategic or non-own local fiscal activities once a residence has been selected.

The other set of control variables is the sum of federal, state and local aid to the cities. Three categories of aid (education, transfers, and highways) are modeled separately. 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.

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change in the results.

IV. Estimation Results

Our estimation strategy has three steps. First, we want to show how the big city responds to changes in suburban public expenditure. Second, we use our estimates to show whether cities respond differentially to the category of expenditure in suburban budgets. Three categories are specified; basic expenditures consisting of the goods and services of most concern to residents, that is safety (police and fire), parks, and roads. The second category is urban transfer payments, consisting of welfare, housing, and health and hospital spending. The residual category is other expenditures, which equals total current spending less basic and transfer expenditures. Other current spending is expenditures on a host of activities, only some of which are offered by competing suburban governments. Our interaction estimates will determine whether these activities are as interesting or important to residents as are basic expenditures.[20]

The third element of our estimation will compare the relative importance of several measured institutional features affecting urban government structure. The empirical question is whether these features have the same relative importance as does residential characteristics. We perform these tests as a window on one possible explanation for the possibility that city governments do not follow the desires of their citizens.

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

[20] At one time, Oates (1989) speculated that large cities offer a wider array of services than small cities. While this thesis has been disproved (at least for zoos, the element of Oates' initial speculation), our empirical test will nonetheless offer a way to test for the relative importance of the vector of goods and services offered by large urban governments.

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 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. We turn to alternative specifications in an attempt to refine the alternatives.

[21] It is also interesting that total revenue rises by far less than tax payments, which

A more complete view, perhaps, is offered in Table 3. While the results are somewhat noisy, column 4 shows that changes in suburban basic expenditure are partially matched by changes in big city basic expenditure, even holding other expenditures constant. In the other categories, only in other is the sign of the big city response even positive. Further, the other columns suggest that taxes and revenue would not change, so that any increases come from reallocation within the fixed budget. The imprecision of the results suggests there is considerable latitude over how expenditure patterns respond to suburban behavior, although the response to basic expenditures is much more consistent than the other categories.

Irrespective of the specification, the results show consistently that big cities have a greater sensitivity to suburban basic expenditures than to other budgetary changes. These changes are not caused by changes in federal or state aid policies since aid is included in the regressions, although we cannot reject that they are caused by unfunded mandates from higher level governments. If the changes were mandated, however, we would expect the expenditure changes to equal the tax changes, which is clearly not true here. A second reason to believe these results are not motivated by unfunded mandates is that Table 3 shows the reverse result, which is that internally financed changes by big cities do not result in significant suburban changes in tax or expenditure.

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

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suggests that cities use part of the tax increases to finance reductions in non-tax revenue.

larger councils are also associated with a larger transfer budget alone of the categories, although the total effect is estimated to be rather small. 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.[22] 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, indicating that some of the matching provisions that accompany this aid may be quantitatively

[22] 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

important.[23] 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. To return to the title, this may be evidence of compassion, as cities with high welfare may also engage in other forms of what are perceived as redistributive activities, even though not explicitly so. 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 on 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 a city that is constrained as to how much of the available land rents it is 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

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

[23] Our sample stops at the first year of TANF, where the matching provisions of AFDC were eliminated. Medicaid remains a matching program, and other programs have implicit matching through administrative regulation.

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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TABLE 1: A COMPARISON OF THE EXPENDITURE AND AID TO LARGE CITIES AND THEIR SURROUNDING SUBURBS (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)	310	(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)	-	-	-	-	-
Suburb Tax[1]	-	1.35* (0.72)	-	-	-	-
Suburb 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: INSTITUTIONAL EFFECTS ON BIG CITY EXPENDITURES1 (cont)

	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)
CanAnnex (=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

TABLE 3: ESTIMATED EFFECTS OF SPENDING CATEGORIES[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 Base Exp[1]	-0.30	-0.19	-0.71	0.75	0.22	-2.01
	(2.54)	(1.51)	(2.43)	(0.51)	(0.62)	(4.61)
Suburban Transfer[1]	2.21	2.83	1.55	-0.89	-0.61	6.92
	(4.34)	(2.65)	(3.77)	(1.02)	(1.11)	(8.67)
Suburban Other Exp[1]	1.32	0.25	1.31	-0.01	0.23	0.38
	(1.23)	(0.58)	(1.03)	(0.26)	(0.31)	(1.17)
# suburbs	0.0006	-0.0001	-0.00002	0.0003*	-0.0002	-0.00002
	(0.0009)	(0.0005)	(0.0010)	(0.0002)	(0.0002)	(0.0010)
WelfAid	3.38*	1.18*	3.28*	-0.15*	1.52*	0.61*
	(0.39)	(0.19)	(0.39)	(0.05)	(0.08)	(0.32)
RoadAid	1.77	(0.01)	1.87	(0.14)	-0.56	3.46
	(3.41)	(1.85)	(3.36)	(0.10)	(0.69)	(4.66)
OtherAid	0.85*	-0.04	0.73*	0.14	0.02	-0.51
	(0.42)	(0.24)	(0.38)	(0.10)	(0.10)	(0.81)
CountyExp	(0.09)	0.08	-0.02	-0.11	-0.06	0.29
	(0.31)	(0.18)	(0.28)	(0.07)	(0.08)	(0.61)
TaxPrice	(0.18)	0.11	-0.23	0.05	0.03	-0.36
	(0.21)	(0.11)	(0.18)	(0.05)	(0.05)	(0.32)
# District	0.01	0.01	0.01	-0.0004	0.001	0.01
	(0.01)	(0.01)	(0.01)	(0.007)	(0.00)	(0.01)
# At Large	0.02	0.02	0.02	0.001	0.00	0.03
	(0.03)	(0.01)	(0.02)	(0.007)	(0.01)	(0.03)
Manager (=1)	-0.06	-0.04	-0.03	-0.01	0.01	-0.12
	(0.17)	(0.09)	(0.16)	(0.05)	(0.04)	(0.19)
CanAnnex (=1)	0.17	0.16	0.13	-0.25	-0.02	0.40
	(0.26)	(0.15)	(0.24)	(0.19)	(0.07)	(0.44)
R^2	0.75	0.85	0.73	0.73	0.64	0.49
# observations	954	954	954	954	954	954

TABLE 3: ESTIMATED EFFECTS OF SPENDING CATEGORIES[2]
(contd.)

P value of Hansen J test	0.22	0.047	0.62	0.96	0.83	0.28

Coefficient estimates from 2SLS estimation, standard errors in parentheses.

* Indicates significance from zero at the 10% level.

Notes: see other tables.

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.