State Income Taxation with Mobile Labor

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Abstract

The ability of state and local governments to use tax and other fiscal policies to redistribute income may be limited when labor is mobile. An analysis of the allocative and distributional effects of a state income tax shows that, by driving out taxed households, the burden of the tax may be shifted to immobile households and other owners of immobile factors of production and may impose an excess burden on them. The NBER TAXSIM model is used to calculate state income tax burdens for representative high-income households in 1986–1988. Further calculations based on assumed demand elasticities for labor indicate that if high-income households are mobile, the marginal excess burden of income taxes imposed on them may be of substantial size in certain states, especially among the highest income groups.

INTRODUCTION

An important issue for American federalism is the degree to which state and local governments undertake income redistribution policy. Many writers [e.g., Stigler, 1959; Oates, 1968; Musgrave, 1969] have observed that state and local governments may be inherently ill-suited to playing a significant redistributive role in society. The attempt by lower-level governments to redistribute income can give rise to adverse locational incentives. The rich, who must bear heavier taxes to finance redistribution, may leave jurisdictions that attempt to impose heavy burdens on them, while the poor, who reap the benefits of redistribution, may be attracted to jurisdictions that transfer resources in their direction. Such incentives lead to an allocation of households among jurisdictions that is driven by fiscal incentives rather than true social benefits and costs. If the migration response to income redistribution were very large, redistribution by lower-level governments could become completely impracticable. But even if redistribution does not drive away every potential contributor and attract every potential beneficiary, the prospect of significant migration responses might significantly limit the amount

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of redistribution that lower-level governments would be willing to undertake. On the other hand, many would argue, from a normative viewpoint, that state and local policy instruments *should* be chosen in such a way as to bring about a more "equitable" distribution of real income. Further, it might be observed that as a practical matter, states and localities *do* in fact engage in some redistributive policies. This is most apparent in the case of state-supported income maintenance programs such as AFDC (Aid to Families with Dependent Children), but state and local income taxation, provision or subsidization of health care, and provision of education may also alter the distribution of income.

One extreme solution to the problem of assigning redistributive responsibilities to different levels of government is to leave all such functions in the hands of the federal government. In this extreme solution, states and localities would not attempt to provide income, shelter, health care, or other public benefits for the poor, nor would they attempt to impose heavier tax burdens on the rich. Insofar as possible, public services would be provided, and priced, according to strict efficiency criteria. Education, transportation, health care, and other functions of states and localities might be privatized or, if still left in the public sector, would be organized and financed in a manner much closer to private provision than is currently the case. While imaginable, such an extreme solution would appear to run counter to rather deep-seated political constraints which require states and localities to pay lip service, if no more, to various equity considerations in setting policy.[1] Another equally extreme solution to the tension between centralized and decentralized redistribution would be to shift all redistributive activities to lower-level governments. In the context of current U.S. policy, this solution is as improbable as its opposite. Its implementation might require constraints on the role of federal government authority which, if they ever existed under the U.S. constitution, have not existed under prevailing constitutional interpretations for the past half-century.[2]

Rather than settling on extreme solutions, American institutions have evolved a complex system of mixed responsibilities among different levels of government. There is continual pressure for reform and adjustment on the margins of the existing structure of American federalism. For example, the AFDC and Medicaid programs provide a framework through which open-ended matching grants from the federal government support state-administered programs providing income support and health care for the poor. With

[1] The mere declaration of redistributive goals for state and local policy should not, of course, be confused with real distributive impacts. For example, it has been argued that provision of education by local governments has led to stratification of localities by income class, as high-income households group together into high-income jurisdictions, using zoning and other policies to limit access to their education and other public services by low-income households. High-income households can thereby protect themselves from the costs of redistribution to which property-tax financing of education would otherwise expose them. [See, e.g., Hamilton, 1975; Mills and Oates, 1975; and Inman and Rubinfeld, 1979 for discussion of these issues.] Similarly, the benefits of state government involvement in higher education may accrue primarily to (the children of) middle-class households, rather than serving as a tool for significant pro-poor redistribution [Weisbrod, 1964]. Short of a comprehensive analysis of the incidence of state and local tax and expenditure policies, it is difficult to assess the extent of net redistribution by income class brought about by lower-level governments.

[2] Brennan and Buchanan [1980] discuss the role of constitutional constraints on central government fiscal powers and the role of fiscal federalism as part of a system of such constraints.

matching rates that range from 50 to 80 percent, the degree of federal involvement is clearly quite high, but the states have wide latitude in setting benefit levels, resulting in substantial interstate variation. States that set higher benefit levels may raise net incomes for the poor and may also attract more poor from other states; in both of these respects, they may confer an external benefit on other states. The existence of these externalities provides one rationale for the use of federal matching grants, as discussed, for example, by Gramlich [1985] and Wildasin [1991a]. However, proposals are frequently made to alter the current mix of federal and state responsibility for support of the poor. For example, the Reagan administration introduced a "New Federalism" plan, under which the states would have taken over full responsibility for cash transfers, while the federal government would have assumed full responsibility for health care for the poor. This program, which was not enacted, could have had far-reaching consequences.[3] As another example, Peterson and Rom [1990] have recently called for more extensive Federal involvement in income support for the poor through the setting of a national welfare standard. Rivlin [1991] calls for an asymmetric assignment of tax and expenditure responsibilities for the federal and state governments. Echoing the arguments of the 1960s and 1970s for revenue sharing, Rivlin argues that the federal government is in a better position to raise revenues equitably, since the states must compete for labor and capital. On the other hand, the states may be in a better position to allocate expenditures in accordance with their diverse priorities and preferences. Thus, Rivlin suggests a system with extensive federal finance for the expenditures of lower-level governments. Federal tax policy may also provide indirect support for state and local expenditures through deductibility provisions for state and local taxes. Removal of the sales tax deduction under the Tax Reform Act of 1986 (TRA86) creates an incentive for states to shift away from the sales tax as a source of finance; the reduction of marginal rates also reduced the level of federal offset for those state and local taxes that remained deductible. The distributional consequences of deductibility have been the subject of some discussion in the literature [see, e.g., Gramlich, 1985; Chernick and Reschovsky, 1986].

One important component of the system of state government finance in the United States, and one which may potentially have significant distributional consequences, is the individual income tax. The income tax is relatively easy to implement at the state (or local) level since lower-level governments can rely on the federal income tax to establish the basic definitions of income and deductions, simplifying tax calculations for taxpayers and facilitating enforcement. Without much administrative difficulty, states could achieve a (statutory) distribution of the burden of state government finance across income classes which varies as progressively as desired simply by choosing an appropriate structure of tax rates. Of course, if high-income households are highly mobile, states might not avail themselves to this opportunity. Furthermore, they might be driven (by a process of tax competition) to choose rather similar tax structures. Empirical models of state and local tax policy determination [e.g., Inman, 1989; Chernick and Reschovsky, 1990; Chernick, 1991] suggest that lower-level governments choose tax structures that reflect

[3] It has been estimated [Craig and Inman, 1986; Inman, 1985] that the New Federalism plan would have reduced state expenditures on AFDC by 70–95 percent, a truly massive impact.

a balancing of political and economic constraints. To what extent does labor mobility constrain the income tax policies of the states?

Through the analysis in this paper, I attempt to shed some new light on the use of state income taxes in the United States, and the possible costs to the states of doing so in the face of mobile labor. I begin by developing a simple theoretical structure within which the distributional and allocative consequences of state income taxes and other redistributive fiscal policies can be analyzed and illustrated. When households are mobile, net fiscal benefits and burdens create incentives for them to migrate. The extent to which they do so depends, among other things, on the elasticity of demand for labor in each state. The analysis shows that the distributional impact of redistributive policies varies markedly, depending on whether or not the affected households are mobile among the states. When households are mobile, an attempt to increase their fiscal burden may fail because they can escape such burdens by moving to other states; in doing so, net incomes for those remaining in the taxing jurisdiction may be reduced due to the distortion of workers' locational choices, resulting in an excess burden of taxation.[4]

I then apply this theoretical framework to the analysis of state income taxes in 1986–88. First, I estimate average tax rates for representative high-income households using the NBER TAXSIM model. These calculations reveal the extent of interstate variation in reliance on income taxation, and the degree to which the states have attempted to use the income tax to differentiate tax burdens by income class. Second, I combine the average tax rate calculations with postulated demands for labor in order to estimate the marginal excess burden that the states might face from taxation of mobile high-income households, assuming that lower-income households and other factors of production are immobile. The assumptions underlying the calculations imply that redistributive policies aimed at transferring income from the mobile rich to the immobile poor may actually *lower* the net incomes of the poor, once employment and wages have adjusted to their new equilibrium values. The calculations, though highly tentative in nature, provide at least some rough indication of the harm that lower-income residents and other owners of immobile factors in a given state might suffer as a result of the imposition of higher tax burdens on mobile high-income households.

In the conclusion, I summarize some of the main results and discuss both possible implications for policy and some directions for future research.

A FRAMEWORK FOR ANALYSIS

The households living in a given state are affected by a host of state government tax and budgetary policies. Virtually all residents of every state derive at least some benefits from some state public expenditures and bear at least

[4] The notion that taxation of labor income can cause resource misallocation resulting in an excess burden is a familiar one, and several excess burden estimates have appeared in prior literature [Hausman, 1985]. However, previous estimates have examined the impact of taxes on labor/leisure incentives, not locational choice. In the present study, it is assumed that the amount of labor supplied by each worker is completely fixed, so that there is no labor/leisure distortion whatsoever. This concentrates attention on the allocative consequences of taxation resulting from distorted *locational* incentives.

some of the cost of financing state government through tax or other revenue sources. On balance, the totality of these policies have some net impact, positive or negative, on the welfare of each resident household. In principle, one could try to measure the monetary value of all of the benefits and costs experienced by any given household, netting the costs from the benefits to determine the household's *net fiscal benefit* from state policy. (Following Buchanan [1950], this net benefit is sometimes called a *fiscal residuum*.) This simple concept can be used as a starting point for the analysis of the distributional impact of state tax and expenditure policies. For example, some studies [e.g., Pechman, 1985; Berliant and Strauss, 1991] have attempted to ascertain the distribution of state tax burdens by income class in order to assess the equity of state tax systems. A change in federal tax policy such as the repeal of sales tax deductibility can also change the distribution of effective tax burdens by income class [Courant and Rubinfeld, 1987]. Of course, the incidence of taxation is only part of the distributional impact of state fiscal policy. The benefits of primary, secondary, or higher education, of expenditures for health or welfare benefits, and other expenditures combine with the tax system to determine the overall distribution of net fiscal benefits.

The real impact of fiscal benefits and costs cannot be adequately assessed, however, without taking their allocative consequences into account. Of particular interest here is the effect of state fiscal policies on the allocation of mobile labor among the states. The following paragraphs present a simple model which is used to compare the allocative consequences of state fiscal policies in two polar cases: the case where labor is assumed to be completely immobile, and the case where labor is completely and costlessly mobile. Of course, neither of these polar assumptions is likely to be literally valid in any practical context. Analyses that ignore the possibility of labor mobility typically embody the first of these assumptions (though the assumption may be implicit rather than explicit). It is useful to consider the opposing polar case of free mobility for the sake of simplicity and sharp analytical contrast. After comparing the effects of state fiscal policies in these two idealized cases, some of the empirical literature on labor mobility and the consequences of relaxing the strong assumption of costless mobility are discussed.

The basic analytical framework is illustrated in Figure 1, in which MP_i denotes the marginal productivity of labor in state i. For simplicity, suppose that each worker supplies one unit of labor, so that the quantity of labor l_i measured on the horizontal axis can also be identified with the number of workers in the state. Although not essential for the analysis, it is most convenient here to assume that there is only one homogeneous type of potentially mobile labor; the principles derived under this assumption remain essentially valid in the case where there are many types, but their application becomes more complex in detail. (The calculations in the following section assume that high- and low-income households provide different types of labor.) The MP_i curve is drawn downward-sloping to reflect the presence of various immobile factors of production, such as land, other natural resources, some types of highly durable capital and infrastructure, and perhaps other types of labor. Assuming that the labor market is competitive, the MP_i schedule shows the gross wage, that is, the wage exclusive of any fiscal burdens or benefits, for any given size of labor force. If n_i represents the number of workers "initially" located in state i, and if in the short run labor is immobile, then the market equilibrium wage is OA.

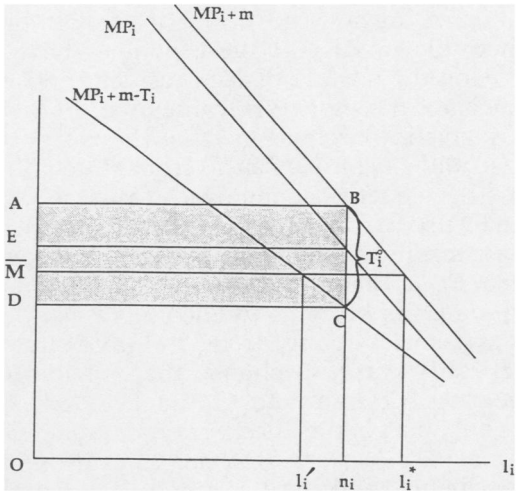

Figure 1. Taxes and labor market equilibrium, with mobile and immobile labor.

A worker's net income in state i could differ from the gross wage for several reasons. First, workers might receive nonwage income, such as interest, dividends, or capital gains. Note that a worker's income from these sources is not dependent on the state of residence; for example, a household residing in California could earn dividends on stock held by a mutual fund in New York, and this income would be unaffected if the household were to move from California to, say, Illinois. Thus, let m (independent of i) represent the nonwage income of a mobile worker. For simplicity, assume this amount to be the same for all mobile workers.

Second, as noted above, tax and expenditure policies alter the net incomes of a state's residents. On the one hand, taxes assessed by the state reduce the net income of its residents. On the other hand, cash and in-kind transfers and other public goods and services provided by the state raise the net incomes of residents. In principle, one could subtract the (monetary) value of all benefits from the total of all taxes to arrive at a measure of the net fiscal burden, denoted by T_i, borne by a worker in state i. This amount could be positive or negative, depending on the size of fiscal burdens relative to fiscal benefits.[5] Figure 1 illustrates the simple case where state i imposes a flat

[5] The value of the benefits from public goods and services to mobile residents would ideally be measured by their willingness to pay. Since such valuations are difficult to determine, they are sometimes approximated by the value of public expenditure. While preferable to ignoring benefits altogether, this procedure does not allow for the possibility that public goods may be valued either more or less highly than the outlays made in providing them. Suppose, for instance, state i imposes more taxes on mobile households and uses the proceeds to provide them with additional public services. The increase in taxes alone raises the net fiscal burden on these households. The value of the additional expenditure on public goods is equal to the extra taxes, and if the additional units of public goods are valued at cost, the net fiscal burden for mobile households is unchanged. In reality, however, the public goods could be valued *more* highly than the cost of provision, in which case the net fiscal burden is actually reduced, despite the increase in taxes. (If the public goods are valued less highly than the cost of providing them, then of course the net fiscal burden rises.)

proportional tax on the total income of its potentially mobile residents, and provides no benefits to them. In this case, the income tax is the sole (state) fiscal variable affecting the net income of the state's residents. The schedule labeled $MP_i + m - T_i$ shows the value of after-tax income for these workers for different sizes of the labor force l_i.[6]

It is easy to see from this diagram how state fiscal policies affect net incomes in the special case where workers are immobile. If the work force is fixed at n_i, then the gross wage is OE, total gross income per worker is OA (the wage OE plus m), the amount of tax is T_i^0, and income net of tax is OD per worker (OA less T_i^0). The total net fiscal burden on all workers is $n_i T_i^0$, which is represented in the diagram by the shaded rectangle $ABCD$. If the tax on these workers were increased, the net income schedule $w_i + m - T_i$ would shift down, the level of gross income per worker OA would remain unchanged, and the net income per worker $OA + m - T_i$ would fall. This extra fiscal burden on workers would create fiscal benefits for other residents of the state, as higher taxes collected from these workers would allow either a reduction in taxes paid by other residents or an increase in public expenditures which benefit them.

Now consider what happens when workers are mobile. Suppose that workers employed in other states receive a net income of $\overline{M}$. If workers are freely mobile, they will move into state i whenever the net income there exceeds $\overline{M}$ and will move out whenever net income is lower than $\overline{M}$. Suppose that n_i workers are initially located in the state. Figure 1 illustrates that migration in either direction is possible, depending on the fiscal policy within the state. It could happen that the net fiscal burden on mobile residents would be zero—whether because they pay no taxes and receive no benefits from state public expenditures, or because the value of the taxes paid just offsets any benefits received. In this case, the curve $MP_i + m$ would show the net income attainable by workers in state i at each possible level of employment; with n_i workers initially allocated to the state, the net income level would be OA. Since OA exceeds the net income $\overline{M}$ available in other states, labor would flow into state i. This inflow would drive down the wage rate in state i and equilibrium would finally be reached with employment of l_i^* workers, each now earning the same income of $\overline{M}$ within the state that they could earn elsewhere. Suppose, on the other hand, that the net fiscal burden on mobile residents was positive, with taxes outweighing the value of the benefits from public expenditure. The schedule $MP_i + m - T_i$ in Figure 1 illustrates such a case, recalling that it refers to the case where a state income tax is imposed on mobile workers without offsetting benefits. With n_i workers initially located in state i, the net income per worker would be OD. This is less than the net income of $\overline{M}$ that is available outside of the state. Therefore, some workers would leave state i, causing labor to become more scarce within the state and driving the gross wage up to a higher level. Equilibrium would be achieved with a level of employment equal to l_i', at which the net income within the state rises to the level attainable elsewhere.

[6] If t_i is the proportional rate of tax, then $MP_i + m - T_i = (1 - t_i)(MP_i + m)$. Note that the amount of the tax per worker, T_i, can and in this case does depend on the size of the work force, since the tax burden varies with the gross wage. In the figure, the tax rate has been assumed to be sufficiently high that after-tax income, including nonwage income, is lower than the gross wage, but this is not a crucial feature of the diagram.

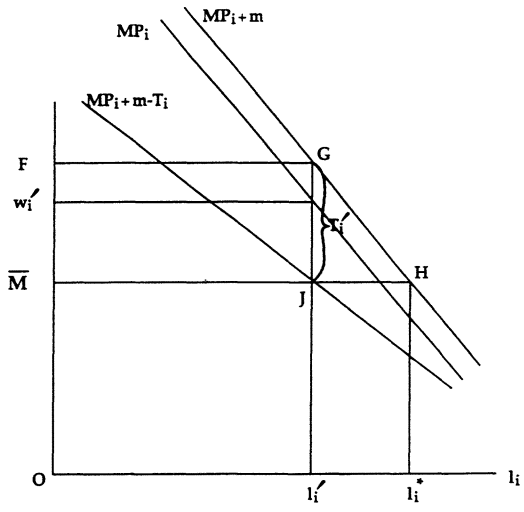

Figure 2. The excess burden of taxation from taxation of mobile labor.

How do taxes affect the distribution of income within state i when the taxed workers are mobile? In contrast to the case where these workers are immobile, changes in taxes now change the allocation of resources and the gross or before-tax return to factors of production. Assuming that migration into or out of state i does not appreciably affect the net income of workers in other states, the net income that they receive in equilibrium must still be $\overline{M}$.[7] In Figure 2 (which shows the same two equilibrium situations as Figure 1 at l_i^* and l_i'), the net income of mobile workers is equal to $\overline{M}$, both in the initial situation where the net fiscal burden on mobile workers is zero and in the case where the taxes imposed upon them have been increased and result in a net burden.Thus, with the higher taxes, the *gross* income per mobile worker must rise to OF in order to offset the added tax burden of T_i'. The outflow of mobile labor that brings this about, however, also lowers the productivity of the *immobile* factors of production, and their equilibrium gross incomes fall accordingly. The revenue collected from heavier taxation of mobile workers can be used to benefit these immobile factors—for example, by reducing the taxes assessed on them—and this partially offsets the reduction in before-tax income that they suffer due to lost productivity. However, on balance, the added revenue from the higher tax on mobile labor must fall short of the loss in the gross income of the immobile factor owners, so that even if all of this incremental revenue is paid to them, either directly through some form of transfer payment or indirectly through a reduction in their own tax burden, they must end up with lower *net* incomes. The net loss borne by the immobile

[7] Actually, even if state i is "small," taxes there will still depress the equilibrium net return in the rest of the economy. This effect will be small in per worker terms, though in aggregate terms it will be of the order of magnitude of the tax collected instate i. See Bradford [1978] and Wildasin [1986, pp. 107–108] for the demonstration of these results in the case of property taxation. For the purposes of the present analysis, these general equilibrium effects on the level of net income in the rest of the economy can be ignored.

factor owners is the familiar *excess burden* of taxation, and it is represented in Figure 2 by the triangle *GHJ*.[8] Note that the magnitude of this excess burden, and the amount of the tax base that is lost due to taxation, depend on the elasticity of demand for the immobile factor (the MP_i curve). The more elastic this demand, the larger is the reduction in employment $l_i^* - l_i'$ brought about by an increase in the net fiscal burden on mobile workers, and the broader is the base of the excess burden triangle *GHJ*. Intuitively, the greater the elasticity of demand for labor, the larger is the misallocation of resources that can result from the distorted allocative incentives associated with state tax and expenditure policies.

A comparison of the effect of taxation in the case where labor is immobile with the case where it is mobile reveals several important points. First, in the immobile case, higher taxes do not drive out the taxed factor and, as a result, factor supplies and gross factor returns are unchanged. A tax on one factor that supports transfers or tax reductions for another factor directly alters the net income distribution. In the mobile case, on the other hand, a tax on a mobile factor reduces its supply to the state, raising its before-tax return and (typically) lowering the before-tax return to the immobile factors. These changes in gross returns shift the burden of the tax on the mobile factor to the immobile factor owners.[9] If there is some fixed external net return available to the mobile factor, the tax imposed upon it by the state does not depress its net return. Furthermore, the revenue derived from this tax is insufficient to compensate the immobile factor owners for the reduction in their gross incomes that the tax, and the ensuing reallocation of mobile labor, brings about. Thus, the distributional impact of a state income tax or other state fiscal policies can vary enormously, depending on the mobility of factors of production.

So far we have explored the impact of state fiscal policies on labor allocation and income distribution in the two polar cases where labor is either completely immobile or completely mobile. Whether any particular type of labor is really mobile or not is an empirical question whose answer depends in part on the time frame of the analysis and its intended application. Undoubtedly, labor migration is not perfectly costless. Migrants (or their employers) bear both pecuniary and nonpecuniary costs. Transportation costs, search costs, and the loss of many types of location-specific human capital all tend to inhibit migration. These costs vary across individuals, in part systematically and in part idiosyncratically. A young person just completing college, a couple

[8] The reduction in the gross income of the immobile factors is equal to the area of the trapezoid $FGH\overline{M}$ in Figure 2. This area, which can be interpreted as a type of "consumer surplus" loss, is equal to the value of the lost output in the state due to the outflow of mobile labor minus the change in wage payments to mobile workers, and thus constitutes the loss in the gross return to the immobile factors that are employed in the state. The amount of additional tax revenue collected from the imposition of the added fiscal burden T_i' on the mobile workers is $T_i'l_i'$, shown in Figure 2 by the rectangle $FGJ\overline{M}$. If all of this incremental revenue is paid over to the immobile factor owners, it offsets a portion of the reduction in their gross income. However, the area of trapezoid $FGH\overline{M}$ exceeds that of rectangle $FGJ\overline{M}$ by the area of the triangle *GHJ*; this excess of the loss of gross income over the amount of revenue collected is the excess burden of the tax.

[9] Cassidy et al. [1989] and Epple and Romer [1991] have investigated income redistribution in models where property taxes allow mobile renters to benefit at the expense of the owners of immobile property (land). Like the present analysis, these studies highlight the importance of immobile factors of production in determining the redistributive impact of fiscal policies by lower-level governments. See also Wildasin [1991b, c].

whose children have just reached adulthood and left home, a newly-retired person, or a worker who has been laid off might find the cost of migration to be low relative to its benefits. A couple with children in school, a person who has just bought a new house, an employee with a secure job and valuable knowledge about firm-specific production techniques, or an entrepreneur with thorough knowledge of local market conditions would all find migration relatively costly.[10] Any one individual or household is likely to find migration rather costly at some points in the life cycle and less costly at other points. Thus, at any moment in time, some portion of the population would be reluctant to migrate while another portion would find migration relatively easy to manage.

The magnitude of migration in the United States appears, in general, to be substantial. In a typical year, about one-third of young American adults (ages 20–29) move, with the percentage of movers falling with age to about 5% in the oldest age groups [*Statistical Abstract*, 1990, Table 25; data for 1987–88]. Roughly one-sixth of these moves are to a different state. Thus, over a several-year period, a substantial proportion of the population has occasion to move, and many movers change their state of residence. Detailed empirical work of Topel [1986] and LaLonde and Topel [1991] supports the view that the migration response to income differentials among regions does indeed vary across household types. They find that the young are more likely to migrate than the old, presumably because the former have a longer period over which to realize the benefits of differentially higher earnings in a new location. [See also Greenwood and McDowell, 1986, and Isserman et al., 1986, for further discussion and references on migration.] Empirical work on hedonic intercity wage differentials [see, e.g., Rosen, 1986, for discussion and references] is premised on the assumption of long-run spatial arbitrage; though it does not directly test for the effects of crime, climate, and other variables on migration, the results of such research seem plausible and lend indirect support to the notion that workers are mobile in the long run.

These considerations suggest that there is no simple characterization of labor as either "mobile" or "immobile." Rather, the nature of the migration responses to redistribution policies by state governments is conditional on the type and duration of policy under consideration. A permanent policy of redistributive taxes and transfers is likely to have a larger impact than a temporary one, both because the anticipated gains or losses from redistribution are greater if they are permanent and because a higher proportion of households are likely to experience circumstances conducive to migration (family changes, occupational switches, etc.) over a long period of time. Accordingly, we might expect a change in redistributive policy by one state to

[10] For homeowners, brokerage fees resulting from the sale of one house and the purchase of another can be of some importance. As a rough estimate, suppose that a household purchases a house that is worth three times annual income, and incurs brokerage fees amounting to 6 percent of house value. This works out to 18 percent of one year's worth of income. Amortized over a 5-year horizon at an interest rate of 5–10 percent, this amounts to 4.1–4.7 percent of annual income; over a 10-year horizon, 2.3–2.9 percent; and 1.4–2.1 percent over 20 years. For a household earning $100,000, the brokerage fee would thus be $18,000, that is $4100–$4700 yearly for 5 years, $2300–$2900 yearly over a 10-year period, and $1400–$2100 for 20 years. These calculations illustrate not only an order of magnitude for one type of migration cost, but the importance of the time frame for the analysis. (I am grateful to Robert Inman for suggesting these calculations.)

have a rather small effect on the interstate allocation of labor in the "short run." In the context of the analysis above, this policy would be expected to have a significant effect on the *net* distribution of income over a short time horizon. If sustained over time, however, such a policy could have a large effect on migration and thus on gross factor prices. As gross factor prices adjust to changes in labor supply, the redistributive impact of the policy would be attenuated and perhaps, in the end, completely undone.

The assumption of perfectly costless migration used in the analysis of Figures 1 and 2 is an idealization. Even in the long run, labor cannot migrate at absolutely zero cost. However, the essential conclusions of the analysis are not necessarily invalidated when this extreme assumption is relaxed. First, it is unnecessary to assume that *all* of the taxed workers are costlessly mobile. In Figure 2, l_i' workers remain in state i even after all adjustments to higher taxes have taken place. Realistically, some workers of a given type might be mobile and others immobile, but all that is necessary for the analysis is that some workers remain mobile *at the margin*. For instance, suppose that a state is considering a tax increase that would cause the equilibrium labor force to shrink by 5% relative to its current level. If at least 5% of the workers are costlessly mobile (in the long run), the final adjustment of employment and wages in response to the tax will not be effectively hindered by whatever costs might inhibit migration by the other 95% of the labor force. They do not need to move in order to complete the adjustment of the labor market to its new equilibrium in any case, so the fact that migration would be costly for them is actually irrelevant. What is critical is that there be enough workers able to move, in the long run, to prevent persistent differences in real net incomes among the states. (When there are several types of labor, as discussed in the next section, the crucial issue is whether there are enough mobile workers of a given type to equalize net incomes among the states for the workers *of that type.*) This is a much weaker assumption than that of costless mobility for all workers. Second, when allowing for mobility of labor, it is not absolutely essential to assume that migration is completely costless. Imagine that the cost of migration is c per worker. If the fiscal burden on potentially mobile workers is less than c, then no migration would occur and the impact of taxation is as described for the case of immobile labor. If the fiscal burden is higher than c, then taxation triggers migration, and in this case its effect is essentially just as described for the costless migration case. We need only reinterpret $\overline{M}$ in Figure 2 as the income attainable in another location, *net* of migration costs. Under this interpretation, the analysis of the imposition of a net fiscal burden on potentially mobile workers in state i proceeds almost exactly as before. That analysis leads again to the conclusion that the burden of redistributive taxation may be largely shifted from mobile to immobile factors of production, provided that enough redistribution is undertaken that it produces some migration response at the margin.

STATE INCOME TAXES ON HIGH-INCOME HOUSEHOLDS, 1986–1988

This section applies the foregoing theoretical framework by analyzing state income taxes on high-income households in 1986 and 1988. There are several reasons for restricting attention to high-income households. First, they are likely to be a group for which mobility is relatively high. This is debatable,

of course, but in general one would expect that the size of the employment "market area" for high-income, high-skill workers would be relatively large and that they would have relatively good information about market conditions in other states. Second, the incidence and allocative consequences of taxes on high-income households is of importance for policy purposes, in part because these households receive a large share of total income and pay a large share of state income taxes. Third, as a purely pragmatic matter, while it is very difficult to measure net fiscal benefits or burdens for any group of households, this difficulty is perhaps minimized in the case of high-income households. These households are unlikely to be major beneficiaries of redistributive transfer programs (AFDC, state-subsidized health care, housing, and the like). Other public services certainly do benefit them, but it is probably true nevertheless that benefits relative to income are relatively small for most high-income households. Ignoring these benefits, which is a practical necessity, probably distorts the estimate of fiscal benefits less for these than for other households. Furthermore, restricting attention to income taxation to the exclusion of other taxes is, again, probably less misleading for high-income households than for others. While exemptions and some rate progressivity make the state income tax perhaps less crucial for lower-income households than sales taxes or other state revenue sources, the state income tax (in states where this tax is used) is certain to reach high-income households and, indeed, to be in many cases the major state tax that they face. Sales and other consumption-based taxes would typically rise less in proportion to income and would therefore be relatively less important for households with high incomes.[11]

As a first step in the empirical analysis, one must begin with a determination of the size of statutory state income tax burdens. Note that what matters, both for distributional purposes and from the viewpoint of locational incentives, is the *total* income tax that a taxpayer must bear, conditional on residing in a given state. In analyzing the effects of taxes on labor supply, we are accustomed to thinking about *marginal* tax rates, since they affect the return to the individual worker from supplying additional hours of work. However, the number of households who wish to reside in a given state will depend on exemptions, the tax treatment of capital income, and any other feature of the state income tax structure that affects the total burden that the taxpayer must bear. Marginal rates, though important, do not really capture the relevant information about state tax policy for our purposes.

The NBER TAXSIM state income tax calculator, however, makes it possible to examine all the features of state income tax policy that are relevant for locational choice. Given a taxpayer with specified attributes, such as filing status (marital status, number of children, and so on), income by type, and

[11] Taxes on luxury goods provide an obvious exception to this statement, but it remains generally valid. Note that the act of consumption, in a life-cycle setting, need not occur in the same state where income is received. Thus, the level of a state's general sales tax would be less important to a household with high current income than its income tax. The latter is assessed when and where the income is received, while a high-income household that is saving from current income can defer the sales tax and thus escape it altogether by moving to another state later in life, for example, in retirement, when previous savings are decumulated and consumed. Thus, even if all income is ultimately consumed over the course of the life-cycle, a state's sales tax would not necessarily impose much burden on middle-aged, high-income life-cycle savers compared to its income tax.

deductible expenses, TAXSIM can calculate the state income tax for which the taxpayer is liable. Of course, state income tax laws can be quite complex, and there are many different types of households. One might imagine trying to describe in detail the specific attributes of the actual population of taxpayers residing in each state, and using TAXISM to calculate their tax burdens. But for the purpose of determining in general what tax burdens different states impose on high-income taxpayers, it is probably most helpful to think in terms of "representative" taxpayers in different income classes, ignoring a multitude of comparatively minor details which, however important for individual taxpayers, do not really contribute to an understanding of the broad features of each state's income tax law. From federal *Statistics of Income* data, it is apparent that the bulk of income accruing to high-income households derives from only a few sources, namely wages, interest, dividends, and capital gains, with the latter of great importance for the very highest income classes. Similarly, most deductible expenses are attributable to a handful of items: state and local taxes, interest expense, and charitable contributions. Therefore, for each of a series of relatively high-income classes, TAXSIM was used to calculate the state income tax burden, in each state, for "representative taxpayers." These representative taxpayers are each assumed to have amounts of income and deductions that conform with those reported in the 1986 *Statistics of Income*. (See the appendix for details on tax calculations.) This makes it possible to determine what state income tax a "typical" member of any income class would bear if that household were to reside in any of the states.

Table 1 presents some of the results from these calculations.[12] Tax calculations are shown for both 1986 and 1988 and are expressed, for convenience, as a percentage of total (grossed-up) income rather than in absolute magnitudes. These are *average* tax rates; that is, total state income tax liabilities expressed as a percentage of household income. A comparison of 1986 and 1988 is of some interest because the Federal Tax Reform Act of 1986 (TRA86) redefined the tax base for federal tax purposes in several important ways, and because many states follow the federal income definitions. In particular, of great importance for the highest income classes, TRA86 eliminated the exclusion of capital gains income, taxing all capital gains as ordinary income. For a given taxpayer with given amounts of capital gains, this redefinition would raise the amount of taxable income and thus the state income tax burden on the taxpayer, at least in a state which follows federal income definitions. A comparison of 1986 and 1988 calculations shows the effect of federal reform, together with any changes in state tax law which may have occurred between 1986 and 1988 (which of course might, but need not, have been stimulated by TRA86 itself).[13]

[12] In order to save space, only the figures for married couples filing joint returns with no children are reported. These results are, however, representative of those obtained for single taxpayers and for married couples filing joint returns with two children. The full results of the TAXSIM calculations are available from the author on request.

[13] The calculations in Table 1 do rest on some assumptions which should be noted. First, they are not adjusted to account for the effect of inflation. Since the taxation of capital income is not indexed, real burdens on capital income are greater than nominal burdens. For the highest income classes shown in the table, this implies that tax burdens are understated. On the other hand, capital gains are taxed only on a realization basis, so that the true (accrued) income of households with capital gains income may be understated, particularly for the highest income

The simple unweighted mean average tax rates for the 43 states with some form of income tax, shown at the end of the table, range from about 3.5 percent at the lower end of the income classes considered ($50,000–$55,000) up to about 7 percent. But both the level and the degree of progressivity of state tax burdens vary widely among the states. Some states, such as Pennsylvania, have income tax rates that are relatively low and quite stable across income classes. New Jersey's income tax (in the years reported) is quite low for incomes between $50,000 and $100,000, but it rises quite sharply for the highest income groups. New York stands out as a high-tax state, with income tax rates well above average at all income levels shown. Its tax rate rises to above 10% in the highest classes; in this respect it is somewhat unusual but by no means unique. (California, Hawaii, Minnesota, Montana, Oregon, and the District of Columbia all have tax rates on the highest income class that exceed 10% for at least one year, and many other states tax the highest income groups at rates in excess of 9%.) The case of Connecticut is perhaps of particular interest in view of recent highly publicized debates there concerning state income taxation. In the years analyzed, Connecticut did not tax wage income, but capital income was subject to tax. The tax burden on representative taxpayers with income below $100,000 was accordingly relatively low, since most income for such taxpayers is derived from earnings. However, capital income is proportionally much more important for the highest income groups and for them, the Connecticut state income tax was far from negligible, amounting to 5–7 percent of income.

Comparing 1986 and 1988, the average figures at the end of the table indicate that state income taxes were generally higher in 1988 than in 1986. The changes in average tax rates between these two years, however, varied quite a lot among the states. In many cases, average tax rates changed by only a percentage point or so, sometimes falling and sometimes rising. As might be expected, the largest tax rate changes occurred in the highest income classes, frequently rising by two percentage points or even more (see, e.g., Minnesota, Montana, and Utah). In a significant number of states, however, tax rates on the highest income classes fell significantly between 1986 and 1988 (see e.g., Nebraska, Rhode Island, and Vermont). Despite interesting changes in particular states, however, it is difficult to see a major overall trend in state income tax rates between 1986 and 1988 in these data.

It is difficult to say a priori whether these state tax burdens are "large enough" relative to migration costs to affect the locational choices of high-income households. If the state tax policies shown in Table 1 are "typical" in the sense that the years 1986–88 were not characterized by exceptionally high or low tax burdens, a potential migrant would presumably anticipate that burdens of approximately the size shown in the table would persist over time. A tax equal to 5 percent of income per year for a period of between 5 and 10

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classes. To the extent that this is true, the tax burdens reported in Table 1 are overstated. The use of 1986 data to determine the share of income attributable to different income sources (i.e., earnings, capital gains, etc.) could be misleading in that it appears that capital gains realizations were unusually high in that year [see Berliant and Strauss, 1991, for discussion of this point]; this would be of importance mainly for the two highest income classes considered here. Finally, it might be noted that the realization of capital gains income is often rather discretionary, and a household living in a state that taxes capital gains heavily might postpone realizations until after a move to another state.

Table 1. Average tax rates, by state and income class, 1986 and 1988 (in percent).

	Income Class ($1000s) and Year													
	$50–55K		$55–60K		$60–75K		$75–100K		$100–200K		$200–500K		$500–1000K	
State	1986	1988	1986	1988	1986	1988	1986	1988	1986	1988	1986	1988	1986	1988
AL	2.52	2.77	2.57	2.82	2.65	2.90	2.83	3.10	3.07	3.34	3.39	3.91	4.12	4.63
AZ	4.14	4.52	4.20	4.58	4.22	4.69	4.32	4.96	4.35	5.31	4.23	6.13	4.29	7.14
AR	4.26	4.78	4.40	4.92	4.61	5.13	5.15	5.61	5.93	6.38	7.14	7.56	8.76	8.89
CA	3.18	3.22	3.53	3.60	4.09	4.28	5.49	5.47	7.32	7.20	9.62	9.46	11.81	11.56
CO	4.05	4.26	4.12	4.35	4.15	4.55	4.30	4.90	4.33	5.39	4.46	6.10	4.74	6.91
CT	0.10	0.19	0.18	0.33	0.46	0.71	1.50	2.05	2.58	3.21	4.44	5.64	5.75	7.84
DE	5.05	5.07	5.30	5.25	5.59	5.50	6.31	6.06	7.20	6.94	8.40	8.29	9.57	9.76
DC	7.11	7.24	7.32	7.42	7.49	7.67	8.10	8.27	8.81	9.28	9.82	10.88	10.98	12.73
GA	4.04	4.13	4.14	4.22	4.22	4.34	4.52	4.67	4.87	5.21	5.39	6.09	6.00	7.12
HI	5.68	6.06	5.83	6.26	6.01	6.54	6.59	7.16	7.41	8.17	8.54	9.71	9.68	11.42
ID	5.00	5.36	5.11	5.54	5.19	5.72	5.56	6.16	6.01	6.78	6.69	7.62	7.48	8.25
IL	2.30	2.38	2.32	2.40	2.38	2.46	2.50	2.57	2.73	2.78	3.14	3.16	3.59	3.61
IN	2.80	3.34	2.83	3.37	2.87	3.45	2.95	3.60	3.10	3.90	3.32	4.39	3.46	4.95
IA	4.74	4.93	4.89	5.03	5.03	5.24	5.49	5.79	5.91	6.48	6.44	7.79	7.05	9.32
KS	2.96	2.67	3.08	2.75	3.19	2.86	3.53	3.12	4.00	3.44	4.36	4.11	4.77	4.89
KY	3.71	4.05	3.73	4.07	3.69	4.11	3.72	4.26	3.66	4.46	3.49	5.04	3.50	5.83
LA	1.68	2.15	1.73	2.19	1.75	2.25	1.85	2.53	2.17	3.16	2.55	4.14	2.88	5.11
ME	3.83	4.70	4.16	4.87	4.56	5.11	5.57	5.65	6.82	6.50	8.38	7.79	9.74	9.21
MD	3.81	4.03	3.86	4.08	3.86	4.09	4.04	4.23	4.24	4.45	4.57	4.79	5.03	5.09
MA	4.58	4.58	4.65	4.65	4.83	4.83	5.34	5.34	6.08	6.08	7.39	7.39	8.31	8.31
MI	4.36	4.38	4.40	4.42	4.46	4.55	4.60	4.79	4.82	5.22	5.13	5.91	5.32	6.69
MN	4.49	5.70	4.60	5.85	4.68	6.06	4.93	6.56	5.09	7.39	5.13	8.69	5.41	10.18
MS	2.80	3.04	2.91	3.16	3.08	3.33	3.48	3.68	4.03	4.25	4.85	5.10	5.95	6.02
MO	2.36	2.90	2.45	3.00	2.54	3.15	2.73	3.46	2.90	3.86	2.98	4.64	3.18	5.54
MT	4.74	5.78	4.86	5.94	4.96	6.17	5.30	6.84	5.60	7.78	5.70	9.45	6.03	11.34
NE	3.77	3.10	4.08	3.29	4.53	3.58	5.34	4.15	6.59	5.00	8.45	6.20	9.47	7.42
NH	0.08	0.08	0.15	0.15	0.19	0.19	0.46	0.46	0.61	0.61	1.06	1.06	1.08	1.08
NJ	2.18	2.18	2.31	2.31	2.54	2.54	2.90	2.90	3.44	3.44	4.22	4.22	4.96	4.96
NM	1.71	2.85	1.89	3.05	2.13	3.37	2.76	4.09	3.64	5.42	4.98	7.17	6.21	8.80
NY	6.34	5.54	6.56	5.84	6.78	6.12	7.56	6.70	8.52	8.02	10.17	10.49	11.95	12.85
NC	4.59	4.88	4.73	5.02	4.92	5.21	5.45	5.67	6.18	6.42	7.31	7.58	8.79	8.90
ND	1.62	2.06	1.71	2.19	1.85	2.37	2.22	2.73	2.81	3.53	3.84	4.28	4.72	4.96
OH	3.98	3.69	4.17	3.86	4.44	4.15	4.94	4.74	6.39	6.19	8.36	8.11	9.40	9.72
OK	3.27	3.77	3.39	3.89	3.50	4.06	3.85	4.44	4.28	5.07	4.88	6.02	5.54	7.10
OR	5.90	5.28	6.15	5.44	6.46	5.68	7.26	6.30	8.49	7.45	10.34	9.38	12.43	11.28
PA	2.20	2.14	2.21	2.15	2.25	2.19	2.34	2.28	2.51	2.44	2.80	2.72	3.15	3.07
RI	3.23	3.24	3.43	3.43	3.65	3.71	4.38	4.24	5.51	5.45	7.48	6.64	9.20	7.66
SC	3.96	4.88	4.08	4.97	4.19	5.11	4.56	5.45	5.00	6.05	5.66	7.04	6.39	8.22
TN	0.37	0.37	0.43	0.43	0.44	0.44	0.71	0.71	0.84	0.84	1.32	1.32	1.31	1.31
UT	4.74	5.96	4.75	6.07	4.71	6.23	4.74	6.64	4.67	7.33	4.49	8.50	4.61	9.89
VT	3.79	3.24	4.01	3.44	4.26	3.71	5.08	4.25	6.38	5.46	8.65	6.65	10.67	7.67
VA	4.07	4.35	4.16	4.45	4.24	4.60	4.49	4.91	4.77	5.43	5.21	6.30	5.77	7.34
WV	3.09	4.10	3.34	4.30	3.70	4.71	4.68	5.43	6.40	6.52	8.69	7.96	10.58	9.29
WI	5.45	5.17	5.57	5.25	5.87	5.46	6.52	6.00	7.48	6.78	8.89	8.05	10.49	9.41

Source: Author's calculations, as explained in text.

years, discounted at rates of between 5 and 10 percent, has a present value equal to about 20–40 percent of annual income. For households with incomes of $50,000, $100,000, and $200,000, this present value amounts to $10,000–$20,000, $20,000–$40,000, and $40,000–$80,000, respectively. The out-of-pocket costs of migration might amount to 20–25 percent of income in a typical case.[14] Thus, for households considering relocating for periods of

[14] See footnote 10.

5–10 years, and *a fortiori* for those planning moves of longer duration, tax burdens of this magnitude could dominate migration costs, though these costs are certainly not negligible.

Under the assumption that high-income households are mobile, the theoretical analysis of the preceding section implies that taxes imposed on them may, on balance, *reduce* the net income of immobile factors of production. In particular, *if low-income households are immobile, state income taxes on the rich might in the end hurt the poor.* Recall the basic mechanism through which this occurs. Taxation of the rich generates revenue which can be transferred to the poor or spent on public services that benefit them. However, taxation of the rich also drives some of them out of the state. The reduction of their labor supply makes the labor services that they provide more scarce and increases their gross earnings, while simultaneously lowering the productivity of poor workers or other immobile factors of production and thus lowering their gross returns. The loss of gross income to the immobile factors is greater than the tax revenue generated by taxation of the rich, the difference between the two being a type of excess burden. Starting from any given level of taxation of the rich, raising still another dollar of revenue by taxing them more heavily produces a *marginal* excess burden, that is, an incremental loss of net income for the immobile factor owners. This marginal excess burden can be viewed as the real cost to the immobile factor owners of raising incremental units of revenue—or what in the literature is often called the "marginal cost of public funds."[15]

Measuring the marginal excess burden of taxation on mobile households for a given state is a complex undertaking, in general. First, one needs to identify which households should be regarded as mobile and which as immobile. As already discussed, this issue cannot easily be settled. The following discussion will proceed on the assumption that high-income households are mobile and that low-income households are not, on the grounds that this is at least an interesting case to explore. Nevertheless, the division of households into mobile and immobile groups is debatable and other cases deserve attention. Measuring the marginal excess burden of taxation also requires an estimate of the net fiscal burden or benefit of mobile households. In the following calculations, it will be assumed initially that the net fiscal burdens on high-income households in each state are equal to the state income tax burdens reported in Table 1. The limitations of this assumption have already been discussed and need not be reviewed again here, but these limitations should be borne in mind in interpreting the results. The sensitivity of the marginal excess burden estimates to different assumed values for the net fiscal burdens on high-income households is discussed later.

As indicated by the diagrammatic analysis presented in Figures 1 and 2, the marginal excess burden of state taxation of mobile labor also depends on the demand conditions for mobile workers. If the demand elasticity for mobile workers is very small, a state income tax on these workers will not have much impact on the equilibrium amount of labor employed, and the marginal excess burden of taxation will be small, whereas the opposite is true if the demand elasticity is high. This insight, derived from the simple diagrammatic

[15] See Boadway and Wildasin [1984, pp. 394–395] for a brief textbook treatment, Fullerton [1991] for a recent discussion and references to the literature, and Wildasin [1989] for an application in the local government context.

analysis where there is only one type of taxed mobile labor, remains essentially valid when there are several types of labor, as assumed in this section. It must be qualified somewhat, however, because taxation of any one type of mobile labor will generally shift the demand for other factors, giving rise to secondary changes in the net return to immobile factors. For instance, a tax on one labor type, such as high skill labor, reduces its equilibrium quantity. This raises the productivity of substitute inputs and lowers the productivity of complementary inputs. These other inputs may include other types of labor, such as low-skill workers; if low- and high-skill labor are complementary inputs, for example, then higher taxation of mobile high-skill labor will tend to lower the productivity and wages of low-skill workers. If the complement and substitute inputs are mobile, their equilibrium quantities will adjust until net returns are again equalized among the states; if they are immobile, their equilibrium gross and net returns will change. Changes in the quantities or returns to other inputs will induce changes in tax revenue which need to be taken into account. The range of such effects expands when there are many different types of labor and other inputs.[16]

A full-blown empirical analysis of the demand for mobile labor lies beyond the scope of this paper. However, it is nevertheless possible to derive some illustrative results for a natural benchmark case. Suppose that total production in each state is described by a Cobb–Douglas production function for which the inputs are the labor of mobile workers in different income classes, along with immobile labor and other factors.[17] Assume that all households with incomes in the $50,000–$55,000 class and up are mobile, and that the share of gross income accruing to the members of each class in each state (the share parameters of the Cobb–Douglas production function) is equal to the amount of wage income reported by that class for 1986 federal income tax purposes expressed as a share of national income for 1986. Starting with some initially given level of tax rates for each state and income class (namely, the rates reported in Table 1), suppose that a given state's income tax structure is marginally adjusted in such a way as to raise $1 of additional income tax revenue from a given income class j, while holding fixed the revenue collected from every other class. Under the assumptions made, it is possible to assess the marginal excess burden associated with such a tax change.[18] Basically, a higher tax on class j causes an outflow of workers in class j and, given the Cobb–Douglas technology, in other classes as well.[19] The gross income of the

[16] In full generality, this presents a complex problem in second-best general equilibrium welfare economics. The basic principles of analysis for such problems are well-understood. Empirical application, however, requires a fully specified general equilibrium model. A computable general equilibrium model would be a useful tool for a detailed analysis of this type. (Indeed, such models have already been fruitfully applied to public finance problems at the regional level. As one example, see Kimbell and Harrison [1984].)

[17] The form of the production function for state i is thus $Q_i = A_i \prod_{j=1}^{n} l_{ij}^{a_{ij}}$ where l_{ij} = amount of (mobile) labor of type j used in state i. It is assumed that $\sum_{j=1}^{n} a_{ij} < 1$, implying the presence of fixed factors whose share of total state income is $1 - \sum_{j=1}^{n} a_{ij}$.

[18] Details of the underlying theoretical derivations are available on request from the author.

[19] This "complementarity" among mobile factors under the Cobb–Douglas technology is somewhat weak. The cross-effect of a tax on one factor on the equilibrium employment of another factor is roughly proportional to the gross income share of the taxed factor, and hence is not too large in the cases considered below.

Table 2. Marginal cost of income taxation, by state and income class, 1986 and 1988 (in percent).

	Income Class ($1000s) and Year													
	$50–55K		$55–60K		$60–75K		$75–100K		$100–200K		$200–500K		$500–1000K	
State	1986	1988	1986	1988	1986	1988	1986	1988	1986	1988	1986	1988	1986	1988
AL	3.70	4.07	3.94	4.36	4.29	4.74	4.88	5.40	5.81	6.40	7.96	9.31	14.69	16.81
AZ	6.04	6.80	6.31	7.23	6.60	7.83	7.27	8.88	8.12	10.52	10.05	15.36	15.34	28.55
AR	6.57	7.36	7.20	8.02	8.06	8.90	9.53	10.36	12.06	12.98	18.43	19.68	37.49	38.22
CA	5.41	5.46	6.50	6.56	8.04	8.25	10.85	10.76	15.58	15.27	26.58	26.01	58.31	56.40
CO	5.94	6.43	6.25	6.91	6.58	7.62	7.32	8.76	8.18	10.62	10.68	15.27	17.24	27.36
CT	0.63	0.89	1.02	1.47	1.72	2.40	3.24	4.44	5.32	6.84	10.78	14.15	21.94	32.48
DE	7.90	7.89	8.75	8.64	9.79	9.65	11.74	11.32	14.79	14.31	22.30	21.98	42.37	43.63
DC	11.19	11.52	12.08	12.47	13.12	13.76	15.26	15.97	18.53	20.01	27.05	30.97	51.75	65.51
GA	6.04	6.24	6.46	6.71	6.94	7.33	7.95	8.41	9.45	10.32	13.22	15.25	22.92	28.46
HI	8.81	9.56	9.54	10.44	10.46	11.64	12.24	13.64	15.24	17.26	22.75	26.76	43.07	55.12
ID	7.57	8.23	8.09	8.91	8.70	9.71	9.97	11.21	11.92	13.64	16.98	19.78	30.28	34.48
IL	3.35	3.45	3.54	3.65	3.83	3.93	4.29	4.40	5.12	5.22	7.31	7.37	12.58	12.62
IN	4.05	4.91	4.25	5.18	4.50	5.60	4.97	6.27	5.74	7.46	7.74	10.52	12.04	18.19
IA	7.19	7.62	7.74	8.23	8.40	9.14	9.78	10.74	11.63	13.28	16.23	20.42	28.03	40.84
KS	4.41	3.97	4.80	4.30	5.24	4.75	6.14	5.49	7.59	6.63	10.43	9.81	17.42	17.94
KY	5.33	5.99	5.51	6.29	5.67	6.70	6.15	7.46	6.73	8.65	8.14	12.30	12.16	22.12
LA	2.46	3.26	2.64	3.55	2.85	3.94	3.19	4.64	4.05	6.17	5.85	9.92	9.84	18.93
ME	6.16	7.29	7.12	7.99	8.31	8.94	10.53	10.50	14.07	13.30	22.29	20.41	43.60	40.21
MD	5.60	5.92	5.90	6.23	6.22	6.57	6.97	7.30	8.07	8.47	10.99	11.55	18.53	18.76
MA	7.02	7.02	7.56	7.56	8.35	8.35	9.81	9.81	12.27	12.27	19.10	19.10	34.86	34.86
MI	6.43	6.56	6.76	6.96	7.17	7.56	7.96	8.53	9.21	10.26	12.47	14.71	19.79	26.25
MN	6.66	8.87	7.07	9.60	7.52	10.60	8.49	12.28	9.72	15.32	12.47	23.28	20.15	46.31
MS	4.25	4.60	4.68	5.05	5.26	5.64	6.25	6.61	7.88	8.31	11.82	12.47	22.72	23.04
MO	3.44	4.36	3.70	4.75	3.99	5.28	4.58	6.15	5.33	7.50	6.90	11.22	10.97	20.82
MT	7.10	9.09	7.56	9.90	8.07	11.01	9.24	13.03	10.82	16.41	14.05	25.89	23.01	54.57
NE	6.04	4.84	6.97	5.45	8.22	6.31	10.13	7.65	13.57	10.00	22.49	15.62	41.85	30.06
NH	0.22	0.22	0.36	0.36	0.47	0.47	0.86	0.86	1.16	1.16	2.36	2.36	3.48	3.48
NJ	3.34	3.34	3.75	3.75	4.34	4.34	5.18	5.18	6.65	6.65	10.11	10.11	18.28	18.28
NM	2.80	4.60	3.33	5.31	4.03	6.30	5.22	7.87	7.26	11.10	12.19	18.55	24.03	37.84
NY	10.04	8.85	10.99	9.93	12.16	11.25	14.47	13.14	18.14	17.30	28.40	29.65	59.17	66.74
NC	7.08	7.52	7.70	8.16	8.55	9.02	10.04	10.47	12.55	13.06	18.92	19.74	37.67	38.26
ND	2.52	3.18	2.87	3.58	3.33	4.12	4.11	4.95	5.50	6.80	9.15	10.26	17.25	18.26
OH	6.27	5.86	7.03	6.58	8.03	7.64	9.45	9.14	13.15	12.82	22.18	21.47	41.38	43.44
OK	4.90	5.73	5.32	6.24	5.81	6.92	6.78	8.04	8.26	10.05	11.86	15.07	20.81	28.34
OR	9.40	8.31	10.42	9.13	11.74	10.25	14.04	12.08	18.19	15.71	29.06	25.66	63.08	54.13
PA	3.17	3.08	3.33	3.24	3.57	3.47	3.97	3.85	4.67	4.53	6.47	6.28	10.86	10.53
RI	5.15	5.07	5.87	5.72	6.77	6.59	8.40	7.90	11.37	10.90	19.50	16.89	40.24	31.33
SC	5.96	7.43	6.43	7.97	6.99	8.70	8.08	9.94	9.77	12.18	14.00	18.05	24.81	34.32
TN	0.60	0.60	0.75	0.75	0.84	0.84	1.27	1.27	1.57	1.57	2.95	2.95	4.27	4.27
UT	6.91	9.23	7.14	9.89	7.36	10.79	8.00	12.35	8.76	15.13	10.73	22.64	16.65	44.37
VT	6.06	5.08	6.92	5.73	7.97	6.60	9.88	7.91	13.42	10.92	23.26	16.92	49.84	31.40
VA	6.05	6.59	6.45	7.09	6.91	7.76	7.84	8.85	9.20	10.79	12.72	15.86	21.83	29.57
WV	5.12	6.47	5.99	7.22	7.18	8.39	9.24	10.18	13.44	13.35	23.38	20.93	49.25	40.69
WI	8.52	7.99	9.25	8.58	10.38	9.52	12.29	11.14	15.58	13.90	23.97	21.20	48.48	41.37

Source: Author's calculations, as explained in text.

immobile factors must therefore fall. Suppose that the extra $1 in revenue from the tax on class j is used to provide partial compensation to the immobile factor owners. The excess of the loss of gross income to the immobile factors over the $1 of extra revenue is the marginal excess burden associated with the taxation of class j.

Table 2 presents estimates of this marginal excess burden for each state and class represented in Table 1. Note that since each state has been assumed to have an identical production technology, the figures appearing in Table 2 differ from one state to another only because the average tax rates appearing

in Table 1 differ across states. These figures suggest that the mobility of high-income workers does significantly raise the cost of collecting revenue in many states. To take the case of Alabama for illustration, the figure of 3.7 percent for the $50,000–$55,000 income class in 1986 indicates that $1 in extra revenue collected from workers in this class would cost the owners of immobile factors in that state $1.037 in lost gross income. This figure rises to $1.1681 for the highest income class under Alabama's 1988 tax law. The difference in figures across income classes provides an indication of the degree to which a reallocation of tax burdens among income classes could reduce the total net burden falling on immobile factor owners associated with any given amount of total revenue collections. For example, raising $1 more from households in the $50,000–$55,000 class while reducing the burden on the highest income class in Alabama in 1986 would raise the net income of immobile factor owners by $(1.1469 − 1.037) = $0.1099, according to the figures in Table 2. This net gain would be realized as the result of an increase in the equilibrium number of taxpayers in the highest income class and a reduction in the number of households in the lower class, along with some secondary adjustments in the supplies of workers in other income classes, while keeping total revenue constant.

In the case of Alabama, the marginal cost of raising revenue from mobile workers is not very high, although it does rise sharply for the highest income group. The estimated gains from reallocating tax burdens among most income classes are trivial. In other states, income taxes are sometimes quite a bit higher, and so the marginal cost of raising funds is correspondingly higher. The marginal cost of raising income tax revenue seldom exceeds 10 percent for income classes below $100,000. For the $50,000–$55,000 class, the marginal cost is typically in the neighborhood of 5 percent. For the highest income groups, however, the cost can become quite large, even in states with relatively low tax rates. For instance, the marginal cost exceeds 10 percent for the highest income classes in Pennsylvania and Illinois, states whose tax rates are low and stable across income classes. The high marginal cost of taxation for the highest income groups is, in general, attributable to the high share of capital income relative to wage income received by these households and the fact that the entire burden of adjustment to the state income tax falls on the labor market. In the states with high and progressive income taxes, the marginal cost of raising revenue from the highest income taxpayers can approach or even exceed 50%. For those with incomes in the range of $100,000–$500,000, the marginal cost tends to be quite a bit smaller, but in a number of cases—for example, California, Delaware, Hawaii, Maine, Massachusetts, Minnesota (1988), Montana (1988), Nebraska (1986), New York, Ohio, Oregon, Vermont (1986), West Virginia, and Wisconsin—these groups have an estimated marginal cost in the 15–20 percent range. It should be recalled here that these excess burden estimates reflect *only* the locational distortions introduced by state income taxes. In particular, individual labor supply has been assumed to be completely fixed, so that the potential impact of state income taxes on hours of work and on labor force participation has been ignored.

For some states, the calculations suggest that there could be nontrivial gains from reallocation of tax burdens by income class. For instance, in California, the marginal excess burden of taxation of the highest income classes exceeds that in the lower classes by 20–50 percent; that is, lowering

taxes on the highest income groups and making up the lost revenue through higher taxes on those with somewhat lower incomes could increase the net income of immobile factors by this percentage of the revenue reallocated. States for which the marginal cost of raising revenue for the $200,000–$500,000 class exceeds that for the $50,000–$55,000 class by 10 percent or more include Arkansas, Connecticut, Delaware, Hawaii, Iowa, Maine, Massachusetts, Minnesota (1988), Montana (1988), Nebraska, New Mexico, New York, North Carolina, Ohio, Oregon, Rhode Island, Utah (1988), Vermont, West Virginia, and Wisconsin. Given the assumptions underlying the analysis, it would appear that these states have chosen tax structures that do not produce the desired level of revenue in a fashion that minimizes the burden on their immobile taxpayers—assumed here to include low-income households. Mobility of the tax base imposes constraints on a state, but, given those constraints, it would be desirable to optimize within them. Abstracting from various qualifications to the analysis, these results suggest that if high-income households are really mobile, it could be advisable, in many states, to tax those in the highest income groups at average rates closer to those imposed on taxpayers with somewhat less income.[20]

The preceding calculations have focused entirely on the effect of state income taxes on migration, considered in isolation from all other fiscal benefits and burdens. It was argued above that the state income tax is likely to be of particular importance for high-income households, but other taxes and fees do affect them nevertheless. Similarly, although high-income households are typically not the recipients of cash or in-kind benefits from state transfer programs, they may benefit indirectly from such policies. They may also benefit from other public expenditures. The estimates in Table 2 are thus based on a rather imperfect assessment of net fiscal burdens by income class, one which omits some fiscal benefits and some fiscal burdens. Unfortunately, the development of more accurate and comprehensive measures of fiscal burdens and benefits, broken down by income class and by state, is a difficult undertaking. Benefit measurement in particular is fraught with problems. Yet even without comprehensive measures of fiscal burdens and benefits, it is possible at least to experiment with different assumed values in order to see how the results depend on the net fiscal burden estimates.

There are many possible assumptions about fiscal burdens that one might consider in deriving marginal excess burden estimates, but the amount of data generated by such experiments quickly becomes difficult to manage. Thus, only one simple case is considered here. Suppose that high-income households actually receive substantial benefits from the public goods that are financed by state income taxes, and that the level of benefits that they enjoy is higher in high-tax than in low-tax states. One can obtain a rough estimate of the marginal excess burden from taxation in this case by scaling the net fiscal burden estimates in proportion to state income tax burdens as reported in Table 1. As one example among many possible, suppose that the net fiscal burden, by income class and state, is only 50 percent of the amount given in Table 1. From general theoretical considerations, we expect that a 50 percent reduction in the value of the net fiscal burden on mobile households

[20] The fact that lower-income households might benefit from reductions in the taxes imposed on the highest income groups leads one to wonder whether these groups might form a political coalition—a possibility reminiscent of Stigler (1970).

should only lower the marginal excess burden from taxation, and should do so more than proportionally. Calculations bear this out, across all income classes and states.[21] The reduction in excess burden is most marked for the highest income classes. For instance, the estimates in Table 2 indicate that an increase in the amount of income tax imposed on the highest income class could lower the net income of low-income households or other immobile factor owners by 25 percent or more of the incremental revenue in over half the states. By contrast, if the net fiscal burden is only 50 percent of that previously assumed, the marginal excess burden just reaches 25 percent for New York and exceeds 20 percent in only three other states. For households in the $100,000–$200,000 income class, Table 2 indicates that the marginal excess burden from taxation exceeds 10% in over half the states; when the net fiscal burden is assumed to be only 50 percent as large, the marginal excess burden is less than 10 percent in all states. For households in the $50,000–$55,000 income class, the marginal excess burden falls by approximately 50 percent or slightly more when the net fiscal burden is assumed to be 50 percent smaller. The overall effect of assuming proportionally smaller fiscal burdens for states and income classes, then, is to lower the highest estimated marginal excess burdens quite considerably and, in general, to reduce the variation in this marginal excess burden across income classes and states.

CONCLUSION

It has long been recognized that the mobility of taxpayers can constrain the ability of lower-level governments in a federation to redistribute income via income taxes or other fiscal instruments. A simple theoretical analysis shows that taxation of mobile workers shifts the real burden of taxation from them to the owners of immobile factors of production, such as land, long-lived capital, or immobile workers. Furthermore, the reallocation of labor that results from redistributive taxation results in an *excess* burden on the immobile factor owners. The marginal excess burden from taxation provides a measure of the extent to which the mobility of taxed factors make them less suitable objects of taxation. This is in contrast to the situation where the taxed workers are immobile. In that case, there is no marginal excess burden from taxation resulting from the relocation of labor, and the burden of the tax is not shifted from the taxed factor.

Estimates of the average state income tax rates facing representative high-income taxpayers were generated using the NBER TAXSIM state income tax calculator. Together with an assumption about the nature of the production technology, which makes it possible to determine demand elasticities for labor, these average tax rate data can be used to derive estimates of the marginal excess burden of state income taxation, by income class, in states using such a tax. The calculations suggest that while these marginal excess burdens are quite small in some states, they are potentially more important in others, especially for the highest income classes. It is noteworthy that taxation of *capital* income at the personal level affects the locational choices

[21] A few summary remarks on these estimates are given here. The detailed calculations are reported in a longer version of this paper, available on request.

of mobile taxpayers, not just the taxation of wage income. For high-income taxpayers, capital income is a high proportion of total income and state income tax burdens on this capital income can create large distortions of locational choices for these individuals: personal *capital* income taxation can have large effects on local *labor* markets.

These marginal excess burden estimates are sensitive to several underlying assumptions, and it would be inappropriate to regard them as other than illustrative. Perhaps most important, the calculations rely on the assumption that high-income households are mobile while low-income households are not. The notion that a state could raise the net incomes of its low-income residents by reducing state income taxes on the rich is perhaps the most paradoxical finding from the analysis here. The reason that this could conceivably occur is that if the rich are mobile, it simply may not be possible for any one state to impose a net burden on its rich residents; the attempt to do so could be worse than self-defeating because it drives out resources—the skills of the high-income households—that help to raise the productivity of low-income residents.

The fact that the incidence of a tax on high-income labor differs so dramatically depending on whether or not that labor is assumed to be mobile suggests that the analysis should be extended to take explicit account of temporal factors. An unexpected increase in state income taxes may not give rise to an immediate and sizable migration response, implying that, in the short run, such a tax can be used to capture income from the statutory taxpayers that can be appropriated for use by, or on behalf of, others. However, the attempt by a state to take advantage of this temporary power may lead to very different consequences as the labor market adjusts to a higher tax. Migration undertaken to avoid the tax gives rise to changes in wage rates and other factor returns that can completely reverse the short-term distributional impact of the tax. The difference between the short- and long-run impact of taxes on mobile labor may present political decisionmakers with an opportunity to transfer income in favor of certain constituencies for some period of time, though these benefits may come to them at the cost of longer-term harm. It is tempting to speculate that policy in states with especially high state income taxes may be driven by an attempt to reap short-term political gains. These states may, however, have high income taxes for a variety of other reasons—for instance, because they are experiencing particularly heavy demands for public services for some reason. The analysis presented here can only suggest that a more explicit investigation of the short- and long-run trade-offs facing policymakers in taxing mobile households might prove informative. Perhaps empirical analyses of state and local policy determination such as those of Inman [1989] and Chernick [1991] could be extended to shed light on the nature of these trade-offs and the way that policymakers resolve them.

APPENDIX

This appendix describes how the NBER TAXSIM model was used to calculate the state income tax liabilities discussed in the text.

The TAXSIM state and federal income tax calculators require a complete specification of the relevant attributes of the taxpaying unit, such as family

size, income by source, and deductible expenses. For this project, the 1986 *Statistics of Income*(*SOI*) served as the main source for information on taxpayer income and expenses. Since most high-income taxpayers itemize their deductible expenses, only *SOI* data for itemizers were used.[22]

The aggregate data on itemizing taxpayers with adjusted gross income (AGI) of $20,000 or more show that almost all income derives from a rather limited number of sources. Wages, interest, dividends, and capital gains accounted for the bulk of income in these income classes. Since the "typical" taxpayer obtains very little income from other sources, the households used in the TAXSIM calculations were assumed to have *only* these income sources. In each AGI class, the hypothetical TAXSIM household was assumed to receive amounts of wage, interest, dividend, and capital gains AGI that were average for the class. Since some AGI is obtained from other sources, these four items add up to less than average AGI for each class. The amount of income assumed to derive from each of these sources was therefore scaled-up proportionately so that the hypothetical household in each class would have an AGI equal to that of the class average. (This proportional scaling preserves the relative shares of the four sources of income.) Since 1986 federal tax law permitted an exclusion of $100 of dividends ($200 for a married couple filing jointly) and since 60 percent of long-term capital gains were excluded from taxation, the AGI for each class was grossed-up to determine the total dividend and long-term capital gains income from which AGI was derived.

A review of *SOI* data on itemized deductions shows that the vast bulk of all deductions derive from interest expense, state and local taxes, and charitable contributions. (These items accounted for most itemized deductions in AGI classes from $20,000 and up in 1986.) Other deductions were therefore ignored in the TAXSIM calculations. For each AGI class, the mean 1986 deductions for these items, and mean 1986 total deductions, were calculated. (In the case of interest expense, mortgage interest was treated separately from other interest expense. Deductions for state and local taxes were disaggregated into income, sales, property, and other taxes.) The hypothetical taxpayer in each AGI class was first assumed to have itemizable expenses of these types equal to those of the class average. Then these expenses were scaled-up proportionately so that they would total to the observed class mean itemized expenses from *all* sources.

The levels of income and deductions in each class thus derived were used to calculate 1986, 1987, and 1988 federal and state income tax liabilities for three household types: single taxpayers, married couples (filing jointly) with no children, and married couples (filing jointly) with two children. The taxpayer attributes were held fixed from year to year, so that the reported tax liabilities arise only from changes in federal or state tax law. In particular, holding grossed-up income fixed means that taxable dividend and capital gains income increased as the TRA86 reforms eliminated the dividend and long-term capital gains exclusions, as well as the deductions for personal interest expense and state sales taxes.

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[22] The data were obtained from Table 2.1, 1986 *SOI*.

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