

On the Determinants of Subnational Tax Progressivity in the U.S.

Abstract - An instrumental variables model of state and local tax incidence is estimated for the years 1977, 1985, and 1991. Tax exporting through deductibility of state and local taxes has a significant positive effect on tax progressivity. I find a negative neighbor effect, with more progressive states geographically contiguous with more regressive states. Party control by Republicans is associated with a more regressive tax structure. Expenditure and tax progressivity are not closely related to one another, with higher welfare spending financed by proportionally higher tax burdens throughout the income distribution. Greater inequality in pre-tax income distributions is offset by more progressive tax systems, but the degree of offset is small.

INTRODUCTION

Despite the standard fiscal federalist prescription that state and local governments cannot engage in redistribution, there is substantial variation across states in the distributional incidence of both taxes and spending. While overall state-local tax systems are regressive, in 1991 the most progressive state-local tax system was more than three times as progressive as the least. The standard deviation of progressivity was equal to a third of the mean (Citizens for Tax Justice (CTJ), 1991). In this paper, I estimate an empirical model to determine the role of various economic and political factors in the choice of tax progressivity across states. Factors include tax exportation through federal tax deductibility, interstate tax competition, the distributional incidence of state and local expenditures, the level and distribution of income, and the political party composition of states. The model is estimated using state and local incidence data for 1976, 1985, and 1991.

State and local taxes are important in magnitude—in 1995 they equaled 11.3 percent of personal income. Hence, variations in their incidence will have a significant impact on the overall distributional incidence of the public sector. However, most research on tax incidence has focused on either measurement or normative aspects. There has been relatively little positive analysis of subnational progressivity in federalist systems. Explaining this variation is important to our understanding of fiscal federalism and, in particular, the

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equity implications of further devolution of fiscal responsibilities from the national to the state level.

The paper is organized as follows. The first section briefly discusses previous literature. The second section presents the empirical model. The third section discusses data and estimation issues. Results are presented in the fourth section, which is followed by a brief conclusion.

LITERATURE REVIEW

The political science literature contains several studies of state and local tax progressivity. Jacobs and Waldman (1983) find that greater income inequality leads to more progressive tax systems, while a higher percentage of blacks is associated with more regressivity. Morgan (1995) finds that a better informed electorate, as measured by newspaper circulation, has a negative effect on tax progressivity. Berch (1995) shows that the number of years of democratic control of the governorship has a positive effect on progressivity, while Lowery (1987) finds that the degree of political competition is positively associated with the degree of tax progressivity. Other studies by political scientists are discussed below.

Economists have focused on tax exporting in explaining variations in the shares of various state taxes in state revenues (Gade and Adkins, 1990; Metcalf, 1993). Their work is relevant to the analysis of tax incidence because of the strong correlation between tax shares and tax incidence.¹ Metcalf (1993) finds that tax exporting through the deductibility of state and local taxes from the federal income tax is important in explaining both the share and level of income taxation, but it does not explain the share and level of the

sales tax. In his work, the decisive voter group for the income tax is estimated to be above the 90th percentile of the income distribution, while the decisive group for the sales tax is closer to the middle. Metcalf's (1993) results suggest that the imposition of relatively progressive state taxes is heavily dependent on the ability to shift burdens via deductibility. Chernick (1992) analyzes incidence directly, but based on only a single year of data. Bahl, Martinez-Vazquez and Wallace (2002) investigate the relationship between progressivity on the tax side, as measured by reliance on the income tax, and the expenditure side, and find the two to be complementary. The Bahl et al. (2002) study is discussed further below.

MODELING STATE AND LOCAL TAX INCIDENCE

Descriptive Data on State and Local Tax Incidence

Table 1 provides summary data on the tax incidence in U.S. states, both overall and by region. As a measure of incidence, I use the ratio of the tax burden, gross of federal deductibility, in the highest quintile of a state's income distribution to the tax burden the lowest quintile. This measure is discussed extensively below. The ratio was 0.66 in 1977, 0.69 in 1985 and 1981, and 0.71 in 1995. Thus, in a typical state, the top quintile of taxpayers paid about 30 percent less in state-local taxes as a fraction of their income than the bottom quintile. The coefficient of variation in progressivity was substantial, equaling 12 percent in 1976, 29 percent in 1985, 31 percent in 1991, and 25 percent in 1995. The South has the most regressive tax systems and the least variation across states.

¹ The income tax share is strongly correlated with the degree of progressivity in state and local tax systems, while greater shares for sales and excise taxes imply a more regressive structure. Based on the data for this study, 58 percent of the variation in state-local tax incidence can be explained by the income and sales tax shares.

TABLE 1
AN OVERVIEW OF STATE-LOCAL TAX PROGRESSIVITY

<i>Panel A—State-Local Tax Progressivity Over Time¹</i>				
Year	Mean	Coefficient of Variation	Two Most Progressive States (Average)	Two Most Regressive States (Average)
1976	0.66	12%	DE, ID (0.79)	NH, CT (0.48)
1985	0.69	29%	MIN, OR (1.22)	TN, TX (0.38)
1991	0.69	31%	MD, VT (1.25)	TN, TX (0.34)
1995 ²	0.71	25%	DE, ID (1.09)	NV, FL (0.38)

<i>Panel B—By Census Region, Average for 1976, 1985, and 1991</i>		
Region	Mean	Coefficient of Variation
South	0.64	12%
West	0.70	31%
North Central	0.68	22%
Northeast	0.75	28%

Sources: Tax progressivity index for 1977 is from Phares (1980). Progressivity indices for 1985 and 1991 are from Citizens for Tax Justice (1991). Progressivity Index for 1995 is from Citizens for Tax Justice (1996).

¹Ratio of gross tax burdens, highest quintile to lowest quintile.

²Data for 1995 not used in regression analysis.

Figure 1 displays the geographic patterns of average progressivity in each state over the period 1977 to 1995. The map shows that regressive states are found in each region of the country, as are relatively progressive states. In some instances neighboring states have similar patterns of incidence, while in other cases highly progressive states border highly regressive states. The empirical model will include a test for the spatial relationship between geographic neighbors.

Empirical Model

In their choice of state and local taxes, politicians are assumed to choose an incidence pattern that minimizes the political costs of raising a given amount of revenue.² In equilibrium, the marginal cost of raising the tax rate on a given income

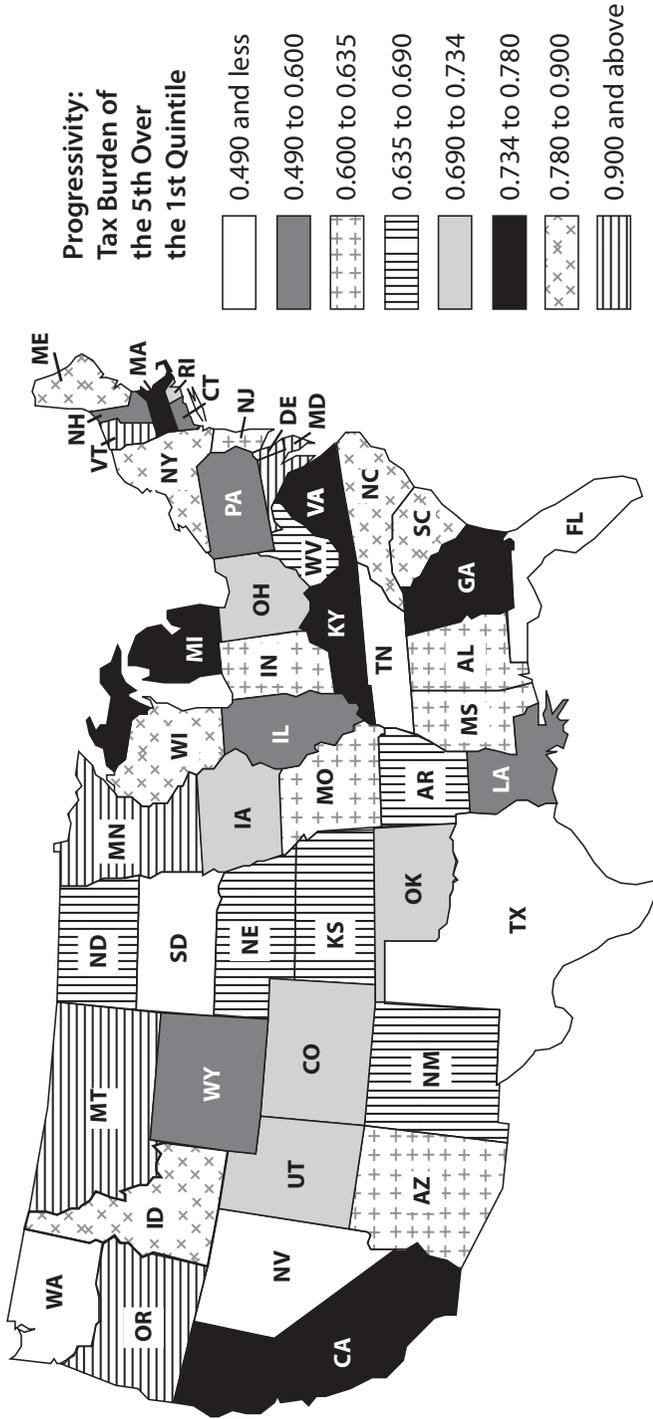
group will be equated to the additional revenue from the tax increase. The additional revenue depends on the size of the tax base and on the elasticity of the base with respect to the tax rate. Variables in the model are interpreted as affecting either the political costs of taxation or the elasticities of the tax base for different income groups.

States vary substantially in the relative importance of state versus local taxes, and the incidence pattern is in part a reflection of this choice.³ Relatively progressive systems are usually associated with reliance on a broad-based graduated state income tax, which is likely to increase the state share of taxes relative to the local share. I do not model the state versus local decision per se. Instead, the model explains the aggregate incidence pattern for all state and local taxes, though variables

² The theoretical basis for this model of tax structure is given by Hettich and Winer (1988).

³ Nationwide, state taxes made up about 60 percent of total state and local taxes over the sample period. (U.S. Bureau of the Census, 1994, Table 478). However, the range was substantial, from a low of 30 percent in Rhode Island and 47 percent in New York to a high of 78 percent in New Mexico and 82 percent in Delaware (Advisory Commission on Intergovernmental Relations, 1993, Table 65).

Figure 1. Progressivity of the Tax Burden (Average for Years 1977, 1985, 1989, and 1995)



influencing the aggregate pattern at the same time affect the state–local choice.⁴

The empirical model, with the expected effect on progressivity in parentheses, can be summarized as follows:

$$[1] \text{ PROGRESSIVITY} = F[\text{PCTITEM (+), NEIGHBOR PROGRESSIVITY (+), REPUBLICAN (-), DEMOCRAT (+), TASTEWELF (+), EDINEQUAL (?), INCINEQUAL (+), INCOME (?)}]$$

PCTITEM, the percentage of tax filing units that itemizes, is a measure of the exportability of state and local taxes through federal tax deductibility. Itemization lowers the marginal tax price for deductible taxes from one to one minus the federal marginal tax rate. Because the likelihood of itemizing is strongly correlated with a taxpayer’s income, the greater the fraction of taxpayers who itemize, the lower is the marginal tax price for taxpayers with incomes above the median for the state. The reduced tax price reduces the elasticity of the high–income tax base, leading to higher relative tax burdens on high–income taxpayers.⁵

I assume that state tax choices are influenced by the tax behavior of adjacent states.⁶ *NEIGHBOR PROGRESSIVITY* is defined as the weighted average progressivity of state and local taxes in a state’s geographic neighbors. A substantial litera-

ture suggests that tax mimicking, defined as a positive relationship between tax changes in one jurisdiction and changes in competitor jurisdictions, is widespread. Mimicking behavior between states has been found for income tax rates (Case, 1993; Besley and Case, 1995) and average tax burdens (Besley and Case, 1995). For the local property tax, Ladd (1992) finds evidence of positive mimicking between counties, and Brueckner and Saavedra (2001) find a similar pattern between municipalities. Rork (2003) finds evidence of positive mimicking behavior between states for excise taxes and the corporate income tax, but a negative relationship for income and sales tax rates. He argues that the difference reflects differences in mobility of the various tax bases, with the income and sales tax base assumed to be less mobile than the excise tax base.

The model presented here tests for the extent to which the entire tax structure of a state, as summarized by its distributional incidence ratio, is influenced by the structure in adjoining states. I expect a positive effect for *NEIGHBOR PROGRESSIVITY*, with geographically contiguous states resembling each other in terms of distributional incidence. Other things equal, if taxes are more regressive in neighboring states, the net fiscal benefit to high–income taxpayers of locating in those states should be enhanced relative to the home state. This should increase the elasticity of the high–income portion

⁴ The link between state and local taxes comes primarily through the level of state aid to school districts. State aid, which is in turn related to the level of state taxes, is a partial substitute for local taxes (Yinger and Ladd, 1989). The incidence of local taxation is complicated by the fact that rates vary substantially across jurisdictions, and may be positively or negatively correlated with jurisdictional income levels (Chernick and Reschovsky, 1982). This complication is not fully accounted for in the incidence studies used here, since they treat the local property tax as a uniform tax across the state.

⁵ For deductible state and local taxes, the marginal tax price for any filer is $(1 - D * FMTR)$, where D is one if the taxpayer is an itemizer, and zero otherwise. The average marginal tax price for a given slice i of a state’s income distribution would be $[1 - P_i(1 - FMTR)]$, where P is the proportion of i that itemizes, and $FMTR$ is the average marginal tax rate among itemizers in i . The average marginal tax price for the state would be $[1 - P(1 - FMTR_{item})]$. This latter measure is used by (Metcalf, 1993). The appropriate federal marginal tax rates were not available for the entire sample period. However, the overall percentage itemizing is highly correlated with each of these measures.

⁶ Since every state is a neighbor to some other state, non–contiguous states will still have an indirect influence on a given state, but the major effect is through immediate neighbors.

of the tax base, leading to a reduction in own-state progressivity. Even if locational choice is relatively inelastic with respect to tax incidence, the political costs of a given distribution of burdens may change if, as argued by Besley and Case (1995), taxpayers use neighbor tax rates as a yardstick for evaluating their own taxes.⁷

Previous studies have found that a substantial degree of party control is necessary to enact significant changes in tax structure (Berch, 1995; Berry and Berry, 1994). Hence, *REPUBLICAN* (*DEMOCRAT*) takes a value of one if the governor is a Republican (Democrat), and Republicans (Democrats) are in the majority in both legislative houses, and zero otherwise. The omitted category is a divided government. The predicted effect on progressivity of *REPUBLICAN* is negative, because the marginal political cost of an increase in tax burdens on high-income taxpayers is expected to be higher than the marginal cost of an increase for low-income taxpayers. Relative marginal costs are reversed under democratic control, so a positive sign is expected for *DEMOCRAT*.

If states differ in their underlying taste for redistribution, then it will be efficient to use both expenditures and taxes to achieve a desired incidence pattern. Bahl et al. (2002, p. 727) argue that expenditure and tax shares are likely to be complementary, because "it makes intuitive sense that individuals who advocate expanded redistributive services will not want those services financed with regressive taxes." Hence, if measures of redistribution are correlated with tastes, we expect a positive relationship between expenditure progressivity and tax progressivity.

However, if it were possible to hold constant the taste for redistribution, then

tax and expenditure progressivity could be substitutes. Suppose that there is an exogenous shift in expenditure incidence, for example from a court-mandated reduction in education spending disparities, or from a federal mandate to provide more medical services to low-income families. In this case, extra spending in poor school districts or additional medical services to low-income families might be financed by an increase in regressive taxes. Even with no exogenous shocks, the desired degree of redistribution could remain the same, while preferences regarding the components of the redistributive package could change over time. In such a case, a state might choose to increase state aid to poor school districts, but finance the increased spending by an increase in regressive taxes.

It is difficult to capture the distributional impact of state and local expenditures in a single measure. As a proxy for pro-poor expenditure patterns, Bahl et al. (2002) use the share of state-local expenditures for welfare and elementary and secondary education.⁸ They find a significant positive relation with tax progressivity. However, while welfare spending is likely to be primarily redistributive, the share of the budget spent on education need not necessarily imply more equality in the distribution of resources. Thus, in 1992 the simple correlation between the educational spending share and the equality of educational spending across school districts is only 0.08.

To test for complementarity between expenditure and tax progressivity, I include two measures of expenditure incidence. One is a measure of the taste for redistribution through public assistance (*TASTEWELF*). The second is a measure of the inequality of educational expenditures

⁷ Besley and Case (1995) hypothesize that mimicking of geographic neighbors is most likely to occur in years when the incumbent must stand for reelection.

⁸ By far the largest share of state welfare spending is for the Medicaid program, which covers long-term care for the elderly. While elderly recipients of Medicaid must have low income and assets, some may not be poor on a longer term basis.

(*EDINEQUAL*). As emphasized by Bahl et al. (2002), tax and expenditure incidence may be simultaneously determined.⁹ To reduce the potential bias, I use, as a measure of welfare, not actual expenditures, but rather the residual from an auxiliary equation estimating welfare benefits. *TASTEWELF* is defined as actual benefits minus predicted benefits, where benefits are the maximum welfare benefit for a family of three. Based on Orr (1976) and others, variables in the benefits equation include state income, the federal matching rate for public assistance, and the percentage of the population that is black.¹⁰ The expected sign on *TASTEWELF* is positive, because states with greater tastes for redistribution are expected to use both the tax and expenditure side of the fisc to achieve their redistributive goals.

EDINEQUAL is measured by the coefficient of variation of per-pupil elementary and secondary education expenditures for all unified school districts in a state. The greater its value, the more unequal is the distribution of expenditures across districts. The dispersion of education spending depends both on the distribution of

local fiscal resources and local spending decisions, and on the equalizing impact of state aid. If a more unequal distribution of education spending (a higher value for *EDINEQUAL*) is primarily a reflection of weaker state tastes for redistribution, we would expect less tax progressivity and, hence, a negative sign.¹¹ However, if the inclusion of *TASTEWELF* as well as other variables controls sufficiently for differences in taste, then there could be a trade-off between spending inequality and tax progressivity, and the coefficient on *EDINEQUAL* would be positive.

The degree of inequality of the income distribution in a state is measured by *INCINEQUAL*, the ratio of the mean income for families of four in the top quintile to that in the bottom quintile (CTJ, 1991).¹² Thus, *INCINEQUAL* is a proxy for the relative size of the high-income tax base. Holding average income constant, an increase in income inequality raises the potential revenue that would be yielded by a given tax burden on higher-income families, and lowers the potential revenue from taxes on low-income families. This lowers the marginal cost per dollar of

⁹ In addressing the potential simultaneity of tax and expenditure incidence, Bahl et al. (2002) use as exogenous variables in their expenditure equation state income, measures of the price of redistributive services, federal grants, and the state unemployment rate. In their tax share equation, they use as a price the percentage itemizing. In this paper, I argue that the percentage itemizing is endogenous to tax structure.

¹⁰ The estimated equation, with variables defined in Table 2 and standard errors in parentheses is:

$$\begin{aligned} \text{maxben} = & 190.8 - 0.006(\text{income}) - 44.0(\text{republican}) + 11.3(\text{democrat}) - 2.7(\text{pctblk}) + 0.007(\text{match}) - 6.0(\text{pctpop}) \\ & (67.7) \quad (0.005) \quad (17.7)** \quad (9.17) \quad (0.59)** \quad (0.009) \quad (1.39)** \\ & - 3.2(\text{pctold}) - 85.2(\text{south}) - 32.2(\text{west}) - 24.5(\text{ncentral}) + 15.5(\text{lnpop}) \quad \text{Adj } R^2 = 0.66 \\ & (2.53) \quad (15.9)** \quad (14.1)** \quad (12.4)* \quad (5.02)** \end{aligned}$$

¹¹ As in the measure of welfare spending, there may also be potential simultaneity between the dispersion of education expenditures and the incidence of the tax system. I was unable to find suitable instruments to identify education expenditures and, therefore, I use the actual value. Hence, it should be emphasized that the regression is a test for association, rather than a true causal test.

¹² The data source for the income distribution data from the CTJ (1991) study are state specific micro samples of tax returns for 1985 and 1989 from the Statistics of Income Division of the U.S. Treasury Department. Because the average income of families with children is higher than the average income of all families and individuals, the average income of the bottom quintile of the CTJ data (\$12,700 in 1991) corresponds to approximately the second quintile of the overall family income distribution.

Values for 1976 were extrapolated backward from the CTJ data for 1985, based on changes in the national income distribution between 1976 and 1985. I first took the 90th percentile to 25th percentile ratio of family income in 1976 and 1985, and formed a 1976/1985 ratio of these ratios. (Karoly, 1994, Appendix 2B, Table 2B.1). For each state, I adjusted this ratio by the 90/25 ratio, relative to the national average for 1976. Data for each state and the national average come from Phares (1980, Appendix Table B-1).

TABLE 2
VARIABLE DEFINITIONS, DATA DESCRIPTION, AND DATA SOURCES

Variable Name	Variable Definition	Mean (Standard Deviation)	Range
<i>PROGRHILO</i>	Ratio of state-local tax burdens: Highest quintile to lowest quintile	0.68 (0.18)	0.34 to 1.3
<i>PROGRMIDLO</i>	Middle quintile to lowest quintile	0.75 (0.15)	0.49 to 1.36
<i>PROGRHIMID</i>	Highest quintile to middle quintile	0.90 (0.09)	0.68 to 1.13
<i>BURDQ5</i>	Avg. S-L tax burden, quintile 5	8.8 (2.0)	3.9 to 15.2
<i>BURDQ3</i>	Avg. S-L tax burden, quintile 3	9.8 (2.0)	5.2 to 15.5
<i>BURDQ1</i>	Avg. S-L tax burden, quintile 1	13.3 (2.9)	6.4 to 20.5
<i>PCTITEM</i>	Percentage of filing units itemizing on federal income tax	30.0 (8.5)	11.1 to 49.8
<i>NEIGHBOR PROGRESSIVITY</i>	Population weighted average progressivity ratio in geographic neighboring states	0.69 (0.13)	0.41 to 1.25
<i>REPUBLICAN</i>	One if Republican control of governorship, both legislative houses, zero otherwise	0.063 (0.243)	0 or 1
<i>DEMOCRAT</i>	One if Democratic control, zero otherwise	0.39 (0.48)	0 or 1
<i>TASTEWELF</i>	Maximum benefit level for AFDC, family of three, actual minus predicted value	0.0	-112 to 138
<i>EDINEQUAL</i>	Coefficient of variation of per pupil educational spending, all unified school districts	15.2 (5.3)	4.6 to 41.1
<i>INCINEQUAL</i>	Ratio of mean income in the highest quintile to mean income in the lowest quintile, for families of four	5.65 (0.77)	4.1 to 7.9
<i>INCOME</i>	State personal income per capita	\$4,739 (796)	\$3,277 to \$7,660
<i>PCTYOUNG</i>	Percentage of the population 5 to 17 years of age	20.4	15.9 to 26.8
<i>PCTURB</i>	Percentage of the population living in urban areas	67.1 (14.4)	32.2 to 92.6
Instruments			
<i>AVGITEM</i> ¹	Synthetic percent itemizing	30.6 (3.2)	22.0 to 38.8
<i>PCTOWN</i>	Percent of households who are owners	64.9 (5.4)	43.8 to 73.2
<i>RLUMPSUM</i>	Federal grants excluding grants for welfare	\$64 (27)	\$38 to \$241
<i>RELSAL</i>	Per capita retail sales, relative to the national average	0.99 (0.14)	0.67 to 1.5
<i>PCTOLD</i>	Percent of the population 65 and above	11.7 (1.87)	7.7 to 17.8
<i>NEIGHBORHAT</i>	Predicted value of neighbor progressivity	0.68 (0.07)	0.50 to 0.95
<i>PCTBLK</i>	Percentage black	9.4 (9.4)	0 to 36.8
<i>PCTPOOR</i>	Percentage below poverty line	12.9 (4.3)	4.6 to 25.8
<i>MATCH</i>	Federal matching rate, aid to families with dependent children	0.608 (0.09)	0.5 to 0.799

Sources:

¹*AVGITEM*—Weighted average of the national proportion itemizing by AGI class, where the weights are the shares of each AGI class in a particular state. *PROGRESSIVITY*—For 1976, Phares (1980, Tables A-91 and B-1. For 1985 and 1991, data provided by Citizens for Tax Justice (1991). See text for description of data. *PCT ITEM*, *AVGITEM*—U.S. Treasury Department, *Statistics of Income* (Individual Tax Returns), various years. *NEIGHBOR PROGRESSIVITY*—Same source as *PROGRESSIVITY* variable. *REPUBLICAN*, *DEMOCRAT*—Statistical Abstract of the United States (1977, Tables 809, 810; 1989, Tables 426, 427; 1996, Tables 447, 448). Detailed discussion provided in a data appendix available from the author on request. *MAX WELFARE BENEFIT*—U. S. House of Representatives (1989, Table 12, p. 546; 1991, Section 7, Table 10, p. 605). *EDINEQUAL*—William and Sonnenberg (2000, Table 3). Because this variable was not available for 1976, I use the 1980 value in its place. *INCINEQUAL*—1985 and 1991 data from Citizens for Tax Justice. CTJ estimates computed from U.S. Internal Revenue Service individual state tax model file and other IRS statistics of income computer files. See Citizens for Tax Justice (1991, p. 70). 1976 data extrapolated backward from 1985 CTJ data. See footnote 11 for details. *INCOME*—U.S. Department of Commerce, *Survey of Current Business*, various years. *PCT URBAN*, *PCT YOUNG*—U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, various years. *NEIGHBOR PROGRESSIVITY*—Same data source as *PROGRESSIVITY*. See text for construction of variable. *PCT OLD*, *PCT POV*, *PCTOWN*—U.S. Department of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, various years. *RLUMPSUM*—U.S. Census of Governments, *State Government Finances and Government Finances*, selected years. *RELSAL*—Retail Sales Index, Sales and Marketing Management Magazine, Survey of Buying Power, selected years.

revenue raised from higher-income taxpayers, while raising the marginal cost per dollar for the poor.¹³ On the other hand, there is some evidence that an increase in income inequality may lead to a reduction in voting rates.¹⁴ If the reduction in the probability of voting is strongest among low-income households, then their reduction in political influence would tend to offset the progressive tax effect of greater inequality. However, unless the vote reduction effect is very strong, we would still expect a net positive effect of greater inequality on progressivity.

The sign on *INCOME* is indeterminate, since it depends on both the income elasticity of demand for public goods and the elasticity of demand for redistribution. The regression also includes controls for the percent of the population of school age (*PCT517*) and the percent urban (*PCTURB*), because they may affect the cost of government services. Table 1 suggests that both the mean and the variance of progressivity vary over time and across regions of the country. To capture regional differences in tastes, I include indicator variables for the country's four regions—*SOUTH*, *WEST*, and *NCENTRAL*, with *NORTHEAST* the excluded category. To control for common influences on all states that may vary over time, year indicators for 1985 and 1991 are included.

TESTING THE INCIDENCE MODEL

Data on Tax Incidence

Because incidence patterns evolve slowly, to obtain sufficient variation it is

desirable to use a panel of state-specific incidence data that span over as long a period as possible. The most comprehensive recent study using a consistent methodology provides estimates for just two years: 1985 and 1991 (CTJ, 1991).¹⁵ Prior to 1985, the most comprehensive study of state and local tax incidence was performed for the year 1976 (Phares, 1980). To increase the length of the panel of data, I merged the Phares and CTJ data, creating a three-year panel spanning the period from 1976 to 1991. Summary statistics and data sources are presented in Table 2. All dollar values are deflated, using the personal consumption deflator of the National Income and Product Accounts.

To test for the validity of pooling distributional data from the Phares and CTJ studies, a Chow test for the equality of coefficients was performed, using the basic specification reported in column (1) of Table 3. The sample was divided into two parts: the 1976 Phares data and the 1985 and 91 CTJ data. The F value was 2.33 (13, 118), which is less than the five percent critical value of 2.34.

While the Chow test provides a statistical justification for merging the distributional data from the separate studies of tax incidence, it is also necessary that the incidence assumptions, underlying data, and allocators for each tax are sufficiently similar. The benchmark incidence assumptions of the two studies are similar and, for the most part, reflect the standard shifting assumptions. These assumptions are described in detail in the data appendix. The Phares study uses aggregate data by state to allocate total taxes to income

¹³ A somewhat different rationale for the effect of income inequality is offered by Meltzer and Richard (1981), and Peltzman (1980). These authors use a median voter model to argue that the greater the difference between the mean and the median income, the greater is the median voter demand for redistribution.

¹⁴ Eibner (2004) finds that an increase in state income inequality reduces voter participation in statewide elections. The increase in income inequality in the U.S. between 1974 and 1990 would have depressed off-year election turnout by 1.5 to 2.3 percentage points.

¹⁵ After this study was completed, the CTJ analysis was updated to 1995 (CTJ, 1996), but with a somewhat revised methodology from their earlier studies. Feenberg and Rosen (1986) provide a study of the incidence of state income and sales taxes from 1977 to 1983. However, their study could not be used in this analysis because it does not include the local property tax.

TABLE 3
PROGRESSIVITY OF STATE AND LOCAL TAXES

Dependent Variable	PROGR HILO ¹	BURD Q5	BURD Q1	PROGR HIMID	PROGR MIDLO	BURD Q3
PCTITEM ²	0.017 (0.007)**	0.064 (0.071)	-0.104 (0.109)	0.006 (0.004)	0.014 (0.006)**	0.04 (0.069)
NEIGHBOR PROGRESSIVITY ^{3,4}	-0.624 (0.210)**	-3.20 (2.14)	9.99 (3.27)**	-0.399 (0.116)**	-0.426 (0.185)**	0.947 (2.07)
REPUBLICAN	-0.126 (0.061)**	-0.727 (0.617)	0.869 (0.943)	-0.05 (0.03)	-0.096 (0.053)*	-0.369 (0.598)
DEMOCRAT	-0.028 (0.028)	0.036 (0.282)	0.667 (0.431)	-0.02 (0.015)	-0.014 (0.024)	0.245 (0.273)
TASTEWELF ⁵	0.00009 (0.0003)	0.014 (0.004)**	0.015 (0.005)**	0.0002 (0.0002)	-0.00005 (0.002)	0.013 (0.003)**
EDINEQUAL	-0.003 (0.002)	0.014 (0.024)	0.049 (0.036)	-0.002 (0.001)	-0.002 (0.002)	0.021 (0.023)
INCINEQUAL	0.016 (0.032)	0.078 (0.329)	0.270 (0.503)	0.045 (0.017)**	-0.019 (0.028)	-0.263 (0.319)
INCOME	-8.48e ⁻⁰⁶ (0.00002)	-0.00008 (0.0003)	-0.0003 (0.0004)	7.3e ⁻⁰⁶ (0.00001)	-0.00001 (0.00002)	-0.0002 (0.0002)
PCTYOUNG	-0.011 (0.012)	0.097 (0.125)	0.220 (0.191)	-0.002 (0.007)	-0.009 (0.011)	0.124 (0.121)
PCTURB	-0.006 (0.002)**	-0.002 (0.017)	0.088 (0.026)**	-0.003 (0.0009)**	-0.004 (0.001)	0.026 (0.016)
SOUTH	-0.168 (0.052)**	-1.93 (0.526)**	-0.585 (0.804)	-1.25 (0.029)**	-0.102 (0.045)**	-1.25 (0.510)**
WEST	-0.099 (0.044)**	-1.55 (0.448)**	-0.970 (0.685)	-0.057 (0.024)**	-0.067 (0.039)**	-1.38 (0.434)**
NCENTRAL	-0.085 (0.036)**	-0.658 (0.362)	0.205 (0.553)	-0.052 (0.02)**	-0.046 (0.031)	-0.244 (0.351)
Adj R ²	0.46	0.59	0.51	0.38	0.39	0.60

Notes:

Number of Observations is 144. The sample is a pooled cross section of 48 continental U.S. states for the years 1977, 1985, and 1991. All equations include year effects for 1985 and 1991. Standard error of coefficients in parentheses.

*Significantly different from zero at the 10 percent level.

**Significantly different from zero at the 5 percent level.

¹Progressivity is measured by the ratio of the top to the bottom quintile of effective tax burdens, gross of federal tax deductibility.

²Instrument for Pct Itemize is *AVGITEM*, the weighted sum of the national average percentage itemizing by Adjusted Gross Income class, where weights are the individual state distributions of Adjusted Gross Income. First stage regression is $PCT\ ITEMIZE = -13.0 + 0.85(AVGITEM) + 7.4(RELSAL) + 0.09(PCTOWN) + -0.05(RLUMPSUM) + all\ other\ regressors\ from\ stage\ two\ progressivity\ model$; $F(4,125) = 30.3$; $Prob > F = 0.0$.

³NEIGHBOR PROGRESSIVITY is the population weighted average actual or predicted progressivity of a state's geographical neighbors.

⁴First stage regression for NEIGHBOR PROGRESSIVITY is:

$NEIGHBOR\ PROGRESSIVITY = 0.365 - 0.218(REPUB) - 0.025(DEMOC) - 0.012(INC\ INEQU) - 8.28e^{-06} INCOME - 0.002(ED\ INEQUALITY) + 0.0007(WELFARE\ BENEFIT) - 0.003(PCTURB) + 0.01(PCT517) - 0.125(SOUTH) - 0.058(WEST) - 0.093(NCENTRAL) + 0.089(YEAR85) + 0.155(YEAR91) + 0.011(AVGPCITEM) + 0.36(RELSAL) + 0.0004(PCTOWN) - 0.0009(LUMPSUM)$; $F(17,124) = 1.79$; $Prob > F = 0.037$.

⁵WELFARE TASTE = maxben - predicted maxben. See text for description, and footnote 10 for regression equation for predicted maxben.

classes, while CTJ uses a microsimulation approach to estimate tax burdens for representative households across the income distribution. Because the Phares study is slightly more comprehensive in its treatment of taxes than the CTJ study, I reduced all of the Phares effective tax rate estimates by the percentage of taxes not included in the CTJ study, plus the proportion of the total tax burden that represents taxes imported from other states. Differences in methodology and coverage of taxes are also discussed in the data appendix.

Measuring Incidence

PROGRESSIVITY, the measure of tax incidence, is defined as the ratio of total state and local burdens of the highest quintile of a state's income distribution to that of the lowest quintile. Quintile breaks are specific to each state. Tax burdens are gross of the federal deductibility offset. This measure provides a simple and accessible measure of the policy choices of the state regarding the distribution of the tax burden.¹⁶ A more commonly used index of tax progressivity, the Suits index, is similar to the Gini coefficient of concentration of the income distribution. The Suits index has the disadvantage of attaching the most weight to transfers among individuals close to the mode of the income distribution (Kiefer, 1984). In contrast, the disadvantage of the ratio measure is that it puts a zero weight on tax burdens in quintiles two through

four.¹⁷ In point of fact, the correlation coefficient between the top-to-bottom ratio and the middle-to-bottom ratio is very high (0.95), while the correlation with the top-to-middle ratio was 0.53. However, to address the issue directly, I also estimate the model using both the top-to-middle and the middle-to-bottom ratios as progressivity measures. To gain more insight into the determinants of progressivity, I also estimate the model with the quintile specific tax burdens as dependent variables. The results tell us whether an observed effect on progressivity is mainly a reflection of the effect on high-income burdens, low-income burdens, or both simultaneously.

The incidence studies used in this analysis are based on annual income. There is a significant body of literature that argues that, when the incidence of state and local taxes is evaluated on lifetime basis, regressivity is substantially reduced (Metcalf, 1994). Consumption taxes become less regressive, and income taxes, less progressive.¹⁸ The import of this view is that differences in incidence across states stemming from relatively greater reliance on consumption taxes, as opposed to income taxes, would be reduced over a longer time horizon. However, even if one accepts this view, a substantial portion of the interstate variation in incidence comes from differences in bases and rate structures under the various taxes. These differences across states would remain significant even if one adopted the lifetime incidence approach.

¹⁶ The CTJ study calculates tax burdens for a married-couple family of four by quintile of the income distribution of such families. Since the average income of this type of family is substantially higher than that of all families (U.S. House of Representatives, 1991, p. 1204), the bottom quintile in the CTJ data, with an average income of \$12,700 in 1991, corresponds to approximately the second quintile of the overall family income distribution. Given that political participation is likely to be much lower for the poor, such an income distribution is more representative of the voting population of each state. The income intervals from the Phares distribution of census money income were chosen to correspond as closely as possible to the CTJ distributions.

¹⁷ Thus, a tax system in which tax burdens are proportional in quintiles two through five, but higher in the lowest quintile, would have the same distributional score under the measure used here as a tax system that is regressive throughout the income distribution.

¹⁸ However, Chernick and Reschovsky (1997) found, in a panel study of income and gasoline taxes, that incidence measured over 11 years of income was only slightly less regressive than annual incidence.

Specification Issues

There is a strong a priori case, as well as considerable empirical support, for the endogeneity of itemization (Feldstein and Metcalf, 1987; Metcalf, 1993). Endogeneity stems from the fact that the higher the tax burden on high-income taxpayers, the higher is the level of itemizable deductions and, therefore, the greater is the likelihood that higher-income taxpayers will itemize their deductions. Since the top-to-bottom quintile ratio of tax burdens is strongly correlated with the top-to-middle ratio, the more progressive the tax system, the higher is the probability of itemizing for middle-income taxpayers as well. Thus, the coefficient on *PCTITEM* will be biased upward.

To take account of this endogeneity, I use, as an instrument for *PCTITEM*, the weighted average of the national proportion itemizing by AGI class, where the weights are the shares of each AGI class in a particular state (*AVGITEM*). Thus, *PCTITEM* is identified by differences in the distribution of AGI across states. This instrument should be uncorrelated with the error term in the progressivity equation, because the proportion itemizing is independent of a state's particular tax structure. This basic identification strategy has been used in numerous studies of the effect of itemization on state and local taxation (Feldstein and Metcalf, 1987). Additional instruments are the percentage of owners (*PCTOWN*), the ratio of per capita retail sales in the state to the national average (*RELSAL*), and lumpsum federal grants (*LUMPSUM*). For each of these instruments, I performed a Hausman test for exogeneity by estimating an augmented regression including the instrument. In each case, the instrument was not significantly different from zero, implying failure to reject the null of exogeneity.

Spatial competition is assumed to depend only on the fiscal behavior of a state's geographic neighbors; thus, the neighbor weighting matrix is non-zero

only if a state is geographically contiguous. This assumption has been typical in the tax competition literature (Rork, 2003). In weighting a state's neighbors, I used both the simple average and the population weighted share. Because the latter yielded sharper results, only the population weighted share measure is reported. Potential simultaneity between a state's own fiscal structure and that of its neighbors has been widely recognized in the literature (Case, 1993; Besley and Case, 1995). Besley and Case (1995) use as instruments both the contemporaneous and lagged values of all of the exogenous variables in the basic regression. I follow a similar strategy, using all of the exogenous variables in the model to obtain predicted values for neighbor progressivity.

To test for the consistency of the OLS estimator, I used the Davidson and Mackinnon variant of a Hausman test by estimating an augmented regression that included the predicted values of *PCTITEMIZE* and *NEIGHBOR PROGRESSIVITY* (Davidson and MacKinnon, 1993, pp. 236–242). Predicted values are a function of the exogenous variables in the model. The F statistic, with degrees of freedom 2 and 123, for the hypothesis that the two predicted values are jointly equal to zero, was 6.09. The null hypothesis that OLS is a consistent estimator can be rejected at a 0.03 level of significance, thus justifying estimation by instrumental variables.

As discussed above, *TASTEWELF* is measured by the residual from an auxiliary equation for maximum welfare benefits. By construction, *TASTEWELF* is uncorrelated with the variables in the welfare benefits equation. The simple correlation coefficient between *TASTEWELF* and the regressors in the progressivity equation is never higher than 0.25.

Results

The results are presented in Table 3. The basic specification, with progres-

sivity measured by the top to bottom quintile ratio, is presented in column (1). Columns (2) and (3) decompose the progressivity effect into separate effects on the top and bottom quintile tax burdens. The coefficient on *PCTITEM* is positive and significant at the one percent level in column (1). Thus, the results support the hypothesis that deductibility increases the progressivity of state and local tax systems. The estimated effect implies that a five percentage point increase in the proportion itemizing, say from the sample mean of 30 percent to 35 percent, would cause the progressivity ratio to increase by approximately 0.085. Relative to the mean progressivity of 0.68, this would be a 12.5 percent increase.

Deductibility is typically viewed as making the net incidence of state and local taxes more regressive (Phares, 1980). In this sample, the mean progressivity ratio, gross of deductibility, is 0.68, while the ratio net of deductibility is 0.58, a 15 percent reduction. However, because gross progressivity itself depends on deductibility incentive, the relation between deductibility and net progressivity can be written as:

$$[2] \quad \frac{P_n}{P_g(\alpha)} = f(\alpha),$$

where P_n (P_g) is net (gross) progressivity, α is the proportion itemizing, and $f(\alpha)$ translates gross into net progressivity. The total effect of deductibility on net progressivity is obtained by rewriting [2] as $P_n = f(\alpha)P_g(\alpha)$, and differentiating with respect to α . This gives:

$$[3] \quad \frac{dP_n}{d\alpha} = f'(\alpha)P_g + \frac{dP_g}{d\alpha} f(\alpha).$$

The estimated function $f(\alpha)$ was estimated to be $P_n/P_g = 0.995 - 0.0045(\alpha)$, or $P_n = P_g(0.995 - 0.0045\alpha)$. Using the mean values for P_g of 0.7 and for α of 30.5, and a value for $dP_g/d\alpha$ of 0.017 from Table 3, column (1), equation [3] can be evaluated as:

$$[4] \quad dP_n/d\alpha = 0.68(-0.0045) + 0.017[(0.995 - 0.0045(30.5))] = 0.012.$$

The interpretation of Equation [4] is that a one percentage point increase in the proportion itemizing would increase net progressivity by about one percentage point. A five percentage point increase (about a ten percent change) would increase net progressivity by six percentage points, or about 10 percent. This strong result suggest that eliminating the deductibility of state and local taxes, as has been urged as a component of comprehensive tax reform (Gramlich, 1985), would substantially reduce the progressivity of state and local tax systems.¹⁹

Contrary to expectations, *NEIGHBOR PROGRESSIVITY* has a negative and significant relation with a states' own progressivity. Each one point increase in neighbor progressivity is associated with a 0.62 point decrease in own progressivity.²⁰ A negative spatial relationship has also been found by Winer and Hettich (1999, Chapter 9) for average income tax rates, and Rork (2003) for changes in both average income tax rates and average sales tax rates.

The negative spatial relationship would, however, seem to conflict with Besley and Case (1995), who find that, if the governor can run for reelection, changes in income tax rates at different income levels are positively related to changes in neighboring states. While Besley and Case (1995)

¹⁹ With the inclusion of fixed effects, *PCTITEM* remains positive but is no longer significant. With only three years of data, the lack of variation makes it difficult to get precise estimates of the effect of itemization when fixed effects are included.

²⁰ I also estimated the neighbor effect using the (population weighted) average of actual neighbor values, rather than predicted values. The coefficient is negative and significant, although the estimated coefficient is less than half the magnitude of the IV coefficient.

model changes in tax rates, I study the ratio of tax burdens, rather than changes in the ratio. To see whether there is a positive relationship for changes in, as opposed to levels of, progressivity I estimate the model including fixed state effects. I find that the neighbor effect remains negative, though the reduction in variation means that the neighbor variable is no longer statistically significant.

Mimicking may also differ depending on the particular tax studied (Rork, 2003). Besley and Case (1995) examine changes in specific tax rates only for the income tax, whereas this study looks at the spatial pattern of aggregate tax incidence. Moreover, Besley and Case (1995, Table 4) find that, while the degree of mimicking is substantial, it is nonetheless only partial.²¹ The partial response of neighboring states to changes in income tax rates is, therefore, not necessarily inconsistent with the negative spatial effect estimated here.

The color-coded map in Figure 1 helps to understand the regression result. It shows that while some neighbors (e.g., Nebraska and Kansas, and Mississippi and Alabama) have similar incidence patterns, other neighbors (e.g., Washington and Oregon, and New Hampshire and Vermont) are at opposite ends of the progressivity spectrum. The average (absolute) value of the difference between a state and its geographic neighbors was 0.11 in the South, 0.15 in the Northeast, and about 0.21 in the West and Northeast. Given these differences, I reestimated the model excluding the regional dummies. The negative spatial effect was only slightly smaller in magnitude, suggesting

that spatial differentiation is not a region specific effect.

One possible explanation for the negative relationship between tax incidence in neighboring states is tax exporting to out-of-state commuters. If interstate commuting is important and goes mainly in one direction, and the average earnings of commuters exceed those of both the state of residence and the state of employment, then the effective size of the high-income tax base is expanded in the employment state and reduced in the residence state.²² In this case, a relatively progressive tax structure in the state of employment would be more productive than in the state of residence. However, while a few states in the Northeast seem to fit this pattern, interstate commuting is not likely to be important enough to be able to explain the negative neighbor effect for the entire sample.²³

Decomposition of the neighbor effect into separate effects on high and low tax burdens (Columns (2) and (3)) suggests a somewhat stronger differentiation for tax rates at the bottom of the income distribution than in the top quintile. An increase in the predicted neighbor progressivity ratio of 0.05 (with a mean of 0.7) would lead to an increase in the lowest quintile burden of about one-half of one percent, while the top quintile burden would decrease by less than two-tenths of a percent. Overall, the results suggest that differences in tastes and/or idiosyncratic development histories are important factors in determining tax structure, and that interstate fiscal competition is not strong enough to eliminate these factors.

²¹ When the governor is ineligible for reelection (about 30 percent of their observations), they find either no relationship or a negative relationship.

²² A number of states have mutual agreements waiving the right to tax the income of non-residents, and, instead, allowing each such state to tax income earned in the state of employment. However, if the commuting flow is asymmetrical, with one state being a residence center and another, an employment center, then the employment center has a strong incentive not to enter into such a reciprocal arrangement.

²³ Using the methodology developed by McClure (1967), Phares (1980) estimates that, in 1976, tax exporting was equal to 16 percent of total state and local taxes. For the income tax, the proportion exported came 27 percent, but almost all of this exporting came through federal tax deductibility.

Republican party control (*REPUBLICAN*) is associated with a more regressive tax structure than a divided state government. At the mean, Republican control of both legislative houses and the governorship is associated with an 18.5 percent reduction in progressivity. Decomposition of the progressivity effect into high and low tax burdens, in columns (2) and (3), indicates that the regressive effect of republican political control reflects both lower tax burdens for high-income families and higher burdens for low-income families. However, neither effect is statistically significant at conventional levels. Democratic party dominance has a negative but insignificant effect on tax incidence.²⁴ The finding that one-party political dominance is associated with less progressive incidence structure is consistent with the finding of Lowery (1987) that more political competition leads to a more progressive tax structure, and that of Berry and Berry (1994) that both party control and ideology influence the likelihood of tax changes in U.S. states.

Neither of the two measures of expenditure incidence—*WELFARE TASTE* and *ED INEQUALITY*—is statistically significant. Columns (2) and (3) indicate that stronger tastes for welfare are associated with higher tax burdens for both the top and bottom quintiles. A value of *TASTEWELF* one standard deviation above the mean (\$48) is associated with an increase in low-income tax burdens of 0.7 percentage points, and of 0.67 for high-income taxpayers. As a result, the ratio of tax burdens is unchanged. This result suggests that the incidence of state financing for welfare is similar to the incidence of other state and local services, and that low-income families make a substantial contribution to paying for additional welfare services.

Greater inequality in educational spending has a negative but not statistically significant relationship with tax pro-

gressivity. The degree of spending dispersion also has no effect on quintile-specific tax burdens, as shown in columns (2) and (3). Evans, Murray and Schwab (1997, Table 3) show the major role of increased state aid in reducing the inequality of education expenditures, particularly in states with court-ordered reform. While the pattern may be different for those states with court-ordered reform, the results presented here, covering roughly the same time period as the Evans et al. (1997) study, suggest that, for the nation as a whole, the increase in state aid has not had a statistically discernible effect on state-local tax incidence.

The lack of statistically strong expenditure effects in either of the two variables differs markedly from the complementarity relationship found by Bahl et al. (2002). While further exploration is suggested, at the least this difference in findings suggests that the relationship between expenditure and tax incidence is sensitive to the particular incidence measures used.

Columns (4) and (5) investigate whether the results differ for alternative definitions of progressivity. In column (4) progressivity is measured by the ratio of burdens of the top to the middle quintile, while column (5) uses the middle-to-lowest ratio. Not surprisingly, given the strong correlation between the various measures, the overall results are similar to the high-to-low measure in column (1).

The major difference is the significant positive effect of income inequality on the top-to-middle ratio. According to the estimate in column (4), the increase in the ratio of average income in the top to the bottom quintile from 5.0 to 6.2 between 1977 to 1991 led to an increase in the ratio of the top to the middle tax burdens of 0.04 (with a mean of 0.9), implying that the change in the incidence of state and local taxes offset about five percent of the change in the pre-tax income distribu-

²⁴ I also tried using various lags in the political party dominance variable, but the results were unaffected.

tion during the period. It is notable that the income distribution effect operates through a reduction in middle- relative to high-income burdens, rather than a reduction in low-income burdens.

CONCLUSION

As shown in Table 1, state and local taxes are, on average, regressive, but there is substantial and persistent variation in the degree of progressivity across states. Average progressivity is highest in the northeast states, and lowest in the South, but variation is greatest in the West. To explain this variation, I estimate a model of tax incidence using a pooled cross-section sample for the years 1976, 1985 and 1991.

Deductibility of state and local taxes has an economically important influence on subnational tax progressivity. A five percentage point increase in the percentage itemizing (about 16 percent) would increase net progressivity by six percentage points, or about ten percent. The magnitude of the effect implies that eliminating or curtailing the deductibility of state and local taxes would substantially reduce the progressivity of subnational tax systems.

Both ideology and party control combine to produce measurable change in tax incidence. Political dominance of state government by Republicans, as compared to a divided government, is associated with a significantly more regressive tax structure. Dominance by Democrats shows a negative but insignificant effect on tax incidence. Greater income inequality leads to reduced tax burdens on the middle relative to the top quintile, but the effect is relatively small. I find a negative and statistically significant relation between neighboring and own-state tax progressivity, with more populous states having proportionally more influence. While positive mimicking has been widely reported in the literature, the results reported here imply that mimicking is not

strong enough to overcome differences in overall tax incidence that are produced by differences in state characteristics, as well as unmeasured differences in tastes or historical development.

Two separate measures of expenditure incidence—one for welfare and the other for education—suggest that distributional patterns on the two sides of the budget are not strongly linked to one another. States with strong tastes for welfare finance the additional spending by proportionally higher tax burdens throughout the income distribution. Hence, all low-income taxpayers contribute to the benefits received by a subset. This suggests that welfare is financed through a combination of the benefits received and the ability to pay taxation. Greater equality in educational spending has a positive relationship with a tax progressivity, but the result is not statistically significant.

This study may be viewed as an initial effort in understanding state and local tax incidence. Further research is warranted concerning the role of tax competition, and the relationship between tax and expenditure incidence. The trade-offs between redistribution through taxes and expenditure incidence are complex, and the results seem to be sensitive to the way in which expenditure incidence is measured. Hence, an avenue for future empirical work is to include additional measures of the benefits by income class of state and local public expenditures. One candidate would be the level and incidence of higher education expenditures. A second avenue for future research is to explore more fully the effect of horizontal and vertical tax competition on state-local tax progressivity. If interstate tax competition has increased over time, as has been argued, then one would expect more recent data to show a convergence in tax incidence and a weakening of the negative neighbor relationship found in this study. Hence, it would be useful to extend the study as more recent incidence

data becomes available. Regarding vertical tax competition, a specification that could take account not only of the price effect of federal tax deductibility, as in my model, but also the potential displacement effect of federal taxation, would help to clarify the relation between federal and state and local tax progressivity, and the overall incidence of the tax system.

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REFERENCES

- Advisory Commission on Intergovernmental Relations.
Significant Features of Fiscal Federalism. Washington, D.C., 1993.
- Bahl, Roy, Jorge Martinez-Vazquez, and Sally Wallace.
"State and Local Government Choices in Fiscal Redistribution." *National Tax Journal* 55 No. 2 (December, 2002): 723–42.
- Berry, Frances, and William Berry.
"The Politics of Increasing Tax Rates in the States." *American Journal of Political Science* 38 No. 3 (August, 1994): 855–9.
- Besley, Timothy, and Anne Case.
"Incumbent Behavior: Vote-Seeking, Tax-Setting, and Yardstick Competition." *American Economic Review* 85 No. 1 (March, 1995): 25–45.
- Berch, Neil.
"Explaining Changes in the Tax Incidence in the States." *Political Research Quarterly* 48 No. 3 (September, 1995): 629–41.
- Brueckner, Jan, and Luz Saavedra.
"Do Local Governments Engage in Strategic Property-Tax Competition?" *National Tax Journal* 54 No. 2 (June, 2001): 203–29.
- Case, Anne.
"Interstate Tax Competition After TRA86." *Journal of Policy Analysis and Management* 12 No. 1 (Winter, 1993): 136–48.
- Chernick, Howard.
"A Model of the Distributional Incidence of State and Local Taxes." *Public Finance Quarterly* 20 No. 4 (October, 1992): 572–85.
- Chernick, Howard, and Andrew Reschovsky.
"The Distributional Impact of Proposition 13: A Microsimulation Approach." *National Tax Journal* 35 No. 2 (June, 1982): 149–70.
- Chernick, Howard, and Andrew Reschovsky.
"Who Pays the Gasoline Tax?" *National Tax Journal* 50 No. 2 (June, 1997): 233–59.
- Citizens for Tax Justice.
A Far Cry From Fair: CTJ's Guide to State Tax Reform. Washington, D.C., April, 1991.
- Citizens for Tax Justice and the Institute on Taxation and Economic Policy.
Who Pays? A Distributional Analysis of the Tax Systems in All 50 States. Washington, D.C., 1996.
- Davidson, Russell, and James G. MacKinnon.
Estimation and Inference in Econometrics. New York: Oxford University Press, 1993.
- Eibner, Christine E.
"Population Heterogeneity and Voter Turnout." Rand Corporation. Mimeo, 2004.
- Evans, William N., Sheila Murray, and Robert Schwab.
"Schoolhouses, Courthouses, and Statehouses After Serrano." *Journal of Policy Analysis and Management* 16 No. 1 (Winter, 1997): 10–31.
- Feenberg, Daniel, and Harvey Rosen.
"State Personal Income and Sales Taxes, 1977–1983." In *Studies in State and Local Finance*, edited by Harvey Rosen, 135–86. Chicago: The University of Chicago Press, 1986.

- Feldstein, Martin, and Gilbert Metcalf.
 "The Effect of Federal Deductibility on State and Local Taxes and Spending." *Journal of Political Economy* 95 No. 4 (August, 1987): 710–36.
- Gade, Mary, and Lee C. Adkins.
 "Tax Exporting and State Revenue Structure." *National Tax Journal* 43 No. 1 (March, 1990): 39–52.
- Gramlich, Edward.
 "Reforming U.S. Fiscal Arrangements." In *American Domestic Priorities: An Economic Appraisal*, edited by John M. Quigley and Daniel L. Rubinfeld, 34–67. Berkeley: University of California Press, 1985.
- Hettich, Walter, and Stanley L. Winer.
 "Economic and Political Foundations of Tax Structure." *American Economic Review* 78 No. 4 (September, 1988): 701–12.
- Hussar, William, and William Sonnenberg.
 "Trends in Disparities in School District Level Expenditures per Pupil." Washington, D.C.: National Center for Educational Statistics (NCES), January, 2000.
- Jacobs, David, and Don Waldman.
 "Toward a Fiscal Sociology: Determinants of Tax Regressivity in the American States." *Social Science Quarterly* 63 No. 4 (December, 1983): 550–65.
- Karoly, Lynn.
 "The Trend in Inequality Among Families, Individuals, and Workers in the United States: A Twenty-five Year Perspective." In *Uneven Tides: Rising Inequality in America*, edited by Sheldon Danziger and Peter Gottschalk, 19–98. New York: Russell Sage Foundation, 1994.
- Kiefer, Donald W.
 "Distributional Tax Progressivity Indexes." *National Tax Journal* 37 No. 4 (December, 1984): 497–513.
- Ladd, Helen F.
 "Mimicking of Local Tax Burdens Among Neighboring Counties." *Public Finance Quarterly* 20 No. 4 (October, 1992): 450–67.
- Lowery, David.
 "The Distribution of Tax Burdens in the American States: The Determinants of Fiscal Incidence." *Western Political Quarterly* 40 No. 1 (March, 1987): 137–58.
- McClure, Charles.
 "The Interstate Exporting of State and Local Taxes: Estimates for 1962." *National Tax Journal* 20 No. 1 (March, 1967): 49–77.
- Meltzer, Alan H., and Scott F. Richard.
 "A Rational Theory of the Size of Government." *Journal of Political Economy* 89 No. 5 (October, 1981): 914–27.
- Metcalf, Gilbert E.
 "Tax Exporting, Federal Deductibility, and State Tax Structure." *Journal of Policy Analysis and Management* 12 No. 1 (Winter, 1993): 109–28.
- Metcalf, Gilbert.
 "The Lifetime Incidence of State and Local Taxes: Measuring Changes During the 1980's." In *Tax Progressivity and Income Inequality*, edited by Joel Slemrod, 59–88. New York: Cambridge University Press, 1994.
- Morgan, David R.
 "Tax Equity in the American States: A Multivariate Analysis." *Social Science Quarterly* 75 No. 4 (September, 1995): 510–23.
- Orr, Larry.
 "Income Transfers as a Public Good: An Application to AFDC." *American Economic Review* 66 No. 3 (June, 1976): 359–71.
- Peltzman, Sam.
 "The Growth of Government." *Journal of Law and Economics* 23 No. 2 (October, 1980): 209–87.
- Phares, Donald.
Who Pays State and Local Taxes? Cambridge: Oelgeschlager, Gunn, and Hain, 1980.
- Rork, Jonathan C.
 "Coveting Thy Neighbor's Taxation." *National Tax Journal* 56 No. 4 (December, 2003): 775–89.
- U.S. Bureau of the Census.
Statistical Abstract of the United States. Washington, D.C.: Government Printing Office, 1994.
- U.S. House of Representatives. Committee on Ways and Means.
Background Material and Data on Programs Within the Jurisdiction of the Committee on Ways and Means. Washington, D.C.: Government Printing Office, 1989, 1991.

U.S. House of Representatives. Committee on Ways and Means.

Overview of Entitlement Programs: 1991 Green Book. Washington, D.C.: Government Printing Office, 1991.

Winer, Stanley L., and Walter Hettich.

Democratic Choice and Taxation: A Theoretical and Empirical Analysis. New York: Cambridge University Press, 1999.

Yinger, John, and Helen Ladd.

"The Determinants of State Assistance to Central Cities." *National Tax Journal* 42 No. 4 (December, 1989): 413–28.

DATA APPENDIX

In both the CTJ (1991) and Phares (1980) studies, the burden of the income tax is assumed to rest with the taxpayer. Sales and excise taxes are shifted to consumers and allocated in proportion to the consumption of taxed items. While both studies ignore variation in property tax rates within states, the incidence of the property tax varies depending on the type of property. The property tax on homeowners rests with homeowners, while half of the tax on rental residential property is shifted forward to renters. CTJ assumes that the non-shifted half is borne by landlords and allocated in proportion to rental income. In Phares, half of the non-shifted portion is allocated according to rental income, and half, in proportion to dividend income. In CTJ, business property taxes are mainly borne by capital. Much of the capital portion is assumed to be exported to other states. The non-exported portion falls on both capital owners and consumers. In Phares, the commercial property tax is assumed to be somewhat more heavily shifted forward than in the CTJ study, with 2/3 of the tax borne by consumers, and the remainder divided between incorporated and unincorporated firms. In CTJ, the corporate income tax is borne by owners of capital and allocated in proportion to a state's share of the ownership of capital. In Phares, half of the corporation income tax is allocated to consumers, and half, to owners of capital.

Thus, the major difference between the two studies in terms of incidence assumptions is

that, for taxes initially paid by firms, Phares assumes that a somewhat higher proportion is passed forward to consumers. While this difference should make CTJ results more progressive than those of Phares, this tendency will be offset by the CTJ assumption that much of the burden on capital is exported to the owners of capital in other states. Since the CTJ study does not take account of tax importing, this exported amount will not increase the progressivity of tax burdens in the importing states.

Methodology and Coverage

The Phares study includes all state and local taxes, while the CTJ study omits taxes equal to about 13 percent of total tax revenue in 1976. The Phares study also makes estimates of both exporting and importing of tax burdens, while the CTJ study ignores importing. To make the burdens compatible between the two studies, I adjusted the Phares estimates downward by 13 percent.

The CTJ data source is a state specific sample of tax returns from the Statistics of Income (SOI) Division of the U.S. Treasury Department. The income measure is federal adjusted gross income, plus other items available from the tax returns, such as excluded capital gains and rental and partnership losses. Phares, by contrast, starts with aggregate BEA personal income by state, and allocates that income by income class using distributional percentages of census money income by state from the 1976 *Survey of Income and Education*.

Because the tax return data from the SOI do not include non-filers, and because most transfer income is excluded from AGI, the CTJ data source is not a representative sample of the low-income population. Moreover, the CTJ study calculates representative tax burdens for married-couple families of four at various fractile positions in the income distribution of such families. Because the average income of families with children is higher than the average income of all families and individuals, the average income of the bottom quintile of the CTJ data (\$12,700 in 1991) corresponds to approximately the second quintile of the overall family income distribution. In the CTJ study,

income brackets that define the quintiles of the income distribution are specific to each state, while in Phares the income brackets are national. To make the brackets specific to each state, state specific cumulative income distribution data from the 1976 SOI were used to select intervals conforming to the quintiles of the state's income distribution (Phares, 1980, Appendix Table B-1).

Both studies allocate sales and excise taxes in proportion to consumption of taxed items, using income consumption relationships

estimated from the Consumer Expenditure Survey (CES). In Phares, separate regressions are estimated at the regional level. CTJ uses national consumption relationships, but adjusts for certain region specific differences (e.g., differences in fuel consumption). For expenditure categories in which the CES differs substantially from the national income accounts estimates of personal consumption, the CTJ study adjusts the CES estimates to conform to the national totals. Importantly, both studies use each state's specific tax base for the sales tax.