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Redistribution at the State and Local Level: Consequences for Economic Growth

Howard Chernick[1]

Abstract

Fiscal redistribution varies substantially across U.S. states, both on the tax and spending side. A compensating differential framework is used to show that greater redistribution will tend to increase the gross wage of skilled workers but that any increase could be offset by stronger preferences for redistribution. An increase in gross wages raises the cost of output in the more redistributive state, leading to a predicted decline in income and output. To test the model, five- and ten-year per capita and aggregate growth rates are estimated as a function of initial measures of tax and expenditure incidence. Data are a four-period panel of U.S. states from 1977 to 1995. Tax progressivity is measured both overall and for the income tax alone. Expenditure progressivity is measured by spending on welfare and higher education, and the state share of elementary and secondary education spending. Tax structure and welfare spending are instrumented. State tax progressivity shows no effect on growth. Welfare

[1] Department of Economics, Hunter College, New York, NY, USA

Corresponding Author:
Howard Chernick, Department of Economics, Hunter College, 695 Park Ave., New York, NY 10065
Email: howard.chernick@hunter.cuny.edu

spending has a negative effect on aggregate income growth but not on per capita income. Higher education spending is unrelated to growth. Fiscal spillovers within regions are asymmetric. Progressive taxation and more higher education spending by a state's geographic neighbors have positive effects on own-state growth. The asymmetry in tax effects explains why interstate tax competition does not lead to geographic convergence in fiscal structures. The results suggest that interstate differences in fiscal redistribution are welfare enhancing in the Pareto sense.

Keywords
interjurisdictional differentials, taxation, health education and welfare spending

U.S. states vary considerably in the extent of fiscal redistribution. Policy choices regarding benefit levels, coverage, and eligibility for means tested programs lead to wide variations in redistributional outlays, both in amount and as a share of income. Other spending categories with significant redistributional implications, such as state aid to elementary and secondary education, and higher education, also vary widely. On the financing side, the most progressive states have tax structures as much as three times more progressive than the most regressive states (Chernick 2005).

This article asks whether there is a trade-off between redistribution and economic growth. Does the Okun (1975) famous leaky-bucket analogy apply at the subnational level? If a more progressive tax system, or a pro-poor expenditure pattern, has an adverse effect on a state's rate of growth, then the deadweight loss from subnational redistribution is presumed to be substantial. If economic growth is unaffected, differences in redistribution may mainly reflect differences in preferences, and as such are Pareto enhancing. Finally, if redistribution has a positive effect on growth, then the positive effects of human capital investment will be dominant. Such a finding would imply that interstate fiscal competition leads to too little redistribution.

The study contributes to the analysis of subnational redistribution by including a broader set of redistributional measures, on both the tax and expenditure side, than in prior work. This comprehensiveness allows us to estimate the separate effects on growth of various distributional policies, while controlling for other types of fiscal redistribution. A second innovation in the article is to examine the spatial impact of redistribution, by the

inclusion of measures of fiscal redistribution in neighboring states. A third contribution is to measure growth over different lengths of time, and in terms of both per capita and aggregate income. The latter distinction addresses the issue of the productivity effects of redistribution, as measured by changes in per capita output, versus population and labor force effects. Potential endogeneity of redistribution is addressed by lags, and by instrumenting for those aspects of redistribution most likely to be affected by economic growth in prior periods.

The article is organized as follows. The first section reviews the various strands of the literature on the effects of subnational redistribution on economic performance, including wage distributions, migration, income levels, and changes in income. The second section discusses the theoretical relationship between redistribution and economic growth. The third section presents the empirical model, focusing on the measures of tax and expenditure redistribution. Results are in fourth section, whereas fifth section concludes the article.

Literature Review

Tax Incidence and Wages

If the supply of labor to a state is sufficiently elastic with respect to fiscal incidence, redistribution could have an effect on wages at different skill levels, as well as overall employment and economic growth. Both Wallace (1993) and Feldstein and Wrobel (1998) merge Current Population Survey wage data and Internal Revenue Service Statistics of Income files to test whether state taxes are capitalized in gross wages.

In her cross-sectional regression of wage rates on state marginal income tax rates, Wallace (1993) finds that in one-quarter of the industry-occupation groups examined, marginal state income taxes are capitalized in gross wages, at rates ranging from 45 to 90 percent. Although mobility rises with educational attainment, she does not find any systematic variation in wage-rate capitalization in terms of the educational requirements of the occupation. Hence, although her results suggest that that an increase in marginal tax rates could, by raising average wage costs, have a measurable impact on employment, there is no evidence to suggest that more progressive tax structures would have a differential effect on high-skilled labor.

Feldstein and Wrobel (1998) regress labor income on individual characteristics, state dummies, and (one minus) the combined state and federal tax burden. As an instrument for the average tax rate, they use the predicted

value of labor income for the individual and his or her spouse, based on all individual characteristics except the tax rate, plus their actual capital income. Federal and state tax rates are simulated based on this predicted income. The estimated coefficient in most of the equations is not significantly different from (minus) one, leading Feldstein and Wrobel to conclude that cross-state differences in the distribution of tax burdens are fully capitalized in gross wages. This finding is considerably stronger than that of Wallace (1993), because it applies regardless of occupation or industry. If correct, it would imply that there are nontrivial differences in the cost of skilled labor in states with more versus less progressive tax systems, with a potentially strong negative effect on economic growth.

There are two sources of bias in the Feldstein and Wrobel (1998) estimate of the capitalization rate for wages. If tax structure is endogenous to the income distribution, as shown in Chernick (2005), the estimated tax effect will be biased upward. Second, while the Feldstein and Wrobel (1998) specification prediction equation for labor income includes state fixed effects, it does not allow the effect of individual characteristics to vary by state. The distribution of wage income within a state is likely to depend on state specific characteristics such as industry-occupation mix, population size, density, and immigration patterns, as well as the distribution of individual characteristics. For example, in New York State, the relative earnings of high-skilled individuals are likely to be greater than their relative earnings nationwide because of size and industrial and agglomeration characteristics. Omission of all such variables forces all of the cross-state variation in the conditional income distribution to be attributed to the tax variable, because this is the only variable allowed to vary across states.

Using the current population survey, Leigh (2008) is unable to find any capitalization of tax rates in wages. Chernick (2003) regresses average income by quintile on Citizens for Tax Justice (CTJ) simulated tax burdens (1995) and finds no evidence for a positive effect of tax rates on income levels. Although Gyourko and Tracy (1989, 1991) find a jointly significant effect of all fiscal amenities on gross wages by city, the effect of income taxes alone is not significant. Thus, the empirical evidence on the capitalization of fiscal variables in wages and incomes is decidedly mixed.

Redistribution and Migration

Taxes and public expenditures may affect labor supply through their effect on migration patterns. Blanchard and Katz (1992) find that when states experience adverse demand shocks, wages and per capita incomes soon

return to their long-run levels, but changes to employment growth persist over many years. The importance of migration as an adjustment mechanism suggests that changes in fiscal redistribution may also exert changes in employment and population. Hence, I estimate the effect of fiscal redistribution on aggregate income and population growth, as well as per capita income growth.

Pema (2005) finds a statistically significant negative effect of both income and sales taxation on the rate of migration, taking into account the degree of progressivity of the tax. Among college graduates, there is a 10 percent increase in the proportion migrating from one state to another for every one percentage point increase in the income tax differential. People with advanced degrees are twice as responsive to tax differentials as those with college degrees, who are in turn about six to eight times more responsive than those with high school degrees.[1] The estimated tax migration effect is similar in magnitude to the estimated effect of wage differentials, which is consistent with the notion that net of tax wages are the relevant variable in labor supply decisions. Although the overall migration in a single year is low, Pema's (2005) results suggest that over time the cumulative flow of high-skilled workers to low-tax states could be substantial.

The elderly have lower labor force attachment than the nonelderly, and their incomes are less dependent on place of residence. Hence, fiscal variables may have a stronger effect on migration patterns. Conway and Houtenville (2001) among others find a strong negative effect of welfare spending, including Medicaid, on net migration flows among the elderly; however, income tax rates have no effect. Although these fiscal effects are notable, the impact of migration of the elderly on economic growth is ambiguous. Although aggregate economic output is likely to be positively related to in-migration of the elderly, growth in per capita income depends on the income level of elderly migrants relative to the existing population.

High levels of transfers could increase fiscal costs by encouraging welfare participation among those already living in a state or by inducing in-migration or preventing out-migration of actual or potential recipients (Blank 1988). Borjas (1999) argues that the welfare magnet effect is most important for immigrants, but Kaushal (2005) disputes this finding.

Recent studies of welfare migration compare migration patterns among various categories of single mothers, using border counties in adjacent states to control for the effect of wage differences on migration. Gelbach (2004) finds that, though interstate migration rates for those most likely to get public assistance are somewhat lower than the rates for other demographic groups, when such groups do migrate they tend to move from lower

to higher welfare benefit states. McKinnish (2005) also finds that Aid to Families with Dependent Children (AFDC) benefit differentials have a statistically significant effect on migration rates between border counties. In both of these studies, the actual number of migrants is relatively low, suggesting that welfare migration effects are unlikely to be large enough to affect average income in either the sending or the receiving states.

Migration declines with distance (Greenwood 1975), and a substantial subset of moves are between adjoining counties in contiguous states. For interstate moves within the same labor market area, we would expect the effect of differentials in tax incidence or public service amenity levels to be magnified relative to more distant states. To take account of the potentially greater impact of regional fiscal conditions, fiscal variables for neighboring states are included in the empirical specification.

Redistribution and Growth

Helms (1985) examined the effect of state welfare expenditures on the level of per capita income. Although welfare spending is not included in the specification, he includes an exhaustive set of other categories of state spending, as well as total tax burdens. The tax coefficient is interpreted as measuring the marginal effect of an increase in state spending going exclusively for welfare. However, because the dependent variable is personal income, and tax burdens are measured by the ratio of taxes to income, potential endogeneity is introduced into the tax coefficient.

Using a recursive framework, and dividing government expenditures between welfare and health (unproductive expenditures) and all other functions, Bania, Gray, and Stone (2007) find a significant negative effect of welfare and health expenditures on the five-year average rates of growth in state personal income per capita. Reed (2008) finds a significant negative relationship between aggregate tax burdens and economic growth but does not address the distribution of tax burdens.

Several studies have related tax progressivity to state economic growth. Although there are some negative findings on employment in the 1970s, these effects disappear when data from the 1980s are included (Wasylenko and Carroll 1989). Chernick (1997) tests whether tax progressivity, as opposed to average tax burdens, affects economic growth. He finds that progressivity has no effect on growth over periods as long as ten years, but a negative effect over a twenty-year period.

The focus of the above discussion is on the effect of distribution on labor supply and human capital. Growth obviously depends as well on the

increase in physical capital. Capital is typically assumed to be in perfectly elastic supply to states. However, the effect of redistribution on the supply price of capital is much more indirect. The empirical literature has considered the rate of business taxation as a more direct measure of the effect of the fisc on firm location and capital supply (Wasylenko and Carroll 1989).

Conceptual Framework

In an open economy, with mobile factors of production, a basic tenet of fiscal federalism is that subnational attempts to redistribute income will be undone by the exit of high-income individuals, and by in-migration of the poor (Oates 1972). If the fiscal residual (or benefits received minus taxes paid) differs across jurisdictions for individuals with similar levels of income or human capital, then there is an incentive to locate in jurisdictions with the most favorable fiscal residuals. If greater redistribution lowers the fiscal residual for high-skilled individuals, while raising the residual for the low-skilled, the high-skilled will have an incentive to locate in less progressive states, whereas the low-skilled are more likely to locate in progressive states. Such fiscally induced mobility, if it reduces the supply and raises the cost of skilled labor, and increases dependency, may penalize a state in terms of its overall economic performance.

In contrast to the "flight from progressivity" model, state economies may be able to tolerate differences in redistributive effort if such differences reflect voter preferences. If preferences differ across individuals, states with more redistribution may attract those with greater preferences for redistribution. Analogous to the local public finance model of residential choice, variation in progressivity could be welfare enhancing, by allowing a better match between preferences and public services (Hochman and Rodgers 1974; Tiebout 1956). Redistributive expenditures may also benefit a state's economy by enhancing human capital, leading to an increase in productivity and output. Thus, preference and human capital effects can act as a potential offset against any negative effects of more progressive fiscal systems.

The effect of changes in fiscal redistribution on growth may be summarized by the multiplicative expression

$$\varepsilon_{q,\mathrm{FR}(H)} = \varepsilon_{q,c}\varepsilon_{c,\mathrm{FR}(H)}, \tag{1}$$

where $\varepsilon_{q,\mathrm{FR}(H)}$ is the elasticity of output with respect to redistribution, $\varepsilon_{c,\mathrm{FR}(H)}$ is the elasticity of unit costs with respect to fiscal redistribution, and $\varepsilon_{q,c}$ is the elasticity of output with respect to cost. Redistribution is summarized by FR(H), the fiscal residual enjoyed by high-skilled residents

of a state. The more elastic the demand for the product of a state (the greater the absolute value of $\varepsilon_{q,c}$), the greater the effect of a change in cost on output. If the elasticity of output demand is equal to (minus) one, a given percentage increase in cost leads to one for one percentage reduction in output. As the elasticity approaches zero, the effect of any cost increase also goes to zero.[2]

The cost elasticity depends on the magnitude of the fiscally induced adjustment in the relative wages of skilled and unskilled labor, and the rate at which changes in relative wages are translated into changes in unit costs. The equilibrium wage adjustment depends on the elasticities of supply for each type of worker, whereas the translation into increased costs depends on the ability to substitute between skilled and unskilled labor. Unit costs are given by

$$\mathrm{C}(q) = \mathrm{C}[\mathrm{W}_H(\mathrm{FR}_H), \mathrm{W}_\mathrm{L}(\mathrm{FR}_L), \mathrm{k}(q)], \tag{2}$$

where FR_H and FR_L are the fiscal residuals for high- and low-skilled workers, respectively, and gross wages are assumed to be a function of the fiscal residuals. The change in unit cost from a decrease in the fiscal residual for high-skilled workers may be written as

$$\mathrm{dC} / \mathrm{dFR}_H = (\partial \mathrm{C}/\partial \mathrm{w}_H)(\mathrm{dw}_H/\mathrm{dFR}_H) - (\partial \mathrm{C}/\partial \mathrm{w}_L)(\mathrm{dw}_L/\mathrm{dFR}_L). \tag{3}$$

The smaller the substitution elasticities between labor types, the greater are the cost terms $\partial \mathrm{C}/\partial \mathrm{w}_H$ and $\partial \mathrm{C}/\partial \mathrm{w}_L$ in equation (3).[3] The larger the labor supply elasticities, the larger in magnitude are the wage response terms $\mathrm{dw}_H/\mathrm{dFR}_H$ and $\mathrm{dw}_L/\mathrm{dFR}_L$.

Graphically, a decrease in the fiscal residual for high-skilled workers shifts the aggregate cost function to the left, leading to a decline in equilibrium output. Adjustment to the new equilibrium level will be marked by a transitory decrease in the rate of growth in state income, before the state's economy returns to its steady state growth path. To the extent that greater redistribution enhances the productivity of low-skilled labor, the cost increase will be smaller, and the negative effect on output will be lessened.

Empirical Modeling of State Economic Growth

Basic Model

Although a full structural model of the effects of fiscal redistribution would include both a labor supply equation and a growth equation, here I estimate a reduced form relationship between growth and redistribution. The rate of economic growth provides an efficient summary measure of the various

channels through which redistribution affects a state's economy. The growth equation is specified as

$$\begin{aligned}\text{Growth}_{t+1} = {} & a_0 + a_1(\text{PROGR}_{t0}) + a_2(\text{NPROGR}_{t0}) + a_3(\text{EXPDISTR}) + \\ & a_4(\text{NEXPDISTR}) + a_5(\text{PCTYOUNG}) + a_6(\text{PCTOLD}) + \\ & a_7(\text{PCTURB}) + \text{error}. \end{aligned} \quad (4)$$

Growth is measured by the rate of change in state personal income, both per capita and aggregate, averaged over five- and ten-year periods (GRWPC5, GRWPC10, GRWAG5, and GRWAG10). Averaging smooths out cyclical fluctuations, and allows for lags in adjustment (Bleaney, Gemmell, and Kneller 2001). The rationale for using changes in aggregate, in addition to per capita income, is that in subnational economies aggregate growth is strongly influenced by interstate and interregional migration of population and labor. As stressed by Pack (2002) and others, growth in per capita income depends on adding high-skilled jobs, whereas growth in total income may be achieved by adding low-skilled employment. If redistributive policies have differential effects on the growth in high- and low-skilled employment, then the effects on per capita growth and aggregate growth will differ.[4]

In equation (4), **PROGR** and **EXPDISTR** are vectors of state tax and expenditure progressivity, whereas **NPROGR** and **NEXPDISTR** are the same measures for a state's geographic neighbors. A broad set of incidence measures allows more precise estimates of the marginal effect of changes in particular tax or spending policies. From the above discussion, own fiscal progressivity is expected to reduce growth, whereas neighbor progressivity is expected to enhance growth.

Measurement of Redistribution

Tax Progressivity. The principal measure of progressivity is the ratio of net state/local tax burdens in the top quintile to net burdens in the bottom quintile (PROGR). The mean value of PROGR is 0.7, indicating that the tax burden on the top quintile of each state's income distribution is on average 30 percent lower than the burden on the lowest quintile. The most progressive states had progressivity ratios almost three times as high as the least progressive. Other measures of progressivity include tax burdens on the lowest and highest quintiles of the state's income distribution separately (BURD1, BURD5). Due to the salience and high visibility of the income tax, I also include income tax burdens alone (INCTAX1, INCTAX5).[5] The

top marginal rate is likely to serve a signal of tax burdens, and INCTAX5 captures the rate structure quite precisely.

Expenditure Incidence. To characterize redistribution empirically, it is useful to divide state and local expenditures into three categories.[6] The first, comprising 16 percent of 2001 spending, consists of explicitly redistributive means-tested programs, including cash assistance, publicly provided health insurance, and other services for low-income households. The second category is education, with a mix of allocative and redistributive impacts, and making up a little more than a third of total outlays. The third, comprising about a third of total outlays, is for public goods, including police, fire, emergency services, environmental protection, transportation services, parks and recreation, general administration, and interest on debt (U.S. Bureau of the Census, 2001–2002). These expenditures are viewed as nonredistributive.

Welfare. The main measure of means-tested redistribution is per capita state and local spending on welfare (WELF SPEND). Welfare includes public assistance, medical services (mainly Medicaid), and other means-tested programs.[7] Because benefit levels for cash assistance have been used to measure the incentive for welfare participation and the incentive for interstate migration of potential recipients, I also used the maximum monthly benefit for Aid to Families with Dependent Children (MAXWELF). In 1995, spending levels varied by a factor of four between low and high states, and benefit levels varied by a factor of five. Although cash assistance fell substantially over the sample period, the variation across states in any given year remained similar.[8] Welfare is also measured relative to personal income (WELFINC), total spending (WELFSHR), and net of the 56 percent of welfare spending that came from federal aid. Welfare spending is expected to have a negative effect on growth.

Elementary and secondary education. An ideal measure of the within-state redistributive impact of public spending for elementary and secondary education spending would be an elasticity of spending with respect to family income. At one extreme, local financing of education, combined with perfect residential sorting by income level, would yield a distribution of education spending that is proportional to the distribution of family income. At the other extreme, complete state financing and equal per pupil aid would yield a uniform spending distribution. The actual distribution of educational spending in the United States is marked by imperfect sorting at the local level and a significant role for state finance.[9]

Assuming that the degree of sorting is exogenous, the main policy variables affecting the distribution of education spending are the amount of state aid, and the extent to which its distribution is fiscally equalizing. The expansion of state aid has been the major vehicle for reducing spending inequalities, particularly in those states subject to court-ordered school finance reform (Evans, Murray, and Schwab 1997).

Because there is no consistent panel data measuring the equalization impact of state aid, as a proxy, I use the state share of education spending (STEDSHR).[10] Almost all states distribute school aid inversely to local fiscal capacity, and regression of the degree of spending inequality across school districts on state share shows that a higher state share is associated with less inequality in per pupil spending, implying a more redistributive impact per dollar of spending.[11] Although the mean state share is 54 percent, there are persistent differences across regions, with the highest shares in the southeast and the lowest in the northeast. To control for historical differences, as well as the impact of court decisions on education finance, I also measure education redistribution by the change in state share from a base in 1972 (STEDSHR CHG_72). The base year is prior to the first important court case challenging education finance court case.

A higher state share is likely to reduce the scope for local fiscal choice and lessen the fiscal advantage of wealthier jurisdictions, with negative impacts on a state's ability to attract and retain high-income families. Because a higher state share is also associated with lower total spending on education ($\Delta = -.20$), it also implies less human capital investment. Although there may be an offsetting positive productivity effect from allocating a greater share of educational resources to lower income children (Levin et al. 2007), overall our expectation is that a higher state share will have a negative effect on growth.[12]

Higher education. The redistributive impact of higher education spending depends on the distribution of (family) income among students attending public colleges, and the public subsidy per student. Because there are no consistent measures of the state-by-state income class incidence of public higher education expenditures, I use total state and local spending on higher education as a rough proxy for redistributional impact (HIGHER ED). Although Hansen and Weisbrod (1969) offer the startling finding that public higher education spending in California is regressive, with subsidy levels rising with income, most studies find that as a share of income, spending on higher education spending is pro-poor.[13] We assume that higher spending is associated with greater access and higher subsidies for lower income students. Because tuition charges are likely to be regressive in their incidence,

Table 1. Definitions, Data Description, and Data Sources

Variable name	Variable definition	Mean (Standard Deviation)	Range: Min, Max
State personal income per capita growth			
GRWPC5	5-year average	0.023 (0.011)	−0.004, 0.052
GRWPC10	10-year average	0.020 (0.008)	−0.001, 0.051
State aggregate income growth			
GRWAG5	5-year average	0.036 (0.018)	−0.010, 0.088
GRWAG10	10-year average	0.037 (0.017)	0.003, 0.095
RELATIVE INC	Ratio of state/national income per capita	0.947 (0.130)	67, 1.345
Ratio of state–local tax burdens			
PROGR	Highest quintile to lowest quintile	0.699 (0.182)	0.342, 1.30
Average state–local tax burdens			
BURD5	For quintile 5 (highest)	8.729 (2.019)	3.45,15.15
BURD1	For quintile 1 (lowest)	12.869 (2.866)	6.323, 20.47
Population-weighted average progressivity ratio in geographic neighboring states			
NEIGH PROGR	Highest quintile to lowest quintile	0.699 (.131)	0.410, 1.254
	Population-weighted average tax burdens in neighboring states:		
NBURD5	For quintile 5 (highest)	9.05 (1.779)	5.265, 14.39
NBURD1	For quintile 1 (lowest)	13.276 (2.3)	6.9, 20.2
Average Income Tax Burden			
INCTAX1	Quintile 1	0.59 (0.84)	−1.9, 3.6
INCTAX5	Quintile 5	2.1 (1.3)	0, 5.0
NINCTAX1	Neighbor quintile 1	0.7 (0.74)	−1.9, 2.7
NINCTAX5	Neighbor quintile 5	2.2 (1.02)	0, 4.7
TOTBURD	Total state and local taxes as share of personal income	10.4 (1.5)	6.5, 18.6
STTAXBURD	State taxes as share of personal income	6.5 (1.2)	2.7, 11.4

(continued)

Table 1 (continued)

Variable name	Variable definition	Mean (Standard Deviation)	Range: Min, Max
STEDSHR	State's share in primary and secondary education spending	0.548 (0.143)	0.133, 0.94
EDINEQUAL	Coefficient of variation of per pupil educational spending, all unified school districts	14.686 (5.121)	4.6, 41.1
HIGHER ED	State and local government spending on higher education per capita	142.40 (41.07)	57.9, 253.3
TUITIONSHR	Ratio of state revenues from tuition to expenditures for higher education	0.394 (0.101)	0.165, 0.936
MAXWELF	Maximum benefit level for AFDC, family of three	188.10 (72.64)	49.1, 66.51
PCTYOUNG	Percentage of population five to seventeen years of age	20.07 (2.29)	15.91, 26.83
WELF SPEND	Per capita spending on public welfare	191 (89)	51, 570
PCTURB	Percentage of population in urban areas	67.72 (14.48)	32.2, 93.5
PCTPOV	Percentage below poverty line	12.99 (4.22)	4.6, 25.8
PCTOLD	Percentage of the population 65 and above	11.97 (1.91)	7.7, 18.6
SALINDEX	Per capita retail sales, relative to national average	1.0 (.134)	0.67 1.5

(continued)

Table 1 (continued)

Variable name	Variable definition	Mean (Standard Deviation)	Range: Min, Max
REPUBLICAN	Equals 1 if Republican control, 0 otherwise	0.11	
DEMOCRAT	Equals 1 if Democratic control, 0 otherwise	0.32	
PCTITEM	Percentage of filing units itemizing on federal income tax returns	30.4 (7.5)	13.4, 50.3

Note: AFDC = Aid to Families with Dependent Children.

Sources: TAX PROGR, BURD1, and BURD5: For 1976, Phares (1980), tables A-91 and B-1. For 1985, 1991, and 1995, data provided by Citizens for Tax Justice (1991 and 1996). See text for description of data. NEIGHBOR PROGRESSIVITY, NEIGHBOR QUINTILE TAX BURDENS: Same data source as PROGRESSIVITY. See text for construction of variable. POPULATION GROWTH: U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, State Annual Estimates, http://www.bea.doc.gov/bea/regional/spi/, various years. EDINEQUAL: Hussar and Sonnenberg, "Trends in Disparities in School District Level Expenditures per Pupil," table 3. National Center for Education Statistics, NCES Electronic Catalog, January 2000. Because this variable was not available for 1977, we calculated the coefficient of variation directly from The Bureau of the Census, 1977 Census of Governments, vol. 4, no. 1, Finances of School Districts (F33). STATE SHARE IN PUBLIC EDUCATION: For 1977, The Bureau of the Census, 1977 Census of Governments, Vol. 4, No. 5, Compendium of Government Finances, table 47, and State Government Finances in 1977, table 9. For 1985, The Bureau of the Census, Governmental Finances 1984–1985, State Finances, table 11, and State and Local Finances, table 29. For 1991, Governmental Finances 1990–1991, table 29, and http://ftp2.census.gov/govs/state/91state. dat. For 1995, http://ftp2.census.gov/govs/estimate/95stlss1.xls, http://ftp2.census.gov/govs/estimate/95stlss2.xls, and http://ftp2.census.gov/govs/state/95states.xls. HIGHER EDUCATION SPENDING, TUITION REVENUE TO HIGHER EDUCATION SPENDING, WELF SPEND: For 1977, The Bureau of the Census, 1977 Census of Governments, vol. 4, no. 5, Compendium of Government Finances, tables 36 and 47. For 1985, The Bureau of the Census, Governmental Finances 1984-85, State Finances, table 7, and State and Local Finances, tables 22 and 29. For 1991, Governmental Finances 1990–1991, tables 22 and 29. For 1995, http://ftp2.census.gov/govs/estimate/95stlss1.xls, and http://ftp2.census.gov/govs/estimate/95stlss2.xls. MAX. WELFARE BENEFIT: United States House of Representatives, Committee on Ways and Means, Background Material and Data on Programs Within the Jurisdiction of the Committee on Ways and Means, 1989 Edition. Washington, D.C.: U.S. Government Printing Office, table 12, p. 546. 1991 Edition, Section 7, table 10, p. 605. 1996 Edition, table 8–12, p. 437. PCT URBAN, PCT YOUNG, PCTPOV, PCT OLD: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, various years. REPUBLICAN, DEMOCRAT: Statistical Abstract of the United States, various years. SALINDEX: Sales and Marketing Management Magazine, various years. PCTITEM: U.S. Department of the Treasury, Statistics on Income, various years.

I also use education spending net, which nets out revenues from tuition.[14] Given the strong and increasing returns to investment in human capital, positive human capital effects of higher education spending are expected to dominate negative redistributive effects, leading to a positive effect of HIGHER ED on growth.

Neighbor fiscal competition. The negative effect of fiscal redistribution on costs and output depends on the extent to which a state stands out from its competitors. The redistributive policies of adjoining states are likely to have a particularly strong influence on a state's own economy (Besley and Case 1995). Hence, the model includes the averages of the tax and spending variables in a state's geographic neighbors, weighted by population. Signs for each neighbor variable are expected to be the opposite of the own-state sign, with neighbor tax progressivity, welfare spending, and state education share expected to have positive effects on own-state growth, and ambiguous effects for neighbor higher education spending.

Identification issues. If fiscal redistribution depends on state economic performance, then estimates of the effect of the fiscal variables on growth may be biased. For example, if rapid growth reduces the number of eligibles for means-tested programs, the welfare coefficient will be biased downward. Alternatively, if altruism is elastic with respect to changes in income, economic growth could lead to an increase in redistribution, causing a positive bias.

Economic growth may also influence both the level and the distribution of taxes. Changes in tax rates are frequently propelled by business cycle conditions, with extended recessions leading to tax rate increases, and recoveries leading to decreases in tax burdens. Although using average growth rates over five and ten years as the dependent variable will help to smooth out business cycle-related tax incidence effects, changes in the rate of growth may still affect both overall tax burdens and burdens at different income levels.

Fiscal estimates will also be biased if unobserved factors affect both redistribution and economic growth. For example, if some states attract high-income or high-skilled residents, for reasons that are unmeasured in the estimating equation, and these residents prefer a progressive fisc, then one would observe a spurious correlation between progressivity and growth.

The endogeneity problem is mitigated by making forward growth a function of initial redistribution. However, if growth rates are autocorrelated, then contemporaneous redistribution could still be a function of prior growth rates, which would in turn be correlated (positively or negatively) with future growth rates. To test this possibility, I first regressed five-year average growth on lagged five-year average growth. I do not find

a significant correlation between growth rates in different sample periods. To test for whether the growth residuals are autocorrelated, I then ran growth models with just year and region dummies as covariates and regressed the residuals on the lagged residuals (Bertrand, Duflo, and Mullainathan 2004). For GRWPC5, the estimated first-order autocorrelation coefficient is negative and significant, whereas for GRWAG10 the residuals are positively correlated.

A simple rank index of progressivity indicates that within-state redistribution is highly correlated over time.[15] This stability, as compared to growth rates, implies that the test for reverse causality will have significant effects if growth residuals are positively autocorrelated, but insignificant effects if the autocorrelation is negative. Table 2 shows the regression of the fiscal variables on lagged five- and ten-year growth rates. Results are broadly consistent with the autocorrelation expectations. Lagged aggregate income growth has a significant negative effect on WELF SPEND and BURD5 (rows 3 and 4), whereas the per capita growth effects are all insignificant at conventional levels. However, the coefficient on GRWPC10 in the welfare spending equation (row 2) is larger than its standard error, as are the coefficients on GRWAG5 and GRWAG10 on BURD1.

To address the potential for reverse causality, valid instruments should be contemporaneously correlated with the fiscal variables but uncorrelated with economic growth. One approach is to used lagged values of the fiscal variables as pseudo instruments (Bleaney, Gemmell, and Kneller 2001). However, lack of variation in redistribution over time limits the effectiveness of this approach.

Alesina, Baqir, and Easterly (1997) and Luttmer (2001) emphasize the role of ethnic and racial homogeneity in promoting spending on public goods and welfare. Alesina and La Ferrara (2005) find that preferences for income redistribution decline with age, education, and income but are consistently stronger for African Americans. On the tax side, Chernick (2005) finds that political party control by Republicans is associated with more regressive state tax structures, whereas federal deductibility encourages progressivity. He also finds that more unequal income distributions are offset by more progressive tax structures. However, stronger "tastes" for welfare do not necessarily lead to more progressive taxation. Meyers, Gornick, and Peck (2001) find that states can be clustered into several groups based on generosity of policies toward poor children, and that these groupings are quite stable over time.

Based on the role of homogeneity in redistribution, I use percentage African American (PCTBLK) as the identifying instrument for welfare

Table 2. Redistribution and Lagged Growth, Growth Coefficients[a] (Standard Error in Parentheses)

	Distributional variable					
Dependent variable Independent variable	PROGR	BURD1	BURD5	WELF SPEND	STEDSHR	HIGHER ED
GRWPC5	−0.013 (0.78)	−0.08 (0.15)	−0.13 (0.15)	−0.44 (6.5)	−0.005 (0.013)	0.43 (4.1)
GRWPC10	−0.014 (0.02)	0.03 (0.21)	0.03 (0.21)	−12.6 (9.1)	0.001 (0.018)	−5.0 (5.7)
GRWAG5	−0.01 (0.009)	−0.20 (0.14)	−0.19 (0.08)**	−7.97 (3.35)**	−0.001 (0.007)	0.48 (2.1)
GRWAG10	−0.015 (0.012)	−0.22 (0.19)	−0.25 (0.11)**	−17.1 (4.4)**	−0.014 (0.009)	−2.0 (2.9)

[a] All regressions include year and region indicator variables.
** Significant at the 5 percent level of confidence.

Table 3. Effect of Tax and Expenditure Progressivity (Standard Error in Parenthesis)

Dependent variable	(1) GRWPC5	(2) GRWPC10	(3) GRWAG5	(4) GRWAG10
TAX PROGR	−0.043 (0.45)	.075 (0.361	0.738 (0.822)	0.674 (0.757)
NEIGH TAX PROGR	1.82 (0.52)***	1.112 (0.63)*	2.92 (1.19)**	2.14 (1.19)*
WELF SPEND	−0.0003 (0.0009)	−0.002 (.0009)*	−0.007 (0.002)***	−0.007 (0.002)**
STEDSHR	−0.679 (0.317)**	−0.411 (0.409)	−0.863 (0.857)	0.701 (0.927)
HIGHER ED	−0.0008 (0.001)	−0.0003 (0.001)	−0.002 (0.004)	−0.0006 (0.004)
Observations	192	144	192	144
Adj R^2	.52	.43	.44	.46

Robust standard errors, clustered by state, are in parentheses. The sample is a pooled cross-section of 48 continental U.S. states for the years 1977, 1985, 1991, and 1995. The year 1991 is not included in columns (2) and (4). All specifications include PCTOLD, PCTYOUNG, PCTURB, year indicators, and seven regional indicators.

* 10% confidence level. ** 5% confidence level. *** 1% confidence level.

spending. Although PCTBLK could have a direct effect on economic growth, I find no evidence for this proposition. Overidentifying instruments for welfare spending are party control variables (DEMOCRAT and REPUBLICAN), the federal matching rate for Medicaid (FMAP), and percentage in poverty (PCTPOV).[16] The first-stage regression is shown in note e of table 4. A Hausman test for exogeneity was performed by estimating an auxiliary regression that included in sequence each of the overidentifying instruments. In each case, the regression failed to reject the null of exogeneity.

The identifying instrument for BURD5 is the percentage of filing units in a state that itemize their federal tax deductions (PCTITEM). By lowering the marginal tax price for itemizers, itemization provides an incentive for states to increase the progressivity of their tax systems (Chernick 2005). Given other factors that affect itemization, including the choice as to whether to have a state income tax, PCTITEM should be substantially uncorrelated with economic growth. BURD1 is identified by the ratio of retail sales to per capita income, relative to the national average (SALINDEX). SALINDEX is a measure of the ability to export consumption taxes. Gade and Adkins (1990) show that the structure of state tax systems is responsive to tax exporting. The first-stage regressions for BURD1 is given in note a of table 4, whereas the BURD5 regression is in note 2. Hausman tests for overidentification fail to reject the null of exogeneity for the overidentifying instruments in both first-stage equations.

If growth rates within a region are subject to common shocks, then neighbor tax effects may also be biased. With such shocks, the transmission of prior period growth to current tax burdens may also carry over to neighboring state tax burdens (Besley and Case 1995). Given the negative effect of aggregate growth, the resultant bias would be expected to be negative. To take account of this potential bias, I instrument for average neighbor tax burdens NBURD5 and NBURD1, using the neighbor values of the identifying instruments used for BURD1 and BURD5.

Control variables include percentage of the population aged five to seventeen (PCTYOUNG), greater than sixty-four (PCTOLD), and living in urban areas (PCTURB) The population variables may affect the supply of labor and the cost of government services. PCTURB serves as a weak proxy for agglomeration economies.[17] To control persistent differences in regional rates of growth (Pack 1998) and national differences over time, most specifications include dummy variables for (eight) regions and year. To allow for regional shocks to demand, some specifications also include time variant regional dummies.

Table 4. Quintile-Specific Tax Burdens and Economic Growth, Ordinary Least Squared and Instrumental Variable Estimates

Dependent variable	(1) GRWPC5	(2) GRWPC10	(3) GRWPC10 (Instr Var)	(4) GRWAG5	(5) GRWAG5 (Instr Var)	(6) GRWAG10	(7) GRWAG10 (Instr Var)
BURD1	.034 (.026)	−.0003 (−.010)	−.001[a] (.026)	−.011 (.053)	.080[a] (.110)	−.042 (.051)	−.215[a] (.194)
BURD5	.071 (.053)	−.002 (.079)	−.033[b] (.036)	.197 (.134)	−.060[b] (.200)	−.085 (0.100)	−.018[b] (.24)
NBURD1	−.059 (.040)	−.020 (.050)	−.028[c] (.040)	−.120 (.074)	−.170[c] (.120)	−.085 (.0740)	−.274[c] (.160)*
NBURD5	.177 (.045)	.119 (.058)**	.127[d] (.040)***	.300 (.140)**	.260[d] (.160)	.223 (.150)	.379[d] (.169)**
WELF SPEND	−.002 (.001)	−.002 (.002)	.005[e] (.003)	−.009 (.003)***	−.022[e] (.005)***	−.008 (.002)***	−.009[e] (.006)
STEDSHR	−.657 (.329)**	−.301 (.483)	−.554 (.430)	−.889 (.968)	−.026 (1.070)	−.649 (.970)	.042 (1.070)
HIGHER ED	−.001 (.001)	−.0003 (.001)	−.0002 (.001)	−.002 (.004)	−.002 (.004)	−.001 (.002)	−.003 (.004)
Adj R^2	.53	.43	.39	.47	.43	.47	.43
Observations	192	144	144	192	192	144	144

Robust standard errors, clustered by state, are in parentheses. Also included are PCTOLD, PCTYOUNG, PCTURB, year indicators, and region indicators.

[a] First-stage equation: BURD1 = 14.1 − 5.8 (SALINDEX) − .093 (PCTITEM) (1.7) (1.3)*** (.03)*** + .87 (REPUBLICAN) + .19 (DEMOCRAT) + .08 (PCTURB) (.54) (.39) (.01).*** Adj R^2 = .49. Regression also includes year and region indicator variables.

[b] First-stage equation: BURD5 = 5.7 + .105 (PCTITEM) -.699 (REPUBLICAN) (.687) (.017)*** (.288)*** + .22 (DEMOCRAT) − .026 (PCTURB) (.207) (.008).*** Adj R^2 = .35. Regression also includes year and region indicator variables.

[c] Population-weighted average of predicted value of BURD1 for geographic neighbors. See table note a for specification.

[d] Population-weighted average of predicted value of BURD5 for geographic neighbors. See table note b for specification.

[e] First-stage equation: WELF SPEND = 248 − 34.7 (REPUB_1) + (38.9) (15.7)** 11.1 (DEM_1) − .452 (MATCH) − 1.33 (PCTBLK) + 3.74 (PCTPOV) − .514 (PCTOLD); (8.69) (.828) (.743)* (1.36)** (2.8). Adj R^2 = .68. Regression also includes year and region indicator variables.

* 10% confidence level. ** 5% confidence level. *** 1% confidence level.

Data

Tax incidence data from 1976 (Phares 1980) are merged with data for 1985, 1991, and 1995 from CTJ (1991; 1996). Phares (1980) allocates taxes by CTJ and the institute on Taxation and Economic Policy income class using aggregate data, whereas CTJ uses a microsimulation model coded to each state to estimate tax burdens for representative households at various quantiles of a state's income distribution.

Incidence assumptions are standard (Chernick 2005).[18] Prior to merging, I reduced the Phares (1980) estimates by the percentage of taxes included in Phares but not CTJ, plus the proportion of the total tax burden that represents taxes imported from other states. The simulation-based estimates are quite close to aggregate measures of state and local tax burdens. The burden on the third quintile of the family income distribution in the simulated data is 9.7 percent, whereas the aggregate tax burden is 10.4 percent.[19]

Expenditure data come mainly from the Census of Governments. The model is estimated with both five- and ten-year panels, using a pooled cross section of data for the forty-eight continental U.S. states. The five-year panel is for the four years beginning in 1977, 1985, 1991, and 1995, whereas the ten-year panel measures growth over the three periods beginning in 1977, 1985, and 1991. All dollar values are deflated to the base year 1976, using the personal consumption deflator of the National Income and Product accounts. Data description and sources are presented in table 1.[20]

Results

Tax Progressivity

Own-state effects. The basic specifications are shown in tables 3 and 4. In table 3, tax progressivity is measured by the ratio of the top quintile burden to the bottom quintile burden. In table 4, tax progressivity is measured by the separate quintile tax burdens in the first and fifth quintiles of the state's income distribution, and estimation is by both ordinary least squares and instrumental variables. Based on table 2, WELFSPEND, BURD1, and BURD5 are instrumented in the five- and ten-year aggregate growth equations, and the 10-year per capita equation. Neighbor tax burdens (NBURD1 and NBURD5) are also instrumented.

The first row of table 3 indicates that the progressivity of a state's tax structure does not have a statistically significant effect on the rate of growth

in personal income. The first 2 rows of table 4 show that neither high- nor low-income tax burdens separately affect economic growth. A variety of robustness tests are presented below.

The statistical significance of the neighbor effects is robust to the use of instrumental variables (columns 3, 5, and 7). The magnitude of the Instrumental Variable estimate is close to the Ordinary Least Squares results for per capita income growth. However, the IV estimate of the neighbor coefficients in the ten-year aggregate model (column 7) is almost twice as large as the OLS estimate. This is consistent with the expected downward bias in the aggregate growth equation.

The main structural feature of more progressive state–local tax systems is greater reliance on income taxation. Because the income tax is the tax most likely to depart from the benefits received principle, any negative influence of tax incidence on growth should be most strongly revealed by focusing on the income tax. Therefore, in columns 1 and 2 of the top panel of table 5, tax incidence is measured in terms of the first and fifth quintile burdens of the income tax alone. The results are consistent with the previous results. Income tax burdens do not a have a significant effect on growth, whereas the neighbor burden on the top quintile has a significant positive effect on own-state growth.

The various tax burden coefficients (BURD1, BURD5, INCTAX1, and INCTAX5) show the effect on economic growth, controlling for burdens elsewhere in the income distribution. Because the model controls for redistributional spending, an increase in the quintile-specific tax burden implies an increase in government revenues, which are allocated to mainly non-redistributional functions (Helms 1985). The lack of a tax effect on growth could reflect the offsetting effects of additional spending on public goods. Therefore, to control for total spending, columns 3 and 4 of table 5 include total taxes as a share of personal income. Only the progressivity and average tax burden variables are shown in the table. In this specification, the tax progressivity variable measures the effect of a shift in the distribution of taxes, controlling for the overall level of taxation. None of the basic results are affected by including the aggregate tax burden.

Table 6 presents a number of additional robustness tests for the tax results. To investigate whether fiscal redistribution on the tax side operates with even longer lags than accounted for in our basic specifications, contemporaneous fiscal variables are replaced by their five-year lagged values. The results, presented in columns 1 to 4 of table 6, show no significant difference in effect. I also estimated a model that included both the initial and

Table 5. Additional Tax Specifications

Dependent variable	(1) GRWPC5 (Income Tax Burden only)	(2) GRWAG5 (Income Tax Burden only)	(3) GRWPC5	(4) GRWPC10
Independent variable				
TAX PROGR			.200 (.418)	.331 (.354)
TOTBURD			.751 (4.13)	−.326 (3.04)
INCTAX1	.080 (.070)	.080 (.130)		
INCTAX5	−.020 (.030)	−.07 (.10)		
NINCTAX1	.040 (.100)	.110 (.190)		
NINCTAX5	.180 (.060)***	.250 (.130)**		
Number of observations	192	144	192	192
Neighbor Effects and Relative Population Size				
	(1) GRWPC5	(2) GRWPC10	(3) GRWPC5	(4) GRWAG10
BURD5	−.025 (.05)	−.072 (.052)	−.021 (.138)	−.090 (.100)
BURD5 · OWNRELPOP	.077 (.064)	.018 (.043)	.118 (.073)	.032 (.089)
NBURD5	0.225 (.062)***	.131 (.054)**	.195 (.198)	.109 (.174)
NBURD5 · NEIGHRELPOP	−.001 (.004)	.004 (.004)	.004 (.01)	.009 (.008)
Number of periods (observations)	4 (192)	3 (144)	4 (192)	4 (192)

OWNRELPOP = own-state population divided by neighbor population; NEIGHRELPOP = neighbor population divided by own-state population. Also included are PCTOLD, PCTYOUNG, year, and regional indicators. Standard error in parenthesis.
* 10% confidence level. ** 5% confidence level. *** 1% confidence level.

the lagged values of the fiscal variables. The results, not presented here but available from the author on request, are unchanged.

Up to this point, tax burdens have been measured for state-specific income quintiles. Tax rates at a given income level have been used more commonly in the tax and growth literature (McGuire and Wasylenko 1985). Average income in the state-specific top quintile is substantially higher in rich states than in poor states.[21] Hence, I am not measuring the difference in potential tax burdens faced by an individual with a given income. To address this issue, I adjusted each state's tax burden to reflect the national income distribution.[22] The adjusted rate serves as a pseudo-instrument for the tax progressivity that would be faced by a family with given earnings capacity in different states. The results for five-year growth are shown in table 6, column 5. The absence of an own-tax effect is unchanged.

Theoretically, tax burdens should be measured net of the federal deductibility offset. However, if taxpayers perceive taxes in terms of gross burdens, then the latter burdens may be more relevant for economic performance. The results for five-year per capita growth are shown in table 6 (column 6). The lack of effect of tax progressivity is again unchanged. Although not shown here, a similar result holds for the other growth measures.

The last two columns of table 6 replace the regional indicator variables with a fixed effect specification for five-year per growth, both per capita and in aggregate. Own tax effects remain insignificant in the per capita equation (column 7), while NBURD5 is now statistically insignificant. In the aggregate growth equation, BURD5 and NBURD5 are now both positive and marginally significant.

Neighbor effects. Although own progressivity does not affect growth, row 2 of table 3 indicates that neighbor state progressivity (NEIGH TAX PROG) has a significant positive effect, particularly over the five-year period. When I decompose the neighbor progressivity ratio into separate tax burdens NBURD1 and NBURD5 (rows 3 and 4 of table 4), the per capita growth models (columns 1 and 2), NBURD5 is positive and significant, while NBURD1 is negative but insignificant. Based on the point estimate of 0.18 in column 1, a percentage point increase in NBURD5 raises the five-year annual rate of state growth in per capita income by 0.18, or slightly less than 10 percent of the 2.3 percent average. From the 0.379 coefficient in column 7, a percentage point increase in NBURD5 increases own-state aggregate income growth by about 10 percent, relative to mean growth of 3.6 percent per year.

Table 6. Robustness Tests on Fiscal Variables

Dependent variable	(1) GRWPC5 Lagged fiscal variables	(2) GRWAG5 Lagged fiscal variables	(3) GRWPC5 Lagged fiscal variables, Separate quintile burdens	(4) GRWAG5 Lagged fiscal variables, separate quintile burdens	(5) GRWPC5 (National average quintile breaks)	(6) GRWPC5 (Tax burdens gross of federal offset)	(7) GRWPC5 State fixed effects	(8) GRWAG5 State fixed effects
TAX PROGR	−.194 (.470)	.590 (.960)			.363 (.418)	.142 (.298)		
NEIGH TAX PROGR	1.970 (.550)***	1.930 (1.330)			1.750 (.622)**	1.350 (.462)***		
BURD1			.015 (.03)	−.056 (.064)			.034 (.044)	−.002 (.070)
BURD5			−.017 (.069)	.034 (.127)			.066 (.106)	.338 (.175)*
NBURD1			−.101 (.040)	−.084 (.08)			−.026 (.067)	−.03 (.098)
NBURD5			.197 (.040)***	.280 (.150)*			.466 (.227)	.586 (.332)*
WELF SPEND	.001 (.001)	−.006 (.002)**	.001 (.001)	−.006 (.003)*			−.004 (.002)*	−.007 (.003)**
STEDSHR	−.184 (.420)	−.110 (1.050)	−.063 (.413)	.074 (1.060)			−.87 (.835)	−.031 (1.280
HIGHER ED	−.002 (.001)	−.003 (.004)	−.002 (.001)	−.003 (.004)			−.007 (.005)	−.016 (.009)*
Adj R^2	.60	.46	.61	.47	.69	.66	.60	.50
Observations	144	144	144	144	192	192	192	192

Also included are PCTOLD, PCTYOUNG, PCTURB, year indicators (1977, 1985, 1991), and seven regional indicators (New England, Mideast, Great Lakes, Plains, Southeast, Southwest, and Rocky Mountains). Standard errors clustered at state level in parenthesis.
* 10% confidence level. ** 5% confidence level. *** 1% confidence level.

Although the magnitude of the neighbor effect is modest and loses significance under the fixed effect specification, it is nonetheless surprising to find an asymmetry between own progressivity, with no adverse effect on growth, and neighbor progressivity, with a positive effect. To explore this asymmetry, I relaxed the restriction so that the magnitude of the tax spillover effect is invariant to the relative size of own and neighbor states, by including interaction terms for the relative size of own and neighbor population.[23] If larger states have more impact on their neighbors than do smaller states, then both the neighbor and the own tax effect would be expected to vary according to the relative size of own and neighbor states.[24] The results, which are shown in the lower panel of table 5, do not support the relative size hypotheses. Neither the neighbor nor the own-state interaction terms are even marginally significant, implying that relative size is not a factor in the tax results. Although interstate commuting might be a factor in the asymmetric geographical effects of tax progressivity, exclusion of states or regions with substantial amounts of interstate commuting also did not affect the results.[25]

The positive neighbor effect is consistent with a compensating differential model, under which differences in effective tax burdens influence the locational choices of high-skilled workers. The lack of an own-tax effect in progressive states suggests that any displacement effect of tax-induced growth in regressive states is sufficiently modest as to be offset by the reverse regional spillover effects on growth in the relatively progressive state.

In summary, controlling for redistribution on the expenditure side, the regression analysis fails to support the proposition that a progressive tax system, or relatively high tax rates on high-income taxpayers, reduces state economic growth. By contrast, progressivity provides a positive spillover to neighboring states, causing a small increase in their rates of growth.

The theory of interstate tax competition predicts that in open economies with significant factor mobility, tax structures will tend to converge over time (Wilson 1999). However, in an empirical analysis of state tax progressivity, Chernick (2005) found persistent spatial differentiation in subnational tax incidence, with progressive states geographically adjacent to states with regressive tax structures. The asymmetric fiscal effects of own and neighbor tax progressivity help to explain why spatial tax differentiation can persist in the long-run equilibrium. If an increase in progressivity were to cause a decrease in own-state growth, whereas at the same time providing a bonus to adjacent states, then the more progressive state would have an incentive to lower its own progressivity, and tax structures would be expected

to converge over time. However, if variation in tax progressivity does not have significant effects on a state's own growth, as the empirical analysis suggests, then states are able to ignore the spillover effects on their neighbors, and vary their tax structures in accordance with variations in voter preferences and economic constraints.

Expenditure Effects

Welfare Spending. The most redistributive of the expenditure measures is welfare spending (WELF SPEND). In table 3, OLS estimates for WELF SPEND indicate negative effects on five- and ten-year aggregate income growth, significant at the 5 and 1 percent levels, respectively, and a negative effect on the ten-year per capita income growth, significant at the 10 percent level. IV estimates are shown in table 4. The effect on 10-year per capita income growth changes to positive but loses even marginal significance. The negative five-year aggregate income effect remains significant and is almost three times as large as the OLS estimate (table 4, column 5). The welfare coefficient in the 10-year aggregate growth model (column 7), though still larger than its standard error, is no longer statistically significant. These results are unaffected by using alternative measures of welfare generosity, including maximum benefits and welfare spending relative to state income. The welfare spending effect on five-year aggregate income growth is also robust to the inclusion of fixed effects (table 6, column 8).

In regressions not shown here, the welfare spending effect on population growth is almost identical to its effect on aggregate income growth. This is not surprising, given the high correlation between population and aggregate income growth (five-year correlation of .78). By contrast, there is little correlation between population growth and per capita income growth (five-year correlation of .09). This suggests that the aggregate growth impact of welfare result is largely a population effect.[26] This interpretation is consistent with evidence that in-migration rates among the elderly are greater in states with lower welfare spending but inconsistent with evidence that welfare serves as a magnet for immigrant migration.

The estimated IV coefficient implies an elasticity of the five-year aggregate growth rate with respect to welfare spending of negative 1.26. Over a ten-year period, the negative effect of welfare spending is less than half as big as over a five-year period but is less precisely estimated. Mean welfare spending as a share of personal income was 2.5 percent, with a two standard deviation variation equal to 1.8 percent of income. Netting out the 54 percent of welfare spending financed by federal aid, the net burden to states of welfare spending

is about 1 percent of personal income. The range is less than 1 percent of income. Although these differences are not particularly large, states with low welfare spending are also likely to have relatively low tax burdens throughout the income distribution. In Chernick (2005), I found that a two standard deviation variation in the "taste" for welfare is associated with a difference of about 1 percentage point in effective tax rates. Thus, differences in welfare spending may be associated with somewhat more substantial interstate differences in the cost of living for workers with low earnings capacity and for the elderly.

Our results suggest a more nuanced picture of the economic effects of welfare spending than has been typical in the literature. Relatively generous welfare spending does not adversely affect state productivity growth, as reflected in the growth in income per capita but does have a negative effect on aggregate income growth. The aggregate income effect, which attenuates over time, appears to be primarily a result of higher rates of population growth in states with low spending on welfare, perhaps reflecting patterns of migration among the elderly and those with relatively low skills.

Education. With the exception of the fixed effect specification in table 6, column 8, higher education spending does not show a significant effect on economic growth. Alternative measures, including spending as a share of general revenues, and spending net of tuition revenues, were also insignificant. Migration reduces the within-state return to higher education spending, and the lack of effect could reflect relatively high interstate migration rates for educated workers (Kodrzycki 2001; Bound et al. 2004). Strathman (1994) presents evidence that spending decisions are in fact responsive to this differential return, with states experiencing higher out-migration of college graduates tending to invest less in public higher education.

In contrast to own spending, there is some limited evidence that neighbor spending on higher education has a positive spillover effect. A similar result has been found by Bartik (1999). As shown in the column 5 of table 7, neighbor higher education has a significant effect in the ten-year aggregate growth specification. At the mean, the estimated elasticity is .57.[27]

The state share of education spending (STEDSHR) has a significant negative effect on growth in five-year per capita income, as shown in column 1 of tables 3 and 4. However, STEDSHR is not significant in the ten-year specifications, and the estimated coefficient is sensitive to alternative specifications. When we use lagged values of the fiscal variables, STEDSHR is no longer significant (table 6, columns 1 to 4). STEDSHR is similarly insignificant under the fixed effect specifications in columns 7 and 8 of table 6. Because STEDSHR is negatively correlated with total education spending ($\Delta = -0.2$), and positively correlated with both the level and share of state taxes

Table 7. Additional Expenditure Specifications

Dependent Variable\	(1) GRWPC5 (includes Total Education Spending)	(2) GRWPC10 (includes Total Education Spending)	(3) GRWPC5 (includes State Tax Share)	(4) GRWPC5 (includes State Tax Burden)	(5) GRWAG10 (includes neighbor expenditure variables)	(6) 5 year (expenditure variables in change form)
STEDSHR	−0.998 (0.431)**	−0.616 (0.342)*	−0.632 (0.569)	−0.491 (0.586)	0.364 (0.875)	
ED EXPEND	−0.0005 (0.001)	0.0004 (0.0009)	−0.003 (0.001)**			
STATE TAX SHARE			−0.666 (0.747)			
ST TAX BURD				−3.470 (5.430)		
STEDSHR CHG_72						−0.249 (0.566)
HIGHER ED EXPEND					−0.002 (0.003)	
HIGHER ED EXPEND CHG_70						−0.002 (0.002)
WELFARE					−0.007 (0.002)***	
WELFARE CHG_70						−0.0003 (0.001)
NEIGH HIGHER ED SPENDING					0.013 (0.005)**	
NEIGHBOR WELFARE SPENDING					0.0002 (0.002)	
NEIGHBOR STATE EDUCATION SHARE					0.738 (1.480)	
Adj R^2	.49	.41	.47	.45	.40	.48
Observations	192	144	192	192	144	192

Also included are PCTOLD, PCTYOUNG, RELINC, year, and regional indicators. Standard errors are in parenthesis.
* 10% confidence level. ** 5% confidence level. *** 1% confidence level.

Table 8. Summary of Effect of Redistribution on Growth

		Growth measure			
		Income per capita		Total income	
Variable	Measure	5 year	10 year	5 year	10 year
Tax Progressivity	Ratio of burdens, top to bottom quintile; top and bottom quintile burdens separately; income tax burden, top and bottom quintiles	None			
Neighbor Tax Progressivity	Population-weighted average of neighbor progressivity ratio, top and bottom quintile rates	Positive: (One percentage point increase in neighbors' top quintile rate leads to a 10 percentage increase in own growth rate)			
Welfare	Spending per capita; Maximum AFDC benefit; Spending as a share of personal income; Spending net of intergovernmental aid	None		Negative (Elasticty= −1.0)	Negative (Elasticity = −0.62)
Elementary and Secondary Education	State share of elementary and secondary education spending	Negative effect (not robust)	None	None	
Higher Education	Total spending; spending from general revenue; nontuition share of total spending	None			
Neighbor Higher Education	Weighted average of neighbor spending	None	None	None	Positive (Elasticity = 0.57)

Note: AFDC=Aid to Families with Dependent Children.

in total taxes (correlation between STEDSHR and state tax share = .5), the estimated effect could be biased by the omission of these variables. Columns 1 to 3 of table 7 include per capita spending on education (ED EXPEND). Column 3 also includes the state share of total taxes, whereas column 4 replaces STATE TAX SHARE with the state tax burden (ST TAX BURD). The negative effect of STEDSHR is robust to the inclusion of educational spending, suggesting that state share is not acting as a proxy for lower total spending on education. However, as shown in columns 3 and 4, the coefficient on STEDSHR is smaller in magnitude and imprecisely estimated when we include state taxes. Because a greater state role in the financing of education implies a greater reliance on state taxes, the results from columns 3 and 4 of table 7 indicate that we are not able to separate the state share of education spending from the tax effect.

There are persistent differences in the state share of education finance between regions of the country, with the highest average state share in the south and the lowest state share in the northeast. Despite the inclusion of region dummies, STEDSHR may be picking up unobserved regional characteristics correlated with state growth. To examine this possibility, we used the change in state share (STSHRCHG) between 1970 and the sample date. As shown in column 6 of table 7, the change in STEDSHR is now insignificant in its effect on five-year growth, as are changes in the other expenditure variables. We also interacted STEDSHR with a dummy variable for states with a court-ordered change in educational finance. The results were unaffected. A final robustness test was to include relative income at the beginning of the period, to take account of growth convergence. The equations are not shown here, but the fiscal effects are unaffected.

Conclusion

The compensating differential model of wage determination predicts that greater fiscal redistribution will be capitalized in higher wages for high-skilled workers, leading to an increase in the relative cost of production and a potential decline in employment and output. This negative effect may be offset by differences across states in preferences for redistribution, and by positive human capital effects from redistributional spending. Economic growth provides an efficient summary of these various effects. I estimate a reduced form model of the effect of subnational redistribution on the rate of growth in state income.

Redistribution is measured by tax progressivity, spending on welfare and higher education, and the state share of elementary and secondary education

spending. Table 8 provides a summary of results. In contrast to conventional wisdom, the degree of progressivity of state and local taxes does not affect economic growth. However, while own progressivity has no effect, I find a modest but statistically significant positive effect for neighbor progressivity, suggesting the existence of fiscal spillovers across states. The implication is that a state that serves as a regional tax haven for higher income taxpayers realizes a small but measurable growth dividend as a consequence of its neighbors' fiscal choices. The fact that own-state growth is not adversely affected by tax progressivity helps to explain the persistence of differentiated tax structures within regions. A leading example is the way in which New Hampshire, with a highly regressive tax structure, adjoins much more progressive Vermont and Massachusetts.

Most of the variables measuring expenditure redistribution are insignificant. In contrast to previous studies, higher welfare spending has no affect on the rate of growth in per capita income. However, aggregate income growth, particularly over five-year periods, is negatively related to higher welfare spending. Because aggregate income growth and population growth are strongly correlated, the welfare effect on aggregate income growth is almost identical to its effect on population growth. The result is consistent with studies of the effect of fiscal factors on the migration patterns of the elderly. The negative effect of welfare spending on aggregate, as opposed to per capita income growth, may indicate that low-skilled workers are more responsive than high-skilled workers to cost-of-living differentials associated with differences in welfare spending. The differential fiscal effects of higher welfare spending are consistent with regional growth studies stressing the distinction between job growth and income growth (Florida 2005).

Federal cost sharing for redistribution, through tax deductibility and intergovernmental aid, serves to diminish interstate fiscal differentials and may therefore help to attenuate negative growth effects of redistributive fiscal policies. Hence, it is noteworthy that welfare spending shows a negative effect on aggregate economic growth, despite the fact that the federal government provides over half of all welfare funding.

The state share of school spending is a proxy for fiscal equalization and is associated with the uniformity of per-pupil spending. In some specifications, the state share of school spending has a negative effect on growth. However, the result is not sufficiently robust to derive policy conclusions. Higher education spending has no effect on any of the growth measures, although there is some evidence of positive spillover effects in aggregate growth to geographic neighbors.

In summary, fiscal redistribution does not exhibit statistically robust effects on economic growth. Although the effects on labor supply (and land rents) may work in the direction predicted by the compensating differential model, any such adjustments are insufficient to affect per capita income. The only robust negative effect is that of welfare spending on aggregate income growth. If anything, this result suggests that low-skilled workers are more responsive to fiscal differentials than higher skilled workers.

The most striking policy implication of this study is that tax cuts for high-income taxpayers cannot be justified in terms of growth in state income. Although such cuts may benefit current taxpayers, there is no evidence of a spillover or trickle-down effect to the overall state economy. The results are also consistent with the notion that variation across states in fiscal redistribution is Pareto improving, allowing for differences in preferences for redistribution, while not imposing significant deadweight losses.

In future research, it would be highly desirable to be able to use more precise measures of redistributional impact on the spending side, particularly with regard to education spending. Such measures, useful in their own right for policy purposes, would also serve to increase our confidence in the results from the current research, and improve our knowledge about ways to structure redistribution so as to minimize possible negative trade-offs.

Notes

1. The greater migration responsiveness for those with higher education levels could reflect either a higher likelihood of migration for any given tax differential, or bigger tax differences among those with more education. Pema (2005) was not able to distinguish between these two potential causes.
2. There are no empirical estimates of the elasticity of output with respect to wages at different skill levels. Garofalo and Fogarty (1987), in their investigation of the elasticity of state output with respect to cost, are forced to use a range of simulated values. Carroll and Wasylenko (1994) use the average wage for production workers as a measure of state cost, and they find no effect on employment in a state.
3. A number of studies have argued that there is limited and possibly decreasing substitutability between high- and low-skilled labor, whereas capital and high-skilled labor are increasingly complementary. Kremer and Maskin (1996) find greater segregation of high- and low-skill workers by firm at the state level, which they argue is consistent with imperfect substitutability by skill. Bartel and Lichtenberg (1987) and Goldin and Katz (1998) argue that physical capital and high-skilled labor are complements, whereas capital and

low-skilled labor are substitutes. Autor, Levy, and Murnane (2003) show that information technology, an increasing share of total capital, is complementary with labor that performs what they refer to as "nonroutine tasks" but is a substitute for labor performing routine tasks. Reshef and Phillipon (2008) present evidence that the elasticity of substitution between skilled and unskilled labor is substantially lower in the service sector, which is growing in importance, than in the goods sector.

4. If firms are increasingly clustering by skill level, as proposed by Kremer and Maskin (1996), then redistribution-compensated changes in skilled and unskilled wages could promote different industrial configurations in progressive versus regressive states, with potentially different patterns of aggregate and per capita growth.
5. The middle income tax burden is excluded because it is strongly correlated with the high quintile tax burden.
6. Prior state growth studies divide government activity into an "unproductive" sector—welfare or welfare plus health—and all other spending (Helms 1985; Bania, Gray, and Stone 2007).
7. Bahl, Martinez-Vazquez, and Wallace (2002) include both welfare and education spending in their measure of state redistribution.
8. The simple correlation coefficient between benefit levels and per capita spending in our sample is equal to 0.19, implying that the two measures provide independent information about welfare policy.
9. Redistribution is also affected by the extent of income mixing within local school districts, the latter depending in large part on the number of school district per capita in metropolitan areas (Figlio, Husted, and Kenny 2004).
10. Although most states allocate state aid in the form of lump sum grants distributed inversely to local fiscal wealth, some use fiscal base equalizing formulae (Fisher 2007).
11. A regression of the degree of inequality in per-pupil spending on the state share shows that a two standard deviation increase in the state share is associated with a reduction in spending inequality of about 14 percent.

$$\begin{aligned} \text{EDINEQUAL} = & 11.2 - 7.3(\text{STEDSHR}) + .05(\text{PCTBIGCITY}) \quad + \\ & .18(\text{PCTYOUNG})(2.33)(1.66)(1.00) \quad - \\ & 1.98(\text{REPUBLICAN}).99(\text{DEMOCRAT}) \quad - \\ & .13(\text{INCINEQUAL}) + (1.67)(1.13)(.53) \end{aligned}$$

$N = 189$, Adj $R^2 = .18$. The regression also includes seven regional dummy variables.

12. Fernandez and Rogerson (1997) argue that more centralized education finance can improve average incomes. Centralized finance, which in their model implies uniform spending, raises spending on the poorest students, and the increased investment in human capital raises average incomes in subsequent periods. Empirically, the link between education spending and outcomes is uncertain.
13. See Pechman (1970) or Johnson (2006, table 2). Johnson also finds that a similar subsidy pattern when family income is measured on a lifetime basis.
14. The tuition share in total spending went from 38 percent in 1977 to 43 percent in 1995. Because tuition acts as a barrier to access for lower income students, the higher the tuition share, the less the extent of redistribution for any given amount of higher education outlays (Courant, McPherson, and Reach 2006). Tuition revenue and total expenditures are highly correlated ($\Delta = .75$), and multiple regression analysis indicates that for every dollar increase in tuition revenues, a state's own fiscal contribution to higher education goes up by about 33 cents.
15. To assess the overall stability of the distributional measures over time, I computed an index based on the simple average of the rank of each state for the tax and spending variables described above. The correlation between index values in any given period and the prior period was equal to .92, whereas the two-period correlation was equal to .80, suggesting overall stability in distributional rankings is quite high.
16. The political party variables are equal to one if both houses of the legislature and the governorship are democratic or republican, respectively. Although economic performance may affect political composition, the political science literature indicates that the relationship is weak (Bruce 1991; Niemi, Stanley, and Vogel 1995).
17. Density of economic activity and the role of agglomeration economies in promoting productivity growth has been increasingly recognized in the literature (Glaeser and Kallal 1992; Ciccone and Hall 1996). To take account of the potential effect of concentrated economic activity on growth, we include either percentage urban (PCTURB), which is a low-level criterion for density, or a variable measuring the proportion of the state's population living in cities or Metropolitan Statistical Areas above a given threshold size (PCTCITY).
18. It is assumed that the income tax is not shifted, whereas sales and excise taxes are fully forward shifted to consumers. Home owners bear the burden of the residential property tax, whereas half of the tax on rental property is forward shifted. Most of the business property taxes and the corporate income tax are assumed to be borne by capital and allocated to individual according to the proportion of income received from capital. In this regard, the use by CTJ of the treasury tax file is particularly important, because it is by far the best source of income data for very high-income individuals.

19. The tax burden estimates are lower than the aggregate measure of taxes as a proportion of state personal income because the tax burden measures do not allocate a small portion (about 13 percent) of state and local taxes, and because the simulation estimates include some exporting of taxes on business property.
20. Incidence assumptions and methodology are sufficiently similar between the two studies to permit pooling. In addition, a Chow test was performed, by breaking the sample into 1977 and the other three years. The test failed to reject the hypothesis of equality of the coefficients. A more extensive description of the tax data is provided in Chernick (2005).
21. At the extremes—New York versus Mississippi—the top quintile income is almost two times as high.
22. Under the adjusted measure, the top quintile tax burden in any particular state is measured as the tax burden faced by a family whose income is equal to the national average income for the top quintile. The adjustment procedure is described in detail in an appendix available from the author on request.
23. Neighbor progressivity was weighted by the ratio of neighbor population to own population, and own progressivity by the ratio of own to neighbor population, using average population of each state over the entire sample period to construct the weights.
24. One reason is simple proportionality. For a given number of moves from a more to a less progressive neighbor, the percentage increase in economic activity will be greater, the smaller the relative size of the neighbor.
25. The asymmetry between the positive neighbor effect and the insignificant own-state effect reflects both demand and supply factors. If there is substantial commuting between a residence state and an employment state, the result might represent the impact on income of high-skilled individuals living in regressive residential states but working in neighboring progressive states. Under this scenario, the sending state benefits from the income increase realized by high-skilled commuters. However, on the production side, the complementarity between labor residing in the employment state and commuter labor tends to offset any negative effect of own-state progressivity. On the demand side, interstate demand by the populations living in adjacent counties helps to increase income in tax states. A test of the interstate commuting hypothesis was performed by excluding the northeast region from the sample, because the largest neighbor tax differentials are concentrated in that region and interstate commuting is significant in a number of northeast states. However, this exclusion does not alter the asymmetry of results.
26. The correlation between five-year population growth and aggregate income growth is .85, but the correlation for per capita income growth and population growth is only .17.

27. At the end of ten years, this would imply that total income is 2.3 percent higher in the state with high-education neighbors.

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Bio

Howard Chernick is Professor of Economics at Hunter College and the Graduate Center of the City University of New York. He is a research affiliate of the Institute for Research on Poverty at the Univ. of Wisconsin, a board member of Citizens for Tax Justice, and a past member of the board of the National Tax Association. He has been a visiting professor at the New School for Social Research, the Woodrow Wilson School at Princeton University, and the University of Rennes in Brittany, France. Before coming to Hunter in 1982, he was a senior economist at the U.S. Dept. of Health and Human Services. He has consulted for the Financial and Fiscal Commission of South Africa, the Organization for Economic Cooperation and Development, and a World Bank sponsored study on the public finances of large cities in India. He is the editor of *Resilient City: The Economic Impact of the 9/11 Attack on NYC*, Russell Sage Foundation, 2005. Research interests include urban public finance, fiscal federalism and redistribution, tax evasion and avoidance, and anti-poverty policy. Recent publications include "Fiscal Effects of Block Grants for the Needy: An Interpretation of the Evidence", *International Tax and Public Finance*, 1998; "On the Determinants of SubNational Tax Progressivity in the U.S." *National Tax Journal*, 2005; "Local Public Finance: Issues for Metropolitan Regions," in Competitive Cities in the Global Economy, OECD, 2006. (with Andrew Reschovsky); "Federal-State Tax Interactions in the United States and Canada." Publius; The Journal of Federalism. Special Issue on U.S. and Canadian Federalism. Summer, 2010. (with Jennifer Tennant).