

State Laffer Curves? Income Taxes and the Destination of Movers to Multistate MSAs

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September 2006

Abstract

We examine how differences in state income tax rates, as well as other state and local taxes and public service expenditures, influence the choice of residence of households (federal tax filers) moving into multistate metropolitan areas (MSA) using annual data from the IRS on county-to-county migration of taxpayers. MSA's that are on borders provide a special discontinuity – discrete differences in state tax rates within a single labor market. MSA's crossing state borders allow residents to live in one state and work in another state, something frequently observed in these MSA's. Given this possibility we examine to what extent do differences in state income taxes influence the relative rates of incoming households to the different state portions of the MSA.

We find that differences in state income tax rates do have a significant impact on the relative rates of taxpayer migration to the states within an MSA with the states with lower income tax rates having greater rates of incoming taxpayers with a difference of ten percent in tax rates leading to a 2.1 percent difference in the relative rate of incoming taxpayers, We find that when examining the inflow of AGI from incoming taxpayers, the impact is even more pronounced with a ten percent difference in income tax rates leading to a 3.4 percent difference in the rate of taxbase inflow. Our results indicate that it is higher income households that are most influenced by differences in income tax rates. We estimate that a difference of 0.01 (0.04 versus 0.05) in state income taxes within a multistate MSA results in a difference of almost \$24,000 in AGI per filer for in-movers to the different states.

1. Introduction

Elected state officials and lobbying groups often make the argument that reductions in state tax rates will ‘pay for themselves’ through the tax revenues generated from new economic activity induced by the lower rates¹. Reducing the top state tax rate on individual income will make the state more attractive to entrepreneurs and other forms of human capital, increasing the tax base and tax revenues through the resulting economic development. Reducing the state tax on pension income will cause more retirees to move to the state, bringing with them more than offsetting property and sales tax receipts. Reducing the tax rate on inventories makes a state more attractive for warehousing and logistics operations, thus creating employment, taxable income and taxable spending that more than offset the loss in inventory taxes. And so on. While the impacts of tax cuts on state revenues is a concern of politicians and policymakers, increases in the tax base through increases in taxpaying units (households) also provides increased employment and economic stimulus.

Presently, decisions to raise or lower state tax rates appear to be justified more by anecdotes, hunches, and ideology than by economic evidence. As we show below, empirical evidence on the impacts of lowering income tax rates on state tax base and economic activity is very difficult to find due to the complexities of migration decisions and the delivery of public services, as well as the sparsity of micro data on movers. Nevertheless, we do find evidence that some movers seem to favor lower tax states.

The idea that tax revenues could rise when high marginal tax rates are cut was popularized at the federal level by Arthur Laffer and others in the 1970s. Presidents Reagan and G.W. Bush were both proponents. A form of dynamic scoring is now used to evaluate proposed changes to the federal tax code, though this remains a controversial area both in terms of methodology and politics (Auerbach (1996, 2005), Holtz-Eakin (2005)). The Congressional Budget Office provides baseline forecasts based on current policy and the Joint Committee on Taxation provides estimates of the changes in federal revenues

¹For example, in 2005 Kentucky’s governor Ernie Fletcher unveiled a ‘tax modernization plan’ to reduce the state’s top individual and corporate income tax rates, and to repeal the state’s corporate license tax. Other tax rates were raised, such as on cigarettes, satellite television, and hotel rooms. The plan was designed to be revenue neutral in the first year. State economists estimated that within five years the plan would create a net of 8,000 new jobs and an additional \$18 million in new state revenues annually.

and expenditures due to proposed legislation. Their models and coefficients are backed up by academic and practitioner research, but operationally the behavioral impacts of fiscal policies are apparently only incorporated for microeconomic issues, e.g., raising the gasoline tax rate reduces gasoline consumption, thus lowering the tax base. Macroeconomic feedback effects are well-understood at the theoretical level, at least in terms of direction, but evidently there is not yet enough consensus about the magnitude of important parameters to incorporate these formally in the federal budgeting process. For example, increased deficit spending may provide short-term stimulus to the economy, thus raising tax revenues, but longer term will raise borrowing costs and possibly lower the national growth rate.

The modeling and measurement problems are different at the state level. In contrast to the federal government, there is little reason for state government officials to worry about the effect of a state tax change on interest rates, savings, prices, exchange rates and other macroeconomic variables. On the other hand, state officials are very concerned about how a tax policy may affect their tax base, as there is much more movement of people, firms, spending, and capital between states than between nations (Rork, 2003). States are engaged in a more intense economic and policy competition than is the nation, and thus measuring the dynamic effects of state tax changes is quite important. However, there are few reliable tools for evaluating the effect of tax rate changes on the tax base and thus future revenues. The literature suggests that state taxes matter to the location of economic activity and assets, though there is little evidence about the magnitude of the effects for different types of taxes. And, due to data availability issues, most of the empirical literature concerns the movement of older taxpayers. Bakija and Slemrod (2004) examine the effect of state estate and inheritance taxes on the migration of wealthy elderly taxpayers. They find a statistically significant but modest negative impact of high state taxes. Conway and Houtenville (1998) find that states with high property, income and sales taxes experience greater out-migration. Conway and Houtenville (2001) find that the elderly tend to migrate to states that have low personal income and death taxes, and which exempt food from sales taxes. Conway and Rork (2006) examine this issue further, suggesting that states may modify tax policy as a *result* of migration rather than the converse. This paper addresses a similar evaluation problem: how changes in state individual income tax

rates affect the migration of households (and their incomes) from state to state. In particular, we take advantage of the natural experiment that occurs inside multistate metropolitan areas, to learn how arriving households sort themselves when presented with a choice among more than one state income tax schedule.

The opportunities for substitution are particularly great in multistate metropolitan areas, where households can readily choose among different taxing jurisdictions as they decide where to live, work, and shop. For example, if a state government substantially raised its income tax rate, households could relocate to a lower income tax state without leaving regular contact with their family and friends, or the advantages of the metro labor market and most of the area's urban amenities². A state like Kentucky, where the majority of its tax base lies in five multistate MSAs, would presumably see more movement of residents out-of-state if it raised its income tax rates than would a state like Hawaii where there are no border states, and moving out-of-state means getting a new job far away³.

Jurisdiction shopping and border jumping in multistate metropolitan areas are mitigated to a degree by reciprocity agreements, or the lack thereof, between state governments. Without a reciprocity agreement, people working in a state may be required to pay that state's individual income tax even if they reside in another state, thus removing the fiscal incentive to live in the state with the lower income tax rate. Seventeen states have reciprocity agreements between one to seven other states, with the bulk of the agreements between states in the Ohio River valley and Great Lakes region, and all of which levy a significant income tax. The agreements allow someone to pay state income taxes to the state of residence even though their income was earned in another state, and possibly earned in a state with a higher tax rate. As might be expected, reciprocity agreements are uncommon between bordering states when one of the

² We acknowledge the possibility of endogenous state tax policies, where State A might keep its tax rates 'competitive' with State B if much of its population and tax base lies along their common border. States, like Texas or Florida, where most of the tax base is far from its border with other states are theoretically able to set tax policy based more on other considerations.

³ If not for a special 'border exemption', the clearest test of the importance of state income taxes could be the case of Texarkana, where the main street (State Line Avenue) literally divides the city into the Texas and Arkansas sides. Texas has no individual income tax, while Arkansas levies a tax rate of up to 5.8 percent. The state of Arkansas treats Texarkana residents essentially as a tax island, exempting residents of both the Arkansas and Texas sides from their state income tax, regardless of place of work.

states does not levy an income tax, e.g., Oregon-Washington, Oklahoma-Texas, Kentucky-Tennessee, Georgia-Tennessee, Georgia-Florida.

In this study, we investigate whether movers to multistate MSAs respond to differential state income tax rates. We expect that the portion of the MSA located in the state with the lowest individual income tax rate would receive a disproportionate number of the new residents, after controlling for other economic and fiscal factors that influence location decisions. Households moving to a MSA have less jurisdictional friction than existing residents, since by definition they are already moving somewhere and therefore are incurring the relevant transaction costs, like selling a house, finding a job, choosing schools, and leaving neighbors and communities. We further restrict the analysis to people moving to multistate MSAs from other states, to screen out people who are simply moving to a metropolitan area from somewhere else in the same state, often from an adjacent exurban county. These people are likely to have more affiliation to their state than out-of-state residents moving to the MSA, as they may be retaining their existing job, have more friends and family nearby, be working for a statewide organization, be paying in-state tuition to state universities, or be residentially connected to the state for cultural or historical reasons. People moving in from other states should be more likely to shop jurisdictions for the best tax value than those moving to a metropolitan area from somewhere else in the same state.

Economists have long exploited the natural experiments that take place along political borders to learn about the economic effects of government policies. Mikesell (1970) found that a high municipal sales tax rate has a negative effect on retail sales when there is a border city with a lower sales tax rate. Mikesell (1971) examined county retail sales along state borders in Illinois, and found that retail sales per capita were lower than in non-border counties, due to the ease of shopping in four adjacent states – each with a lower sales tax rate than Illinois. The effect was most important for large purchases, with no border effect found for example for convenience stores. Fox (1986) examined the effects of differential tax rates in three multistate MSAs containing Tennessee counties. He found that sales tax differentials exerted a “modest influence on the location of economic activity along state’s borders”, with retail activity the most responsive, albeit for a small percentage of total sales. Income tax differentials also exerted a minor effect

on location, while property tax differentials had no effect. Similarly, Walsh and Jones (1988) measured the growth in grocery store sales along the state border as West Virginia phased out its sales tax on groceries over three years. Holmes (1998) found that manufacturing employment rises sharply in counties governed by state right-to-work laws when they are bordering states without right-to-work laws. Mark et. al. (2000) find that jurisdictions within the Washington DC metropolitan area that have high sales and personal property taxes see a reduction in economic activity. They examine activity over nine jurisdictions in two states and DC. They find that job growth was negatively related to high sales and personal property taxes, but that real estate property tax differentials were not important. Holcombe and Lacombe (2004) examine personal income growth over thirty years in adjacent counties along state borders, and find that high state income tax rates lead to lower growth in the border counties of those states. Hoyt and Harden (2006) investigate the impact of state taxes on the distribution of employment and population between counties contained in border versus interior metropolitan areas. They examine economic and tax data over twenty years, focusing on the effects of differential individual income, general sales, and corporate income taxes. They find a strong negative effect of corporate taxes on the location of employment and population in border metropolitan areas.

While the study of the impacts of taxes along border or multistate MSAs is of interest because we believe these are areas in which taxes are likely to influence locational decisions, studying the impacts of state taxes in these areas also provides us with the opportunity to eliminate much of the uncontrolled heterogeneity that frequently plagues interstate studies of taxes. Essentially the border acts as a “spatially discontinuity” providing us a distinct discrete difference in state tax policies between two or more areas (parts of the same MSA in different states) otherwise very similar. In many ways we treat the pair (or for some MSA’s triplets, or quadruplets) as “twins” employing an approach in many ways similar to that used in the study of human twins by Ashenfelter and Krueger (1994) to control for unobserved heterogeneity. Panels across states and over time allow for the opportunity to control for time-invariant differences in state or metropolitan characteristics. As we have a panel, like numerous other studies, we control for state-specific time-invariant fixed effects. Like some other “border” studies such as Holmes

(1998) or Black (1999), because we restrict our attention to the choice of where to reside within a single MSA, we are able to eliminate time-variant MSA-specific unobserved heterogeneity. Thus MSA-specific business conditions or changes in the mix of employment within an MSA, while not quantified, are effectively controlled for in our estimation.

We can track the gross migrant flows to portions of multistate MSAs by examining annual IRS data on movers, those that file their federal income tax from a different county in subsequent years. We seek to determine whether new migrants favor locating in the state with the lower individual income tax. We control for other economic and fiscal factors that may pull migrants to a particular side of a MSA, such as job growth, state spending, other state taxes, local government spending and taxation. Ideally, we would know something about the household characteristics of these movers, including their family composition, ages, professions, and incomes. A household's state income tax liability is a function of these characteristics, and state income tax structures vary widely in terms of rates, brackets, progressivity, type of income, and exemptions. However, the IRS data only provides aggregate county-to-county flows of people and income, not micro data on the tax filers. Other databases, such as the decennial PUMS (Public Use Microdata Samples) and the annual Current Population Survey, provide socioeconomic information about individual movers, but have other limitations for this study. The decennial PUMS data are the richest of all, but only reveal county-to-county movements between the years 1995 and 2000, or other comparable five year time frame around a decennial census. The CPS dataset is limited by its much smaller sample, and cannot support the county-level geographic analysis of interest here. Hence, we proceed to investigate the relationship between annual gross migrant flows and a measure of relative state income tax rates.

In addition to providing the gross number of in-movers to a county or, as we formulate the analysis, the number of in-movers to a state/MSA, the IRS data also provides data on flows of adjusted gross income. In terms of determining the elasticity of the tax base, this information is more relevant than the number of in-movers. In conjunction with information on in-movers we can determine the relative AGI per in-mover household (filer), thereby allowing us to estimate how the tax policies of states within a

multistate MSA influences the location of high and low income households moving into the MSA. Since the inflow of new residents entails both additional tax revenues and public service costs to state and local governments, an understanding of how state tax policies affect the income and therefore tax revenue per household of in-movers would seem to be important information for both state and local governments. If public service costs imposed by a household are relatively independent of their income but the revenues collected from them are not, tax policies may be focused less on attracting more residents but on attraction higher-income households.

We find a negative relationship between state income tax rates and the destination of movers to multistate MSAs. The relationship is both statistically and economically significant, though clearly other factors are important as well. State income tax differentials inside these MSAs appear to influence the location decisions of tens of thousands of the hundreds of thousands of households that move to multistate MSAs each year. Our estimates suggest that a ten percent difference in state income tax rates among two states within a multistate MSA will lead to a 2.1 to 4.1 percent difference in the rates at which in-movers locate in the two states. Not surprising, our results also suggest that higher-income households are more sensitive to differences in state income tax rates. Based on our findings, a ten percent difference in state income tax rates between two states in a multistate MSA leads to a 3.4 to 5.4 percent difference between the two states in the rate of adjusted gross income (AGI) of in-movers as fraction of total AGI and the ten percent difference in tax rates leads to a difference of 5.0 to 7.6 percent in the average AGI of in-mover households.

High tax rates tend to repel new residents, implying a reduction in the state's tax base (though we do not estimate the revenue impacts here) and suggest a significant elasticity in the tax bases of states with a large share of their population in border MSA's. The negative relationship between state income taxes and the destination of movers exists for both states that have reciprocity and those that do not, suggesting that some of these location decisions of new residents may be influenced by location decisions of their employers. Finally, while not the primary focus of our analysis, we also find that state sales taxes

have a negative and significant impact on the flow of movers to a state but that local taxes appear to have little significant impact.

In the next section we develop a simple theoretical framework intended to highlight the factors influence the decision of where to reside in an MSA. In *Section 3* we discuss the data and examine the many measurement issues we confronted. In *Section 4*, provides the basic structure for our empirical model following the theoretical model discussed *Section 2*. Here we also discuss the results of our estimation and use these results to get an indication of how differences in state income taxes have affected the location patterns of movers to specific border MSA's. Finally, *Section 5* concludes.

2. A Model of Residential Choice for Extra-MSA Movers

Our interest is in how taxes, specifically state income taxes, influence household decisions of where to reside and when to move. As discussed, we focus on border or multistate MSAs. The advantage of focusing on MSAs is that they are, by design, intended to reflect a single labor market or at least markets that are strongly interlinked.⁴ In a MSA consisting of counties within two or more distinct states, we have the unique advantage of having two or more different state tax structures in a single labor market. In this setting, then, as is frequently observed, households can reside in one state while working, shopping, or relaxing in another state.

In analyzing the influence of taxes on decisions regarding household decisions of where to reside and when to move, we make a distinction between two types of movers. *Extrametropolitan* movers are households entering the MSA from somewhere outside of it. In our empirical work, we also exclude moves from outside of the MSA but from within the states in which the MSA is located, and focus on

⁴ A metropolitan statistical area (MSA) must have at least one urbanized area of 50,000 or more inhabitants. Under the standards, the county (or counties) in which at least 50 percent of the population resides within urban areas of 10,000 or more population, or that contain at least 5,000 people residing within a single urban area of 10,000 or more population, is identified as a "central county" (counties). Additional "outlying counties" are included in the MSA based on commuting to or from the central counties. Currently outlying counties must have twenty-five percent of their labor force commuting to the counties in which central cities are located and have fifty percent of county income attributed to the earnings of these commuters or from providing local goods and services to the households of these commuters.

moves from states not included in the MSA. We assume, in our modeling, that the decision to move to the MSA is exogenous.⁵ Specifically, we assume it was not influenced by the taxes in the MSA relative to where the household previously resided and is presumably motivated by another reason, possibly transfer or new employment. However, the decision of where to live within the border MSA, conditional on moving there, presumably will be influenced by differences in taxes and public services within the MSA. For the decision of where to live for these households, the relative *levels* of taxes within the MSA should be relevant.

These movers may be contrasted with those moving within the MSA, or *intrametropolitan* moves. These are moves made by a household from one state in the multistate MSA to another state within that same MSA. Presumably, when choosing its initial residence within the MSA, it chose to reside in the state in which its utility was maximized given the policies and amenities of the respective states as well as employment opportunities in the two states. Then if the household chooses to move to another state within the MSA, it is presumably because of *changes* in one of the factors influencing its location decision including the tax and public service policies of the states. Since there are long lags in adjustment of place of residence to changes in state tax rates, and since few states made significant changes to their tax rates over the eleven years studied, we limit our analysis to the location decision of the extra-metropolitan movers.

We offer a very simple model of the location decision of households moving into a multistate MSA. We simplify the choice of the household by assuming that the MSA consists of two states, denoted by the subscripts 1 and 2. Households, when choosing where to live, presumably base their decision on which location gives them the highest discounted utility for the period of time in which they expect to live in the MSA. This suggests that households would need to know and consider expected future state and local public policies when choosing where to live. However, since for empirical implementation we as-

⁵While we assume that the decision to move to the MSA is exogenous and not influenced by differences in taxes between the MSA to which the household moves and their previous state of residence, if, in fact, this is not the case -- their decision to move was influenced by taxes between their new and old state of residence, this should have no impact on our empirical work.

sume that households will base their forecasts of future policies in a state on current policies, we can collapse the household's problem to choosing where it lives based on current policies and amenities alone. Let the utility for household i in state j of the *MSA* be given by

$$V_1^i = u_x^i(x_1^i) + u_s^i(g_1^s) + u_l^i(g_1^l) + a^i + c_1^i - \varepsilon_j^i \quad (2.1a)$$

where x refers to private consumption and g^s and g^l denote the services provided by state and local governments. The term a^i denotes household i 's valuation of *MSA* specific amenities and c_j^i denotes the household's valuation of amenities specific to state j , $j=1,2$ in the *MSA*. The term ε_j^i , which can be negative or positive, represents an idiosyncratic household specific preference for a state not based on public services or the state-specific amenities. Then let $T_j^l(Y^i, D^i)$ represent the state income taxes of household i with Y^i being their income and D^i being other characteristics of the household affecting their taxable income such as number of dependents and deductions. Analogously, we define $T_j^l(Y^i, D^i)$ to be aggregate local taxes paid by household i if it resides in state j . Since the household can purchase goods and services in either state in the *MSA*, households residing in state 1 may choose to purchase goods and services in state 2. Then let $T_j^s(Y^i, D^i)$ be total sales taxes paid by household i if purchasing its goods in state j and let $C_{jk}(Y^i, D^i)$ be the additional costs of transportation and time associated with residing in state j and shopping in state k . Then the household will choose to shop in state 2 if it resides in state 1 if $T_2^s(Y^i, D^i) + C_{12}(Y^i, D^i) < T_1^s(Y^i, D^i)$.⁶ Finally, let E_j denote the commuting costs associated with living in state j .

Then private consumption for household i residing in state j is given by

$$x_j^i = Y^i - T_j^l(Y^i, D^i) - T_j^s(Y^i, D^i) - \text{Min}(T_j^s(Y^i, D^i), T_k^s(Y^i, D^i)) + C_{jk}(Y^i, D^i) - E_{kj}, \quad j, k = 1, 2; j \neq k \quad (2.2)$$

The household will choose to live in state 1 rather than state 2 if

⁶This specification suggests that all purchases or at least those subject to the sales tax occur in a single state. While not generally true, this specification is merely intended to reflect the fact that purchases need not be made where the household resides but if made in the other state in the *MSA* there may be some additional transportation and time costs associated with purchasing goods there. The importance of taxes versus additional travel and time costs in these multistate *MSAs* is an empirical question which our estimation at least indirectly addresses.

$$V_1^i - V_2^i > \varepsilon_2^i - \varepsilon_1^i \equiv \Delta\varepsilon_{12}^i \quad (2.3)$$

Let $\beta_x^i, \beta_s^i,$ and β_l^i denote the marginal utilities with respect to the private good, the state public services, and the local public services. Then using (2.2) we can use a first order approximation to express (2.3) as

$$\begin{aligned} & -\beta_x^i(T_1^l - T_2^l) - \beta_x^i(T_1^s - T_2^s) - \beta_x^i \text{Min}(T_1^s - T_2^s, C_{12}) + \beta_s^i(g_1^s - g_2^s) + \beta_l^i(g_1^l - g_2^l) \\ & + (E_1^i - E_2^i) + c_1^i - c_2^i > \varepsilon_{12}^i \end{aligned} \quad (2.4)$$

where we suppress the dependence of taxes on the income and characteristics of the household. We can somewhat simplify the notation by letting $\Delta X_{12} = X_1 - X_2$, the difference in the variable X between the two states in the MSA we have

$$\beta_l \Delta T_{12}^l + \beta_l \Delta T_{12}^l - \beta_s \text{Min}(\Delta T_{12}^s, C_{12}) + \beta_{g_s} \Delta g_{12}^s + \beta_{g_l} \Delta g_{12}^l + \Delta E_{12} + \Delta c_{12} > \Delta \varepsilon_{12} \quad (2.4')$$

where we suppress the superscript for household i and replace $-\beta_x$ by $\beta_l, \beta_b,$ or β_s for the income, local, and sales taxes, respectively. As (2.4) indicates the choice of where to live in the MSA depends on differences in tax and public service policies between the two states in the MSA, differences in community costs to the places of employment, and the evaluation of *state-specific* amenities by the household. The choice does not depend on *MSA-specific* amenities as these are assumed to be consumed in either state within the MSA. While household income does not directly enter (2.4) because we assume that the place of employment chosen by the household is the same regardless of choice of residence within the MSA, it indirectly enters (2.4) as taxes are a function of income.

Since $\Delta\varepsilon_{12}$ is a random variable, we can use (2.4') to express the probability of the household choosing state l of the MSA as

$$P(-\Delta\varepsilon_{12}) > -(\beta_l \Delta T_{12}^l + \beta_l \Delta T_{12}^l - \beta_s \text{Min}(\Delta T_{12}^s, C_{12}) + \beta_{g_s} \Delta g_{12}^s + \beta_{g_l} \Delta g_{12}^l + \Delta E_{12} + \Delta c_{12}) \quad (2.5)$$

As our data is not on individual household location decisions but on aggregate flows of households, we do not estimate the probability of a household locating in a state but instead use (2.5) to motivate our estimation of the factors determining the difference in migration rate to the different states in the MSA. To undertake this estimation, we need to develop measures of the difference in in-mover rates,

tax rates, spending, and other factors among the state portions of the multistate MSAs. We next turn to a discussion of the data available, and their characteristics.

3. Data and Measurement

3.1 Multistate Metropolitan Areas

Currently there are 44 multistate metropolitan areas, containing 286 counties in 37 states. We use these current metropolitan definitions retroactively for all data measures, constructing estimates from the component counties. *Table 1* provides some summary data on these areas. Multistate metropolitan areas contain 68 million residents, about one-third of the US population, thanks to the inclusion of the very large New York, Chicago, Philadelphia, and Boston markets. Two of these areas span four states, five span three states, with the rest including counties in just two states. In a few cases very little population of the MSA is found in one of the states. For example, Union County, South Dakota has a population of only thirteen thousand and is the only part of South Dakota in the Sioux City, IA-NE-SD metropolitan area. Metropolitan areas are defined primarily using county-to-county employment interchanges, so there is an economic tie between the Iowa, Nebraska and South Dakota portions of the area. We include all multi-state metropolitan counties, regardless of size or distance from the center of the market. Note that in several cases the population or employment of the metropolitan area is almost evenly split between two states, e.g., Clarksville, Davenport, Hagerstown, Kansas City, Weirton, and Wheeling.

We also provide some indicative state tax rate data in *Table 1*. We have calculated the average state income tax for a hypothetical household with \$250,000 income, and have also listed the state sales tax rate – adjusted for coverage of groceries⁷. This level of income is high enough to trigger the top tax rate in every state, and therefore can be considered a measure of the highest tax rate in each state. In many cases the state tax rates are similar inside the multistate metro. But there are some very interesting contrasts. For example, the Chattanooga and Clarksville MSAs contain counties in relatively high tax states (Georgia and Kentucky) as well as in Tennessee, where the state does not tax wages and salaries. At

⁷ According to the Current Expenditure Survey (CES), spending on food at grocery stores accounts for about 20 percent of retail spending normally taxed by state sales tax laws. Hence, we use this ratio to factor down the sales tax rate in states that exempt groceries.

first glance, the Portland MSA provides a stark choice between Oregon's high income tax and Washington's zero rate, but recall that Oregon does not have a reciprocal relationship with Washington and hence the income tax cannot be avoided by choosing to live in the low tax state.

The ease of living in one state and working in another is evident from Census data on county-to-county commuting patterns. There were 2.4 million cross-state commuters in these 44 multistate MSAs in 2000, a growth of ten percent from a decade earlier⁸. In six areas, there are more residents crossing a state border to work than are working in their home state: Columbus MSA – Alabama portion, Fargo MSA - Minnesota, Huntington MSA - Ohio, Lewiston MSA - Washington, New York MSA, Pennsylvania, Virginia Beach MSA – North Carolina.

3.2 Movers

The US Internal Revenue Service (IRS) provides a rich database on the annual movement of taxpayers between counties, beginning with movers between 1980 and 1981. IRS matches the social security numbers of taxpayers between tax years, noting those who claim a different county of residence in a subsequent year (Gross and Kilss, 2002). The data set only reports movers where the social security number of the primary taxpayer matched between tax years, thus excluding many people who married, divorced, died, or entered errors on their tax return. There is no practical way to get around the problem of incomplete coverage, and hence studies implicitly assume that there is no geographic bias to the undercount (believed to be about two percent).

One data characteristic that constrained our study is the change in cutoff values used for recording. For the tax years 1980-81, 1983-84, and 1984-85, the cutoff was set at .5 percent of all migrants to or from a county, with no absolute cutoff number. As with all years, the residual migrants were included in higher level aggregations for the destination counties, but the origin counties were not disclosed. For the 1985-86 through 1989-90 data sets, the cutoff was set to 50 migrant tax filers, regardless of percentage of all migrants. The cutoff value used for reporting county-to-county flows

⁸ Calculated from county-to-county commuter data, obtained from US Census Bureau: www.census.gov/population/www/cen2000/commuting.html.

changed again with the 1990-91 data set. Beginning in that year, each county pair is listed if there were ten or more filers who moved between counties, or if the flow represented at least 0.5 percent of all county migrants. The effect of this change in cutoff criteria is that more county-to-county flows are identified after 1990-91 than before. There are fifty to sixty percent more county-to-county flows identified beginning with the 1990-91 data set than in previous data sets. Because of this large increase in detail available, we decided to begin our analysis in 1991.

The database includes measures of tax returns, number of exemptions, and adjusted gross income for each county pair, that is between each origin and destination county. We have organized these data for the multistate metros, distinguishing between intrametropolitan movers and those moving to the metropolitan areas from outside – extrametropolitan movers. We aggregate county-level data to measure the flows of movers going to each state component of the multistate metros. For extrametropolitan movers, we further distinguish those who came from counties in the same state as the destination county. These movers are likely to have existing institutional linkages with the state and be biased in their state selection when moving to the metro area. Hence, in our statistical work, extrametropolitan movers refers to those moving to a state portion of a metropolitan area and who did not live in the metro or the same state in the previous year.

About 600,000 household members, as measured by the number of tax exemptions, moved annually to these multistate metros over the eleven years analyzed. These extrametropolitan movers chose to live in one of the states available in the metro area. An additional 300,000 household members moved annually within the metropolitan areas, but crossed a state border. The total adjusted gross income of the extrametropolitan movers varied between \$10 and \$21 billion annually over the period. The adjusted gross income of intrametropolitan cross-state movers varied between \$5 and \$8 billion annually. For most of the time period, extrametropolitan movers reported two to three thousand dollars more in taxable income per return than did intrametropolitan movers. However, this reversed in 2002, with intrametropolitan movers reporting slightly more average income (\$49,100 compared to \$48,300). The household size (number of exemptions per tax return) was slightly larger for intrametropolitan than extrametropolitan

movers. In 2002, intrametropolitan movers had 1.84 exemptions per return, compared to 1.69 for extrametropolitan movers.

What are the demographic and economic characteristics of movers? Since the IRS data contain only the number of aggregate movers, exemptions, and adjusted gross income of movers between counties, we cannot infer much about the characteristics of these households. Some indications can be gleaned from decennial census data. Between 1995 and 2000, 45.9 percent of the US population changed residences, with nearly one-half of these moving to a different county, for a total of 55 million out-of-county movers (Berkner and Faber, 2003). Franklin (2003) analyzed recent census data on the movement of young adults (aged 25 to 39). This group accounted for one-third of all movers. She found that three-fourths of young adults who were single and college-educated changed residences between 1995 and 2000, with 23 percent changing state of residence (compared to only eight percent for the total population). Moreover, this cohort had the greatest tendency to move into central cities relative to the suburbs or to nonmetropolitan areas. Clearly, young educated adults are one of the most mobile cohorts in the US population, and it seems a safe assumption that they represent a large portion of the movers in our IRS database of annual county-to-county movers. The large literature, cited above, on the movement of elderly households suggests that this cohort is also highly mobile. Yet, 91 percent of those aged 65 or older did not change county of residence between 1995 and 2000, compared to 80 percent of the nonelderly. Or, measured another way, the elderly accounted for only 7.2 percent of the number of persons that moved between US counties between 1995 and 2000, though they accounted for 13.6 percent of the population (He and Schachter, 2003). Thus, while we do not know precisely the demographic and economic characteristics of the annual county-to-county movers in the IRS database, we can be confident that most are younger adults (and their children) and that the group has on average more education (and thus higher incomes) than the nonmovers.

3.3 State Income Tax Rates

We are most interested in the elasticity of income tax bases with respect to state individual income tax rates. Measures of the numerator are readily available, as we can observe the net movement of

people (or jobs, retail sales, and business establishments) among states, metro areas, and counties over time. However, the denominator poses a messy measurement problem, largely due to the complexities of the various state tax codes. For example, many states levy a range of tax rates for different individual income brackets, allow widely varying deductions for dependents, old age, or blindness, and different treatment for married versus unmarried filers. Some tax wage and salary income at different rates than investment income. Some states allow a deduction for the amount of federal income taxes paid. And, famously, the state of Alaska sometimes has a negative income tax, sending a check to residents rather than the reverse. For these reasons it is difficult to detect empirically how a change in a specific state tax code translates into a change in tax cost for a potentially mobile household.

The conventional way to deal with these tax code complications is essentially to ignore them by computing an ‘effective’ tax rate. An effective tax rate is usually an average, calculated by dividing total tax collections in a tax category by the tax base. For example, if a state collects \$1 billion in individual income taxes in a year when residents in the state earned \$50 billion in income, we could say that the effective income tax rate on income was two percent. Typically, the tax base is assumed to be personal income, not ‘adjusted gross income’ as found on federal and state income tax forms. Personal income, as defined by the US Bureau of Economic Analysis, includes nontaxable transfer payments (food stamps) and in-kind income (clothing provided by an employer), and hence is a rough measure of taxable income. Alternatively, one could use wages and salaries as a measure of the tax base. But the individual income tax is levied on state residents and typically on all their income, not just wages and salaries, and there is not a strict correspondence between the jurisdiction of taxation and the jurisdiction of economic activity. Moreover, wages and salaries are measured on a state of work basis, while income tax collections are made on a state of residence basis. Most states have significant cross-border movement of workers and shoppers, so the common effective tax rate calculation is crude (though convenient).

Even if the cross-jurisdictional measurement issues could be resolved, the effective tax rate is not an ideal measure of tax costs when trying to understand the mobility of people and capital. There are two obvious problems. First, the average tax rate could remain unchanged even though the actual tax rate

faced by the most mobile agents rises or falls. A simple example is the taxing of retirement income. People between the ages of 60 and 75 tend to migrate to a few and southern states (He and Schachter, 2003), and their households are relatively wealthy. A northern state could raise the tax rate on investment and pension income, lower the tax rate on wages and salaries, and find that more retirees leave the state even though the effective average tax rate on income remain unchanged. Second, the effective tax rate calculation implicitly ignores simultaneity issues and dynamic effects. A fast growing state may be able to keep lowering its tax rate due to the rapid growth in the tax base. Tax collections may rise commensurate with the tax rate, and thus the effective tax rate remains unchanged over time even though the tax rate faced by mobile agents continues to fall, thus ensuring an enhanced tax base in the next period.

Detailed descriptions of each state's individual income tax schedules and rates for each year are available from the Federation of Tax Administrators, the Tax Foundation, and the Advisory Commission on Intergovernmental Relations (ACIR). The profiles contain information on the tax brackets, rates, exemptions, and whether the state allows taxpayers to deduct their federal income tax payments from their income before calculating their state income tax liability. However, the problem of distilling all these complications into a single measure to represent a state's income tax structure is seemingly intractable. Simply put, the tax rate a household faces in a state is dependent upon the level and types of income received, ages of household members, the number of dependents, the amount of itemized deductions, and many other factors.

Since we do not have information on these characteristics of movers in our IRS database of county-to-county flows, we are not able to use the state tax codes to construct a good measure of the tax rates faced by the movers⁹. Instead we have chosen to measure state individual income tax rates via simulation for four important hypothetical taxpayers in each of the fifty states and the District of Columbia. The National Bureau of Economic Research provides a tax simulation program (Taxsim) that cal-

⁹ Detailed socioeconomic data on county-to-county movers between 1995 and 2000 are available from the 2000 census. This suggests an alternative approach to the one taken here. Rather than look at eleven years of state tax rates and IRS mover data, one could examine the single observation of taxes and census movers. Richness in mover data is gained at the expense of variation in state tax rates over time.

culates the state individual income tax liability in any state in any year (since 1977), given the financial and demographic characteristics of the taxpayer (Feenberg and Coutts, 1993). We have used the program to calculate state income taxes for the four taxpayer types for each of the eleven years, 1992 to 2002, corresponding to our IRS mover data. We constructed the taxpayer profiles to represent very different types of possible movers. The ‘young and single’ taxpayer is likely to be moving to take a job, have no dependents, and no non-wage income. The ‘full nester’ taxpayer may also be moving for economic reasons, but has higher household income, two earners, two children, and some property income and deductions. The ‘just retired’ taxpayer includes two people over the age of 65, and receives income from private pensions, social security, and property income. The ‘high incomer’ taxpayer-household is in its peak earning years, has substantial salary and property income, but also large deductible expenses. *Table 2* provides the profiles used to simulate income tax liabilities in each state. Our objective is to explore the range of tax rates faced by some very different household types, not to completely characterize state tax rates.

In *Figure 1* we summarize the average tax rates for the four hypothetical households for all states, ranked by the tax rate on high income households. One can see that retirement income faces low state taxation everywhere^{10 11}. Our hypothetical two-retiree household with \$50,000 annual income would pay the most in Massachusetts, but the average rate there is only 2.3 percent. Given that all states give favorable tax treatment to retirees, it seems likely that mobile retirees might be more sensitive to state (and local) sales taxes than state income taxes. This is consistent with the findings of Edwards and Wallace (2004), who examine the 1995 Public Use File of the IRS Statistics of Income and document the much lower average effective state tax rates for elderly taxpayers than for the nonelderly. For our three hypothetical households with wage and salary incomes, the highest tax states are the District of Columbia, Oregon,

¹⁰Taxsim reported a negative state income tax liability for our hypothetical retirees in three states: Hawaii, Michigan, and New Jersey. Upon investigation, we learned this was not an anomaly but a reflection of the homestead rebates granted in those states for certain households (\$750 for New Jersey in 2002). We set the tax liability to zero for those states to make the chart easier to read.

¹¹Smith and Rork (2005) use the Taxsim calculator to examine the effect of state income tax rates on the migration of elderly households. By comparing state tax rates for elderly married households to those for nonelderly married households at the lowest and highest income quintiles, they are able to highlight more variation in state tax rates than suggested in our *Figure 1*.

Maine, and North Carolina. Seven states levy no tax on the income of any of our four households: Alaska, Florida, Nevada, South Dakota, Texas, Washington, and Wyoming. Given that the retiree population faces low state income taxation everywhere, and that the tax rates for the other three groups move together across states, we use only one average state tax rate in our econometric work, that for the high income household. In *Figure 2*, we plot the change in average tax rates between 1992 and 2002 for the high income households. Note that only two states, Missouri and Louisiana, raised their top rates significantly, while most states lowered their top rates.

In our econometric work we also take account of reciprocity agreements between states. These are potentially important, since they may neutralize the economic effects of differences between state income tax rates inside a multistate MSA. For example, because there is no reciprocity agreement between the Oregon and Washington, residents of Vancouver WA working in Portland OR must pay income taxes to the state of Oregon. Thus, one cannot avoid the Oregon income tax simply by residing across the state border; if you earn income in Oregon, you must pay tax there. Seventeen states allow some nonresidents to work in their state, but to only pay income tax to their home state government even if the tax rates differ (*Table 3*). Typically, a pair of states agrees to reciprocity if they are neighbors and both levy an income tax. Note that most agreements are among industrial states around and below the Great Lakes. All of these states levy an income tax and have a large interchange of residents crossing state borders to work. None are in the South, where important states do not levy an individual income tax (Tennessee, Florida, Texas).

3.4 Government Expenditures and Revenues

We use Census of Governments (COG) data to measure local taxes and expenditures by function. There are three measures of local taxation (income, property, sales) and four measures of expenditure per capita (parks and recreation, fire, police, primary and secondary education). For primary and secondary school spending, we aggregated district-level data up to counties and metropolitan areas. Our local tax measures are “rates,” revenues divided by personal income.. Our measures of fire, parks and recreation, and police expenditures are on a per capita basis (\$2003) and primary and secondary educational

spending is on a per student basis (\$2003). With the exception of education spending, these data are available at the county level, but only every five years. We interpolate between the COG years of 1992, 1997, and 2002. State government expenditure data are available annually from the Census Bureau. As additional measures of public services, we include state highway spending per capita and higher education spending per student.

3.5 Demographic and Socio-economic Measures

We include several variables that measure basic socio-economic and demographic characteristics in each state's portion of the multistate MSAs: the unemployment rate, the fraction of the population that is Black or Hispanic, the average annual earnings of workers, and the median household income of the resident population.¹²

4. Empirical Methodology and Results

4.1 Empirical Methodology

We assembled a panel of data over 98 MSA-state components and 11 years. To better understand how state and local tax policies influence the locational decisions of incoming households and state tax bases in these multistate MSA's we consider three alternative measures of the movement of taxpayers or the tax base as dependent variables in our estimation. Our first measure is the rate of extrametropolitan movers (filers) going to each state's portion of the multistate MSAs where this rate is simply the number of extrametropolitan filers in a state within an MSA divided by the number of nonmover filers. Following the modeling discussed in *Section 2* the dependent variable is the difference between these rates for the states in the MSA. Our second measure is the rate of inmover adjusted gross income (AGI), the AGI of inmover filers divided by the AGI of nonmover households. Again, the dependent variable is the difference between this rate for the states within the MSA. Finally, our third measure is the difference in AGI per filer among the states in the MSA. Our explanatory variables include measures of differences in state and local taxes and spending among the states in the MSA. Two state tax rate measures are included, the

¹²The fraction Black and Hispanic is derived by the annual county population estimates of the U.S. Census Bureau, county unemployment rates are obtained from the Bureau of Labor Statistics, and earnings and income information is obtained from the Regional Economic Information System (REIS) of the Bureau of Economic Activity.

average income tax rate for high income households and the state sales tax rate, both measured as the difference between rates for the states in the MSA. Where there are more than two states, we subtract the own-state rate from the average of the other states. For state income taxes, we interact a measure of state reciprocity agreements to account for the fact that some states do not ‘accept’ other states’ tax policies. That is, if a reciprocity agreement is not in effect a person may be taxed on their earnings in the state even if they are not a resident. For example, Kentucky has reciprocity agreements with all of its northern border states (where four multistate MSAs are located), but not with Tennessee (which has no state income tax on wages and salaries). Hence, a Tennessee resident working in the Kentucky portion of the Clarksville, TN-KY MSA would be subject to Kentucky income tax. We also include measures of the share of jobs in each state’s portion of the multistate MSA. The job share is a proxy for commuting costs, so that a portion of the MSA that is gaining jobs will be likely to see a rising in-mover rate, as workers seek to live closer to their jobs.

For a two-state MSA, we can characterize our empirical model by the set of equations,

$$\frac{\Delta y_{1jt}}{y_{1jt}} - \frac{\Delta y_{2jt}}{y_{2jt}} = \beta(x_{1jt} - x_{2jt}) + \mu_j + \delta_t + \varepsilon_{1jt} \quad (4.1)$$

and

$$\frac{\Delta y_{2jt}}{y_{2jt}} - \frac{\Delta y_{1jt}}{y_{1jt}} = \beta(x_{2jt} - x_{1jt}) + \mu_j + \delta_t + \varepsilon_{2jt} \quad (4.2)$$

where Δy_{kjt} is the number of in-movers to state k in MSA j in year t ; y_{kjt} refers to the number of nonmovers, and x_{kjt} are our explanatory variables, specifically the tax rates in respective states. The error structure, $\mu_j + \delta_t + \varepsilon_{2jt}$, consists of a MSA-specific effect (μ_j), a time-specific effect (δ_t) as well as an effect specific to the single observation, ε_{kjt} . From inspection of (4.1) and (4.2) it is apparent that the two observations are not independent with the dependent variable and explanatory variables in (4.2) simply being the negative of those in (4.1). If we add (4.1) and (4.2), we obtain

$$-2(\mu_j + \delta_t) = \varepsilon_{1jt} + \varepsilon_{2jt}. \quad (4.3)$$

Clearly the two observations are not independent and inclusion of both observations in any estimation adds no new information and will lead to incorrect estimation of standard errors. For this reason

we drop one observation (state) from each MSA. For a two-state MSA we have one observation per year, a three-state MSA has two observations per year, and a four-state MSA has three observations per year.

Consistent with the specification of our error structure, we estimate a two-way fixed effects model. And we use a generalized least squares estimator to use any information about the variance of the residuals in our regressions to improve the precision of coefficient estimates. As depicted in (4.1) and (4.2) for a two-state MSA all explanatory variables are constructed as differences between the states in the MSA in the value (level) of the variable; for a three or four state MSA the dependent and explanatory variables are the difference in the level for the observation and the population-weighted level of the variable in the other states in the MSA.¹³

Following numerous studies examining the impacts of taxes on employment or population growth to reduce concerns about the endogeneity of the tax variables, we use the lagged values of the tax rates and government expenditures rather than the current values. However, doing so reduces the number of years in our panel by one.

4.2 Estimation Results

The results of our estimation are summarized in *Tables 5, 6 and 7*. These include the results of regressions for three measures of movement: number of IRS filers, aggregate adjusted gross income of filers, and the adjusted gross income per filer. Our results indicate that state income tax rates are both statistically and economically significant for each of alternative measures of taxbase movement. In all cases, *ceteris paribus*, states with the higher state income tax rates will have lower rates of in-movers or incoming taxbase.

4.2.1 The Rate of In-movers

¹³If the formulation of our dependent variable were $\frac{\Delta y_{1jt}}{y_{1jt} + \Delta y_{1jt}} - \frac{\Delta y_{2jt}}{y_{2jt} + \Delta y_{2jt}}$ rather than $\frac{\Delta y_{1jt}}{y_{1jt}} - \frac{\Delta y_{2jt}}{y_{2jt}}$ its value would be constrained to be between -2 and 2. With our formulation no structural limitation on the values of the dependent variable are imposed. While in theory there may be some limit on the values of the dependent variable that would violate the assumptions of the classical model, in practice its values are not close to these limits and we do not transform the dependent variable to address concerns regarding a limited range of its values.

Table 5 provides the results for our estimation when the dependent variable is the difference in the rate of in-movers (filers) to the states within the MSA. The estimated coefficient on $\Delta State Income Tax_{i,t}$ measures the decrease in the relative in-mover rate to one side of the MSA due to an increase in that state's income tax rate. The coefficient estimate was negative and significant in all four regressions though the coefficient in specification 4 was less than half the magnitude of the coefficient on $\Delta State Income Tax$ in the other specifications, suggesting significant omitted variable bias when $\Delta Earnings$, the difference in average earnings, and $\Delta Income$, the difference in median income, are omitted. Given the influence measures of earnings and income on the coefficient on the state income tax measure our preferred specification includes these two variables. To interpret the coefficient on the state income tax, again consider specification 4. With a coefficient on $\Delta State Income Tax$ of -0.0383 an increase (decrease) in a state's income tax rate of one percent point leads to a decrease (increase) in the in-mover rate of 0.0383 relative to that state's portion of the MSA. Evaluating at the median difference in in-mover rate and difference in tax rate (see *Table 4*) the associated elasticity, as reported in *Table 9*, is -0.21 meaning that a ten percent increase in the difference in tax rates between the two states (in a two state MSA) would lead to a 2.1 percent increase in the difference in in-mover rates. While the coefficient on the dummy variable *Reciprocity* was negative and marginally significant, the coefficient on the interaction of reciprocity and the state income tax rate was not statistically significant with its sign varying among the alternative specifications.

The state sales tax rate also had a negative and statistically significant impact on the relative in-mover rate. In this case, the associated elasticity for specification (4), found in *Table 9*, is -0.19, close to that for the income tax rate. Despite the opportunity to purchase goods in the state in which they do not reside, evidently, movers do take state sales taxes into account, rationally observing that much of their retail purchases are for groceries, meals, clothing and other recurring items that are typically purchased near one's home. None of the coefficients for local tax rates are statistically significant with the exception of that for $\Delta Local Income Tax$ in (4) which is unexpectedly positive. Expenditures on public services seem to have little impact with the exception of fire protection services ($\Delta Fire$). Differences in the share of

employment ($\Delta Employment Share$) and, as mentioned before, earnings and income also have significant impacts on the differences in the rates of in-movers.

4.2.2 *Adjusted Gross Income*

Results when the dependent variable is the difference in the rate of in-mover AGI are reported in *Table 6*. Qualitatively the coefficients when the dependent variable is now the difference in the rates of in-mover AGI are quite similar to those found with the dependent variable being the difference in the rate of in-movers. Again we find that the coefficient on $\Delta State Income Tax Rate$ is sensitive to the inclusion of earnings and income measures and, again, we also find that reciprocity has little impact on the relative rates of in-mover AGI. One exception to these qualitative similarities is the significance of the coefficient on $\Delta Police$. To better understand quantitative differences in these two measures again consider the estimated elasticity of the income tax rate. In specification (4) for the state income tax the elasticity is -0.34, considerably greater than the elasticity of -0.21 for the rate of in-movers with the same specification.

4.2.3 *Average AGI per Filer*

The results with our final measure of taxbase mobility, the difference in AGI per filer, are found in *Table 7*. Again, the coefficient on $\Delta State Income Tax$ is sensitive to the inclusion of the earnings and income measures. In specification (4), this coefficient is -238.53, meaning a difference in the state income tax rate of 0.01 (0.04 versus 0.05) leads to a difference of \$23,850 in the average income (AGI) of in-moving filers. Evaluated at the median, this gives an elasticity of -.50, far greater than the elasticities found for the differences in the rates of in-movers or in the rates of AGI of in-movers, suggesting that it is higher income households who are most responsive to difference in state income tax rates.

Unlike our estimates using the number of filers or in-mover AGI, AGI per filer is not significantly affected by the state sales tax with the exception of specification (4) which has a significant and positive coefficient. Primary and secondary educational spending has a positive and significant coefficient as does $\Delta Parks \& Recreation$. Also positive and significant, contrary to what might be expected, is the coefficient on the difference in the local income tax, perhaps suggesting an omitted measure of public service

spending valued by high-income households and financed by local income taxes. The estimated elasticity in this case is -.50 with respect

We are somewhat surprised that the coefficient on the interaction of the state tax income rate and tax reciprocity was generally not statistically significant. One possible explanation for its insignificance is that while reciprocity might eliminate the incentive of households to locate in the lowest income tax state, it does not eliminate the incentive of firms to do so to reduce taxes for their employees and, presumably, the compensation they are required to offer. While our data is not ideal for examining how differences in state and local taxes affect differences in employment growth within multistate MSA's we are able to offer at least some evidence on this issue. In *Table 8* we report the results of a single regression in which the dependent variable is the difference in the rate of employment growth among the states within the MSA. Unlike our measure of in-movers, this is not strictly new employment related to the location of new firms but could also represent new employment from expansion of existing operations. Of course, employment growth could be negative as well if plants contract their operations or leave the state/MSA entirely.¹⁴ We follow the same empirical methodology as was done with the estimation of the relative capture of in-movers and AGI. However, we now include an additional tax measure, the difference in the corporate income tax rate (revenues as a fraction of income), and we also use a lagged value for the differences in the share of employment to reduce concerns about endogeneity. Our results from this single regression suggest that differences in growth in employment in these multistate MSA's may well be related to differences in personal income taxes. In fact, in our simple specification the state individual income tax is the only tax rate that did have a significant effect on the difference in employment growth. While our examination of how the state income tax affects employment is only tangential to our primary focus, other studies such as Mark et. al. (2000) and Hoyt and Harden (2006) find similar impacts of differences in state income tax rates on employment patterns in multistate MSA's.

¹⁴Formally if y_{ijt} is employment in state i of MSA j at time t then with two states ($i=1,2$) in the MSA the dependent variable is $\frac{y_{1jt} - y_{1jt-1}}{y_{1jt}} - \frac{y_{2jt} - y_{2jt-1}}{y_{2jt}}$.

4.3. *The Impacts of State Income Tax Differences on MSA Migration Patterns*

Figure 3 summarizes the simulated effect for the last year of the sample, 2002. The labels indicate the name of the multistate metropolitan area, with the higher taxing state name in parentheses. For example, in the first bar, the New York state portion of the New York MSA would gain 13,214 more movers if it would lower its individual income tax rate to that in the Pennsylvania portion of the MSA. Overall, our model predicts that 27,4000 tax filers would have chosen a different state of residence that year if the higher tax state had aligned its rate with that of the lower tax state. While this represents only 7.5 percent of the 370,000 in-movers to the multistate MSAs that year, it can be of fiscal importance in some areas. The top six affected states are each estimated to lose over 700 tax filers annually, with New York losing thousands. The filers average 1.7 exemptions, so that the population impacts are a multiple of the filer impacts. Moreover, the impact compounds each year, as more migrating households choose the lower tax state, have children and grandchildren. The effect of high state income tax rates in multistate MSAs can become very important to settlement patterns, and thus the tax bases of jurisdictions, over decades.

5. *Conclusion*

We find evidence of statistically significant effects of state tax rates on the residential location decision of movers to multistate metropolitan areas. Metro areas that span states with the greatest differences in income tax rates see proportionately more in-movers locating on the low tax side. The economic and fiscal significance of our results are modest, at least on an annual basis. Multistate MSAs present arguably the greatest opportunity for choosing a low tax state, but collectively account for only around 600,000 extrametropolitan in-movers annually. And we estimate that the effect of differential state income tax rates can explain the location of but five percent of these movers. Since only around five percent of U.S. households move between counties each year, and state income tax rates exert but one influence on choice of state, the magnitude of the annual effect of tax rate differentials on state tax bases is small. In most high tax states, the effect is likely to be only a few hundred potential taxpayers lost per year. If there is a state-level Laffer curve, it appears to be fairly flat in the short run. Over decades,

however, the cumulative and compounding effects of taxpayers choosing lower tax states can be substantial, with commensurate effects on state revenue sources. Moreover, local job growth in many retail, health care, personal services, entertainment, and professional services depends on population growth; hence, more than the individual income tax base of movers is at stake when rate changes influence migration patterns.

There are a number of extensions to this framework that would be useful for tax policy evaluation. It would be valuable to know more about the demographic characteristics of the movers. To the extent they are young couples just starting to have children, the relocation decision is likely to lead to two or more new state residents within a decade of the move. This leads initially to an increase in demand for schools and other local services, then later an increase in human capital and tax base. To the extent movers are of an age when their children have moved out of the house, the relocation decision leads to an increase in the tax base for the destination jurisdiction, with a typically smaller demand for public services. A more complicated model, assuming one could determine the age profile of annual movers, would incorporate a cohort-component framework, with births, deaths, and migration rates keyed to tax policy. Similar refinements could be made if one knew the education levels and incomes of the movers. Tracking intrametropolitan cross-state movers in a dynamic framework would be even more ambitious and interesting study, if and when data became available. The larger sample sizes of the annual American Community Survey this decade will create a rich database for probing the characteristics of movers between labor markets and tax jurisdictions.

Another test of whether state income tax rates matter might be performed using existing data, though the causal issues are complex. Given the natural experiment that occurs in multistate MSAs, and the fact that there is great variation among states in the settlement patterns within their boundaries, one could examine whether there is more convergence of tax rates when greater proportions of states' populations reside along borders with other states. This approach would treat state income tax rate differentials as endogenously determined in competition with neighboring states. The more that labor markets overlap state boundaries, the less scope there is for setting a relatively high income tax rate.

However, collusion is also possible, where two states sharing a common border and a large border population implicitly agree to keep tax rates high. Reciprocity agreements may reflect such collusion. The outcome, at least in the short run, would be greater tax revenues for both state governments than if one state were to start a tax cutting competition. Establishing causation is further complicated by the fact that the state individual income tax is but one of many instruments for revenue generation. States may rely on, for example, mineral taxes (Alaska, Texas, Wyoming) sales tax collections from tourists (Florida), or gaming taxes (Nevada) to fund many state-level services. Their low income tax rate (zero) may reflect more their natural endowments, energy prices, or extreme social policy than a lack of populated state borders.

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Table 1. Multistate Metropolitan Statistical Areas

MSA code	Population		States	Share of total MSA population	Share of total MSA employment	Average state income tax		State sales tax rate, adjusted for coverage
	2002	MSA name				rate, high income household	rate, adjusted for coverage	
10900	758,243	Allentown-Bethlehem-Easton	PA	85.8%	88.0%	2.8%	4.8%	
			NJ	14.2%	12.0%	4.5%	4.8%	
12260	507,002	Augusta-Richmond County	GA	66.5%	68.6%	4.8%	3.2%	
			SC	33.5%	31.4%	6.0%	5.0%	
14460	4,432,698	Boston-Cambridge-Quincy	MA	90.9%	92.1%	4.9%	4.0%	
			NH	9.1%	7.9%	0.1%	0.0%	
16740	1,406,713	Charlotte-Gastonia-Concord	NC	87.6%	91.5%	6.6%	3.6%	
			SC	12.4%	8.5%	6.0%	5.0%	
16860	483,305	Chattanooga	TN	72.2%	83.7%	0.2%	7.0%	
			GA	27.8%	16.3%	4.8%	3.2%	
16980	9,267,336	Chicago-Naperville-Joliet	IL	91.0%	92.7%	2.8%	6.3%	
			IN	7.4%	6.0%	3.3%	4.0%	
			WI	1.7%	1.3%	5.8%	4.0%	
17140	2,035,828	Cincinnati-Middletown	OH	77.2%	80.1%	5.7%	4.0%	
			KY	19.1%	17.3%	5.3%	4.8%	
			IN	3.7%	2.6%	3.3%	4.0%	
17300	234,212	Clarksville	TN	63.9%	48.2%	0.2%	7.0%	
			KY	36.1%	51.8%	5.3%	4.8%	
17980	286,161	Columbus	GA	82.8%	90.2%	4.8%	3.2%	
			AL	17.2%	9.8%	3.1%	4.0%	
19060	101,114	Cumberland	MD	73.2%	79.8%	4.1%	4.0%	
			WV	26.8%	20.2%	5.8%	6.0%	
19340	375,027	Davenport-Moline-Rock Island	IA	42.4%	45.9%	5.9%	4.0%	
			IL	57.6%	54.1%	2.8%	6.3%	
20260	276,202	Duluth	MN	84.2%	86.4%	6.4%	5.2%	
			WI	15.8%	13.6%	5.8%	4.0%	
21780	344,540	Evansville	IN	82.8%	85.6%	3.3%	4.0%	
			KY	17.2%	14.4%	5.3%	4.8%	
22020	177,030	Fargo	ND	70.7%	80.4%	3.3%	4.0%	
			MN	29.3%	19.6%	6.4%	5.2%	
22220	366,937	Fayetteville-Springdale-Rogers	AR	94.1%	95.7%	5.8%	5.1%	
			MO	5.9%	4.3%	4.6%	4.2%	
22900	278,156	Fort Smith	AR	68.3%	78.7%	5.8%	5.1%	
			OK	31.7%	21.3%	5.4%	4.5%	
24220	95,799	Grand Forks	ND	67.7%	73.9%	3.3%	4.0%	
			MN	32.3%	26.1%	6.4%	5.2%	
25180	231,576	Hagerstown-Martinsburg	MD	58.2%	65.4%	4.1%	4.0%	
			WV	41.8%	34.6%	5.8%	6.0%	
26580	286,503	Huntington-Ashland	WV	48.1%	53.8%	5.8%	6.0%	
			KY	30.2%	33.1%	5.3%	4.8%	
			OH	21.7%	13.0%	5.7%	4.0%	
28140	1,887,265	Kansas City	MO	59.2%	56.7%	4.6%	4.2%	
			KS	40.8%	43.3%	5.2%	4.9%	
28700	230,605	Kingsport-Bristol-Bristol	TN	90.0%	93.5%	0.2%	7.0%	
			VA	10.0%	6.5%	4.9%	3.5%	
29100	127,958	La Crosse	WI	84.4%	89.7%	5.8%	4.0%	
			MN	15.6%	10.3%	6.4%	5.2%	
30300	57,743	Lewiston	ID	64.4%	76.7%	6.6%	5.0%	
			WA	35.6%	23.3%	0.0%	5.2%	
30860	107,650	Logan	UT	89.0%	91.8%	5.3%	4.8%	
			ID	11.0%	8.2%	6.6%	5.0%	

Table 1 (cont). Multistate Metropolitan Statistical Areas

MSA code	Population		States	Share of total MSA population	Share of total MSA employment	Average state	
	2002	MSA name				rate, high income household	State sales tax rate, adjusted for coverage
31140	1,180,396	Louisville	KY	80.3%	83.2%	5.3%	4.8%
			IN	19.7%	16.8%	3.3%	4.0%
32820	1,226,726	Memphis	TN	80.4%	85.4%	0.2%	7.0%
			MS	15.4%	11.9%	4.1%	7.0%
			AR	4.2%	2.8%	5.8%	5.1%
33460	3,055,157	Minneapolis-St. Paul-Bloomington	MN	96.5%	97.5%	6.4%	5.2%
			WI	3.5%	2.5%	5.8%	4.0%
35620	18,589,964	New York-Northern New Jersey-Long I	NY	65.7%	65.1%	6.3%	3.2%
			NJ	34.0%	34.8%	4.5%	4.8%
			PA	0.3%	0.1%	2.8%	4.8%
36540	783,036	Omaha-Council Bluffs	NE	84.9%	88.8%	6.0%	4.4%
			IA	15.1%	11.2%	5.9%	4.0%
37620	163,660	Parkersburg-Marietta-Vienna	WV	61.8%	62.9%	5.8%	6.0%
			OH	38.2%	37.1%	5.7%	4.0%
37980	5,741,826	Philadelphia-Camden-Wilmington	PA	67.3%	68.9%	2.8%	4.8%
			NJ	22.2%	19.7%	4.5%	4.8%
			DE	8.9%	10.4%	4.8%	0.0%
			MD	1.6%	1.0%	4.1%	4.0%
38900	2,013,088	Portland-Vancouver-Beaverton	OR	81.1%	86.6%	7.7%	0.0%
			WA	18.9%	13.4%	0.0%	5.2%
39300	1,612,760	Providence-New Bedford-Fall River	RI	66.3%	68.3%	5.6%	5.6%
			MA	33.7%	31.7%	4.9%	4.0%
41140	123,226	St. Joseph	MO	93.4%	94.4%	4.6%	4.2%
			KS	6.6%	5.6%	5.2%	4.9%
41180	2,758,986	St. Louis	MO	75.4%	81.1%	4.6%	4.2%
			IL	24.6%	18.9%	2.8%	6.3%
43580	142,864	Sioux City	IA	72.4%	68.5%	5.9%	4.0%
			NE	18.6%	18.7%	6.0%	4.4%
			SD	9.0%	12.8%	0.0%	4.0%
43780	317,448	South Bend-Mishawaka	IN	83.8%	90.4%	3.3%	4.0%
			MI	16.2%	9.6%	3.9%	4.8%
45500	130,909	Texarkana TX-Texarkana	TX	68.4%	70.8%	0.0%	5.0%
			AR	31.6%	29.2%	5.8%	5.1%
47260	1,471,229	Virginia Beach-Norfolk-Newport News	VA	98.7%	99.2%	4.9%	3.5%
			NC	1.3%	0.8%	6.6%	3.6%
47900	3,493,855	Washington-Arlington-Alexandria	DC	16.2%	30.7%	7.9%	4.6%
			VA	21.0%	20.5%	4.9%	3.5%
			MD	61.6%	48.1%	4.1%	4.0%
			WV	1.3%	0.7%	5.8%	6.0%
48260	129,335	Weirton-Steubenville	WV	44.2%	47.2%	5.8%	6.0%
			OH	55.8%	52.8%	5.7%	4.0%
48540	151,011	Wheeling	WV	53.8%	60.2%	5.8%	6.0%
			OH	46.2%	39.8%	5.7%	4.0%
49020	95,510	Winchester	VA	78.0%	87.0%	4.9%	3.5%
			WV	22.0%	13.0%	5.8%	6.0%
49660	595,742	Youngstown-Warren-Boardman	OH	79.9%	79.6%	5.7%	4.0%
			PA	20.1%	20.4%	2.8%	4.8%

MSA definitions, population, and employment estimates from US Bureau of Economic Analysis, May 2005.

Table 2. Assumptions for Taxsim Calculations

	Young & taxpayer: Single	Full Nesters	Just Retired	Very High Income
Marital status	1	2	2	2
Dependent exemptions	0	2	0	2
Age exemptions	0	0	2	0
Wage & salary - taxpayer	\$50,000	\$68,000	\$0	\$200,000
Wage & salary - spouse	\$0	\$5,000	\$0	\$10,000
Dividend income	\$0	\$0	\$5,000	\$10,000
Other property income	\$0	\$2,000	\$5,000	\$30,000
Taxable pensions	\$0	\$0	\$20,000	\$0
Gross SS income	\$0	\$0	\$20,000	\$0
Property taxes paid	\$1,000	\$3,000	\$2,000	\$5,000
Other itemized deductions	\$2,000	\$7,000	\$8,000	\$3,000

Table 3. State Income Tax Reciprocity Agreements, 2005

		State of Residence																	
		KY	MI	PA	IN	OH	VA	WV	WI	IL	MD	DC	MN	ND	IA	CA	MT	NJ	OR
Taxing State	KY		X		X	X		X	X	X									
	MI	X			X	X			X	X			X						
	PA				X	X	X	X			X							X	
	AZ				X		X				X					X			X
	IN	X	X	X		X			X										
	OH	X	X	X	X			X											
	VA	X		X				X			X	X							
	WV	X		X		X	X				X								
	WI	X	X		X					X			X						
	IL	X	X						X						X				
	MD			X			X	X				X							
	MN		X						X										
	ND												X				X		
	NJ			X															
	DC										X								
	IA									X									
	MT													X					

Source: www.itssimple.biz/biz_tools/text/P07_1278.html

Table 4: Summary Statistics

MSA/State Levels			
	Mean	Standard Error	
Extrametropolitan Returns	0.0052	0.00494	Extrametropolitan Returns/Total MSA/State Returns
Extrametropolitan AGI	0.0096	0.00911	Extrametropolitan Adjusted Gross Income/Total MSA/State Adjusted Gross Income
AGI per Household	38.9	12.4	Extra Metropolitan AGI per household, \$1000, (\$2003)
State Income Tax Rate	0.05	0.019	TaxSim State Income Rate for High Income Households
Reciprocity Agreement	0.480	0.450	1 if State/MSA has reciprocity agreement with other states in MSA
State Sales Tax	0.032	0.008	State Sales tax revenue as fraction of income
State Corporate Tax	0.004	0.00178	State Corporate tax revenue as fraction of income
Local Income Tax	0.002	0.00489	Local Income tax revenue as fraction of income
Local Property Tax	0.027	0.0105	Local property tax revenue as fraction of income
Local Sales Tax	0.003	0.004141	Local Sales tax revenue as fraction of income
Primary and Secondary	6,935	1,572	Primary and Secondary Educational spending per student, \$2003
Higher Education	5,061	1,272	Higher Education spending per student, \$2003
Fire	57.43	36.33	Fire spending per capita, \$2003
Police	121.4	71.8	Police spending per capita, \$2003
Parks	39.8	32.8	Parks and Recreation spending per capita, \$2003
Highway	303.3	95.2	State Highway spending per capita, \$2003
Unemployment Rate	4.98	1.67	State/MSA Unemployment Rate
African American	0.101	0.125	Fraction of population African-American
Hispanic	0.031	0.036	Fraction of population Hispanic
Employment	0.449	0.331	Share of MSA Total Employment
Earnings	33,975	8,325	Earnings per worker, \$2003
Income	43,583	8,370	Median Income, \$2003
Differences in MSA/State Levels (Absolute Value)			
	Mean	Minimum	Maximum
ΔExtrametropolitan Returns	0.004	0	0.017
ΔExtrametropolitan (AGI)	0.008	0	0.035
ΔAGI per Household	9.96	0	96.3
ΔState Income Tax	0.022	0.000106	0.078
ΔState Sales Tax	0.012	0	0.052
ΔState Corporate Tax	0.0191	0.0000008	.00669
ΔLocal Income Tax	0.003	0	0.034
ΔLocal Property Tax	0.009	0.0000104	0.030
ΔLocal Sales Tax	0.003	0	0.025
ΔPrimary & Secondary	806.2	2.4	5257.0
ΔHigher Education	1,274.9	6.3	5310
ΔFire	35.4	0.027	180.0
ΔPolice	59.3	0.005	524.8
ΔParks	30.9	0.318	102.9
ΔHighway	97.6	0.429	448.6
ΔUnemployment	1.066	0	6.08
ΔAfrican-American	0.062	0.0000204	0.491
ΔHispanic	0.019	0.000031	0.151
ΔEarnings	8348	18.5	35,342
ΔIncome	4995	17.3	22,327

Table 5: Relative Capture Rate of Extrametropolitan Inmovers

	(1)	(2)	(3)	(4)
Δ State Income Tax ₋₁	-0.0866 (7.60)**	-0.0923 (10.81)**	-0.0898 (9.11)**	-0.0383 (2.77)**
Reciprocity* Δ State Income Tax ₋₁	0.0333 (1.36)	0.0280 (1.25)	0.0272 (0.86)	0.0380 (1.18)
Reciprocity	0.00221 (0.55)	-0.00113 (0.33)	-0.00296 (0.86)	-0.00482 (1.76)
Δ State Sales Tax ₋₁	-0.2237 (3.34)**	-0.1373 (2.91)**	-0.1321 (3.02)**	-0.0745 (2.26)*
Δ Local Income Tax ₋₁	-0.241 (2.16)*	-0.068 (0.60)	0.000 (0.00)	0.219 (2.01)*
Δ Local Property Tax ₋₁	0.0575 (1.38)	0.0237 (0.54)	0.0221 (0.580)	0.0209 (0.68)
Δ Local Sales Tax ₋₁	-0.039 (0.43)	-0.016 (0.18)	0.163 (1.52)	0.130 (1.28)
Δ Primary & Secondary	-0.00000037 (1.03)	-0.00000010 (0.30)	-0.00000012 (0.35)	-0.00000023 (0.77)
Δ Higher Education	0.00000009 (0.53)	0.00000016 (1.05)	0.00000008 (0.62)	-0.00000006 (0.48)
Δ Employment Share	0.01430062 (10.53)**	0.0075204 (2.06)*	0.01053622 (2.82)**	0.01370033 (4.46)**
Δ Fire		0.00003935 (2.79)**	0.00003437 (2.38)*	0.00001422 (1.12)
Δ Parks & Recreation		0.00002167 (0.93)	0.00001034 (0.46)	-0.00000124 (0.07)
Δ Police		-0.0000153 (2.08)*	-0.0000099 (1.07)	-0.0000154 (1.55)
Δ Highway		0.00000009 (0.04)	-0.00000007 (0.03)	-0.00000024 (0.12)
Δ African-American			-0.0235 (3.26)**	-0.0189 (2.60)*
Δ Hispanic			0.0165 (1.40)	0.0140 (1.29)
Δ Unemployment			-0.000171 (1.70)	-0.000125 (1.39)
Δ Earnings				-0.00000011 (2.81)**
Δ Income				0.00000042 (6.12)**
Observations	493	493	493	493
R-squared	0.92	0.93	0.93	0.94

Robust t-statistics in parentheses, as absolute values

* denotes significance at 1% level; ** is significance at 1% level

Note: Dependent variable is calculated as the difference in number of extrametropolitan inmovers (filers) divided by the number of nonmovers (filers) between the states in the MSA-state portion.

Table 6: Relative Capture Rate of Adjusted Gross Income of Extrametropolitan Inmovers

	(1)	(2)	(3)	(4)
Δ State Income Tax Rate ₋₁	-0.184 (9.07)**	-0.197 (13.71)**	-0.192 (11.20)**	-0.124 (4.51)**
Reciprocity* Δ State Income Tax Rate ₋₁	0.106 (2.37)*	0.104 (2.48)*	0.095 (1.49)	0.122 (1.91)
Reciprocity	0.00100 -0.15	-0.00426 -0.69	-0.00718 (1.11)	-0.00953 (1.73)
Δ State Sales Tax ₋₁	-0.375 (3.31)**	-0.220 (2.75)**	-0.217 (2.85)**	-0.138 (2.26)*
Δ Local Income Tax ₋₁	-0.329 (1.62)	0.057 (0.28)	0.147 (0.73)	0.545 (2.61)*
Δ Local Property Tax ₋₁	0.0651 (0.89)	-0.0036 (0.05)	0.0003 (0.00)	-0.0187 (0.30)
Δ Local Sales Tax ₋₁	-0.2280 (1.45)	-0.1723 (1.04)	0.0762 (0.37)	-0.0388 (0.19)
Δ Primary & Secondary	-0.00000064 (0.98)	0.00000006 (0.10)	0.00000010 (0.16)	0.00000009 (0.15)
Δ Higher Education	0.00000019 (0.59)	0.00000041 (1.34)	0.00000031 (1.08)	0.00000009 (0.32)
Δ Employment Share	0.0284 (11.72)**	0.0152 (2.59)*	0.0197 (3.19)**	0.0244 (4.49)**
Δ Fire		0.000069 (2.67)*	0.000062 (2.36)*	0.000030 (1.25)
Δ Parks & Recreation		0.000052 (1.32)	0.000036 (0.93)	0.000017 (0.52)
Δ Police		-0.000035 (2.70)**	-0.000026 (1.55)	-0.000030 (1.67)
Δ Highway		0.00000099 (0.21)	0.00000076 (0.16)	0.00000044 (0.10)
Δ African-American			-0.0338 (2.63)*	-0.0127 (0.90)
Δ Hispanic			0.0181 (0.77)	0.0126 (0.55)
Δ Unemployment			-0.000061 (0.32)	0.000017 (0.10)
Δ Earnings				-0.0000003 (3.74)**
Δ Income				0.0000008 (5.75)**
Observations	493	493	493	493
R-squared	0.91	0.92	0.92	0.93

Robust t-statistics in parentheses, as absolute values

* denotes significance at 1% level; ** is significance at 1% level

Note: Dependent variable is calculated as the difference in AGI of extrametropolitan inmovers (filers) divided by AGI of nonmovers between each state in the MSA-state portion.

Table 7: Difference in Adjusted Gross Income per Filer of Exrametropolitan Inmovers

	(1)	(2)	(3)	(4)
ΔState Income Tax ₋₁	-323.42 (14.74)**	-313.69 (13.48)**	-342.78 (15.44)**	-225.82 (5.21)**
Reciprocity*ΔState Income Tax ₋₁	-55.60 (0.70)	-58.13 (0.82)	74.72 (0.63)	100.87 (0.92)
Reciprocity	-21.52 (2.49)*	-18.67 (1.77)	-14.93 (1.50)	-19.14 (2.11)*
ΔState Sales Tax ₋₁	-80.20 (0.84)	106.28 (0.97)	84.00 (0.76)	215.37 (2.00)
ΔLocal Income Tax ₋₁	945.23 (2.91)**	934.26 (2.57)*	1089.20 (3.07)**	1600.25 (4.47)**
ΔLocal Property Tax ₋₁	-55.11 (0.49)	-256.85 (1.93)	-229.16 (1.73)	-234.11 (1.79)
ΔLocal Sales Tax ₋₁	16.99 (0.05)	-216.50 (0.66)	-680.90 (1.70)	-766.04 (1.83)
ΔPrimary & Secondary	0.0054 (7.06)**	0.0033 (3.86)**	0.0032 (3.67)**	0.0030 (3.44)**
ΔHigher Education	0.00124 (2.15)*	0.00105 (1.86)	0.00107 (1.86)	0.00074 (1.23)
ΔEmployment Share	10.67 (2.79)**	-14.64 (2.03)*	-20.64 (2.46)*	-13.39 (1.44)
ΔFire		0.02939 (0.80)	0.04421 (1.12)	-0.00215 (0.05)
ΔParks & Recreation		0.128 (3.03)**	0.144 (3.40)**	0.117 (2.69)**
ΔPolice		0.04803 (1.79)	0.01524 (0.57)	0.00324 (0.13)
Δ Highway		-0.003563 (0.35)	0.000555 (0.05)	0.000158 (0.02)
ΔAfrican-American			45.66 (1.52)	57.98 (1.82)
ΔHispanic			24.25 (0.71)	18.26 (0.64)
ΔUnemployment			1.22 (2.09)*	1.33 (2.27)*
ΔEarnings				-0.000280 (1.41)
ΔIncome				0.000986 (3.96)**
Observations	493	493	493	493
R-squared	0.65	0.67	0.67	0.68

Robust t-statistics in parentheses, as absolute values

* denotes significance at 1% level; ** is significance at 1% level

Note: Dependent variable is calculated as the difference in AGI of extrametropolitan inmovers (filers) divided by AGI of nonmovers between each state in the MSA-state portion.

Table 8: Relative Capture Rate of Employment Growth

Δ State Income Tax ₋₁	-0.648 (2.86)**
Reciprocity* Δ State Income Tax ₋₁	1.1928 (1.58)
Reciprocity	0.0422 (0.36)
Δ State Sales Tax ₋₁	-0.466 (0.32)
Δ Local Income Tax ₋₁	-5.551 (1.63)
Δ Local Property Tax ₋₁	0.873 (0.82)
Δ Local Sales Tax ₋₁	8.041 (1.52)
Δ State Corporate Income Tax ₋₁	5.826 (0.95)
Δ Employment Share	0.0129 (0.39)
Observations	549
R-squared	0.05

Robust t-statistics in parentheses, as absolute values

* denotes significance at 1% level; ** is significance at 1% level

Table 9: Estimated Elasticities

	Models Estimated			
	(1)	(2)	(3)	(4)
Inmovers				
Δ State Income Tax ₋₁	-0.48	-0.51	-0.49	-0.21
Δ State Sales Tax ₋₁	-0.67	-0.41	-0.40	-0.22
AGI				
Δ State Income Tax ₋₁	-0.51	-0.54	-0.53	-0.34
Δ State Sales Tax ₋₁	-0.56	-0.33	-0.33	-0.21
AGI per Household				
Δ State Income Tax Rate ₋₁	-0.71	-0.69	-0.76	-0.50
Δ State Sales Tax ₋₁	-0.10	0.13	0.10	0.26

Figure 1. Average State Individual Income Tax Rates, 2002

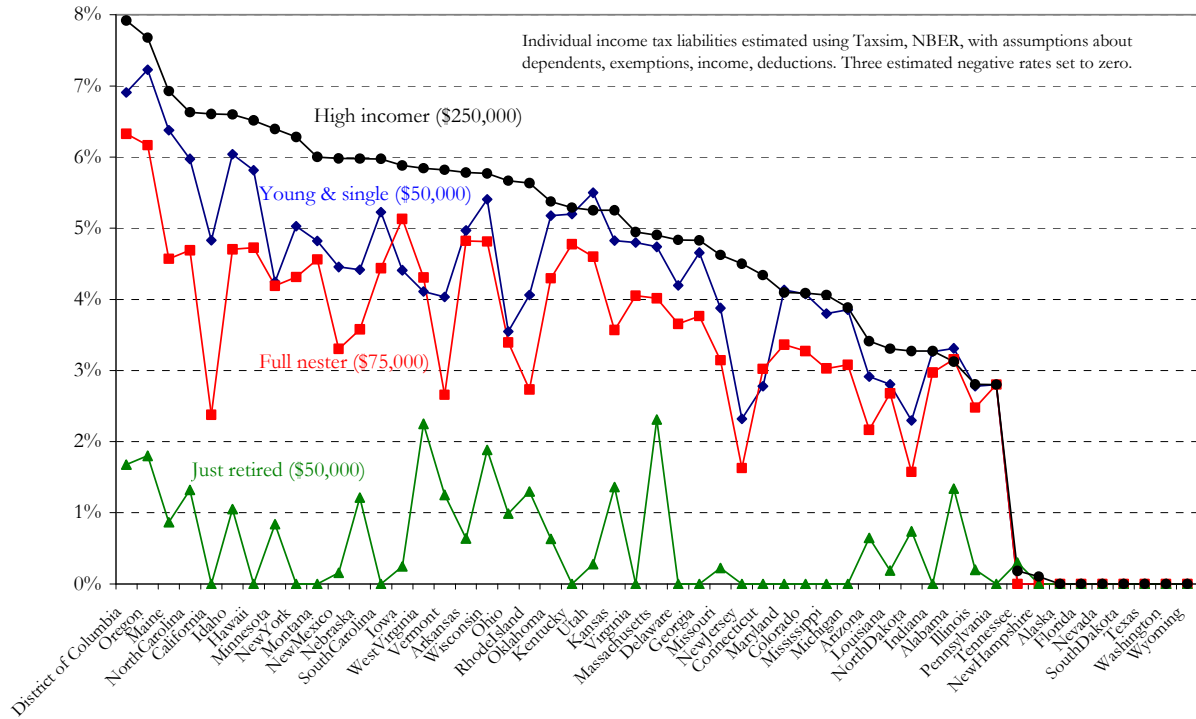
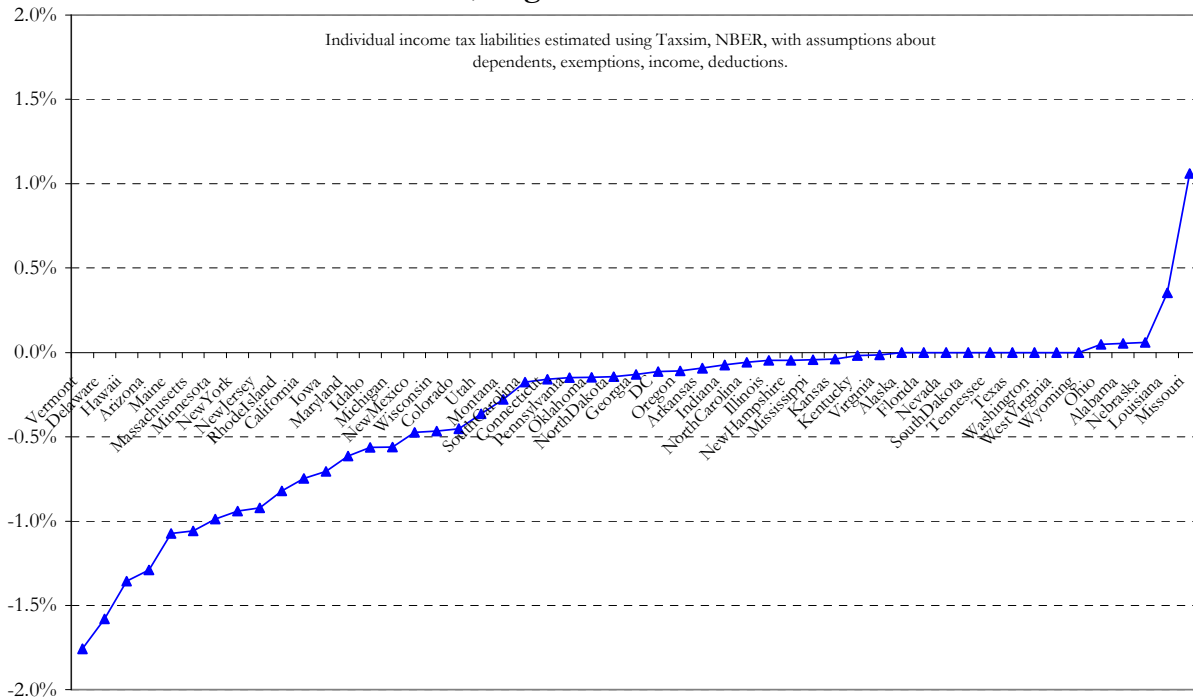


Figure 2. Change in Average State Individual Income Tax Rates, 1992 to 2002, High Income Households



**Figure 3. Simulated Loss of New Tax Filers
in Metropolitan Areas (from Highest Income Tax State), 2002**

