

Vertical Fiscal Competition Between States and Cities in the U.S.

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Introduction

One-fifth of the total U.S. population lives in the nation's 98 largest cities. The growth and prosperity of these cities is key to the economic prosperity of the nation. Cities, because they enable a higher than average density of economic activity, lower costs for both customers and suppliers. Dense urban environments allow business firms to more easily adapt to changes in demand, increase the quality of the matching process between the needs of businesses and the skills of workers, and facilitates spillovers of knowledge from one industry to another. In many cases, these economies of agglomeration are more than sufficient to offset the greater congestion costs in dense urban areas (Ciconne and Hall, 1996). Cities facilitate specialized consumption, such as art and culture, and cities that specialize in these types of activities tend to have relatively high rates of growth (Haughwout and Inman, 2000).

The prosperity of cities is not preordained. A necessary condition for the economic prosperity of cities is the existence of an effective local government that provides a wide array of public services at competitive tax rates. The economic recession, the depressed housing market, and the fiscal crises facing many states, all raise concerns about the continued ability of large U.S. city governments to function effectively.

One way to systematically assess the fiscal health of city governments is to measure whether their *revenue-raising capacity* generates adequate revenue at reasonable tax rates to fulfill their *expenditure needs*. Expenditure needs depend on a variety of factors, some of which are under the control of municipal officials, and some of which are outside of their control. One major factor that is outside of cities' control is the set of municipal expenditure functions for which cities are fiscally responsible. In most states, the state legislature determines which public services must be provided by its local governments. Furthermore, state government statute or

court-ordered mandates may require city governments to provide minimal levels of service, especially services directed to the needy. Expenditure needs of local governments may also differ because the *cost* of providing municipal public services may differ across local governments for reasons that are largely out of the control of local public officials. Factors that reflect differences in costs are likely to include the demographic and social composition of a community. For example, cities with high concentrations of poor families are likely to face higher costs of providing core municipal government services, such as public safety and fire protection. Physical characteristics of a city, such as density and the age of infrastructure can also influence costs.

Factors to some extent under the control of municipal officials include relative efficiency in the delivery of services, the size of the municipal labor force, and the compensation of public employees. While base levels of compensation are determined by market wage rates and the bargaining power of public employee unions, cities have some degree of discretion in terms of overall compensation levels. In some states, such as New York, pension benefits are heavily influenced by state actions, hence to some extent are outside of the control of municipal officials.¹

Revenue raising capacity depends on the fiscal base in the city, and the range of tax and revenue instruments which are legally available to city governments. The fiscal base is a direct function of the strength of the city's economy, which in turn depends on the willingness of firms and households to locate in the city. The legal authority to use various revenue instruments is

¹ For example, see Press Release, Governor David Paterson (2009). Available at http://www.state.ny.us/governor/press/press_12100901_print.html.

determined by the state. All cities are allowed to use a local property tax, with the tax base consisting of both residential and non-residential property. A small number of cities use a local income or wage tax, and a larger number use local-option general sales taxes, as well as excise taxes on tobacco, alcohol, and gasoline. In addition to these major taxes, cities raise substantial amounts of revenue from charges and fees of various types, including license fees for firms, and charges for municipally operated utilities.

Own-revenue raising capacity is augmented by intergovernmental grants from the state, which on average make up about one-fifth of municipal government revenues. By definition, the state government determine how much revenue it will provide to its local governments. The state government also determines the form state grants take. As shown by Fisher and Prasad (2009) only a handful of states have chosen to provide their municipal governments with substantial amounts of unconditional aid. In 2007, about three-quarters of all grants to municipal governments were designated for specific purposes, such as public health, highways, or education.

In this paper, we will study the neglected issue of vertical tax competition between states and their large cities. To what extent are taxes at the two levels of government substitutive, versus complementary? Has such sharing led to higher overall rates of taxation than in non-shared states? What fiscal arrangements have been made to reduce the externalities inherent in the sharing of the tax base? Is the price of permission to diversify city revenue bases, a reduction in direct state intergovernmental aid?

The plan of the paper is as follows. In the next section, we discuss the potential interrelationships between various revenue and expenditure components of state and city governments. This is followed by a section in which we considers the applicability of the vertical

tax competition model to state-local fiscal relations, and provides a brief review of tax interaction literature. Next we present data on revenue sources for big cities in 2002 and 2007, and discusses the extent to which revenue systems are diversified. In the next two sections, we first present the special case of New York State as an example of vertical tax relationship, and then discuss a preliminary regression analysis of vertical tax competition involving the general sales tax. In the last section we draw some preliminary conclusions and discuss our future research plans.

Fiscal Relationships Between State and City Governments

The municipal budget identity can be represented by the following equation:

$$\text{Expenditures} = \text{Revenues} = \text{Taxes} + \text{Charges} + \text{Intergovernmental Revenue} \quad (1)$$

$$\text{Expenditures} = \text{Sum of spending on all Services} \quad (2)$$

Spending per service equals the average cost per unit of service provision, multiplied by the service level (quality) of each service.

The state budget identity may be represented similarly to the city budget identity;

$$\text{State Revenues} = \text{State Expenditures} \quad (3)$$

$$\text{State Revenues} = \text{Taxes} + \text{Charges} + \text{Intergovernmental Revenue} \quad (4)$$

$$\text{State Expenditures} = \text{State Aid to Localities} + \text{State Direct Expenditures} \quad (5)$$

There are simultaneous links between each of the components of state expenditures and local expenditures. For example, if a state assigns a relatively high share of expenditure responsibility to the locality, then state direct expenditures may be relatively low, and state aid to localities relatively high.

States have a major influence on municipal finance through their legal control over taxing authority, through the amount of intergovernmental assistance, and through their role in determining expenditure responsibility. Ladd and Yinger (1989) find that there is a systematic trade-off between grants and a measure of what they refer to as institutional assistance. The latter includes both taxing authority and expenditure assignments. Using a sample of the 50 largest cities in 1982, they estimate a two-equation model of grants and institutional assistance. They find that a \$1 increase in institutional assistance is associated with a 40 cent decrease in state grants. However, the trade-off is not symmetric: a \$1 increase in grants is offset by almost a full dollar of decrease in institutional assistance. The implication is that states place a higher value on direct grants than on allowing more tax authority or relieving cities of expenditure responsibility, in terms of their perception of the effectiveness of the respective approaches to dealing with the fiscal problems of big cities.

The state-local budgetary linkage we focus on in this paper is that between local and state taxes. In a general sense, states and their localities compete for the same fiscal resources. If the two levels of government use different taxing instruments, then the competition is less direct than if they share the same fiscal base. This basic point is reflected in the existing division of tax reliance, with the property tax as the primary local tax, and state income and sales taxes as the primary state taxes. However, if property tax revenues are insufficient to finance the local share of cities' expenditure needs, cities may try to diversify their revenue sources by turning to local-option general sales taxes, excise taxes, and income or wage taxes. These alternative local taxes may then become direct competitors to the state for fiscal resources.

There is a longstanding trend in city finance to move away from the property tax as the predominant municipal revenue source. The property tax accounted for 75.6 percent of the tax revenue of all local governments in 1992. That percentage had fallen to 71.4 by 2007 (U.S. Census Bureau, 2009).

Vertical Tax Competition

Implications of Tax Competition

Vertical harmonization of taxes through shared bases permits a federal system to adjust the relative roles of national and sub-national financing through the explicit exchange of tax points, as has occurred from time to time in Canada. A tax point is a percentage point of taxing capacity. A transfer of tax points is a swap, in which the federal government reduces its tax rate on a shared base by a certain number of tax points, and the provinces replace this rate by an offsetting increase in their own rate. There are also substantial administrative and compliance advantages from a vertically harmonized tax system, under which the higher level of government serves as tax collector, remitting the local share to the lower level government.

The potential disadvantage of vertical tax base sharing is that a change in the tax rate at one level can have a negative effect on the tax base at the other level. If the effect on the other tax base is significant, but is not taken into account by voters and their governments when deciding on tax rates, the cumulative rate of taxation in the federation may be greater than optimal (Boadway and Tremblay, 2005; Dahlby, 1996).

At the same time that cumulative rates under shared tax bases may be too high, any increase in rates at one level may at least partially displace taxes at the other level. The displacement effect occurs because the rate increase on the shared base increases the marginal excess

burden at the other level. The response may be a decrease in tax rates. Unless the lower level government is large relative to the higher level government, the direction of displacement is most likely to run from higher to lower level tax rates.

A necessary condition for vertical tax competition is that both levels of government have some degree of independence in the setting of tax rates. While this condition typically holds sufficiently for U.S. states in relation to the federal government, it is not clear that it applies to the typical state-local fiscal relationship. Localities are the legal creatures of the state, and are highly constrained in their taxing authority. With the sometimes exception of the property tax, all decisions to raise tax rates are subject to state approval, requiring in most states a majority vote in both houses of the state legislature. Over the past thirty years, even the ability of local jurisdictions to control the property tax has been increasingly restricted by tax and expenditure limitations. As of 2006, 43 states had such restrictions, though they vary substantially in the effective constraints imposed on local property taxation. (Anderson, 2006).

Given the degree of state control over local finances, the concept of vertical tax competition, in the sense of independent fiscal units reacting to the policies of other independent units, is less relevant in state-local fiscal relations than in federal-state relations. However, competition for fiscal resources is inherent in the shared responsibilities of states and their localities for both financing and services. If a small number of big cities in a state comprise a significant portion of state population and/or economic output, as is the case in New York, then fiscal competition may be even more intense than at the federal to state level. One might even hypothesize that in historical terms, the causality of fiscal control goes from greater relative size to greater state regulation, i.e. that the dominance of large urban agglomerations leads to demand by smaller

municipalities for countervailing state power over the large cities. These forces imply that fiscal competition is likely to lead to substitution between state and local taxes, rather than complementarity.

In addition to direct intergovernmental grants, states provide fiscal assistance to cities and municipalities through a variety of mechanisms. For example, some 35 states provide property tax relief to the local government residents. As of 2008, 33 states and the District of Columbia had some form of circuit breaker program under which property tax relief is provided to taxpayers paying property taxes above some specified proportion of their income (Bowman, et al., 2009). Some states provide flat rebates that vary by income level, or rebates as a percentage of property taxes, with the percentages varying by income. Nine states use a separate, stand-alone rebate process to administer their circuit breaker programs, while nine administer the circuit breaker as if it were part of the income tax, but offering stand-alone rebates to individuals who do not owe any income taxes (Lyons, et al., 2007). Thus, depending on the form of relief, property tax relief may show up in lower income taxes or in higher state aid. The size of property tax relief programs varies substantially across states, so the effects on state aid, state taxes, and local taxes will vary commensurately.

In addition to the automatic or mechanical relation between state and local taxes that result from property tax relief programs, tax relief to localities may also provide implicit incentives for municipalities or school districts to raise their property taxes. Eom, Duncombe, and Yinger (2007) argue that New York's State Tax relief program (STAR) acts like a matching grant in lowering the price of public spending. They present evidence that school districts have responded to this incentive by raising school spending and property tax rates. A

similar result has been found for Georgia (Brian, 2009). If localities respond positively to tax price incentives that are built into property tax relief policies, we would expect that the stronger the incentive, the greater will be observed complementarity between state level taxation and local taxation.

Literature Review

The empirical literature on vertical tax competition has looked primarily at fiscal relationships between national and provincial (state) levels of government. Studies for Canada and the U.S. have tended to find complementary relationships between effective national and provincial tax rates for the income tax.

Chernick and Tennant (2010) find that for the income tax, the average rate at the state level is independent of the average federal rate. However, higher federal tax rates on high income taxpayers are offset to some extent by lower state income tax rates on the same income group.

For Canada's corporate income tax, Hiyashi and Boadway (2001) find that higher national taxation tends to displace corporate taxation at the provincial level. The major exception is Ontario, where the national rate has no effect on the provincial rate. By contrast, Ontario's rate, and only that of Ontario, has a positive effect on the national rate. This could be because of the relatively large share of corporate income in Canada which is realized in Ontario. This result suggests that at the state level, reciprocal tax relationships, in which city tax decisions affect state tax rates, will be strongest for very large cities.

Esteller-Moré and Solé-Ollé (2001, 2002) examine the effect of both vertical and horizontal tax competition on state income taxation in the U.S. (2001) and provincial income taxation in Canada (2002). In the U.S. analysis, using a sample of the 41 states with income taxes, for the

years 1987-1996, they test for the differential effects of reciprocal deductibility of state and federal income taxation, as opposed to the norm of one-way deductibility. They also test for fiscal illusion, as measured by dummy variables for whether or not a state's income tax base conforms to the federal tax base, or whether a state's income tax is set as a proportion of the taxpayers' federal income tax liability. The extent to which states do not completely undo the automatic response of state tax burdens to a change in the federal tax base is taken as a measure of fiscal illusion, because the resultant change in tax rates does not result from fiscal choices reflecting fundamental demand and supply relationships in the state's public economy.

Esteller-Moré and Solé-Ollé (2001) find a positive relationship between federal and state/provincial income tax burdens in both the U.S. and Canada. In their U.S. study, a one percentage point increase in the federal tax burden is associated with a 0.10 percentage point increase in state income tax burdens, and a 0.22 percentage point change in the combined state income and sales tax. The magnitude of the response in states that conform to the federal income tax base is almost twice as high as in those states that do not conform. This supports the notion that fiscal illusion matters in determining state income tax burdens.

Big City Finances in 2002 and 2007

In this section, we present summary data on big-city financing. The source of the data is the 2002 and 2007 Census of Governments individual unit of government file. We focus primarily on selected aspects of the fiscal behavior of the 98 largest city governments, those with 2007 populations over 200,000. We start by describing the 2007 data and then look at changes from 2002 to 2007. With the exception of a break out of cities with dependent school districts, in this paper we do not adjust or take account of the significant differences in city expenditure responsi-

bilities across cities, including the different fiscal roles of county governments. In the next phase of our work, we will divide cities into those which coincide with their counties and those with separate and overlapping counties. In the latter case, we will make adjustments for the city's share of the county population, tax base, and expenditures. We will also add functional responsibility information from the Census of Governments government organization file. We will use the more complete data on city finance to model the vertical and horizontal fiscal relationships between cities, states, and counties, with the goal of estimating the tradeoffs between state intergovernmental aid and state taxation, on the one hand, and city and county taxation on the other hand.

Big City Finances in 2007

The first two tables are divided into three panels. On the left, we present data for all general-purpose local governments, those classified by the Census Bureau as either municipalities or townships. The central panel contains data for the 98 largest municipal governments, while the panel on the right presents data for all other general-purpose governments. Although there were 36,011 general-purpose governments in the U.S. in 2007, the largest 98 governments accounted for 46 percent of the \$433 billion of general revenue of all general-purpose governments. Table 1 demonstrates that for the largest cities, a larger than average share of general revenue comes from intergovernmental sources, 30.3 percent compared to 23.8 percent for all other governments. Although municipal general-purpose governments get about four times more revenue from state aid compared with aid from the federal government, in relative terms, federal aid makes up a larger share of total intergovernmental revenue for the large cities compared with smaller municipal governments. The data make clear that on average municipal governments in the U.S. raise a large portion of their own revenue. Of the own-source revenue of general-purpose governments, nearly

two-thirds comes from taxes, with user fees and charges and miscellaneous revenues making up the rest.

Fiscal competition between city and state governments will be strongest when states and cities utilize the same taxes. Table 2 presents a picture of the sources of tax revenue for general-purpose municipal and township governments in the U.S. The data make clear that the largest cities rely much less heavily on the property tax compared with smaller general-purpose governments. About 40 percent of the tax revenue of the big cities comes from the property tax, while other general-purpose governments rely on the property tax for nearly two-thirds of their tax revenue. For big cities, the most important sources of tax revenue after the property tax are (in terms of aggregate revenue), the general sales tax, the individual income tax, selective sales (or excise) taxes, and the corporate income tax. The data in Table 2 show that smaller governments rely much less heavily on income taxes than the big cities.

Table 2 provides only a partial picture of revenue diversification among city governments. Because a few of the largest city governments, most notably New York City, are among the most diversified city governments, the averages in Table 2 paint a picture of more revenue diversification than actually exists in the typical big city. Perhaps a more accurate picture is given in Table 3, which provides a count of the number of big cities that use each tax and among those using the tax, the number which rely on the tax for less than a third, between one-third and two-thirds, and for more than two thirds of their total tax revenue. The data in Table 3 show that corporate income tax revenue is quite rare, with only five cities utilizing the tax. Only 17 of the largest 98 cities use the individual income tax, with just nine cities generating more than a third of city tax revenue from the tax. In contrast, all but two cities, Akron, Ohio and Milwaukee, Wisconsin, raise tax revenue

from consumption taxes, with 52 of the largest cities generating over a third of their tax revenue from these taxes. As all states and the District of Columbia impose excise taxes on tobacco, alcohol, and gasoline, and all but five utilize general sales taxes, vertical tax competition will be most direct for consumption taxes.

As indicated above, not all city governments have the same set of expenditure responsibilities. Because of these variations in fiscal structure, care must be taken in interpreting cross-municipality comparisons on both the spending and revenue sides. Although it was not feasible for this paper, in future work we will attempt to determine the impact of different fiscal arrangements and expenditure responsibilities on the way city governments choose to raise revenues. As a first step in this direction, we recalculated the data presented in Tables 1 and 2 after excluding the 12 big cities that have dependent school districts. As education spending is typically more heavily supported by state aid than other type of municipal spending, it is not surprising that distribution of revenue sources in the remaining 86 large cities differs somewhat from the data reported in Tables 1 and 2. Once we exclude cities with dependent school districts, the share of general revenue from state aid drops from 22 to 14 percent, and own-source revenue as a percentage of total general revenue rises from 70 to 78 percent. Although reliance on the property tax remains unchanged, the use of consumption taxes in the cities with dependent school districts rises from 26 to 37 percent of general revenue and the reliance on individual and corporate income taxes falls from 23 percent in the 98-city sample to 10 percent in the set of large cities with independent school districts.

Fiscal Changes between 2002 and 2007

Although in 2002 the U.S. economy was beginning to emerge from a relatively mild recession, the fiscal condition of most state governments was deteriorating. Not only did many state governments face large budget gaps in 2002, these gaps continued in both 2003 and 2004 (Johnson, 2003). One way in which states closed their budget deficits in the period between 2002 and 2004 was to cut state aid to local government (Dye and Reschovsky, 2007). Between 2005 and 2007, however, the economy grew at a healthy average annual rate of about six percent. As we know now, the country was close to the peak of the housing bubble, with nominal housing values rising by an unprecedented 66 percent between 2002 and 2007.

Tables 4 and 5 are organized in a similar fashion as Tables 1 and 2, but present data on the dollar and percentage **changes** in municipal government revenue between 2002 and 2007. The general revenue of municipal governments grew at an average annual rate of 6.2 percent between 2002 and 2007, with revenues growing at a slightly slower rate in the 98 largest municipalities. The data in Table 4 demonstrates that in the big cities, own-raised revenues, and especially taxes, grew at a substantially faster rate than intergovernmental revenue. When we compare the big cities to smaller municipalities, it is clear that taxes grew at a faster rate in the big cities, while both federal and state intergovernmental revenues grew much more slowly. It is noteworthy that state intergovernmental revenues grew at a rate that was less than half of the overall growth rate of local government general revenues. This pattern is consistent with the finding of Reschovsky (2004) that at least a dozen states cut in absolute terms their unconditional grants to local governments between fiscal years .

As shown in Table 5, although property tax revenue grew at a faster rate in the largest cities than in other municipalities, overall property tax revenue grew at a somewhat slower rate

than the growth rate of all locally-raised taxes. Large cities experienced especially rapid growth in personal and corporate income taxes, and other taxes, which is a residual category. Revenue from consumption taxes grew faster in smaller municipalities than in the largest cities between 2002 and 2005.

It is notable that the rate of growth in property taxes, though not inconsiderable, was exceeded by the rate of growth in income taxes, despite the unprecedented rate of appreciation in real estate prices in this period. This pattern is not surprising, given that income taxes are in general much more procyclical than property taxes. The relative revenue stability of the property tax reflects in part assessment lags inherent in the administration of the property tax, and the fact that local governments set property tax rates annually and thus can easily lower rates as property values increase. In response to rapidly rising property values, some cities may have also expanded property tax abatements. We will explore these issues in future research.

The Impact of Revenue Diversification

The role of the property tax in the financing of public services varies tremendously among the nation's largest cities, from no use of the property tax in Mesa, Arizona to 67 percent of own-source revenue in Boston. In order to begin exploring whether revenue diversification away from heavy reliance on the property tax leads to a different set of fiscal decisions, we have divided the 98 largest cities into three groups depending on their degree of reliance on the property tax in 2002. The first group contains the 29 most diversified city governments, those that raised less than 15 percent of their own-raised revenue from the property tax in 2002. The middle group contains the 39 cities that raised between 15 and 30 percent of their own-raised revenue from the property

tax, while the least diversified 30 cities relied on the property tax for over 30 percent of own-raised revenues.

Table 6 summarizes our preliminary results. We start by noting that cities with the least revenue diversification, namely those that rely most heavily on the property tax, receive more state aid per capita than cities that have a more diversified revenue base. This finding is consistent with the idea that states that prohibit vertical tax competition from their municipal governments compensate their local governments with additional state aid. Although the data in Table 6 suggest that per capita spending is higher in cities with less revenue diversification, this pattern disappears when we restrict the analysis to the 86 large cities with independent school districts. In fact, spending per capita in the whole sample grew at a faster rate in cities with the most diversified revenue bases. This pattern may reflect the fact that because diversified cities levied fewer property taxes in 2002, it was politically easier for them to raise property taxes in response to the state aid cutbacks that occurred in most states between 2002 and 2004. Also, because cities with diversified tax bases tended to rely on state aid for a smaller share of their revenue, the impact on them of state aid cutbacks was milder.

Examples of Vertical Tax Competition

As a first example, we consider New York City's vertical tax relationships. Almost half of New York State's population and over one-half of state output are concentrated in New York City (Chernick, 2005). New York also is among the highest taxed states in the country. New York is also unique in the taxing powers assigned to its largest city, New York City's taxing structure more more akin to that of states than cities. It has a full array of taxes, including a local personal income tax, a local corporate income tax, and a local sales tax. The respective tax shares of the

property tax, sales and excise taxes, personal income tax, and corporate income tax were 35, 16, 21, and 18 percent. The state and the city divide the sales tax almost evenly between the two levels, with the state sales tax at 4 percent, and the local tax at 4 percent.²

New York's unique urban configuration makes it the state where the vertical tax competition argument is potentially most relevant. New York has always been a high tax state. Census data for 2007 indicate that state and local taxes as a percent of income in New York were 15.9 percent compared to 11.6 percent for the nation, 36 percent higher than the national average. In terms of own-raised revenues, New York was at 21 percent of personal income compared to the national average of 17 percent. Indeed, the high cumulative tax rates may reflect the common pool problem discussed in the vertical tax competition literature. Each level of government overtaxes in its respective jurisdiction, because it does not take account of the effect of its taxing decisions on the tax base of the other levels of government. Legal authority over most tax decisions is vested at the state level, as in all states. However, the state legislature, though typically more receptive to suburban and rural than urban interests, must be somewhat responsive to the fiscal needs of its largest jurisdiction (Chernick and Reschovsky, 2001).

The problems of vertical tax competition and invading of the other level's tax base are well recognized in New York State. There have been a number of specific instances of direct conflict. For example, a special state surcharge capital gains tax on properties selling for a million dollars or more was vigorously contested by New York City because almost all of the properties were located in the city.

² There is a small additional sales tax levy which is allocated to regional transportation authorities.

A second example concerns the cigarette tax. In 2002, in exchange for allowing New York City to raise its cigarette tax rate from 8 cents per pack to \$1.50, the state required that 46 percent of annual city cigarette tax revenues be redirected to the state, as compensation for the decline in state cigarette tax revenues that would result from an increase in tax rates on an elastic tax base. The 46 percent state share can be viewed as the price imposed on New York City for being granted the authority to raise its own tax. It is worthwhile noting that the state's mandated 'take' on the locally raised tax is roughly in line with New York City's share of votes in the state legislature.

In 2008, the New York State raised the state cigarette tax by \$1.25, to \$2.75 per pack. Chernick and Merriman (2010) find that in the short term the elasticity of state revenue with respect to the tax increase was .54. This implies that the 83 percent increase in the state tax rate increased cigarette tax revenue by about 45 percent. The increase in revenue is consistent with a price elasticity of demand for cigarettes of about -1.0. Taxable sales in New York City dropped by 22 percent. This decrease in taxable sales implies an elasticity of New York City revenue with respect to the state tax rate of -.27, meaning that a ten percent increase in the overlying state tax rate reduces New York City revenue by about 2.7 percent.

The displacement effect, i.e. the reduction in New York City tax revenues, was estimated to be about 12 percent relative to the increase in New York State revenues. However, even this calculation overestimates the loss in revenue to New York City. Because the state shares in New York City cigarette tax revenues at a rate of 46 percent, it also incurs 46 percent of any decrease in New York City revenues. Thus the loss in New York City revenues of \$4.4 million per month is about \$2.5 million, with the state bearing the other \$1.9 million. This relatively trivial loss for New York City can be counterbalanced against the benefits from decreased smoking which were

induced by the tax increase. Thus, paradoxically, vertical tax competition is mitigated by the state's requirement that it be allowed to share in city tax revenues from a shared or common tax base.

Empirical Tests for Vertical Tax Competition

Since almost all states and cities have both local and state sales and/or excise tax rates, our initial cut at modeling vertical tax competition was to estimate a simple model of state and local sales tax rates. We follow the typical specification in the literature, which makes the local rate a function of the higher level rate. We estimate a regression model in which the average local sales tax rate for the state is the dependent variable, and the state rate is the independent variable. While it would have been preferable to use the local sales tax rate for specific cities within each state, we have not yet been able to collect those data. Additional regressors include the share of own source revenue from the property tax and the sales tax, city population, and state excise tax rates on cigarettes and alcohol. Initial results are presented in Table 7.

The regression shows a significant negative relationship between state and local rates. The magnitude of the estimated coefficient on the state rate $-.26$, implies that a one percentage point increase in the state rate is associated with a 0.26 percentage point decline in the local rate. This result suggests that state fiscal systems do in fact trade off between local and state taxation. However, the important point to note is that the coefficient is well below one. The suggestion, to be pursued more thoroughly in future work, is that dividing the tax between state and local levels allows a higher overall rate of sales taxation than if the tax is levied only at the state level. This result is thus consistent with the prediction of higher overall rates when there is tax base sharing between levels of government.

An alternative form of trade-off for cities is between different tax instruments. We expected that cities that rely relatively more heavily on property taxation would have lower sales taxes. As a measure of reliance on the property tax, we include the share of own-source revenues raised from the property tax. Somewhat surprisingly, in this initial specification the property tax share is positive, but not statistically significant. Thus, our initial, very tentative, results do not suggest that cities trade-off property taxes for sales taxes.

The other result of note in Table 7 is the negative and significant effect of the state cigarette tax on the local sales tax rate. This suggests that states and their cities may make explicit trade offs between general sales taxation and excise taxation.

Conclusions

This paper provides a new look at the financing of cities in the U.S. We focus on the interrelationships between states and cities, through both intergovernmental aid and the sharing of taxing authority, particularly for the sales and income taxes. The traditional model of vertical tax competition assumes a strong degree of fiscal independence between states or provinces and the national government. Theoretically, tax rates can be complementary or substitutive. We hypothesize that city taxation of shared tax bases is more likely to substitute for, rather than complement, state taxation, due to the subordinate legal position of cities. The example of cigarette taxation in New York State is illustrative. An initial regression analysis, for state and local rates of sales taxation, is also suggestive of the substitutive nature of vertical tax competition, with higher state rates partially offset by lower local sales tax rates. As pressure increases on cities to diversify their revenue base away from the property tax, competition between cities and states for fiscal base is likely to increase.

In the data section of the paper, we draw on city finance data from the individual unit files of the 2002 and 2007 U.S. Census of Governments to present some basic statistics on city finance in 2007, and changes since 2002. Our sample is the 98 largest U.S. cities. At this point, the data have not been adjusted for differences in expenditure responsibilities, or the varying fiscal role of overlapping counties. We find that big cities raise about 70 percent of their revenues from own sources, of which about two-thirds comes from taxes. Though the property tax continues to be the main source of taxation, cities show substantial reliance on other sources. For example, fifty two of the 98 cities in our sample raise one-third or more of tax revenue from sales and excise taxes.

General revenue of municipal governments grew at an average annual rate of 6 percent between 2002 and 2007. In big cities, taxes grew substantially faster than intergovernmental aid. Among taxes, the fastest rate of growth was for individual and corporate income taxes, though the latter are used by only a small proportion of cities.

Our initial look at the data indicate that cities were able to maintain revenue growth in the period 2002-2007 by substituting local taxation for declining or more slowly growing state aid. To look briefly ahead, although the economy has started to grow again and the loss of jobs is ebbing, city governments will face enormous fiscal pressure over the next few years. Revenue from all sources is likely to grow very slowly. State income and sales taxes have experienced precipitous declines, and are projected to grow very slowly over the next few years. Past history suggests that many states will deal with their large budget deficits by cutting state aid to their local governments. At the same time, the ability of cities to continue to substitute local taxation, particularly property taxes, for state aid is in doubt, given the decline in many local real estate markets. Unless

federal aid, or increased fees and charges, can provide alternative funding, the overall outlook for city finances is not promising.

This paper provides a first step in our goal of exploring in depth the fiscal conditions of large American cities by focusing on their complex relationships with overlapping jurisdictions, in particular their state governments. In order to analyze the taxing and spending decisions of large city governments, we will need to measure differences across cities in their public service responsibilities, and control for the different roles played by the county governments in which cities are located. In future work, we plan to estimate a simultaneous model of state and local taxing and intergovernmental grant decisions. Ultimately, we hope to shed light on what kind of fiscal arrangements best enable city governments to meet their responsibilities to provide public services in a volatile economic and fiscal environment.

Type of Revenue	All General-Purpose Governments		98 Largest City Governments		All Other General-Purpose Governments	
	Amount (in mil.\$)	Percentage of Total Revenue	Amount (in mil.\$)	Percentage of Total Revenue	Amount (in mil.\$)	Percentage of Total Revenue
Intergovernmental rev.	115,824	26.8%	60,362	30.3%	55,462	23.8%
Federal aid	20,980	4.8%	13,761	6.9%	7,219	3.1%
State aid	84,211	19.5%	42,875	21.5%	41,336	17.7%
Local gov't transfers	10,633	2.5%	3,726	1.9%	6,907	3.0%
Own-source revenue	316,959	73.2%	139,091	69.7%	177,869	76.2%
Tax revenue	199,767	46.2%	89,623	44.9%	110,144	47.2%
User fees & charges	74,961	17.3%	32,058	16.1%	42,903	18.4%
Misc. general rev.	42,231	9.8%	17,410	8.7%	24,821	10.6%
Total general revenue	432,783	100.0%	199,453	100.0%	233,330	100.0%

*Includes all governments classified as municipalities and townships by the Census Bureau.
Source: Authors' tabulations of data from the 2007 Census of Governments.

Type of Tax	All General-Purpose Governments*		98 Largest City Governments		All Other General-Purpose Governments	
	Amount (in mil.\$)	Percentage of Total Taxes	Amount (in mil.\$)	Percentage of Total Taxes	Amount (in mil.\$)	Percentage of Total Taxes
Property	106,416	53.3%	35,744	39.9%	70,672	64.2%
General sales	29,533	14.8%	13,840	15.4%	15,693	14.2%
Selective sales	19,011	9.5%	9,286	10.4%	9,725	8.8%
Individual income	17,439	8.7%	13,319	14.9%	4,120	3.7%
Corporate income	7,620	3.8%	7,517	8.4%	103	0.1%
Motor vehicle license	497	0.2%	339	0.4%	158	0.1%
Other taxes	19,251	9.6%	9,579	10.7%	9,672	8.8%
Total taxes	199,767	100.0%	89,623	100.0%	110,144	100.0%

*Includes all governments classified as municipalities and townships by the Census Bureau.
Source: Authors' tabulations of data from the 2007 Census of Governments.

Table 3				
Number of City Governments by Share of Tax Revenue from Each of the Major Taxes, 98 Largest U.S. Cities, 2007				
Type of Tax	Share of Tax Revenue from Each Tax			
	Zero revenue	Less than 1/3	1/3 to 2/3	More than 2/3
Property tax	1	30	46	21
Consumption taxes (sales and excise)	2	44	41	11
Individual income	81	8	4	5
Corporate income	93	5	0	0
Other taxes and licenses	0	97	1	0

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

Type of Revenue	All General-Purpose Governments*		98 Largest City Governments		All Other General-Purpose Governments	
	Amount (in mil.\$)	Percentage Change	Amount (in mil.\$)	Percentage Change	Amount (in mil.\$)	Percentage Change
Intergovernmental rev.	22,647	24.3%	9,524	18.7%	13,123	31.0%
Federal aid	5,351	34.2%	2,795	25.5%	2,555	54.8%
State aid	15,027	21.7%	6,124	16.7%	8,903	27.5%
Local gov't transfers	2,270	27.1%	605	19.4%	1,665	31.8%
Own-source revenue	90,321	39.9%	41,843	43.0%	48,478	37.5%
Tax revenue	59,155	42.1%	28,809	47.4%	30,346	38.0%
User fees & charges	19,410	34.9%	8,206	34.4%	11,204	35.3%
Misc. general rev.	11,756	38.6%	4,829	38.4%	6,927	38.7%
Total general revenue	112,969	35.3%	51,368	34.7%	61,601	35.9%

*Includes all governments classified as municipalities and townships by the Census Bureau.
Source: Authors' tabulations of data from the 2002 and 2007 Census of Governments.

Type of Tax	All General-Purpose Governments*		98 Largest City Governments		All Other General-Purpose Governments	
	Amount (in mil.\$)	Percentage Change	Amount (in mil.\$)	Percentage Change	Amount (in mil.\$)	Percentage Change
Property	29,256	37.9%	10,571	42.0%	18,685	35.9%
General sales	7,989	37.1%	3,410	32.7%	4,578	41.2%
Selective sales	4,914	34.9%	2,111	29.4%	2,803	40.5%
Individual income	4,717	37.1%	4,137	45.1%	580	16.4%
Corporate income	4,591	151.6%	4,488	148.2%	103	NA
Motor vehicle license	-43	-7.9%	-25	-7.0%	-17	-9.9%
Other taxes	7,700	66.7%	4,117	75.4%	3,583	58.8%
Total taxes	59,155	42.1%	28,809	47.4%	30,346	38.0%

*Includes all governments classified as municipalities and townships by the Census Bureau.
Source: Authors' tabulations of data from the 2002 and 2007 Census of Governments.

City Characteristics	Property Tax as a Percentage of Own-source Revenue, 2002		
	Most Diversified (less than 15%)	Some Diversification (15% to 30%)	Least diversified (Over 30%)
Property tax as a percentage of tax revenue, 2002	18.4%	42.5%	73.5%
Property tax per capita, 2002	\$125	\$319	\$557
Spending per capita, 2002	\$1,120	\$1,397	\$1,611
State aid per capita, 2002	\$196	\$307	\$615
Percentage change in property taxes, 2002 to 2007	49.4%	43.4%	34.1%
Percentage change in state aid, 2002 to 2007	42.5%	33.3%	30.8%
Percentage change in spending, 2002 to 2007	37.8%	32.7%	29.2%

Source: Authors' tabulations of data from the 2002 and 2007 *Census of Governments*.

Table 7

**Regression of Local Sales Tax Rate on State Sales Tax Rate
98 Largest U.S. Cities, 2007**

Independent Variables	Coefficient	t statistic
State Sales Tax Rate	-0.259**	-2.59
Prop Tax Share	0.809	1.33
Sales Tax Share	3.134***	4.67
City Population, 2002	0.000000317**	2.63
State Cigarette Tax Rate	-0.702***	-3.44
State Spirits Tax Rate	-0.0274	-0.78
State Beer Tax Rate	-0.0209	-0.03
Constant	2.935***	-3.53

N 98

adj. R-sq 0.348

* p<0.10, ** p<0.05, *** p<0.01

Notes: Data set is all cities with 2007 population of 200,000 or more. All city specific data are from the 2007 Census of Governments. State sales tax rates are for 2009; local sales tax rates are for 2007. Local sales tax rates are statewide averages rather than city specific. Sales and excise tax rate data are from the Tax Foundation (2009).

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