Redistribution at the State and Local Level:

Consequences for Economic Growth

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Introduction.

States vary considerably in the income distributional impact of their tax and expenditure policies. Distributional effects depend on the structure and level of program funding, and the types of taxes used to finance government spending. Expenditure programs such as cash assistance and Medicaid are explicitly redistributional, with eligibility depending on income and assets. Hence, greater fiscal effort in these programs implies a relatively more redistributional public sector. However, other social service programs, particularly education, can have important distributional impacts as well. On the financing side, tax structure and incidence also vary widely. (Chernick, 2005)

This paper addresses Okun's leaky-bucket proposition at the sub-national level. Is there a trade-off between redistribution and economic growth? If a relatively progressive tax system, or a pro-poor expenditure pattern, has an adverse effects on a state's economy, then sub-national redistribution is presumed to be inefficient. On the other hand, if more redistribution has no measurable effect, or actually promotes economic performance, then the equity-efficiency tradeoff is minimized. To investigate these questions, we estimate models in which a variety of measures of state economic growth are regressed on a set of variables measuring the distributional characteristics of a state's tax and budget policy.

The paper is organized as follows. Section I presents a brief discussion of the theory of why redistribution might affect a state's economic growth. Section II discusses the measures of redistribution used. Section III describes the empirical model. Basic results are discussed in Section IV. Additional checks for robustness are described briefly in Section V. Section VI conclues.

I. Theoretical Relationships.

In an open economy, with mobile capital and labor, a basic tenet of fiscal federalism is that a progressive fiscal stance will be undone by the exit of productive factors, and by in-migration of the poor. If the net fiscal residual, defined as the difference between the value of benefits received and taxes paid, differs across jurisdictions for individuals with similar levels of

human and physical capital, there is an incentive for households to move to jurisdictions with favorable fiscal residuals. High-skill individuals have an incentive to locate in less progressive states, while low-income individuals, who realize a positive fiscal residual from greater redistribution, are more likely to locate in progressive states. If the fiscally induced mobility of productive factors is sufficiently great, a state that is "too progressive" may be penalized in terms of lower levels of income or slower economic growth.

In contrast to the "flight from progressivity" model, state economies may be able to tolerate differences in progressivity if such differences reflect the preferences of a substantial majority of their citizenry. If the altruistic component of preferences differs substantially across individuals, states with more redistribution may attract those with greater preferences for redistribution. Under this framework, analogous to the local public finance model of residential choice first described by Tiebout, variation in progressivity is welfare enhancing, in that it allows a better match of public services and preferences. If differences in preferences for redistribution are important, then the potential negative effects of relatively more progressive fiscal systems will be attenuated.

Growth Model

A simple growth equation, adopted from Besley and ___ (2005) may be used to formalize the growth effects of redistribution.

$$g(p) = \frac{y_2 - y_1}{y_1} = \frac{1}{y_1}\left\{\delta^{\gamma} q\left[k, l(p)\right]\right\} - 1 \qquad (1)$$

.

In (1), given the initial level of per capita income $y_{1,}$ growth between periods 1 and 2 is a function per capita output in year 2. Output is the product of a regularly behaved production function q, multiplied by a density measure δ.

The density component reflects the role of geographically concentrated popululation and employment in generating increasing returns to scale and lowering costs (Hall and Ciccone, ____), Glaeser (_____). The role of agglomerations economies in promoting increases in

productivity through spillovers of knowledge has been increasingly recognized in the literature. The specification of the density effect is taken from (_____) and Hall and Ciconne.(1996) Density is assumed to have a marginal growth productivity γ. Though our analysis is at the state level, and the density effect is typically measured at the city or metropolitan level, we include a density measure into the empirical specification.

Per capita output in year 2 depends on the net incidence of state and local expenditures, denoted by *p*. With a uniform nationally determined rate of return, capital is typically assumed to be in perfectly elastic supply to each state. (Gyourko and Tracy, ___; Haughwout and Inman, _____).[1]

If a negative fiscal residual for higher income individuals is associated with a more redistributive fiscal posture, then higher income individuals are likely to be deterred from locating in the state. This deterrent effect could be capitalized in land values or wages. In the formulation in (1), fiscal disamenties are reflected in wages and labor supply, rather than in land. This formulation is more appropriate when the level of analysis is the state, since at the state level land is in much more elastic supply than at the metropolitan or city level. If a negative fiscal residual from greater redistribution is capitalized in wages, the equilibrium cost of skilled labor would rise in states with relatively redistributive tax and expenditure policies, while the cost of low-skilled workers would decline.

Thus the impact of a more progressive fiscal system would be offset by a more unequal pre-tax wage distribution. (Feldstein and Wrobel, 1998) Howerver, the higher supply cost for skilled labor would reduce employment in high-skilled occupations. If state specific demand for skilled labor is elastic relative to supply, there would be a decline in employment in the high-skilled sector, and an increase in low-skilled employment. The effect on gross wages of a change in the amenity value of the public fisc depends on the elasticity of supply of labor, and the elasticity of demand for labor. Elasticity of demand depends on the price elasticity of demand for the product, and the elasticity of substitution between various types of labor (skill and unskilled), capital, and land. Conceptually, wage capitalization can range from zero to

complete. (Wallace, 1993)

The adjustment in gross wages follows from the standard model of compensating differences. Under this model, an indirect utility function for a worker in any location is identically equal to an exogenously given level. Following Feldstein and Wrobel (1998), denote two skill levels, high (H) and low (L).

$$V_H(r_H, W_H, \tau_H, G_H) = V_{0,H} \qquad (2)$$

$$V_L(r_L, W_L, \tau_L, G_L) = V_{0,L} \qquad (3)$$

where r is the price of land, W is the gross wage, $\tau$is the state and local tax rate, and G is the government good. G may be divided into a public good component and a redistributional component.

$$_{VH}(R_H, W_H, \tau_H, G, TR) = V_{0,H}. \qquad (4)$$

$$V_L(R_L, W_L, \tau_L, G, TR) = V_{0,L} \qquad (5)$$

V is decreasing in r and τ, and increasing in G. $\partial V_H/\partial TR \gtrless 0$, depending on the preferences of donors for redistribution. $\partial V_L/\partial TR > 0$, under the assumption that consumption is increasing in the level of transfers.

Tax rates are linked to government expenditures via the state's budget constraint.

$$\tau_H Y_H + \tau_L Y_L = G + TR - IG \qquad (6)$$

Tax rates τ include taxes on income, sales, and property. The effect of land capitalization on growth occurs through the government budget constraint. If fiscal disamenities are capitalized in lower land prices, higher property tax rates are required to raise a given amount of revenue. This will in turn decrease the value of *p*, the net fiscal residual.

If an increase in τ_H leads to an increase in public goods G, the effect on utility depends on the value high skilled residents assign to additional units of the public good. The same holds for extra revenues used to finance increased transfers. Under a benefit received system of finance, the equilibrium condition is that

$$\partial V_H/\partial G = \partial V_H/\partial TR = -\partial V_H/\partial \tau_H \qquad (7)$$

The condition in (7) means that an increase in tax rates would not generate a compensating effect on wage rates. Even if $\partial V_H/\partial TR > 0$, the presumption is that $\partial V_H/\partial G > \partial V_H/\partial TR$, i.e. that in equilibrium the value of an additional dollar spent on public goods exceeds the marginal value of a transfer dollar. If so, this implies that there will be a compensating adjustment in wages or land prices.

Suppose that the increase in τ_H is revenue neutral, i.e. fully offset by a decrease in τ_L. This change will lead to a compensating increase in W_H or a decline in R_H, the price of land or housing for high skilled workers.[2] As pointed out by Feldstein and Wrobel (1998), if $P_H = P_L$, i.e housing prices are the same for high and low-skilled workers, then the change in tax incidence cannot be capitalized in relative land prices, and the adjustment must take place in relative wages.[3]

Housing prices do vary widely by submarket, and are differentiated by a Tiebout mechanism by jurisdiction and school quality. Hedonic analyses find that a substantial proportion of the variation in housing prices is due to differences in school quality, as measured by school spending per pupil or test scores (Black,___). To the extent that higher income residents of a state live in the suburban areas of the states largest metropolitan areas, an increase in the tax on high skilled workers may have an implicit spatial component, which would increase the role of adjustments in housing prices. Therefore, adjustments in the price of housing and land cannot be ruled out as a possible response.

If the wage adjustment is incomplete, so that costs for low skilled labor do not fall as much as costs rise for high skilled labor, then the overall increase in cost should lead to a deline in production in the state, hence a decline in state income. If the adjustment in relative wages just offsets the change in the distribution of tax burdens, there is still likely to be a decline in the productivity of firms in the state. This decline stems from the well-documented complementarity between technology-capital and skill. (Goldin and Katz, 1998).[4] As employers substitute low for high-skilled labor, there will be an adverse effect on the productivity of capital. To the extent the adjustment is borne through a decline in the price of land, there will

be a decline in land rents, and a decline in property tax revenues. The decline in property tax revenues would lead to fiscal problems. Hence, any of the possible reactions would have an adverse effect on personal income. Given the range of possible responses, the most comprehensive way to assess the impact of changes in redistribution is to examine the effect on income or the change in income in a state.[5]

Labor supply and redistribution.

The growth equation (1) specifies the primary adjustment mechanism for redistributional changes as occurring through the effect on labor supply $l(p)$.[6] Ceteris paribus, the more elastic the supply of labor of a given skill level, the greater the degree of wage capitalization from a change in fiscal residuals facing that skill level. The elasticity of labor supply to a given state with respect to the wage depends on the usual factors, and on locational decisions, i.e. the extent of geographic mobility.

If labor demand for a given skill level is less than perfectly elastic, there will be a compensating increase in the gross wage, and a reduction in employment. If the long-run demand curve for labor is more elastic than the short-run curve, then over time the degree of wage capitalization will decrease, while the effect on employment and income will increase. In this case, the long run effect on state income from an exogenous shift in incidence will exceed the short run effect.

Evidence on the effect of fiscal policies on labor supply and compensation levels.

Empirical evidence for the effects of state level fiscal policy on labor supply is relatively sparse. There have been several studies of the effect of taxation on wages and on migration. The authors are unaware of any studies on the effect of fiscal policy on employment at different skill levels.

Both Wallace (1993) and Feldstein and Vaillant (1998) merge demographic and wage data from the Current Population Data with IRS tax data to examine the effect of state taxes on wages. Using 1985 data, Wallace regresses wage rates on marginal state income tax rates, net of the federal tax deductibility offset. Each individual is assigned the average tax for his state, industry, and occupation. Separate equations are estimated for each of eight different industry groups. Using occupation as a proxy for mobility, the marginal tax variable is interacted with a set of occupation dummies. She finds that higher state taxes do lead to higher wages, but that the effects vary substantially by occupation and industry. In 25% of occupations and industries examined, the marginal income tax rate is capitalized in gross wages, at rates ranging from 45 to 90 percent.

While the migration-mobility literature would predict greater rates of capitalization for occupations with higher educational requirements, Wallace's results do not support that prediction. Executive, administrative, and managerial, and professional occupational categories are no more likely to exhibit wage capitalization than are occupations with lower education requirements. If higher gross wages act as a deterrent to employment, the Wallace results are potentially strong enough to suggest that changes in marginal state taxes could have a measurable effect on the growth in state employment. However, since she does not find a consistent pattern of greater capitalization among higher skilled occupations, her results do not support the notion that a more progressive tax structure will have a more adverse effect.

The Wallace analysis controls for education and experience, but uses the average tax rate by industry and occupation as an instrument for the actual tax rate faced by a given individual. Within a given industry-occupation group, in states with more graduated income tax structures, this approach will understate the tax faced by potential high earners and overstate the tax faced by low earners. While Wallace makes a plausible argument that firms are more likely to take into account the average tax rate facing any particular group of employees, this instrument should nonetheless tend to attenuate the estimated capitalization effects.

Using a national sample from the CPS, Feldstein and Vaillant (1998) regress an

individuals annual labor income on a set of individual characteristics, state dummies, and (one minus) the combined state and federal tax burden. As an instrument for the average tax rate, F-V use the predicted value of labor income for the individual and his/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 coefficent in most of the F-V equations is not significantly different from (minus) one, Leading F-V 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, since it applies regardless of occupation or industry. If correct, it should imply a substantial increase in the cost of skilled labor in states with more progressive tax systems, with a potentially strong negative effect on economic growth.

There are two sources of potential bias in the F-V estimate. First, state and local tax burdens may be endogenous, because the distribution of tax burdens may itself be a function of the earnings or income distribution in a state. If a more unequal income distribution leads to a more progressive tax system, as shown in Chernick (2005), this endogeneity will impart an upward bias to the tax coefficient. Second, F-V's prediction equation for labor income includes individual state dummies, but does not allow the effect of individual characteristics to vary by state. However, the distribution of wage income within a state may be a function of state specific characteristics such as the industry-occupation structure, population size and density, and immigration patterns, as well as the distribution of individual characteristics. For example, because of its size, and industrial and agglomeration characteristics, the relative earnings of high skilled individuals in New York State are likely to be greater than their relative earnings nationwide. Because state specific distributional effects are excluded from the F-V specification, all of the across state variation in the conditional income distribution must be attributed to the tax variable, which is the only variable in F-V's other than the dummy that is allowed to vary acaross states. Hence, if any variable other than the tax burden is correlated with the distribution of income within a state, the estimate of the tax coefficient should be

biased upward, because the conditional distribution of income within the state can only be attributed to the tax variable.

An alternative test of the wage capitalization effect, using state-wide aggregates, is provided by Chernick (2004). Using tax burden and income data from the Citizens for Tax Justice simulation model, (CTJ1991, 1996), Chernick estimates a pooled cross section model in which the average of family income for a given quintile is regressed on the net tax burden for that quintile, plus a state dummy variable. Tax burdens are measured both for all state-local taxes, and for the income tax alone. If wage capitalization were widespread, one would expect a significant positive relationship between tax burdens and family income. The study does find positive effect for the top income quintile. However, this result holds only under the sparsest specification, with just the tax rate and a state dummy on the right hand side. When the specification includes population and percent manufacturing, both of which are expected to be correlated with a state's income distribution, the tax effect becomes negative. To address potential endogeneity of the average tax burden, an IV estimator is also provided. The tax burden effect is found to be positive, but not significant. Chernick concludes that the overall degree of capitalization is not strong enough to influence the distribution of income across states. This suggests that any negative effects on economic growth in a state will be small or nonexistent.

Substate Capitalization. Studies of the capitalization of taxes and government spending at the city level include a tradeoff between land and wages. In these models both factors are undifferentiated by quality. In a simulation model of local fiscal policy, Haughwout and Inman (2001) have two labor inputs, resident workers and non-resident commuter managers. Managers wages are determined by the exogenous wages available at locations in the suburbs, and local wage taxes are assumed to fully compensated for in the managers' gross wages. However, Haughwout and Inman do not provide empirical evidence to support this assumption. In their empirical studies of city wages and land prices, Gyourko and Tracy (1989, 1991) do find a significant effect of all fiscal amenities taken togehter on gross wages.

However, the tax effect alone (state and local income taxes) is small and statistically insignificant.

Migration Studies. An alternative way to address the potential effect of taxes and/or public expenditures on state income is to look at migration patterns directly. Geographic mobility varies substantially by age, education, and marital status. Greenwood ( ) Younger single workers are more mobile than older married workers. Two earner couples are less mobile than single earners. Education beyond high school leads to substantially greater mobility (Kodrzycki, 2001) Attachment to community increases with age. There may also be a significant component of state specific rent in the return to specialized high skill labor. These factors help to explain the lower mobility of married older workers. Borjas (2000, Chapter 9) reports that the migration rate of households where the wife does not work is 4 percentage points lower than that of households where the wife does not work.

Blanchard and Katz (1992) find that by far the most important means of adjustment to adverse shocks in labor demand or supply occurs through out-migration, rather than through wages. Their models show that wages and incomes adjust relatively little, and return to their long-run levels relatively quickly, while changes to employment growth persist over many years. Migration responds mainly to unemployment. Thus a negative labor supply shock caused by a change in fiscal amenities would lead to a relatively small change in gross wages, and a larger increase in outmigration. The emphasis that their study places on long-run employment effects suggests that we should look at the effects of fiscal redistribution on aggregate income and population growth, as well as per capita income growth.

Evidence on Migration and Fiscal Differentials. Pema (2005) finds a statistically significant negative effect of both income and sales taxation on the decision to migrate. The income tax rate is calculated by family type and education level, so the method takes into account the degree of progressivity of the tax. Pema finds that for college graduates, there is about a ten percent increase in the proportion migrating from one state to another for a one percentage point increase in the income tax differential. However, because the overall

percentage migrating is low, this overall flow is not very great. Pema does find that the estimated tax migration effect is similar in magnitude to the estimated effect of wage differentials. This similarity is broadly supportive of the notion that individuals take account of net wages in their decisions about labor supply to local areas. However, given the Blanchard and Katz results on the relative importance of unemployment versus wage changes as factors affecting the decision to migrate, this migration effect is still likely to be relatively small.

Pema (2005) also finds that the strength of the migration effect varies by household type. The marginal response to tax differentials goes up sharply with education. People with advanced degrees are twice as responsive as those with college degrees, who are in turn about 6-8 times more responsive than those with high school degrees.[7] The most likely explanation for this finding is that because of underlying differences in mobility, a given tax differential will make it more likely that migration will be away from high tax and toward low-tax states among the more mobile groups. .

A substantial subset of moves are between adjoining counties in contiguous states. For this type of short distance move, workers may continue to hold the same job. Hence we would expect the effect of tax or public service amenity differentials to be magnified relative to more distant states. Hence, fiscal variables for neighboring states are included in the empirical specification.

Welfare Migration. The economic growth effects of higher redistributional spending will be negative if they have an adverse effect on labor supply. However, greater social welfare expenditures could have positive effects on income levels if they increase human capital by promoting improved health, greater educational attainment, or reduced family dislocation. Redistribution would have a negative effect on labor supply if high benefits encourage greater take-up for transfer programs. Higher participation rates would increase the cost of transfer programs in more generous states, leading to a decrease in labor supply. Take-up rates would rise if the native population with given characteristics of a state is more likely to participate, and/or if benefit differentials induce migration of actual or potential recipients of

redistributional programs. Welfare migration would reduce the effective labor supply, by lowering average human capital in a state.

There is an extensive literature on welfare migration. Recent studies compare the migration patterns among various categories of single parent mothers. Gelbach (2004) finds a five-year interstate migration rate of five percent for those most likely to get public assistance - never-married high school dropouts, a rate 2 to 6 percentage points lower than rates for other demographic groups. Among the never-married dropout group, their maximum benefits go up by $24 to $54 per month, compared to other groups. While these effects are likely to have some influence in states' determination of welfare benefits, they are probably too small to affect state average income levels. Mckinnish (2005) looks at migration of single parent families between border counties in different states. She finds that AFDC benefit differentials have a significant effect on migration rates between border counties, but again the number of actual migrants is relatively low. In the empirical analysis, the specifications include welfare spending or benefit levels in neighboring states.

There have been several studies of the migration behavior of the elderly. Because labor force attachment is weak among this group, fiscal variables are expected to have a stronger effect. However, the economic growth impacts of elderly migration are unclear. While migration will increase aggregate economic output, the effect on per capita income depends on the income level of elderly migrants relative to the native population. Conway and Houtenville (2001) among others find a strong negative effect of welfare spending on net migration flows among the elderly. Surprisingly, higher medicaid spending on the elderly does not act as a attractive force for elderly migrants. The average level of income taxation has a weak negative effect on elderly migration, while the marginal rate, which is interpreted as representing the progressivity of the income tax, has no impact. Research on the effects of social welfare programs on other groups of potential migrants has not been done.

Using a state fixed effects model, Helms (1985) infers a negative effect of welfare expenditures on state income levels. Welfare spending is not included directly in the Helms

specification. However, by including an exhaustive set of other categories of state spending, as well as total taxes, the tax coefficient is interpreted as measuring the marginal effect of an increase in state spending exclusively for welfare. Wallace follows the same approach.

Given the imprecision of the census of government classification scheme, and the fact that some welfare spending - for example for Medicaid - may be classified in other categories, it seems preferable to include welfare spending directly, and that is the strategy followed in this analysis.

II. Measures of Redistribution

Patterns of tax incidence over time are summarized in Table 1. In 1995, for example, the average effective stat-loca tax rate on taxpayers in the top fifth of a state's income distribution, with a mean income of $137,000, was 8.4 percent. The effective rate on the bottom fifth, with mean income of $16,000, was 11.5 percent, impying a progressivity ratio for tax burdens of .75 (column 5). However, the variation across states in the progressivity ratio was 25 percent of the mean, (col 6). The most progressive states had progressivity ratios almost three times as high as the most regressive states (cols. 7 and 8).

Data on state and local tax incidence are taken from the comprehensive set of studies by the Citizens for Tax Justice (CTJ). CTJ estimates of tax burdens by income quintile were available for 1985, 1991, and 1995. (Citizens for Tax Justice, 1991, 1996). Prior to 1985, the most comprehensive study of state and local tax incidence was performed for the year 1976-77 (Phares, 1980). To increase the length of the panel of data, I therefore merged the Phares and CTJ data, creating a four-year panel spanning the period from 1977 to 1995. Incidence assumptions and methodology are sufficiently similar between the two studies to permit data pooling.[8] 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.

Redistribution on the expenditure side of state and local budgets is difficult to

summarize in a single index. Bahl et al (2002, Appendix Table A) use the share of state-local expenditures for welfare and elementary and secondary education as an index of pro-poor expenditures.[9] For purposes of measuring redistribution, state and local expenditures may be roughly classified into three categories:

> Pure public goods, available approximately equally to all: included in this category are police, fire, emergency services, environmental protection, transportation services, general administration, and interest on debt.
>
> Primarily redistributive programs: these include public assistance, publicly provided health insurance (Medicaid or its state variant), health services (clinics, public hospitals), child welfare services, and other social services.
>
> Education expenditures: comprising pre-school, elementary and secondary, and higher education spending.

Group 1 - pure public goods - comprises about a third of total state and local expenditures. Group 2 - primarily redistributive - comprises about 25 percent. Group 3 - education - comprises a bit more than a third of total outlays. (U.S. Bureau of the Census, 2002)

Of the three categories of expenditures, category 2 is clearly the most redistributive. However, if state and local expenditures are valued at cost, and assumed to be equal per capita (i.e. no geographic variation in pure public goods) then even pure public good expenditures will be redistributive, in the sense that the value of the expenditure as a fraction of income, will be higher for lower income individuals. On the other hand, if services are evaluated in terms of standard willingness to pay criteria, and demand for public goods are income-normal, then the pure public goods may have a neutral or pro-rich incidence.

Higher levels of education spending are likely to be associated with more redistribution.[10] However, for any given outlay, the net redistributive effect will be affected by the rules for access to education spending in a state. If there are substantial disparities in elementary and secondary education spending per pupil, with the children of lower income families getting

lower expenditures because they are concentrated in low-spending districts, then the redistributional effect of any given overall level of elementary and secondary spending will be reduced. If students from low-income families are less likely to attend public colleges than higher income students, the redistributional impact of higher education will be similarly attenuated. In general, the greater the reliance on tuition as opposed to general state subsidies, the less redistributive are higher education expenditures.

To take account of the various dimensions of redistribution in state and local spending, and the possibility that different aspects may have different effects on a state's economy, we include a variety of measures in our empirical work. For the public welfare component, spending, we use the maximum monthly benefit for Aid to Families with Dependent Children, and welfare spending per capita. The maximum benefit is an indication of distributional prefernces, and has been used in many studies of welfare migration. Welfare spending per capita reflects benefit levels for public assistance and eligibility and coverage rules for Medicaid, as well as the size of the potentially eligible population. Benefit levels are correlated with per capita spending, but not particularly strongly ($\rho = .19$). Other measures of welfare, including spending as a share of state and local budgets, and as a share of personal income, are highly correlated with spending per capita. As shown in Table 2, mean welfare benefits fell over the sample period, but the variation across states in any given year remained similar.

We use two measures of redistribution for elementary and secondary education. The first is the coefficient of variation of per-pupil spending across school districts (EDEQUAL). A higher dispersion is assumed to reflect higher spending in richer districts relative to poorer districts.[11] Education is jointly funded by states and local school districts. Inequality in spending results from inequality in fiscal resources across local jurisdictions, differences in preferences, and differences in the tax price of spending. For example, communities with a lower ratio of pupils to population face a lower cost per capita of providing a given level of spending, and may therefore choose to spend more per pupil.

The distribution of local fiscal resources by income level may be viewed as an exogenous

determinant of the distribution of spending. At the state level, the major policy decision in education spending is the amount and the distribution of state aid. State aid to education, which makes up about 55 percent of total spending tends to offset local inequalities. While the degree of fiscal equalization in the distribution of state aid may vary across states, even the least redistributive state aid formula is likely to reduce disparities in educational spending. (Evans, Murray, and Schwab 1997). Hence, as a proxy for state efforts to equalize educational spending, our second measure is the share of education spending provided by the state (STATESHR). A higher share is assumed to reflect a more redistributive policy. Table 2 shows that the variation in the degree of spending dispersion across states is about 30 percent. The average dispersion fell somewhat over time, reflecting the increased role of state aid.[12]

To measure the distributional impact of higher education we use spending levels per capita, tuition revenues per capita, and the share of spending provided by tuition. Johnson (2004, Table 2) replicates a well-known earlier result that the dollar value of public subsidies for higher education is increasing in current family income.[13] However, as a share of income the subsidy declines with income. Higher spending levels are likely to be associated with greater access to public higher education, which will increase the redistributional impact. On the other hand, access is restricted by tuition, so the higher the tuition share the less redistribution for any given amount of higher education outlays. For those who do attend college, tuition functions as a user charge for higher education services, and its impact is expected to be regressive, i.e. tuition will be a decreasing proportion of family income as income rises.[14] As shown in Table 2, both tuition revenues and expenditures have risen over time. The share of spending from tuition has also risen between 1985 and 1995, from 36 percent to 43 percent. Of the three measures of redistribution in higher education, tuition revenues per capita have the highest variation, while the tuition share is somewhat less dispersed. To summarize, Table 2 shows considerable dispersion across states in a variety of measures of redistribution, and persistence over time in the degree of dispersion.

III. The Empirical Model of State Economic Growth.

Economic growth is modeled as a function of own and neighbor state-local tax burdens at the first, third, and fifth income quintiles, and a set of spending variables which together characterize distributional policy on the expenditure side of the fisc. As controls, we include measures of income inequality in the state, the age distribution of the population, and the spatial concentration of the population. To allow for economic convergence, initial income level relative to the national average (RELATIVE INCOME) is included in the specification. The basic specification is

$$\text{Growth}_{t+1} = a_0 + \mathbf{a_1(TAX\ BURDEN_{t0})} + \mathbf{a_2(NEIGHBOR\ TAX\ BURDEN_{t0})} + \mathbf{a_3(EXP\ REDISTR)} + \mathbf{A4(NEIGHBOR\ EXP\ REDISTR)} + a_5(\text{INCOME DISTR}_{t0}) + a_6(\text{RELATIVE INCOME}_{t0}) + a_7(\mathbf{DEMOGR_{t0}}) + \text{error term} \quad (8)$$

GROWTH: The dependent variable is the average annual rate of growth in personal income per capita, over periods of 5 years and 10 years. Taking the average provides some smoothing against temporary shocks, and provides a better indicator of long-run patterns.

TAX BURDEN. All taxes burden measures are both gross and net of the federal deductibility offset. The first measure is of tax progressivity (PROGHILO), the ratio of tax burdens at the fifth quintile to the first quintile. The estimated coefficient indicates the marginal effect of changing the distribution of the tax burden, leaving overall expenditures unchanged, while controlling for redistribution on the expenditure side. Thus it captures the effect of a pure shift in the distributional burden of financing state and local government expenditures. Based on the amenity-labor supply model, the expected effect is negative.

The second tax measure is the tax burden for the first, third, and fifth quintiles of the income distribution: BURDQ1, BURDQ3, AND BURDQ5. In different specifications, we use either the total tax burden or the income tax burden alone. The coefficients indicate the marginal impact on economic growth of an increase in the average tax burden on a particular

slice of the income distribution, given tax burdens on the rest of the distribution, and redistribution on the spending side. A negative coefficient is expected for BURDQ5, and a positive coefficient for BURDQ1. BURDQ3, the middle income tax burden, is expected to have a zero effect, as it represents the tax burden chosen by the median voter in the state. Because individuals are more likely to perceive and care about their own tax rate, as opposed to a relative rate, differences in the individual tax burden coefficients provide a sharper test than the progressivity measure. However, an increase in a given tax rate should allow an increase in government spending, with the extra fiscal resources allocated to non-redistributional functions. The extra spending may be expected to attenuate any negative tax effect. This specification contrasts with Helms (1985), who excludes welfare spending but includes all other types of spending.

NEIGHBOR TAX BURDEN: Population weighted average tax burden measures for a states geographic neighbors. Neighbor progressivity is expected to have a positive effect on a state's growth, with a state benefiting by serving as a regional tax haven for higher income individuals.

EXPENDITURE REDISTRIBUTION.

WELFARE BENEFITS, WELFARE SPENDING: expected to have a negative effect on economic growth. Higher benefits may attract more potential recipients from other states, reduce own-state labor supply, and discourage in-migration of the elderly. Higher welfare spending may also divert resources from other potentially more productive expenditures, such as education or infrastructure investment. (Helms, 1985).

STATESHR: The state share of education expenditures is a proxy for the equalization of educational expenditures by statewide policy. A higher state share reduces the scope for local fiscal choice, and reduces the fiscal advantage of high wealth jurisdictions. This may hurt a state in terms of its ability to attract and retain high income families. On the other hand, a higher state share may signal more investment in education spending for low income families,

with potentially positive effects on a state's economy. The net effect is therefore ambiguous.

HIGHERED: State spending on higher education. This is a measure of a state's investment in human capital, and even though higher spending levels imply greater fiscal redistribution, we expect a positive effect on growth.

Other Control Variables.

Persistent differences in regional rates of growth are important. (Pack, 1998). To control for these differences in growth rates, as well as differences in the national rate of growth rates over different time periods, all specifications include dummy variables for (eight) regions and the four years in the sample. Thus the estimated coefficients indicate the effect of redistribution in causing a state to grow faster or slower than the regional average. Some specifications also include time variant regional dummies, to reflect the role of regional shocks to demand. We also estimate a fixed effects model, with dummies for each state. In this latter model, each state is assumed to have its own exogenously determined long-run growth path. The effect of fiscal variables is to cause temporary deviations from that path.

Data Description.

Table 3 contains the comprehensive list of variables used, along with their description, summary statistics, and sources (listed below table). The categories of variables include, state growth, tax progressivity, expenditure progressivity, and demographic characteristics. All dollar values are deflated to the base year 1976, using the personal consumption deflator of the National Income and Product Accounts**.**

IV. Results.

The basic specification for the growth model is shown in Table 4, Column 1. The dependent variable is the average annual rate of growth of per capita personal income over five years. The equation shows that between 1976 and 2000 the degree of progressivity of state and local taxes, measured at four (unequal) intervals during the period, did not have a significant

effect on the average rate of growth in per capita income over the next five years. Similarly, none of the expenditure incidence variables had any effect. Interstate tax competition is measured by the (population weighted) average progressivity among a state's geographic neighbors. The results show a significant positive effect of neighbor progressivity, suggesting that a state can benefit from having a less progressive tax structure than its neighbors. However, the policy relevance of this result is reduced by the fact that the effect of own progressivity remains insignificant.

In the short run, differential growth could come from shocks to the demand for the industries in which a state specializes. Over the longer term, however, differential growth in per capita income requires a differential rate of increase in labor productivity. This differential rate could come from faster growth in physical or human capital, or state-specific technological shocks. In column 2 of Table 4, average growth in income is measured over a ten year period. In this regression we are asking whether the long run effects of tax and spending policies differ from the shorter run effects. The results again show no effect of fiscal policy on economic growth. The major difference from the five year model is a negative and significant coefficient on RELATIVEINC, the measure of economic convergence. This difference from the five year model suggests that economic convergence between states in the U.S. does occur over the long run, but that there can be significant deviations from the convergence pattern over shorter periods. The significance of the neighbor effect disappears under a ten-year growth period model.

The growth periods over which the model in column (2) is estimated are 1977 to 1987, 1985 to 1995, and 1991 to 2001. Thus the specification makes long-period (ten year) average growth rates a weighted function of tax and expenditure structure at the beginning of the period and at a point within the interval. The underlying model is one of partial adjustment, with a substantial time period required for states to fully adjust to changes in fiscal policy. If a state revises its fiscal policy, in response to the economic performance of the economy, the effect of the change would occur only gradually. To avoid the overlapping period problem, we also

estimated the model with non-overlapping sample periods, using ten-year average growth from 1977 to 1987, and 1991 to 2001 as the two sample periods. The results, not shown here, were unchanged.

In columns (3) and (4) of Table 4, the dependent variable is aggregate income growth over 5 and 10 years respectively, rather than growth in per capita income. Aggregate income growth is the sum of growth in total factor income of residents, whether from growth in population, labor force, capital, or technology improvements. Greater neighbor progressivity continues to have a positive effect, in this case over ten years as well as the shorter five-year period. The convergence effect, as measured by the coefficient on relative income, is still present, but is weaker statistically than in the per capita income regression. The major difference from the per capita income regressions in columns (1)-(2) is that welfare benefits (MAXWELF) have a significant negative effect in the five-year growth model. The estimated coefficient implies that a state with welfare benefits of $72 per month above the mean, which is equal to one standard deviation above the mean, would retard aggregate income growth by 0.4 percentage points per year. This compares to a mean annual rate of growth of aggregate income of 3.6 percent. However, over ten years (Column 4), the effect of higher welfare benefits is no longer statistically significant. The significance of the welfare effect, which is similar when we use welfare spending per capita, is consistent with the evidence on elderly migration to states with lower welfare spending. esponse to welfare differentials. This migration contributes to

In columns (5) and (6), the dependent variable is state population growth, again over 5 and 10 year ranges. These specifications test whether greater growth in aggregate income is primarily a function of population growth. The results show that the lower rate of aggregate growth that is associated with higher welfare benefits is related to lower rates of population growth. Elderly migration is likely to be an important factor in explaining this result. The significant negative coefficient on INCINEQUAL in the 10 year income and population growth equations (4) and (6) suggests that in the longer run states with greater income inequality have tended to grow more slowly.

In the next set of specifications, shown in Table 5, we decompose tax progressivity into separate tax burdens on the top, middle, and bottom quintiles of the income distribution. We examine whether income growth - in aggregate or per capita - is sensitive to the tax burden taxes at various points in a state's income distribution, and also whether quintile specific tax burdens or other fiscal policy variables affect rates of income growth for specific slices of a state's income distribution. Individuals are more likely to be aware of and take account of the tax burden they themselves face, as opposed to the relative tax burden compared to others in the state. The sample is smaller in these specifications than in Table 4, because we lacked data on quintile specific income levels in 1976.

In columns (1) and (2) of Table 5, we regress five and ten year per capita growth rates on the tax burdens on the bottom, middle, and top income quintiles, as well as the neighbor quintile tax burdens. In (3)-(5), the dependent variable is the average rate of growth in the quintile specific income level. As shown in column (5), higher own tax rates on the top quintile lower the growth in income in the highest quintile, while higher neighbor rates have a positive effect. However, despite this negative effect at the individual quintile level, columns (1) and (2) indicate that the quintile specific result does not translate into an overall reduction in economic growth. It is notable that that none of the own tax burdens has any effect on average income growth. In particular, the regressions do not support the argument which is frequently made that relatively high tax rates on the rich send a negative signal about a state's economic climate and hurt a state's economic growth.[15]

Looking at the effect of neighboring tax rates, higher neighbor rates on the bottom quintile have a negative association with five-year growth, while higher neighbor rates on the middle quintile have a positive effect on ten-year growth. This pattern is consistent with a tax competition model in which there is some spillover of the benefits and burdens of redistribution. In the short run, higher neighbor tax rates on the poor appear to lower economic growth in a state. However, over a longer period, a state benefits if its tax rates on the middle class are lower than those in adjacent states. The negative neighbor effects at the bottom and the positive

effects in the middle may reflect the possibility that, within a region, labor supply is responsive to differential tax rates for a given earnings capacity. The difference in signs suggest that increased labor supply among the middle earnings capacity fosters growth in per capita income, while increased supply among low earners lowers economic growth. However, direct testing through micro-locational studies would be required to have more confidence in these hypotheses.

V. Additional Specifications and Tests..

1. National Tax Burdens. The above specifications measure tax burdens at state-specific income quintile breaks. Hence, our measure of the distribution of tax burdens is specific to each state. However, the average income for example in the fifth quintile in New York State is substantially higher than the average income in the fifth quintile in Mississippi. Hence, we are not measuring the potential tax burden faced by an individual with given characteristics as they choose among states. The latter measure, for example income tax rates at a given income level, has been used more commonly in the tax-growth literature. (McGuire,____). To deal with this issue, we have also computed a national income-adjusted measure of tax burdens.[16] 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. This nationally-adjusted rate functions as an instrument for the tax burdens faced by people with different earnings capacities in different states. The lack of any significant tax results is unchanged by using the national instrument.

2. Deductibility. Tax burdens were measured both gross and net of the federal offset through the deductibility of state and local taxes. Theoretically, the net measure is preferred. The results were unaffected.

3. To control for region specific shocks to growth, regions were interacted with year. Results on the fiscal variables were largely unaffected. To control for the role of density and agglomeration

economies, a variable measuring the proportion of the state's population living in cities or MSA's above a given threshold size was created. There was no greater impact from this variable than a simple percentage urban variable, suggesting a limited role for agglomeration economies in influencing overall state growth rates.

4. Neighbor expenditure policies. We also tested specifications which included neighbors' expenditure policies. The results on a state's own fiscal variables were unchanged. Some of the neighbor variables had significant effects on a state's own economic growth, either per capita or in aggregate. However, there was no consistent distributional pattern in these results.

5. Income taxation. Because the income tax is a particularly visible tax, we expected that any negative influence of tax incidence on growth would be to be most likely to be revealed under this specification. We find that income tax burdens on the top quintile, as well as the middle quintile, have no significant effect on any of the measures of economic growth. The income tax burden on the lowest quintile has a significant negative effect on aggregate income and population growth, over both five and ten year periods.

6. Endogeneity of tax rates. To test whether the distributional pattern of tax burdens is itself a function of economic growth, we regressed tax progressivity on economic growth and a set of additional covariates, as described in Chernick (2005). We found no relationship of economic growth to tax progressivity.

7. Joint significance of fiscal variables. F tests show that the overall effects of own-state redistribution on the growth in per capita income are not significantly different from zero. However, fiscal variables are jointly significant in the aggregate income and population growth equations. Neighbor characteristics have a jointly significant effect on own economic growth.

VI. Conclusion.

There is considerable diversity in state choices of fiscal distribution. On the tax side, for example, tax incidence in the most progressive state is three times as great as the least. Welfare spending as a fraction of personal income ranges from a low of 2.4 percent all the way up to 5

percent. A review of the literature finds substantial evidence these differences matter in terms of migration patterns and effects on wages and land prices. The many margins along which adjustments can occur suggest that an overall evaluation of distributional effects can best be performed by examing the effect on the growth in income in a state over time. We ask whether sub-national redistribution retards economic growth. If a more redistributive fiscal system implies a lower fiscal residual for high income taxpayers, then such groups have an incentive to relocate to states that more closely approximate a benefits-received model. The net effect could be a substantial excess burden associated with greater progressivity.

We use a variety of measures of economic growth to examine the effects of a state's redistributive choices. The sample for state fiscal and other characteristics is for four years between 1977 and 1995. These characteristics are used to explain growth from 1977 to 2001. On the tax side, our conclusion is that tax progressivity does not have a statistically significant effect on any of the measures of economic growth. The conclusion is similar on the expenditure side, with the one exception that higher welfare spending shows a negative relation to five-year aggregate income and population growth. This finding is probably related to the migration patterns of the elderly, who tend to move to high to low welfare states. Our results thus do not support the frequently cited paper by Helms (1985) on the negative effects of welfare spending on per capita income.

Several explanations are possible for the lack of any consistent negative effect of redistribution on income growth. The first is that redistributional differences across states are simply too small to have a measurable influence on economic growth. That is to say, the effects on labor supply and land rents work in the direction predicted by the growth model, but given the distributional differences, the magnitude of the adjustments is not great enough to have a statistically significant effect on employment or income. This interpretation is consistent with our review of the literature on capitalization and migration. We uncover substantial evidence that redistribution influences migration. However, the oveall flows are simply not large enough to generate effects on income growth. The political choice process which generates

distributional outcomes prevents any state from becoming too redistributive.

A second possibility is that federal sharing of the burden of redistribution, through tax deductibility and grants-in-aid for public assistance and Medicaid, reduces the net fiscal differentials across states. While we do take tax deductibility into account, federal grants are not incorporated in the analysis. Doing so would be a useful extension of this researcy.

A third possible explanation is that the variation across states in redistribution is in fact Pareto optimal, in that it allows the optimal matching of preferences for redistribution to actual outcomes. Under this interpretation, the lack of negative (or positive) growth effects indicates that subnational fiscal systems in the U.S. are in a kind of distributional equilibrium.

The policy implication of our findings are important. Tax cuts for high income taxpayers cannot be justified in terms of growth in the average income of a state. Overall, state policy makers have substantial latitude in their choice of redistribution. While the problem of welfare magnets may exist, the overall effect of high (or low) welfare benefits on a state's economy is negligible.

These statewide results might seem to be in conflict with a substantial literature showing negative effects of taxation on growth and job creation at the local and metropolitan level. (Bartik, 1996; Haughwout, et al; 2004). The difference may imply that any metropolitan effects are dissipated at the broader state level.

In contrast to own tax structure, some of the specifications showed a positive and significant association between the progressivity of neighboring states and a state's own growth rate. This positive affect could reflect the benefits that accrue from being a regional tax haven. However, they might also reflect spillover benefits from better infrastructure in neighboring states, if the latter is associated with more progressivity. Further research is suggested, including the use of instruments for the neighboring states' progressivity and tax burden variables, so as to take account of spatial correlation.

Finally, the empirical characterization of the distributional impact of state spending is

rather rudimentary. Better measures - particularly for education - would improve our confidence in the results.

Table 1

State-Local Tax Progressivity over Time

Year	Mean Income Top Quint. (Nom. $s)	Eff. Tax Rate on Top Quint. (stdev)	Mean Income. Bottom Quintile (Nom $)	Eff. Tax Rate on Bottom Quintile (std dev)	Progressivity Ratio.[1]	Coeff of Var of Progr. Ratio.	Two Most Progressive States (Avg)	Two Most Regressive States (Avg)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1976		10.2 (1.5)		15.6 (2.4)	.66	12%	.79 Del, Idaho	.48 NH, Conn
1985	58,692	7.7 (1.9)	10335	11.5 (2.3)	.69	29%	1.22 (Minn, Ore)	.38 (Tenn, Texas)
1991	76831	8.5 (1.9)	12431	12.8 (2.6)	.69	31%	1.25 (Md, Vt)	.34 (Tenn, Texas)
1995	136759	8.4 (1.9)	15979	11.5 (2.2)	.75	25%	1.09 (Del, Idaho)	.38 (Nev, Fla)

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

Table 2.

State and Local Redistribution

Year	Welfare Benefit Maximum for family of three	Elementary and Secondary Education Expenditures	Higher Education Expenditures
		Per Pupil Expenditure Inequality (Coef. of Var.)	Percent of State Gov't ShareTuition Revenues Per CapitaSpending Per CapitaPercent of Revenue from Tuition
All Years of Sample		14.7	55%
	$188	[34.9]	[26.1]
	[38.6]		$56
			[40.4]
			$142
			[28.8]
			39%
			[25.6]
1977	233	16.6	52
	[34.6]	[38.0]	[26.9]45
			[36.7]120
			[28.6]38
			[30.3]
1985	180	14.9	55
	[36.8]	[35.0]	[26.1]48
			[36.0]133
			[27.7]36
			[22.7]
1991	184	14.1	55
	[36.9]	[28.8]	[26.1]62
			[35.7]152
			[26.0]41
			[24.3]
1995	156	13.1	57

[34.3]	[31.0]	[25.5]71
		[34.6]164
		[24.0]43
		[22.0]

Coefficient of Variation in square brackets

Table 3

Variable Definitions, Data Description, and Data Sources

Variable Name	Variable Definition	Mean (Standard Deviation)	Range: Min, Max
	State personal income per capita growth:		
PCINCGRW5YR	calculated from 5 year range	.023 (.011)	-.004, .052
PCINCGRW10YR	calculated from 10 year range	.020 (.008)	-.001, .051
	State aggregate income growth: calculated from 5 year range		
AGINCGRW5YR	calculated from 10 year range	.036 (.018)	-.010, .088
AGINCGRW10YR		.037 (.017)	.003, .095
INCOME	State personal income per capita	7605 (1491)	
RELATIVEINC	Ratio of state/national income pc	.947 (.130)	
4911, 12865			
.67, 1.345			
INCINEQUAL	Ratio of mean income in the highest quintile to mean income in the lowest quintile, for families of four.*	6.452 (1.82)	
4.061, 13.667			
	Annual personal income per capita growth calculated between observation years:		
INCQ5GROWTH	for quintile 5 (highest)	.079 (.077)	-.016, .283
INCQ3GROWTH	for quintile 3 (middle)	.014 (.019)	-.018, .071
INCQ1GROWTH	for quintile 1 (lowest)	.017 (.040)	-.025, .194
	Ratio of state-local tax burdens:		
PROGRHILO	highest quintile to lowest quintile	.699 (.182)	.342, 1.301
PROGRHIMID	highest quintile to middle quintile	.898 (.097)	.654, 1.130
BURDQ5	Average state-local tax burdens:		
BURDQ3,	for quintile 5 (highest)	8.729 (2.019)	3.45, 15.15
BURDQ1	for quintile 3 (middle)	9.694 (1.948)	4.795, 15.48
	for quintile 1 (lowest)	12.869 (2.866)	6.323, 20.47
	Population weighted average progressivity ratio in geographic neighboring states:		
NEIGHHILO	highest quintile to lowest quintile	.699 (.131)	.410, 1.254
NEIGHHIMID	highest quintile to middle quintile	.900 (.068)	.732, 1.096
NEIGHBURDQ5	Population weighted average tax		
NEIGHBURDQ3,	burdens:		
NEIGHBURDQ1	for quintile 5 (highest)	9.05 (1.779)	5.265, 14.39
	for quintile 3 (middle)	10.025 (1.68)	6.00, 15.16
	for quintile 1 (lowest)	13.276 (2.3)	6.882, 20.21
POPGROWTH5YR	Annual state population growth:		-1.84, 6.00
POPGROWTH10YR	calculated from 5 year range	1.166 (1.205)	-0.51, 6.63
	calculated from 10 year range	1.185 (1.15)	

EDSTATESHR	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
HIGHED	Total government spending on higher education per capita	142.40 (41.07)	57.9, 253.3
TUITIONTOHIGHEDU	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, 366.51
PCTYOUNG	Percentage of the population 5 to 17 years of age	20.07 (2.29)	15.91, 26.83
WELFAREPC	Per Capita Spending on Public Welfare	191 (89)	51, 570
UNEMPL	Unemployment rate	6.3 (1.69)	2.6, 13
PCTURB	Percentage of the Population Living 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	Percent of the population 65 and above.	11.97 (1.91)	7.7, 18.6

Data Sources

PROGRESSIVITY, QUINTILE TAX BURDENS: For 1976, Phares (1980), Tables A-91 and B-1. For 1985, 1991 and 1995, data provided by Citizens for Tax Justice (1991 & 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: William Hussar and William 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 1984-85, State Finances, Table 11, and State and Local Finances, Table 29. For 1991, Governmental Finances 1990-91, 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, WELFAREPC: For 1977, The Bureau of the Census, 1977 Census of Governments, Vol. 4, No. 5, Compendium of Government Finances, Tables 36 & 47. For 1985, The Bureau of the Census, Governmental Finances 1984-85, State Finances, Table 7, and State and Local Finances, Tables 22 & 29. For 1991, Governmental Finances 1990-91, Tables 22 & 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.
INCDISTR, INCQ5, INCQ3, INCQ1: 1985, 1991 and 1995 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, April, 1991, p. 70., and June, 1996. 1976 data extrapolated backward from 1985 CTJ data. See Note 11 for details.

INCOME (PER CAPITA, TOTAL, RELATIVE) U.S. Dept. of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, State Annual Estimates, http://www.bea.doc.gov/bea/regional/spi/, various years.
PCT URBAN, PCT YOUNG, PCTPOV, PCT OLD: U.S. Department of Commerce, Bureau of the Census, Statistical Abstract of the United States, various years.
UNEMPL: "Historical State Labor Force Data" was downloaded from the Bureau of Labor Statistics' web site http://stats.bls.gov/lau/home.htm

Table 4

Various Measures of Economic Growth Against Tax Progressivity and Expenditures

Dependent Variables					
(1) PCINC GRW5YR	(2) PCINC GRW10YR	(3) AGINC GRW5YR	(4) AGINC GRW10YR	(5) POP GRW5YR	(6) POP GRW10YR
PROGHILO					
0.000204	-0.00102	0.00532	0.00514	0.461	0.472
(0.00394)	(0.00343)	(0.00709)	(0.00747)	(0.452)	(0.473)
NEIGHHILO					
0.0129	0.00699	0.0268	0.0205	1.18	0.979
(0.00575)**	(0.00477)	(0.0104)***	(0.0104)**	(0.66)*	(0.658)
INCINEQUAL					
-0.000538	-0.000892	-0.00164	-0.00716	-0.106	-0.563
(0.000704)	(0.00133)	(0.00127)	(0.00289)**	(0.0809)	(0.183)***
RELATIVEINC					
-0.00967	-0.0361	0.00489	-0.0401	1.44	-0.158
(0.0127)	(0.0113)***	(0.0229)	(0.0246)*	(1.46)	(1.55)
EDSTATESHR					
-0.00757	-0.00719	-0.0128	-0.0128	-0.394	-0.413
(0.00562)	(0.00483)	(0.0101)	(0.0105)	(0.646)	(0.665)
HIGHED					
-0.0000144	-0.0000277	-0.00000872	-0.0000413	0.000586	-0.00117
(0.0000215)	(0.0000189)	(0.0000388)	(0.0000412)	(0.00247)	(0.00261)
MAXWELF					
0.000000387	0.0000177	-0.0000677	-0.0000412	-0.00623	-0.00517
(0.0000164)	(0.0000132)	(0.0000295)**	(0.0000288)	(0.00188)***	(0.00182)***
PCTYOUNG					
0.000278	0.000165	-0.000114	-0.000413	-0.0315	-0.0486
(0.00079)	(0.000689)	(0.00142)	(0.0015)	(0.0907)	(0.0949)
PCTOLD					
-0.000164	-0.000815	-0.000674	-0.0018	-0.0396	-0.0735
(0.00055)	(0.000487)*	(0.000991)	(0.00106)*	(0.0632)	(0.0671)
PCTURB					
0.000107	0.000222	0.00031	0.000518	0.0175	0.0239
(0.000072)	(0.0000636)***	(0.00013)***	(0.000138)***	(0.00827)**	(0.00877)***
Adj R^2					
0.47	0.43	0.39	0.42	0.44	0.5

Also included are three year and seven regional effects: (1977, 1985, 1989, New England, mideast, Great
Lakes, plains, southeast, southwest, Rocky Mountains)
Number of Observations: 192 for columns (1), (3) and (5); 144 for (2), (4) and (6). The sample is a pooled cross section of 48 continental U.S. states for the years 1977, 1985, 1991 and 1995 (1995 not used in 10 year range dependent variables).
Standard Error in parenthesis

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

Table 5

Measures of Economic Growth Against Quintile-Specific Tax Burdens and Expenditures

Dependent Variables	(1) PCINC GRW5YR	(2) PCINC GRW10YR	(3) INCQ1 GROWTH ^	(4) INCQ3 GROWTH ^	(5) INCQ5 GROWTH ^	
BURDQ1	0.000238	-0.0000213	-0.00311	-0.000116	-0.00138	
	(0.000403)	(0.000333)	(0.00218)	(0.000824)	(0.00183)	
BURDQ3	0.000559	0.000966	0.0065	0.00215	0.00982	
	(0.00113)	(0.00105)	(0.00739)	(0.0028)	(0.00622)	
BURDQ5	0.000279	-0.000581	-0.00372	-0.000444	-0.0113	
	(0.000894)	(0.000853)	(0.00607)	(0.0023)	(0.00511)**	
NEIGHBURDQ1	-0.00107	-0.00062	-0.00694	-0.000991	0.000678	
	(0.000519)**	(0.000413)	(0.00287)**	(0.00109)	(0.00242)	
NEIGHBURDQ3	0.00265	0.00318	-0.00583	-0.00362	-0.0157	
	(0.00166)	(0.00145)**	(0.0108)	(0.00408)	(0.00908)*	
NEIGHBURDQ5	-0.0001	-0.000757	0.0061	0.00413	0.0125	
	(0.00125)	(0.00111)	(0.0082)	(0.0031)	(0.0069)*	
INCINEQUAL	-0.000709	-0.000335	0.00991	0.00375	0.0144	
	(0.00072)	(0.00144)	(0.00881)	(0.00333)	(0.00742)*	
RELATIVEINC						
-0.00964	-0.0367	0.0409	0.0191	0.0734		
(0.0127)	(0.011)***	(0.0742)	(0.0281)	(0.0624)		
EDSTATESHR						
-0.00947	-0.00776	-0.015	-0.00725	0.0198		
(0.00579)*	(0.0051)	(0.0342)	(0.013)	(0.0288)		
HIGHED						
-0.00000888	-0.000024	0.0000705	0.0000135	-0.000121		
(0.0000212)	(0.0000182)	(0.000114)	(0.0000429)	(0.0000955)		
MAXWELF						
-0.0000263	0.000000543	-0.0000677	-0.0000616	0.000144		
(0.0000184)	(0.0000147)	(0.000115)	(0.0000435)	(0.0000967)		
PCTYOUNG						
0.0000243	0.000123	0.00387	0.00156	0.00295		
(0.000784)	(0.000675)	(0.00399)	(0.00151)	(0.00336)		
PCTOLD						
-0.000265	-0.000878	0.00249	0.00145	0.00171		
(0.000548)	(0.000472)*	(0.00281)	(0.00106)	(0.00237)		
PCTURB						
0.0000743	0.000209	-0.000216	-0.0000434	0.000374		
(0.0000723)	(0.0000623)***	(0.000436)	(0.000165)	(0.000367)		
Adj R2	0.49	0.48	0.54	0.71	0.91	

Also included are three year and seven regional effects: (1977, 1985, 1989, New England, mideast, Great Lakes, plains, southeast, southwest, Rocky Mountains)

Number of Observations: 192 for column (1); 144 for (2); 96 for (3), (4) and (5). The sample is a pooled cross section of 48 continental U.S. states for the years 1977, 1985, 1991 and 1995 [for column (1)]; '77, '85, '91 [for column (2)]; '85, '91, '95 [for columns (3), (4) and (5)].

^ Annual growth periods are calculated from the ranges: 1985 to 1991, and 1991 to 1995

Standard Error in parenthesis
* 10% confidence level, ** 5% confidence level, *** 1% confidence level

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Notes

[1] This assumption follows the typical Harberger- Mieskowski model.

[2] Even in this scenario, an altruism model would imply that the decline in utility from lower after tax income would be mitigated by the increased after tax income of lower income households.

[3] Studies of the capitalization of taxes and government spending at the city level include a tradeoff between land and wages. In these models both factors are undifferentiated by quality. In Haughwout and Inman (2001), production takes place in the city, and there are two labor inputs, resident workers and non-resident commuter managers. Managers wages are determined by the exogenous wages available at locations in the suburbs, and all local wage taxes are assumed to fully compensated for in the managers' gross wages. City wages and land values are determined endogenously, and there is a trade-off between them. Firm demand for land and workers is subject to a zero profit constraint, and resident workers must achieve a utility level which is given exogenously. Gyourko and Tracy (1989, 1991) find overall a significant effect of fiscal amenities on gross wages. However, the effect of state and local income taxes is small and statistically insignificant.

[4] This complementarity is consistent with the finding that the labor demand for unskilled workers is more elastic than the demand for skilled workers. (Hammermesch, 1993)

[5] The argument is analogous to that for assessing the behavioral impact of changes in tax policy by observing the change in taxable income. (Feldstein, 1995)

[6] Local property taxes are closer to benefit taxes than are state taxes, so the variance in the degree of redistribution is much more limited.

[7] It is not possible from the Pema study to separate this greater responsiveness to a greater migration response for given tax differentials, versus higher tax differentials for those with more education.

[8] See Chernick (2005) for a detailed description and comparison of the methodologies for measuring tax incidence in the two studies.

[9] The mean value of this index was 44.6 percent over a sample period slightly roughly corresponding to that used in this paper. The standard deviation was 4.2, implying a coefficient of variation of about 10 percent, somewhat smaller than the variation in tax incidence.

[10] There is some question whether the incidence of public higher education expenditures is progressive if one measures family income on a lifetime basis. Johnson (2004).

3 The correlation between the share of the budget devoted to education and the dispersion measure is very low. In the year 1992 the correlation was only .08.

[12] This increase was partially prompted by a number of court cases requiring more school finance equalization. (Evans, Murray, and Schwab, 1997).

[13] Johnson (2004) also finds that subsidy pattern is similar when family income is measured on a lifetime basis.

[14] Aggregate tuition levels are imprecise measure ofdistributional impact, because effective tuition may vary by family income level. However, at this point we have no systematic state data on need based public scholarships.

[15] Governor Pataki of New York State has recently made this argument in proposing an early rollback of state income tax surcharges on high-income tax payers. (Al Baker and Sewell Chan, 2005)

[16] The adjustment procedure is described in an appendix.