Fiscal Federalism and the Role of the Income Tax

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What is the role of the income tax in a Federal system of government? The past literature on the income tax has largely assumed that the role of this tax is to redistribute income from rich to poor in order to maximize the (perhaps weighted) sum of individual utilities. Vickrey and Mirrlees shared a Nobel Prize for papers developing this model of the income tax, while among many other papers Gruber and Saez (2002) provided empirical estimates of key parameters yielding quantitative estimates for the implied optimal tax schedule.

Largely, this literature has focused on the role of a national government in such a redistribution of income. In practice, though, most notably in the U.S., individual states also impose income taxes on their residents, with tax rates that vary widely across states. Apparently, the implicit objective functions of state governments vary, with some desiring substantial redistribution and others much less so.

Surprisingly, this simultaneous use of the income tax by both Federal and state governments seems hard to justify in the context of the fiscal federalism literature, as embodied in Oates (1972). In this literature, decentralization enables individuals with heterogeneous tastes to sort across locations based on these tastes. Those who have high demand for particular services choose locations spending a lot on these particular services, but in exchange need to pay more in taxes and fees to finance these services. Decentralized provision induces costly migration by households, but the gains from better matching government service provision to heterogeneous tastes can justify these costs, enabling decentralized provision to raise national social welfare, compared to the setting where services are provided solely by the Federal government.

In the case of the income tax, heterogeneous tastes refer not to heterogeneous household preferences but to heterogeneous implicit objective functions of the various state governments.[1] The puzzle, given longstanding decentralized use of the income tax, is that decentralized use seems to lower the implicit measure of social welfare used by the national government.[2] From the national perspective, social welfare would be higher if the income tax is the sole responsibility of the national government, with revenue potentially used to finance transfers to state and local governments.

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[1] Self-interested individuals would always prefer higher net-of-tax income.

[2] Here, we assume that the national government's implicit objective function depends solely on the distribution of individual utilities, as would be required if decisions are to lead to Pareto-efficient outcomes (as shown in Kaplow (1995)).

What if individuals have heterogeneous behavioral elasticities, though, when responding to tax incentives? Could decentralization help in this setting, allowing those with high elasticities to sort into states with low tax rates, lessening overall misallocations due to tax distortions? Migration, though, should lead to those with high elasticities to sort into states with higher (rather than lower) tax rates, since these individuals are better able to avoid paying these high rates. Decentralized use of the income tax still results in worse outcomes.

The aim of this paper is to explore an alternative hypothesis for the overall role of the income tax, in part to help explain the longstanding simultaneous use of the income tax by state as well as Federal governments. Given the large uncertainties particularly younger individuals face concerning their future earnings,[3] in principle individuals should value getting insurance to reduce the dispersion in their future earnings, paying into the system when they end up doing well to get help in exchange when they end up doing badly. Such insurance can be provided through use of an income tax, with revenue used to finance lump-sum transfers.

In spite of the risks people face concerning their future career prospects, we see little or no such income insurance provided in the private market. Apparently, adverse selection (those expecting high future earnings declining to buy such insurance) and moral hazard costs (in part from those who ex post have high earnings dropping future coverage) are too high to support such private coverage.

However, if the national government uses an income tax to provide such insurance, there would be mandatory "participation" in the income tax, avoiding any adverse selection problems or ex post dropping of coverage, two key advantages of government provision of this type of insurance.[4]

Many years ago, Buchanan (1976) argued that this insurance role for the income tax was the key source of its strong political support. Based on their self-interest, individuals potentially gain from insuring against future risks through the income tax. [5]

The existing optimal income taxation models do talk about insuring individuals against the risk they face behind a "veil of ignorance", as argued in Rawls (1971). But the resulting ex-post equity gains would not per se be a source of political support for the income tax from self-interested voters. Insurance against future risks would be a source of support.

[3] For example, a Mincer-style regression forecasting individual earnings as a function of age, education, gender, and parental characteristics (much of the information available at entry to the labor force) can explain only maybe a quarter of the observed variation in future earnings. In an older population, including past earnings in the regression helps in forecasting future earnings, but still leaves substantial residual variation.

[4] Insurance coverage would still create other costly distortions, through discouraging labor supply, effort, or full compliance with the tax code, limiting the optimal amount of insurance provision.

[5] Hoynes and Luttmer (2011) and Stepner (2019) both provide empirical evidence that the insurance value to individuals from the income tax can be substantial.

How does our model contrast with past optimal income taxation models? Past optimal taxation models trade off the resulting equity gains from the tax with the offsetting efficiency losses incurred due to tax distortions. This paper instead focuses on potential efficiency gains from an income tax through insuring individuals against future risks. To more sharply distinguish our model from the past literature, we entirely ignore any equity gains from the income tax by assuming an equal social value of an ex-ante dollar going to each individual. The efficiency gains from income insurance provided by the tax will then be traded off with the same types of efficiency costs as in the prior literature.

By focusing on an insurance role for the income tax, though, we also make salient the potential behavioral response to the tax coming from increased risk taking, a response noted years ago in Domar and Musgrave (1944) but largely ignored in the optimal taxation literature since then. While an individual would be just indifferent to increased risk taking, by the envelope condition, from a social perspective there would be efficiency gains due to the taxation of the risk premium, with no offsetting extra risk-bearing costs since the variance of the sum of idiosyncratic risks goes to zero relative to the sum of expected tax revenue by the law of large numbers. Risk taking through the pursuit of new ideas can also generate positive externalities, given the limits of patent protection.

The extent of the uncertainty in future earnings that individuals face will vary dramatically across individuals, as can their degree of risk aversion. As emphasized in the fiscal federalism literature, e.g. Oates (1972), one response is to allow decentralized provision of such a public "service", allowing individuals to sort across jurisdictions providing different degrees of insurance provision. Those facing high risks can sort into states that have high taxes and high transfers, while those facing low risks can sort into states with low taxes and transfers. This decentralized provision, with heterogeneous tax rates across states, then provides some important efficiency benefits relative to just Federal use of an income tax.

The paper then develops a formal model where states offer heterogeneous tax/transfer programs each designed to best benefit their residents at the time, while people can then migrate (at a cost) if the plan offered by another state looks more attractive given their own personal expected earnings and degree of future uncertainty. For any given level of expected future income, individuals facing high risks in their future earnings would be more likely to choose a jurisdiction with a generous tax/transfer program, while those with settled careers would gravitate instead to states with low or zero income tax rates.

What types of households face high risk? Certainly younger workers face more risks than older workers, since their future career path is still unclear.[6] High-tax states

[6] Even older workers with a settled career face some uncertainty about when poor health or simply lack of vitality will push then to retire. Such risks of losing a few years of earnings, though, seem small, compared to the uncertainty faced by the young concerning their entire lifetime career path. As noted in Diamond (1977),

should then have a younger population, while the most successful ex post among these young residents would have a propensity to migrate to low-tax states once their careers are well established.[7] Those working in start-up firms, particularly in more innovative firms, face substantial risk, given the high failure rate of these firms but also the huge potential payoffs when the firm is successful. High-tax states should then attract more innovative firms. Once a firm is well established and has a stable niche, it has an incentive to shift its operations to a low-tax state.[8]

This argument that the income tax provides insurance focuses on insuring idiosyncratic risks that each individual faces, but where there is no aggregate risk by the law of large numbers. As noted in Diamond (1967), taxation of market risks would lead to no reduction in risk-bearing costs and no change in risk taking, since risks should already be efficiently allocated across individuals through the stock market. However, while the stock market helps insure risky returns to capital income, it does not do well in insuring risks to earnings, even when those risks arise from the business cycle, as documented in Schmidt (2022). [9]

Migration will be driven not only by differences in future risks but also simply by differences in expected future income: Individuals with high income would tend to migrate to low-tax states, while those with low expected future income would tend to migrate to high-tax (and high-benefit) states, for any given amount of future risks the individual faces. The costs of migrating to another state limit these adverse selection and moral hazard pressures with state provision, though they also limit the potential efficiency gains from sorting based on insurance demand.[10]

The choices states make about their tax/transfer programs will not be second-best efficient from a national perspective, however. In particular, a state's increase in its income tax rate generates positive "horizontal" externalities to other states, as high-income individuals facing low future risks migrate towards low-tax states while low-income individuals in these states (and particularly those facing more future risks)

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an uncertain date of retirement could be partially insured through providing larger net transfers under the Social Security program to those who retire at a younger age.

[7] The costs of moving, though, will limit such out-migration from high-tax states, costs that would not inhibit exit from any privately provided contract insuring future income risk.

[8] That Elon Musk moved personally and shifted his new plants from California to Texas, once Tesla was well established, fits well within this theory. The propensity of highly successful inventors to move from high-tax to low-tax countries documented in Akcigit et al (2016) is also consistent with this choice to start a firm in a high-tax jurisdiction, then migrate to a low-tax jurisdiction once future risks are less.

[9] Schmidt (2022) provides evidence that even though the risk that an individual loses his or her job has a strong cyclical component, only a small idiosyncratic fraction of individuals in fact lose their job during a recession, limiting the ability of the stock market to hedge against this type of cyclical income shock.

[10] The costs of migration are many, including costs of finding a new job and residence, paying realtor fees if the individual owned their prior residence, parting with friends in the prior community and trying to make friends in the new community, forcing children to adjust to a new school system, losing all the location-specific information acquired in their prior community about where to find particular goods and services, and of course paying to move one's belongings to a new location.

may leave to take advantage of the resulting increase in benefits in the state raising its tax rate.

One possible Federal response is to impose its own income tax, setting a floor for the overall insurance provided to residents in the country. Such a Federal program would not be vulnerable to either adverse selection or ex-post migration responses, giving it an advantage over state programs. However, a Federal tax cannot provide the heterogeneity in provisions that would be appropriate given the heterogeneity in household circumstances.

The optimal Federal tax rate should be at least as high as the optimal state tax rate would be in the state attracting households facing the least risks. A yet higher rate would imply a net efficiency loss for those households facing the least risk, but can take into account the positive externalities from a higher rate on the insurance programs in other states through weaker migration incentives faced by the most (least) successful households in high-tax states (the lowest tax state), allowing these states to provide a more generous insurance program.

A second potential Federal response is to subsidize S&L use of the income tax, such as occurs through SALT deductions under the Federal income tax. Due to the migration responses, having a more generous program creates positive externalities to other states and as a result leads to too little insurance provision. A subsidy can in principle help correct for such under-provision.

A third potential Federal response would be to treat moving costs less generously under the Federal income tax. To the degree that people move in order to take advantage of a more attractive job offer in another location, then these moving costs should in principle be a deductible expense, so that the tax falls on net earnings. However, when individuals move for consumption reasons, such as a preference for a different climate, there would be no grounds to treat this form of consumption differently than other forms of consumption. To that extent, moving costs should not be deductible. Here, current tax law matches this reasoning, allowing a deduction only when the individual is moving to a new job. However, an important reason that individuals may choose to move to a new job is to relocate to a state with a more favorable tax rate, generating in the process negative fiscal externalities. Here, there would be grounds for adding to the costs of this choice (working to internalize these externalities), contrary to current law.

The outline of the paper is as follows:

In section 1, we lay out our key assumptions, made in an attempt to keep the model as simple and transparent as seemed feasible. For one, we assume that individuals live for two periods, facing on average high risks in period 1 but much lower risks in period 2.

Section 2 will then derive equilibrium locational choices for both young and old, for any given set of state income tax rates, with a focus on the empirical regularities forecast by the model.

Section 3 will then use this model to solve for each state's choice of the generosity of its income tax/transfer program given the characteristics of its residents and possible mobility responses, maximizing the sum of the resulting dollar-equivalent benefits received by its initial residents.

Section 4 will then analyze each of the roles described above for the Federal government, while Section 5 will provide a summary of the key empirical forecasts from the model that might be a focus of future research.

1. Key assumptions of the model

We assume that each individual i lives for two periods, and works in both periods.[11] In the previous period, they lived in some state h. If they remain in that state, the ex-post earnings for those in period 1 of their life would equal $\tilde{Y}_i^{1p} = Y_i(1 + \tilde{\epsilon}_i)$, where Y_i is their expected income,[12] and $\tilde{\epsilon}_i$ is an idiosyncratic random shock to income with variance σ_i^2. The ex-post earnings for those in period 2 of their life would equal $\tilde{Y}_i^{2p} = Y_i(1 + \tilde{\epsilon}_i)(1 + \tilde{\eta}_i)$, where $\tilde{\eta}_i$ is an idiosyncratic random shock to income with variance $\alpha\sigma_i^2$, with $\alpha < 1$.

Each individual in period 1 has a child. Her offspring will face her own idiosyncratic shocks over her life. The child's values for Y_i and σ_i can be correlated with those of her parent. These values depend in part on educational and occupational choices that can easily be affected by the parent's characteristics.

The role of S&L governments to begin with is to provide goods and services to residents. The Tiebout mode assumes these expenditures are financed with user fees. Given heterogeneous preferences for such services within a jurisdiction, though, use of benefit taxes can help generate more efficient political choices for the level and composition of public services. Those with higher private consumption would presumably have higher demand as well for the consumption of government-provided services, providing some justification for sales taxes and property taxes to help finance local public services.

[11] Assume for example, that individuals are aged twenty to forty-five in the first period and aged forty-five to seventy in the second period. Following this interpretation, individuals are born when their parent is aged twenty-five, making them aged twenty at the beginning of the next period.

[12] Given that reported income can depend on the tax rate the individual faces, we interpret Y_i as the expected income they report in their current state of residence under that state's current tax law. If they move and as a result face a different tax rate, their expected reported income can change.

Normally, we would then argue that this use of consumption taxes comes at the cost relative to user fees of discouraging the labor supply needed to finance extra consumption. In our context, though, consumption as well as income taxes help provide insurance to individuals against random future income, in itself an efficiency gain. Our focus will then be on the trade-off between efficiency gains from insurance and public service provision through use of consumption and income taxes and the offsetting costs of distorting labor supply, work effort, and tax compliance.

We assume that the value of public services to residents can be measured simply by the expenditures on these services, and will treat overall government expenditures as if it were entirely a lump-sum transfer.

In general, the timing of income and consumption differs, with consumption smoothed relative to income. In our setting with a two period lifecycle model, the timing would differ only to the degree that individuals shift income across periods. To simplify the discussion, we ignore any savings (or borrowing) across these two periods, so that consumption and income are equal within each period. Use of an income tax rather than a sales tax has advantages when individuals face borrowing constraints within each of the two periods.[13] It also has the advantage that it taxes all earnings, whereas state sales taxes cover only roughly a third of household consumption, introducing distortions to consumption bundles. For simplicity, though, we simply focus on the combined tax rate on earnings (both when earned and when spent), and will simply refer to this combined tax as an "income" tax.

To differentiate our model from the traditional optimal income taxation model, we also ignore any justification for these taxes as a form of income redistribution by assuming that the ex-ante marginal utility of an extra dollar is viewed to be the same for all households.[14] The policy focus will then be on maximizing efficiency, given the challenges of insuring income.

For simplicity, we will also ignore the presence of any form of private insurance for income risks, even though we recognize that some such insurance can be present. Such insurance could in principle exist through various routes. For one, family members can insure each other.[15] Churches or other social "clubs" can help insure their members against adverse events, to the extent that they can make exit from the club costly. Firms can partially insure workers by having wage rates vary less over time than does the marginal product of the firm's workers, a form of insurance that can survive due to a firm's control over hours of work and the high costs to workers of exiting the firm when their marginal product is unusually high.[16]

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[13] Borrowing constraints are more likely the greater the variance in the individual's income.

[14] We do this not because we think distributional issues should play no role in the policy debate, but in order to learn more about the implications of insurance motives per se for the income tax.

[15] See Altonji, Hayashi, and Kotlikoff (1992), however, for empirical evidence that does not support the presence of this type of insurance within the family.

[16] See Chetty and Saez (2010) for an analysis of the complications that arise in the design of an optimal taxation program in the presence of private income insurance.

Each state s imposes a linear income tax at rate t_s,[17] with revenue used to finance a lump-sum transfer to state residents equal to $T_s \equiv t_s \bar{Y}_s$, where $\bar{Y}_s$ is the average reported income among those who choose to reside in that state. The tax base for this tax is individual earnings, with say a cash-flow tax on business income to capture earnings retained within one's firm. This tax base then shares risks from idiosyncratic income reported in closely-held firms as well as risks in wage income.

Individuals have the option to move across states at the beginning of each period, paying a moving cost of m_i, where m_i is presumed to be much lower in period 1 than in period 2 of a person's life. If an individual chooses to live in some state s, her consumption equals $\tilde{C}_{is} = \tilde{Y}_i^p(1 - t_s) + t_s \bar{Y}_s - m_i \iota_{s \neq h}$, where m_i is the fixed cost of migrating.[18] Here, $\iota_{s \neq h} = 1$ if the individual chooses to move out of her home state h, and equals zero otherwise.

We do allow individuals to change their labor supply, the riskiness of their career choice, their effort, and their tax compliance behavior in response to any change in the taxes and transfers they face. In each case, these behavioral responses affect state tax revenue, but to first-order these changes would leave utility unaffected by the envelope condition.

Other than differences in t_s and in T_s, for simplicity we assume states are equivalent. In particular, we assume enough local communities in each state that an individual can find a location offering the desired package of public goods and services. We ignore any amenity differences across states that might differentially affect individual or firm preferences across location. We assume that market-clearing wage rates are equalized across states, as would occur if the factor-input proportions differ enough across industries that the industry composition in each state can adjust to equalize wage rates across locations.

We also for simplicity ignore land as an input to housing, avoiding the need to solve for equilibrium land prices. Land prices would depend heavily on the supply vs. demand for space in states offering each particular level of insurance, pushing large states for example to choose a tax/benefit schedule that appeals to a broader range of individuals, whereas small states can focus on more specialized parts of the market. Given the omission of land from the model, individuals face no constraints on moving into a state, other than the costs of moving there and the need to pay the tax rate charged by that state.

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[17] Here, we define t_s as the income tax rate equivalent to the combined consumption and income taxes used in the state. With an income tax at rate n and a consumption tax at rate c, the individual's budget constraint equals $Y(1 - n) = C(1 + c)$, or $C = Y(1 - n)/(1 - c)$. The effective tax rate t_s is then defined implicitly by $1 - t_s \equiv (1 - n)/(1 + c)$.

[18] In this expression for consumption, we have ignored for simplicity possible precautionary savings in period 1 to help cushion any remaining risk that will be faced in period 2. As seen in Kimball (1990), individuals would choose not to engage in precautionary savings if the third derivative of their utility (as a function of income) equals zero.

The sequence of events in each period is as follows. First, states choose their tax rate, raising this rate as long as the sum of the net dollar-equivalent benefits to existing residents from this change to the state's tax/transfer program is positive. Then individuals choose whether to migrate (at a cost) to a different state. Next, individuals learn their random draw on income, and consume their resulting after-tax earnings plus their lump-sum transfer.

An individual's expected utility in any given period and chosen state of residence equals:

$$(1) \qquad \begin{aligned} EU\left(\tilde{C}_{is}\right) &\approx U(\bar{C}_{is}) + U'(\bar{C}_{is})E\left(\tilde{C}_{is} - \bar{C}_{is}\right) + .5U''(\bar{C}_{is})E(\tilde{C}_{is} - \bar{C}_{is})^2 \\ &= U(\bar{C}_{is}) - .5\rho_i U'(\bar{C}_{is})E(\tilde{C}_{is} - \bar{C}_{is})^2/\bar{C}_{is}. \end{aligned}$$

Here, we took a second-order Taylor expansion of utility, recognize that $E\left(\tilde{C}_{is}\right) = \bar{C}_{is}$, and then denote the individual's coefficient of relative risk aversion by $\rho_i \equiv -U''(\bar{C}_{is})\bar{C}_{is}/U'(\bar{C}_{is})$. While we allow ρ_i to vary across individuals, we assume it is a fixed parameter for each individual.

2. Equilibrium location choices of individuals

In equilibrium, we quickly infer that T_s is simply a function of t_s: If T_s differed among states charging the same t_s, then nobody would choose to locate in the state with the lower value of T_s. We can also immediately infer that the equilibrium T_s is an increasing function of t_s: If a state charged a higher tax rate but offered the same or lower net transfer as some other state with a lower tax rate, then nobody would choose to live in the higher-tax state. We can then summarize the equilibrium net transfer by the function $T_s = f(t_s)$ with $f' > 0$, and the individual's choice set by the function $f(t_s) - m_i\iota_{s\neq h}$.

Consider first each individual's locational choice in period 2, where they take as given their initial locational choice and their expected income in period 2, $\tilde{Y}_i^{1p}$. Here, they either choose to remain in their initial state, denoted by h, or else move to their best alternative among the other states. In order to characterize their preferences, we derive the shape of their indifference curves, trading off a higher t_s with a higher T_s.

Differentiating their utility function with respect to t and then allowing that individual's transfer, denoted T_i, to adjust to leave utility unaffected on net, we find that:

$$(2) \qquad \frac{\partial T_i}{\partial t} = Y_{i2}\left[1 - \frac{\rho_i Y_{i2}\alpha^2\sigma_i^2(1-t)}{\bar{C}_i D_i}\right]$$

Here, $D_i = 1 + .5\rho_i(1+\rho_i)Y_{i2}^2\alpha^2\sigma_i^2(1-t)^2/\bar{C}_i^2$. At first glance, it would seem that $\partial T_i/\partial t$ need not be positive. However, if it were negative then the individual would

gain from reducing their Y_i, so that this case would never be seen in equilibrium. The observed indifference curve must then have a positive slope. The expression in brackets captures the gains from reduced risk-bearing costs resulting from a higher tax rate, in itself making the indifference curve flatter.

Taking a second derivative, we find that the second derivative equals zero when $T = 0$, given that $C_i = Y_{i2}(1-t) + T$,[19] and is positive when $T > 0$.[20]

We then conclude that these indifference curves are steeper for those with a higher income, and shallower, given income, for those facing more risk or those who are more risk averse. We then expect those with higher income and facing little risk to have a higher propensity to move to a low-tax state in period 2, whereas those with lower income or facing more risk will tend to locate in high-tax states.[21] Given high moving costs, though, many individuals are likely to remain in the state they chose in period 1.

We capture this choice problem in Figure 1. Here, the dotted curve represents the function $f(t_s)$, describing the available choice set the individuals face if they move, along with the point labeled H (higher by the amount m_i) if they choose not to move. The solid curve represents the points providing the same utility as staying in the current state. As drawn, the individual, ignoring moving costs would move to a state with a lower tax rate, but given moving costs chooses to remain in the state they chose in period 1.

What about the individual's locational choice in period 1, assuming the individual was born in state b? Now, the individual is choosing a location to:

$$max_h\{EU(\tilde{C}_{i1}|b) + EU(\tilde{C}_{i2}|h, \tilde{\varepsilon}_i)\} \quad (3)$$

To begin with, ignore the option to move in period 2. In period 1, the individual faces much more risk than will be faced when making a locational decision in period 2, and also faces much lower moving costs. The young are therefore more likely than the old to locate in a high-tax state (buy more insurance).[22] In contrast, those with higher Y and facing less risk could still choose to move to a lower-tax state.

[19] An implication of constant relative risk aversion is that the risk premium is a constant fraction of income when the risk is a constant fraction of income.

[20] Note that an exempt income of E under a state income tax is equivalent to an addition to T of tE, at least for those with $Y > E$.

[21] Firms with high inherent risk, such as entrepreneurial start-ups, should then concentrate in high-tax states in order to more easily attract employees.

[22] Since they were born in a state chosen by their young parents who also likely faced high risk when choosing where to live, they are likely already in a high-tax state and may well remain in that state rather than paying the moving costs to choose a someone different high tax rate. Those born in a low-tax state, in contrast, should have a greater propensity to move in period 1.

The option to move in period 2 adds to the incentive to locate in a higher-tax state in period 1, since the individual can escape this high tax rate if their income turns out to be high enough to justify paying the migration costs of relocating.

One omission from the above expression, to avoid undue notation, is that an individual's choice of location in period 1 becomes the birth state of that individual's offspring. Given the correlation in incomes and risks across generations, the optimal choice for the offspring will be similar to that for the parent. In any case, given low moving costs in period 1 this additional factor will likely be small.

One forecast in the above model if we ignore risk is that higher-income individuals will tend to relocate to states with low tax rates, leading average income to be higher on net in low-tax states.

Yet in the data, high-tax states such as California, Massachusetts, and New York have more than their share of high-income residents. However, the counterfactual forecast that the rich concentrate in tax havens can be reversed if higher-income individuals face enough risk relative to lower-income individuals. Certainty the fraction of the high-income individuals active in a closely-held firm is far higher than for lower-income residents. The variability of ex-post lifetime income among college graduates is also high relative to that of the rest of the population. Our model provides then one possible explanation for why higher-income individuals often choose to reside in high-tax states: because they often face high risk and value the extra insurance.

We recognize that there can be other proposed explanations for why the high-income tend to concentrate in high-tax states. One could be that the high-income are willing to spend a larger fraction of their income on having access to amenities, such as being able to live in a nice climate. This taste makes the rich relatively immobile, enabling a state in a nice climate to raise their income tax rate without inducing much exit.

The poor (if they choose to move) will also tend to concentrate in the states with high tax rates (and high lump-sum transfers).[23] The gains from moving, and moving to a high-tax state, are higher the more risk that the individual faces. By attracting those facing higher risks, the income dispersion in high-tax states is likely to be much higher.

Another plausible forecast from the above theory is that population turnover will be greatest in states with the most extreme tax rates, low and high, particularly among older residents. Any gains from a move must be high enough to justify the potentially high moving costs, suggesting that the resulting change in the tax rate the individual faces must be large enough to justify paying these high costs. The typical moves would then be high income individuals in period 2 who move out of a high-tax state to

[23] Plausibly, moving costs are a higher fraction of income for the poor than for the rich, limiting the extent of such migration.

a low-tax state, replaced by individuals in period 1 with low expected income and/or facing high risk who move in to these high-tax states coming from a low-tax state. The result is a permanently younger population in high-tax states and a permanently older population in low-tax states.

3. Equilibrium choice of tax rate by each state

Each state is assumed to raise its tax rate as long as the resulting dollar-equivalent benefits summed[24] across residents living in the state at the beginning of the period are positive. In doing so, we need to take into account the labor supply and risk-taking incentives faced by each individual, as well as whether any of these individuals expect to migrate elsewhere in response to the equilibrium choice of a state's tax rate, given the effects of these behavioral responses on the state budget and so on the equilibrium lump-sum transfer.[25]

There will be equal numbers of people entering period 2 and period 1 of their lives, given that those who had been in period 1 each had a child. Each cohort will then comprise half of the state's residents potentially impacted by a tax change.[26]

For past residents, if they expect to migrate out of state given their current expected income and the future risks they face, then they will be unaffected by a marginal change in the state's tax rate.

If a resident instead intends to remain in the state, then the dollar impact of a tax change on this individual depends on any impact on the lump-sum transfer they receive from the government minus its impact on the certainty-equivalent income they are left with after taxes:

(4) $$\frac{1}{U_i'}\frac{\partial U_i}{\partial t_s} = \bar{Y}_s\left(1 - e_s\frac{t_s}{1-t_s}\right) - Y_i\left(1 - \frac{\rho_i Y_i \alpha^2 \sigma_i^2 (1-t_s)}{\bar{C}_i D_i}\right)$$

Here e_s denotes the elasticity of the state's average reported income with respect to the fraction of income left net of tax, $(1 - t_s)$. This average income can change due to changes in each resident's labor supply, effort, or tax compliance, the standard focus. It also changes due to migration in and out of the state of rich vs. poor, and

[24] Recall that we suppress any concern about distributional issues by giving equal weight to the dollar-equivalent ex-ante benefits to each resident.

[25] One complication we ignore is that any migration that occurs in response to the choice of tax rate not only affects current tax revenue but also affects the set of individuals whose welfare affects the policy choice in the next period.

[26] Note that our discussion, for simplicity, does not mention the children of those in period 1 of their life, who are also resident in the state for much of that period. Since the children are not working, they are impacted by state policy choices only due to changes in the lump-sum transfer. In our discussion below, we already take into account the aggregate lump-sum transfers in our measure of the sum of the benefits to state residents.

also due to changes in risk taking by existing residents. While e_s would be positive due to the first effect,[27] the third effect pushes in the opposite direction (since more risk-taking adds to an individual's expected income),[28] while the second effect is of ambiguous sign given that the state now would tend to lose high-income residents and attract people with lower Y_i, but also attract those facing more risk (who for this reason would have higher expected income). In general, then, the sign of e_s is ambiguous.[29]

Adding up these dollar impacts on residents and setting this sum to zero to solve for the optimal tax rate, we find at the optimal tax rate that:

(6) $$\bar{Y}_s\left(1 - e_s \frac{t_s}{1-t_s}\right) = \bar{Y}^{st}(1 - \Pi_s), \text{ or}$$

(6a) $$(\bar{Y}_s - \bar{Y}^{st}) + \bar{Y}^{st}\Pi_s = \bar{Y}_s e_s \frac{t_s}{1-t_s}$$

Here, $\bar{Y}^{st}$ denotes the average expected income among past residents who decide to stay in the state, while Π_s is the weighted average benefits from extra risk-sharing among these stayers. As seen in this expression, individuals are trading off the gains from extra risk-sharing due to a higher tax rate with the costs through added distortions to various dimensions of behavior. In addition, taxes are more attractive for initial residents to the extent that their expected tax payments are less than their expected lump-sum transfers, due to the difference between $\bar{Y}^{st}$ and $\bar{Y}_s$.

$\bar{Y}_s > \bar{Y}^{st}$ to the extent that the average income of those who migrate into the state exceeds the average income of those who stay in the state, and conversely. We expect that low-tax (high-tax) states attract individuals with unusually high (low) income, who are willing to pay the moving costs to face a lower tax rate (higher lump-sum transfer). We then expect $\bar{Y}_s > \bar{Y}^{st}$ in low-tax states, and conversely for high-tax states. This extra term then serves to reduce the dispersion in tax rates.[30]

In Figure 2, we graph the expressions on the two sides of equation (6a). The curve reflecting the efficiency costs arising from the resulting drop in reported taxable income (as a function of t_s) is the solid curve. This curve starts at zero , is upward sloping and convex for a given value of e_s, due to the way t_s enters the expression.

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[27] Any drop in tax revenue due to a reduction in labor supply or effort implies an efficiency cost, while any drop due to an increases in evasion are partially an efficiency cost (see Chetty (2009)).

[28] See Domar and Musgrave (1944) for an early recognition of this behavioral response to taxes. For empirical support for this forecast, see Bird (2001) and Cullen and Gordon (2007).

[29] Note that increased risk taking would result in an immediate fall in income when start-ups first enter, hoping to develop a new product/process, even though expected income should eventually be higher. Event studies would then systematically underestimate the longer-run impact of a tax change on state income, as suggested by the higher per capita incomes commonly seen in high-tax states. Migration responses to a tax change are also gradual, but have an ambiguous effect on state tax revenue.

[30] Note that the extra term $(\bar{Y}_s - \bar{Y}^{st})$ introduces a trade-off between efficiency and redistribution between new and old residents.

The curve reflecting the gains to those staying in the state from sharing more risk with the government as well as through pre-existing migration patterns on the average income, is captured by the dashed curve, which is downward sloping since further risk-sharing gains become smaller as individuals are left with less risk net-of-tax. Where the curves cross would be the optimal choice for t_s, denoted by t^*.

The extent of insurance provision is then limited by the range of behavioral responses captured by the parameter e_s. Among these responses is the effects of a higher tax rate in a state on the equilibrium sorting of individuals across states. A change in sorting patterns in response to a tax change implies fiscal externalities, with richer individuals fleeing a higher tax rate, or no longer tempted to move to the state given the now higher tax rate. These fiscal externalities create a role for Federal government intervention. The next section focuses on possible policy responses.

4. Implications for possible Federal government interventions

A. Policies that affect moving costs

As seen in equation (6a), the provision of insurance through the income tax is limited because of the offsetting costs arising from the resulting tax distortions affecting both reported labor income and migration decisions. Migration decisions create positive fiscal externalities to the budgets of other states.[31] Because of these externalities, state decisions on their income tax rates will not be second-best efficient from a national perspective.

There are a variety of possible approaches that the Federal government could take to lessen the resulting inefficiencies.

The first policy we consider deals with the treatment of moving costs under the Federal income tax. Until the 2017 tax legislation, moving costs (under certain conditions) were a deductible expense under the income tax. This deduction has been suspended during 2017-2025 except for those moving to a new job. To what degree can this policy choice affect the efficiency of allocation decisions in our setting?

Restrictions on exit from an insurance plan play a major role in the survival of these plans. Our model built in strong restrictions on migration by assuming individuals can move only twice in their lives. Without any restrictions or costs of migration, an

[31] While the strong presumption, coming from a setting without risk, is that migration responses to taxes create positive fiscal externalities to other states, the migration from low-tax to high-tax states of individuals facing high-future risks in itself likely leads to a net fiscal loss to these low-tax states. (This migration would be a form of brain-drain, as the most energetic and ambitious residents migrate elsewhere to pursue high-risk ventures, hoping to "make it big".)

insurance package can easily unravel, with only those residents in a state experiencing the worst outcomes in equilibrium remaining covered by any insurance plan, with others migrating to states with lower tax rates, causing a breakdown in any insurance coverage. The lack of any cost of exit from a plan insuring income risk explains the lack of a private market for such insurance.

Some restrictions on exit therefore raise efficiency, with more insurance being provided in equilibrium the higher these exit costs. If there were no other reason for moving other than to escape the high taxes faced in the state where one currently resides, if and when an individual learns that their future income will be high, then the most efficient policy choice would be arbitrarily high moving costs for the old in period 2.[32]

What about migration decisions made in period 1? Costs faced to enter a plan could improve allocations to the extent that they discourage people moving simply to claim a higher lump-sum payment, but worsen allocations to the extent they lead to a worse match between individuals and insurance plans. Individuals who grew up in a low-tax state a would choose to move to a high-tax state b whenever:

$$T_b - T_a > (t_b - t_a)Y_i + m_i - Y_i(RP_a - RP_b) \tag{7}$$

Here, RP_s denotes the risk premium (as a fraction of expected income) if the individual chooses to live in state s. For any given level of risk an individual faces, equation (7) then implies that individuals move only if their expected income is below some level (a higher cut-off the more future risk they face).

The net fiscal impact of a move on the combined tax revenue in these two states equals: $(t_b - t_a)Y_i - T_b + T_a + t_b\Delta Y_i$, where ΔY_i measures the change in the individual's reported income due to the move to a high-tax state.[33] For an individual just indifferent to moving, the net social gain from the move then equals:

$$Y_i(RP_a - RP_b) - m_i + t_b\Delta Y_i \tag{8}$$

Figure 3 describes both who chooses to move and then which moves imply a net social gain or loss. The solid line captures the implications of equation (7) characterizing which individuals choose to move, while the dashed line describes the set of individuals whose move would imply zero net social gain or loss based on equation (8). Individuals located in area A represent movers who provide a net social gain from moving through improved risk allocations dominating, while those in area B represent movers who impose a net social loss due to their moving costs dominating.

[32] For any given lump-sum transfer, the tax rate needed to finance it goes up the easier it is for residents to avoid the tax when their income turns out to be high. The excess burden from the tax grows as the square of the tax rate, implying efficiency losses from easy emigration.

[33] ΔY_i would be positive to the extent individuals shift to a riskier career due to better insurance protection, but negative to the extent that the higher tax rate discourages labor supply and effort and leads to more evasion.

The net social gain is more positive (more negative) the further individuals are to the northeast (southwest) of the dashed curve.

If the government were to use tax policy to either aid or discourage moves, this would affect equation (7) describing individual migration decisions, shifting this curve up or down, but not affect equation (8) since true mobility costs would not be affected. Whether an intervention helps or hurts is unclear in general, depending on the density functions for moving costs, expected income, and risk premia.

Deductibility of moving costs under the income tax has only minimal effects on the moving costs for the young (whose possessions likely fit in their car trunk), while facilitating moves by the old. From the perspective of our model, this policy would be counterproductive, leading to worse fiscal externalities and an undermining of the provision of income insurance.

An alternative policy that does discourage moves is the provision that imposes a capital-gains tax on owner-occupied housing at the time of sale, rather than for example an earlier policy that allowed a deferral of this tax if a new property of at least comparable value was purchased around the same time. Given the tax savings in present value resulting from deferral of capital-gains liabilities, taxing capital gains whenever the individual moves does discourage migration of the old without affecting migration of the young (who even if they owned housing would not have owned for long enough to have much capital gains).[34]

Omitted from our model, though, is any other reason for a move, including for example moving to a job that provides a better match for the individual's skills, or moving to be nearer to key friends and relatives.

A formal analysis could trade off these various offsetting effects of higher moving costs. Instead, we turn to other possible policy responses.

B. Use of the Federal income tax as a base level tax

Another possible Federal policy response, which of course we see, is to impose a Federal income tax, at some tax rate denoted t_F, which in effect serves as a base level tax from which the states may choose to impose a supplementary income tax.[35]

State taxes would then impose negative fiscal externalities on the Federal government to the extent that individuals in response report lower taxable income. State tax rate increases, though, still presumably create positive fiscal externalities

[34] However, it also discourages within state moves, a net cost.

[35] The question analyzed in this section overlaps with that analyzed in Gordon and Cullen (2012). However, that paper focused on a setting where states are identical, contrary to the setting in this paper. In particular, given the assumption of identical state tax rates, that paper assumed that migration occurred due to taste differences rather than due to a response to tax differences.

for other states due to the out-migration of higher-income residents and the in-migration from other states of individuals with lower-income.

Consider first the impact of a Federal tax on the chosen state tax rates. Let $\tau_s \equiv t_F + t_s$ denote the combined tax rate affecting individuals in each state s. Note that the value of τ_s that solves the equation:

(6b) $$(\bar{Y}_s - \bar{Y}^{st}) + \bar{Y}^{st}\Pi_s = \bar{Y}_s e_s \frac{\tau_s}{1-\tau_s}$$

equals the tax rate t_s that solves equation (6a) if migration patterns were the same. If this were the equation determining state tax rates, then we find a one-for-one drop in state tax rates when a Federal tax rate is imposed.

The right-hand side of equation (6b) takes into account the drop in both state and Federal tax revenue due to the elasticity of taxable income with respect to the income tax. Yet any state would have reason to take into account any resulting drop in Federal tax revenue only to the extent that this drop is borne by residents in the state. Even a large state would bear only a small fraction of the Federal tax loss resulting from an increase in that state's tax rate. Replacing the right-hand side of equation (6b) with the impact of changes in reported earnings on just that state's tax revenue, as in equation (6a), leads to higher equilibrium state tax rates than implied by a one-for-one offset.

Given that individuals already receive some insurance through the Federal tax/transfer system, however, the gains to state residents from further insurance through a state tax/transfer system are reduced. The optimal state tax rate is reduced in response to the introduction of a Federal tax, even if the fall in tax rate is not one-for-one.

With the resulting (less than one-for-one) drop in state tax rates at the top, the dispersion in state tax rates will be reduced. Tax rates in the low-tax state remain positive, since both terms on the left-hand side of equation (6b) are positive, while tax rates fall in the high-tax states due to the introduction of a Federal tax. The reduced dispersion in state tax rates implies weaker migration incentives, lowering the elasticities e_s and pushing the differentials $(\bar{Y}_s - \bar{Y}^{st})$ towards zero. Each of these changes in themselves improve state allocations, conditional on Federal tax revenue.

Regardless of the choice of Federal tax rate, misallocations remain. Positive horizontal externalities will outweigh the negative vertical externalities in the states generating the largest spillovers (presumably the states with the most extreme tax rates, low and high), leading to too low tax rates from a Federal perspective in these states. In contrast, states generating the smallest spillovers (presumably those with intermediate tax rates, where the benefits from migration will be low enough to discourage much migration) will generate negative net externalities, leading them to choose too high tax rates from a Federal perspective. The optimal Federal tax rate

will then trade off the costs from having too high tax rates in some states, and too low tax rates in other states.

Even under the optimal Federal tax rate, there should still be too much migration on efficiency grounds, leaving a potential role for interventions that reduce migration rates. In particular, the effects of an individual's migration from a high-tax state b to a low-tax state a implies a gain to the budget in state a equal to $t_a(Y_i + \Delta Y_i) - T_a$ and a change in the budget of state b equal to $T_b - t_b Y_i$. Here, $\Delta Y_i > 0$ to the extent that the individual reports higher earnings now that the individual faces a lower tax rate.[36] In addition, the impact of this migration decision on the Federal budget equals $t_F \Delta Y_i$.

If the individual were just indifferent to this move, then the combined fiscal externalities of this move equal the sum of these three terms:[37]

$$t_a(Y_i + \Delta Y_i) - T_a + (T_b - t_b Y_i) + t_F \Delta Y_i \tag{9}$$

$$\approx (t_b - t_a)\left[\bar{Y}_b - Y_i\left(1 - e_i \frac{\tau_a}{1-\tau_a}\right)\right] - t_a(\bar{Y}_a - \bar{Y}_b) \tag{9a}$$

Given the presumption that the highest income individuals will be the ones most likely to migrate to save on taxes, we would expect $Y_i \gg \bar{Y}_b$, leading to a negative first term in equation (9a) for any plausible elasticity of reported taxable income. Given the migration of the high income to low-tax states and the low-income to high-tax states, we would also expect $\bar{Y}_a > \bar{Y}_b$, implying that the second term in equation (9a) will also be negative. Together these imply a negative net externality from marginal migration decisions, leaving open an independent role for interventions to reduce migration.[38]

C. Allowing state income tax payments as an itemized deduction

Another much debated Federal policy of potential relevance is the availability of state sales or income tax payments as an itemized deduction under the Federal income tax. We explore in this section the degree to which this provision affects individual decisions on migration and risk-taking, and state decisions on their tax rates.

Consider first the effects of this policy on migration decisions of high-income individuals in period 2, considering a move from a high-tax to a low-tax state. The tax savings from the itemized deduction equal at most $t_F t_b \tilde{Y}_i$. If the individual moves to a low-tax state, however, either the deductions are much smaller due to the lower tax rate, or are lost if the standard deduction now dominates.

[36] But expected reported earnings can also fall due to a choice to pursue a less risky career, now facing less insurance coverage.

[37] To derive the second line, we made use of the definitions of price elasticity of income and of the T_s.

[38] The expression for the net externality from the migration of individuals from a low-tax state to a high-tax state will also be negative unless the migration is dominated not by the low-income but by those facing substantial future risks.

This differential tax savings will then lead fewer people to migrate. Itemizers who remain in the high-tax state are partly those who would have stayed even without this itemization provision, plus those who choose to stay only because of it. For those individuals who were dissuaded from migrating, the net fiscal externality benefit from this decision is at most: $(t_b(1-t_F)-t_a)(\tilde{Y}_i^{2p}-\bar{Y}_b) + t_a(\bar{Y}_a-\bar{Y}_b)-\tau_a\Delta Y_i$. This expression is positive if $t_b(1-t_F) > t_a$ and if ΔY_i is not too large, both of which likely hold. This policy, though, requires a further budgetary transfer to those itemizers in the high-tax state who would not have migrated regardless, presumably a much larger group, particularly in states with intermediate tax rates. Financing this transfer has efficiency costs.[39] From its effects on migration alone, support for this provision would be unclear.

What about effects on individual risk-taking? Extra risk-taking creates a positive fiscal externality, since individuals who take on more risk will in compensation have higher expected income, and pay higher expected taxes.[40] If this provision increases risk taking, by keeping more individuals in high-tax states, that would be a net efficiency gain.

With this provision, however, the dispersion around Y_i increases for the range of outcomes $Y_i(1+\tilde{\varepsilon}_i)$ where the individual gains from itemizing. due to the lower resulting marginal tax rate. Before the introduction of this provision, the individual had chosen the amount of risk to face so as to maximize utility. For those whose expected income is high enough that they almost always choose to itemize ex post, the individual now faces more dispersion in their net-of-tax income except for extremely negative outcomes for $\tilde{\varepsilon}_i$. Here, the individual would compensate for the introduction of itemization by reducing risk-taking. Since entrepreneurial activity in particular is concentrated among the highest-income individuals, overall risk-taking will likely fall in response to the introduction of SALT deductions, in itself a net efficiency loss.[41]

What about effects of this provision on the tax rates chosen by states, assuming individuals have been able to re-optimize the amount of their risk-taking? How do preferences of residents over the state's tax rate change in response to this itemization provision? If individuals can always deduct their state income taxes under the Federal tax, then an increase in the tax rate by $dt/(1-t_F)$ now has the

[39] There would in general also be equity costs from a transfer focused on the highest-income individuals, costs we ignore in our focus on efficiency effects of insurance provision.

[40] The idiosyncratic risk in their tax payments has no social cost, given the law of large numbers.

[41] Another unappealing aspect of this provision is that individuals receive a tax break when they need it least (a tax break proportional to ex-post income). Are there alternative available policies that would instead provide a tax break when the individual most needs the funds? With such a tax break, mean income would still go up but net-of-tax risk would fall, leading to an unambiguous forecast that desired risk-taking would increase. One example of such a policy would be to treat business losses more favorably under the income tax. (Note, though, that the deductibility of business losses from other income was eliminated under the 2017 tax legislation.)

same effect on the distribution of after-tax income as would an increase in the tax rate by dt without this provision, but generates a larger lump-sum transfer.[42] For those who almost always itemize, the optimal state tax rate would then go up by at least the multiple $1/(1-t_F)$. However, given that most individuals do not itemize, state tax rates would go up by less than this multiple.

5. Possible directions for future empirical work to test the forecasts from this model

The model has some intriguing empirical forecasts, which are potentially testable. Among them:

1) Since the young face more uncertainty than those who are older about their future career paths, we would expect to see a differential propensity for the young to migrate to high tax states.[43]

2) Innovative start-up firms should be particularly concentrated in high-tax states.

3) Migrants from high-tax to low-tax states would tend to have high income and face relatively low risk.

4) High-tax states should end up with a younger population, while low-tax states should have an older population.

5) Those who choose to move to (stay in) a high-tax state should have greater dispersion in their future earnings than do otherwise identical individuals from the same initial state who chose not to move to (emigrate from) the high-tax state.[44]

6) High migration costs should discourage moves unless the resulting change in taxes and benefits is large enough. Migration rates should then be lower for residents in states with intermediate tax rates.

7) Even though the model forecasts that those who end up with high income will tend to locate in low-tax states, if migration costs are high enough then high-tax states could still end up with higher income due to the extra earnings individuals facing high risks expect to receive to compensate for this high risk.

[42] The costs to the Federal budget would be shared with other states, so are of second-order importance in a small state.

[43] This differential effect occurs in the model due to both lower migration costs and greater demand for insurance among the young.

[44] This could occur due both to sorting and to behavioral responses in the amount of risk-taking when more insurance is available.

8) Political support for the income tax should be much broader than would be forecast using the median voter model with no risk to future incomes. Ignoring uncertainty, the gain to any given individual from use of the income tax equals $t_s\left[\bar{Y}_s\left(1-e_i\frac{t_s}{1-t_s}\right)-Y_i\right]$, implying support only from individuals with well below the mean income. When individuals face risk and are risk averse, there is an additional gain to them from use of the income tax.[45] To what degree are those favoring more use of the income tax drawn in part from those facing more risk to their future income?

9) The model highlights the longstanding forecast, dating back to Domar and Musgrave (1944), that higher tax rates with higher lump-sum payments, by helping to ensure those undertaking risks, can increase the amount of risk taking and in the process raise expected income. Higher tax rates would still be forecast to discourage labor supply and encourage tax evasion, in itself lowering reported income. A longstanding conventional wisdom, based on the second effect, is that higher tax rates in a state lead to behavioral changes that reduce tax revenue. But effects of taxes on risk-taking raise questions about this forecast. If high tax rates have major effects encouraging risk taking (or attracting individuals facing high risks), then states with high tax rates may for this reason have high average incomes. While effects of tax reforms on risk-taking and migration patterns will take time to show up, weakening the evidence available through natural experiments, attempts to capture these dimensions of the behavioral response to taxes would be valuable.

[45] This is just the argument made in Buchanan (1976) for why political support for the income tax is so broad.

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Figure 1
Individual Location Choice

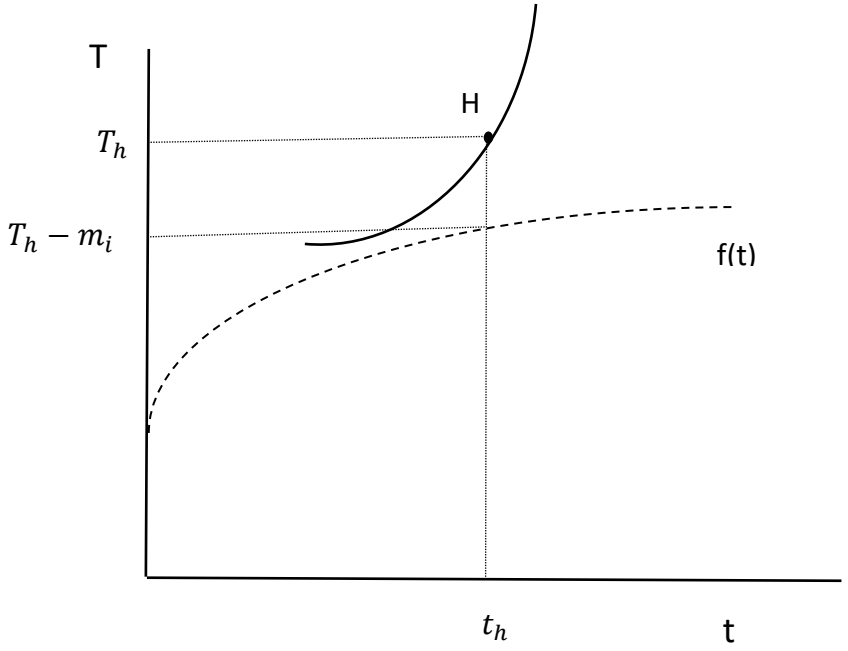

Figure 2
State Choice of Tax Rate

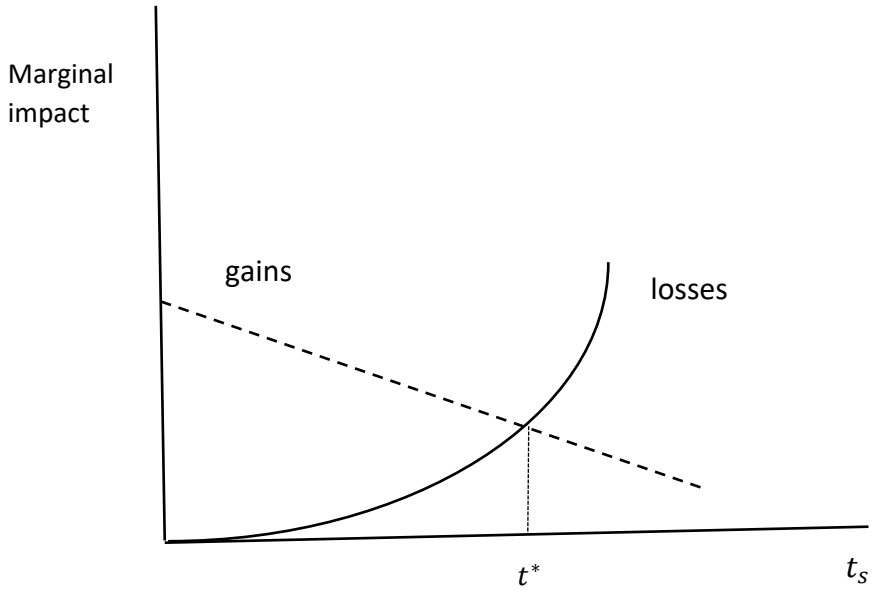

Figure 3
Migration Patterns