Fiscal Federalism and the Role of the Income Tax

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Abstract: This paper rethinks the design of the income tax by assuming that the objective of the tax is not to redistribute from rich to poor but instead to provide some insurance to individuals against the uncertainties they face in their future earnings, the motivation for the income tax hypothesized in Buchanan (1976). The income tax provides insurance by collecting money on net from individuals to the extent they end up doing well to finance net transfers to them when they end up doing badly.

Individuals differ in the amount of future risks they face. These heterogeneous tastes for insurance provide a rationale for states to offer heterogeneous tax/transfer programs, each state then attracting a different clientele in the population.

Given the ease of household migration, state tax policies generate fiscal externalities to other states. The paper explores possible Federal interventions to improve on the equilibrium choices states make for their tax policies.

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

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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.

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 states as well as by the Federal government. 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

[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)).

[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 to an individual when entering 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.

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, in an attempt to provide a more convincing positive explanation for the income tax. 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 redistribution based on outcomes from past risks 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.

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 responses 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. While an individual would be just indifferent to a marginal increase in risk taking, by the envelope condition, from a social perspective there would be efficiency gains arising from the sharing of individual idiosyncratic risks across the broader population.[6] Risk taking through the pursuit of new ideas can also generate positive informational externalities, given the limits of patent protection.

[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.

[6] Note that the variance of the sum of idiosyncratic risks in tax payments goes to zero relative to the sum of expected tax revenue by the law of large numbers. While individuals face potentially high risk-bearing costs from idiosyncratic risks in their own earnings, there should be no risk-bearing costs from idiosyncratic risks borne jointly through random tax revenue. The resulting efficiency gains from lowering the costs of risk-bearing through taxation are then traded off with other distortions created by the tax system.

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 each individual 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 move to a jurisdiction with higher taxes and transfers, while those with settled careers would gravitate instead to states with low 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.[7] High-tax states should then have a younger population. Once individuals' careers are well established, the most successful ex post would have a propensity to migrate to low-tax states.[8]

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 start-up firms. Once a firm is well established and has a stable niche, it may have an incentive to shift its operations to a low-tax state.[9]

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 shown in Gordon (1985), proportional taxation of risky publicly-traded securities would lead to no reduction in risk-bearing costs and no

[7] 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), 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.

[8] 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.

[9] That Elon Musk started his career in California (a high-tax state), but then moved personally and shifted his new plants from California to Texas, once his career became 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 for the most successful to migrate to a low-tax jurisdiction once future risks are less.

change in risk taking, since these risks should already be efficiently allocated across individuals through the securities market. However, while the securities 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).[10]

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.[11]

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 some high-income individuals facing low future risks migrate towards low-tax states while some low-income individuals currently living in lower-tax states (and particularly those facing more future risks) leave to take advantage of the resulting increase in benefits in the state raising its tax rate. In both cases, this migration response adds to the tax base in other states. Due to these positive fiscal externalities, states choose too low tax rates (offer too little insurance) from a national perspective.

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), saving directly

[10] 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.

[11] 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.

on migration costs and also allowing these states to provide a more generous insurance program.

A second potential Federal response is to subsidize state 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.[12]

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.[13]

In addition, we discuss some more detailed adjustments to the Federal income tax, aimed directly at providing more insurance specifically for risky closely-held firms. One possibility would be a higher tax rate, but more generous deductions. A second would be less aggressive enforcement of taxes on such activities. A third would be more generous loss offset provisions for such business ventures.

The outline of the paper is as follows:

Section 1 lays out 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

[12] We will show, however, that this particular attempt at a subsidy worsens allocations, by reducing the implicit insurance available to residents, in a setting in which there is too little insurance due to migration pressures.
[13] However, raising moving costs also discourages individuals from migrating to a state with a more appropriate implicit insurance plan, or even moving to a new location within the same state.

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 note some surprising forecasts from the model.

1. Key assumptions of the model

We assume that each individual i lives for two periods, and works in both periods.[14] 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 initial expected income,[15] and $\tilde{\epsilon}_i$ is an idiosyncratic random shock to income in period 1, with variance σ_i^2. The ex-post earnings for those in period 2 of their life would equal $\tilde{Y}_i^{2p} = \tilde{Y}_i^{1p}(1 + \tilde{\eta}_i)$, 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 state and local 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.

Normally, we would then argue that the use of taxes on consumption 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 lost when user fees are employed instead. Our focus will then be on the trade-off between efficiency gains provided through the combined use of consumption and income taxes providing insurance for earnings risk along with a combination of public

[14] 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.

[15] 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.

services and lump-sum transfers, while imposing offsetting costs by distorting labor supply, work effort, and tax compliance.

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 net income are equal within each period, after taking into account tax and transfer provisions. Given our assumption that expected income in period 2 is the same as ex post income in period 1, the individual faces no reason to borrow against future income.[16] In addition, we ignore precautionary savings in period 1 to help cushion any risks that will be faced in period 2.[17]

Use of an income tax could still have an advantage over a sales tax if individuals face borrowing constraints within each of the two periods.[18] 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. Evasion rates could also differ between income and consumption taxes, with consumption taxes vulnerable to cash sales and cross-border shopping, while income taxes are vulnerable particularly to evasion by closely-held businesses, an issue we return to below.[19] For simplicity, though, we 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.

Each state s imposes a linear income tax at rate t_s,[20] with per capita revenue 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.

[16] Given this assumption, we ignore another possible gain through use of an income tax, through providing net transfers to individuals in period 1 when their income is relatively low financed by net taxes on individuals in period 2 when their income is relatively high, thereby weakening possible borrowing constraints.

[17] 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, an assumption we implicitly make below from making use of a second-order Taylor expansion of the individual's utility function.

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

[19] Gordon and Nielsen (1997) examine the relative evasion rates in Denmark of their income tax compared to their VAT, and found very similar overall evasion rates, with just a slight advantage to the VAT. However, the Danish VAT covers roughly two-thirds of consumption, whereas U.S. state sales taxes cover only roughly one-third of consumption.

[20] Here, we define t_s as the income tax rate equivalent to the combined consumption and income taxes used in the state. Note that we do not attempt to solve for the optimal nonlinear tax schedule. Doing so would be much more complicated in our setting than in the past optimal-tax literature, since a change in any marginal tax rate now distorts the behavior of all taxpayers ex ante, given risk, and not just those individuals earning a specific level of income ex post.

This tax revenue is used to finance public services as well as transfer payments. We assume for simplicity 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.[21]

Individuals have the option to move across states at the beginning of each period, once they learn the tax and transfer rates chosen by each state, 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 ex post 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. 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.

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.[22] 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

[21] Any explicit discussion of expenditures on public services would face the issue not only of the marginal benefit to residents of cash vs. additional public services but also of the effects of the composition of these expenditures on migration patterns. For example, providing services of particular value to high-income residents (such as a higher quality state university system) has the added benefit to the state of keeping more high-income residents in the state's tax base.

[22] 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.

members can insure each other.[23] 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, due to costs incurred following a layoff in the event of low marginal products arising from high fixed costs to the firm of finding and training a replacement worker once marginal products increase, and due to the high costs to workers of exiting the firm when their marginal product is unusually high.[24]

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.

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

[23] See Altonji, Hayashi, and Kotlikoff (1992), however, for empirical evidence that does not support the presence of this type of insurance between parents and children. However, two-earner households do help insure each other by pooling their income. We will then presume that two-earner couples tend to face lower risk relative to their combined income than one-earner couples or single individuals.

[24] 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.

In equilibrium, we assume that T_s is simply a function of t_s: If T_s differed (even slightly) among states charging the same t_s, then nobody would choose to move to the state with the lower value of T_s, leading to a dramatic fall in that state's population. Similarly, 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 move to the higher-tax state. We 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) $$\frac{\partial T_i}{\partial t} = \tilde{Y}_i^{1p}\left[1 - \frac{\rho_i \tilde{Y}_i^{1p} \alpha^2 \sigma_i^2 (1-t)}{\bar{C}_i D_i}\right]$$

Here, $D_i = 1 + .5\rho_i(1+\rho_i)(\tilde{Y}_i^{1p})^2\alpha^2\sigma_i^2(1-t)^2/\bar{C}_i^2$. 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 $C_i = \tilde{Y}_i^{1p}(1-t) + T$,[25] and is positive when $T > 0$.[26]

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 move to high-tax states.[27] Given high moving costs, though, many individuals are likely to remain in the state they chose in period 1.

[25] 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.

[26] 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 $Y > E$.

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

We capture this choice problem in Figure 1. Here, the dotted curve represents the function $f(t_s)$, describing the available choice set 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).[28] In contrast, those with higher Y and facing less risk could still choose to move to a lower-tax state.

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.

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

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 for any given level of current income.

Young two-earner couples who choose to move, though, would have less incentive to move to high-tax states than one-earner couples or single individuals, for any given level of past income, given that they already pool risks within the family.

[28] 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 somewhat different high tax rate. Those born in a low-tax state, in contrast, should have a greater propensity to move in period 1.

Innovative start-up firms should be particularly concentrated in high-tax states, since their employees as well as the entrepreneurs would particularly gain from having better insurance coverage.

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

High-tax states should then end up with a younger population, while low-tax states should have an older population, since those in period 2 have less need for insurance.

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.[29]

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, while those who migrate would normally choose a substantial change in their tax rate (particularly for the old who are assumed to face much higher moving costs).

3. Equilibrium choice of tax rate by each state

Each state is assumed to raise its tax rate in a given period as long as the resulting dollar-equivalent benefits summed[30] across residents living in the state at the beginning of that period are positive.

Here, we preserve a feature of the optimal tax literature by taking as a social objective maximizing the sum of individual utilities. This focus on the average benefits to residents contrasts with the traditional focus in the political-economy literature on the median benefits to voters, where it is assumed that the median voter is decisive in any election. Our approach makes use of the income tax less appealing than it would be focusing on the preferences of the median voter, since the dollar impact of a marginal tax change on high-income residents can be dramatically larger than its dollar impact on even median-income residents. Use of a median voter model, though, is challenging in our context, since median preferences depend on

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

[30] Recall that we suppress any concern about distributional issues by giving equal weight to the dollar-equivalent ex-ante benefits to each resident at each decision date. Note that under the Von Neumann-Morgenstern assumptions, each individual's utility function is unique up to a linear transform. Here, we choose the units for each individual's utility function so that the expected marginal utility of income is equated across individuals.

the joint distribution of expected income, the degree of risk in income, and the degree of risk aversion, and not just the preferences of the individual with median income.

In solving for the tax rate that maximizes the sum of utilities, 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 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.[31]

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.[32]

Here, we follow the assumptions made in the past optimal taxation literature, and ignore any altruistic preferences of parents (those in period 2 of their lives) towards their adult children (entering period 1 of their lives). In doing so, we deviate from Buchanan (1976), who argued that even quite wealthy parents could support use of the income tax because of the insurance benefits it provides to their children before their children's careers are well established. Under Buchanan's assumptions, support for the income tax would be considerably stronger.

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 also due to changes in risk taking by existing residents. While e_s would be positive

[31] 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.

[32] 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.

due to the first effect,[33] the third effect pushes in the opposite direction (since more risk-taking adds to an individual's expected income).[34] The strong presumption is that migration responses to a tax increase also impose a net cost on the state, as some rich residents leave and some poor individuals migrate in, attracted by the resulting higher transfer payments.[35]

Note that past empirical estimates for this elasticity of taxable income make use of national tax changes, thereby leaving out any migration response. In addition, they likely fail to capture well any resulting changes in risk taking.[36]

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.[37]

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

[34] 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).

[35] This strong presumption comes from a setting without risk. However, 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".)

[36] Increased risk taking would result in an immediate fall in income when start-ups first enter, hoping to develop a new product/process, or when an individual first shifts to a riskier occupation, 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, focusing on the discontinuity in reported income in the immediate period following a discrete change in tax rates.

[37] Note that the extra term $(\bar{Y}_s - \bar{Y}^{st})$ introduces a trade-off between efficiency and redistribution, but now not redistribution between rich and poor but instead between remaining and new residents.

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.

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 marginal 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 positive fiscal externalities, with richer individuals fleeing to other states, and poor individuals in other states leaving, attracted by a now higher transfer payment in the state raising its tax rate. Because of these externalities, states will choose too low income tax rates from a national perspective. The next section focuses on possible Federal policy responses.

4. Implications for possible Federal government interventions

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

One 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.[38]

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.[39] Note that the value of τ_s that solves the equation

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

[38] 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.

[39] Here, we ignore the possible deductibility from Federal taxable income of state tax payments as an itemized deduction.

equals the tax rate t_s that solves equation (6a) if the other parameters remain the same.[40] 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, leaving individual behavioral incentives unchanged.

The right-hand side of equation (6b), though, 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 marginal gains to state residents from further insurance through a state tax/transfer system are reduced. This drop in the size of Π_s would be large in states where residents face significant risks, and would be zero (in the limit) in a state where residents faced no risk. The optimal state tax rate is reduced in response to the introduction of a Federal tax, particularly in states where it had been higher, even if the fall in tax rate is not one-for-one.

As a result, 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, in itself an efficiency gain, given the negative externalities generated by migration decisions. In addition, weaker migration incentives lead to lower elasticities e_s, 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.

The initial problem motivating Federal intervention was that state decisions on their tax rates generate positive externalities in other states, implying too low equilibrium tax rates. Now, however, state taxes impose negative fiscal externalities on the Federal government to the extent that individuals in response report lower taxable income, a negative externality that is greater the higher the Federal tax rate. Gordon and Cullen (2012) in a setting with many identical states, then argue that state incentives in setting their tax rates are efficient when the Federal tax rate is high enough that the negative externality imposed on the Federal government by an

[40] Note in particular that $\bar{Y}_s$ remains unchanged only if the Federal income taxes collected from any given state are then used entirely to finance a lump-sum transfer to residents of that state, thereby avoiding any redistribution across states. If the Federal government considered in addition, possible lump-sum transfers between states, further improvements in allocations are possible to the extent that transfers are targeted at states where residents have a greater propensity to undertake additional risks.

increase in any given state's tax rate just offsets the positive externalities this tax change creates for other states.

In our setting, in contrast, states are heterogeneous. At the optimal Federal tax rate, the aim is instead to choose a Federal tax rate such the sum of the costs from having net positive externalities generated by tax changes in some states and net negative externalities generated by tax changes in other states are minimized. 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 trades off the costs from having too high tax rates in some states, and too low tax rates in other states.

B. Allowing state income tax payments as an itemized deduction

Even with the optimal use of a Federal income tax, equilibrium tax rates in the states choosing the highest-tax rates will still be too low from a Federal perspective, even if the chosen tax rates are too high in states with intermediate tax rates.

One other policy response that targets mainly higher-income individuals in high-tax states is the availability of state sales or income tax payments as an itemized deduction under the Federal income tax. With this provision, an individual saves on taxes an amount equal to $t_F t_s \tilde{Y}_i$, assuming the individual's other itemized deductions are already larger than the standard deduction. The tax savings then are focused on individuals with high income living in states with a high tax rate.

Allowing state sales and income tax payments as an itemized deduction lowers the cost to a state of raising its tax rate, and raises the cost to an individual of moving from a high-tax to a low-tax state (and then having lower itemized deductions). In this section, we confirm that this provision leads to higher equilibrium state tax rates and lower migration rates. But we will then argue that this provision reduces equilibrium insurance provision, and on net is counter-productive.

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 $t_F t_s \tilde{Y}_i$, assuming all tax payments can be deducted. If the individual moves to a low-tax state, however, these deductions are much smaller due to the lower state tax rate. 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. Both groups benefit from the added itemized deduction, but only the second set of itemizers changed their migration decision, implying potentially large budgetary outlays for any given reduction in migration propensities. Financing these outlays has efficiency costs.[41] From its effects on migration alone, support for this provision would be unclear.

What about effects of this provision on the tax rates chosen by states? 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 same effect on the distribution of after-tax income as would an increase in the tax rate by dt without this provision. For those who itemize, the optimal state tax rate would then go up by the multiple $1/(1-t_F)$. However, given that most individuals do not itemize, state tax rates would go up by much less than this multiple.

The policy concern, however, is not per se that tax rates are too low in high-tax states, but that insurance provision in these states is too limited. With this deductibility of state tax payments, individuals face a lower marginal tax rate, implying that they now bear greater risk. By introducing this itemized deduction, the efficiency gains that resulted from transferring risk from individuals to the government are then reduced. In addition, having to bear a larger fraction of any risks, individuals will choose to take on less risk, implying a further efficiency loss. The resulting increase in the state's chosen tax rate would not be enough to offset this impact on the allocation of risk. Allowing state tax payments as an itemized deduction as a result imposes efficiency losses through its effects on risk taking.

C. 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.

Even under the optimal Federal tax rate, there would 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

[41] 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.

the individual reports higher earnings, now that the individual faces a lower tax rate.[42] 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:[43]

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

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

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.[44]

Consider then 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 an insurance plan. 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 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

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

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

[44] 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.

most efficient policy choice would be arbitrarily high moving costs for the old in period 2.[45]

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.[46] 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. 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

[45] When a high-income resident exits in response to a marginal increase in the state's tax rate, this decision has only a second-order effect on that individual's utility by the envelope condition. However, that state loses tax revenue, lowering the welfare of the remaining residents in the state.

[46] 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.

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 also discourages 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).[47]

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.

D. Tax provisions affecting closely-held firms

There are many sources of risky labor income. One important source of risky income is employment in a closely-held firm, particularly in a firm engaged in innovative activity. Around two-thirds of start-up firms fail within a relatively short period of time, though a subset can be spectacularly successful. Often, employees in these firms are paid in part through stock options, implying risky income while employed in addition to any risk of continuing employment.

It is worth considering then the tax treatment of closely-held firms, including sole proprietorships, partnerships, LLC firms, and to some degree subchapter S corporations, income in each case taxed under the personal income tax. Risks faced by publicly-traded corporations, in contrast, should already be allocated efficiently across the economy through the stock market.

There are various ways in which policy provisions can affect the allocation of risks generated by these firms, and their incentives to undertake further risks. One approach was tried in a dramatic fashion in Kansas during 2012-17, when the income tax rate on closely-held firms was set to zero. The 2017 Federal tax reform also reduced the effective personal tax rate on income from a specified subset of closely-held firms to 80% of the normal rate.

By imposing a lower tax rate on particular firms, these tax changes distorted the allocation of economic activity, in itself imposing efficiency costs. The main potential

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

source of offsetting efficiency gains would be through increased risk taking. Yet as a result of these cuts in marginal tax rates, less of the risky income generated in these firms is offloaded onto the government, leaving higher risk-bearing costs to the owners and employees in these firms. Risk-bearing costs as a result are higher, and further risk-taking is discouraged.

A contrasting approach would be to raise rather than lower the marginal tax rate on such activity, shifting more of the resulting risk to the government, but to complement this higher tax rate with more generous deductions in order to maintain the level of activity in this sector.[48] In combination, these policies can in principle maintain the level of employment and investment in this sector but lower the overall costs of risk bearing and encourage more risk-taking in this sector.

Any differential tax treatment of closely-held and publicly-traded firms, though, opens up opportunities for tax avoidance through shifting profits between a closely-held firm and a jointly owned publicly-traded corporation.[49] If these same tax provisions (a higher marginal tax rate and more generous deductions) were offered to both corporate and closely-held firms, these particular tax avoidance opportunities could be avoided. Corporate investment incentives can be preserved through the appropriate degree of generosity of various deductions. The main cost is likely to be income-shifting by multinationals, now facing a higher tax rate on profits reported in the U.S., to their foreign subsidiaries.

Another important aspect of the taxation of closely-held firms, ignored so far in the discussion, is the high rate of tax evasion among such firms. While closely-held firms may aggressively pursue available opportunities to hide profits, though, they have every incentive to document any tax losses they experience. One policy choice is how much effort to expend to detect and penalize such tax evasion. By preserving the sharing of any losses with the government, but allowing these firms to retain a larger fraction of their profits, lax tax enforcement would still lead to risk sharing for the outcomes that would have been particularly costly for firms to bear while in the process encouraging greater risk-taking. Of course, any efficiency gains through the resulting risk-taking incentives must be balanced against costs arising from the resulting differential taxation of closely-held and publicly-traded firms, but also taking into account the cost savings from less aggressive tax enforcement.

Yet another aspect of the tax treatment of closely-held firms is the specific tax treatment of any losses they experience. One particular provision of the 2017 Federal tax reform was the elimination of any deductibility of non-corporate business losses against other personal taxable income. The effects of this provision on risk taking is the reverse of the effects of weak tax enforcement. With this provision, firms bear all of any losses they experience, but receive only the after-tax share of any

[48] For example, the types of capital used in these firms could be granted more accelerated depreciation provisions.

[49] The threat of this type of tax avoidance was likely a key reason why the 2017 Federal tax reform lowered the tax rates on corporate and closely-held firms in tandem.

profits they generate. This provision therefore raises risk-bearing costs and discourages risk-taking, in both cases generating an efficiency loss.

5. Some surprising implications of the model

A key focus of this paper dealt with the effects of the income tax both on the incentives to pursue jobs with riskier income and on the overall costs of bearing the risks in this income. There is a long-standing literature, dating back to Domar and Musgrave (1944), arguing that a higher income tax rate lowers the costs of bearing idiosyncratic earnings risk, and as a result encourages more risk-taking.

While these effects of taxes have been recognized for a long time, their implications are often overlooked. This section will highlight two of them.

For one, there is a longstanding presumption that when a state raises its income tax rate, it induces a migration pattern that provides positive fiscal externalities to other states.[50] Higher income individuals in the state may now find it worth the cost to migrate elsewhere, while lower income residents elsewhere may now be tempted to move to the state that raised its tax rate and as a consequence raised its lump-sum transfer.

Yet, when a state raises its tax rate, it also makes the state a more attractive location for those residents living elsewhere who face high risks and would be willing to pay a higher tax rate in order to obtain better insurance against these risks. Individuals facing high risks in exchange must be earning higher expected income, to be willing to face these risks. Attracting the ambitious risk-takers from other states, then, could well impose a negative fiscal externality on these other states, at least raising a question whether the overall fiscal externalities generated when a state raises its tax rate are positive.

Another longstanding presumption is that when a state raises its tax rate, the resulting behavioral responses will inevitably lower the reported income in the state, through adverse migration responses as well as through fewer hours of work, less work effort, and greater tax avoidance activity.

Yet if we look at the data, per capita incomes are if anything higher in states with high tax rates (states such as California, Massachusetts, and New York). Yes, there can be many possible explanations for high per capita incomes specific to any given state. For example, the agglomeration economies generated by the concentration of activity in Silicon Valley, along route 128, or on Wall Street may be so strong that longstanding activity in these locations continues even when tax rates in the state rise. Alternatively, high-income individuals 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

[50] I have followed this presumption throughout the paper.

climate to raise its income tax rate without inducing much exit, potentially explaining higher observed incomes in California (but maybe not in New York or Massachusetts).

The effects of taxes on migration patterns and risk-taking incentives, though, provide yet another potential explanation for the observed high incomes in states with high income tax rates. In particular, the counterfactual forecast that higher-income individuals concentrate in tax havens can be reversed if these individuals face enough risk relative to lower-income individuals. Certainty the fraction of the high-income individuals active in a closely-held firm is dramatically 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. Even ignoring effects of taxes on migration patterns, those living in a high-tax state face greater incentives to engage in risk-taking activity, again in the process raising per capita income in the state. Our model provides then yet another explanation for the observed high incomes in high-tax states.

I hope this paper encourages future researchers to undertake empirical work looking at risk-taking propensities among residents in high-tax compared to low-tax states, and also to look at migration patterns between states, to see if those who move to high-tax states are often high income and tend to work in risky sectors. Such research, looking at the effects of taxes on the variance of income as well as on expected income would be a nice addition to the literature.[51] That taxes should affect risk taking propensities seems clear from the theory. Whether these effects are large or small, though, requires empirical work to document.

[51] In particular, by the above theory, a state's tax increase should lead to an increase in individual risk-taking propensities. Given the costs of any induced changes in occupation or location, income would be expected to fall initially, but in the longer run expected income should be higher, and the variance of ex-post income should be higher (and growing relatively over time) than in other states.

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Figure 1
Individual Location Choice

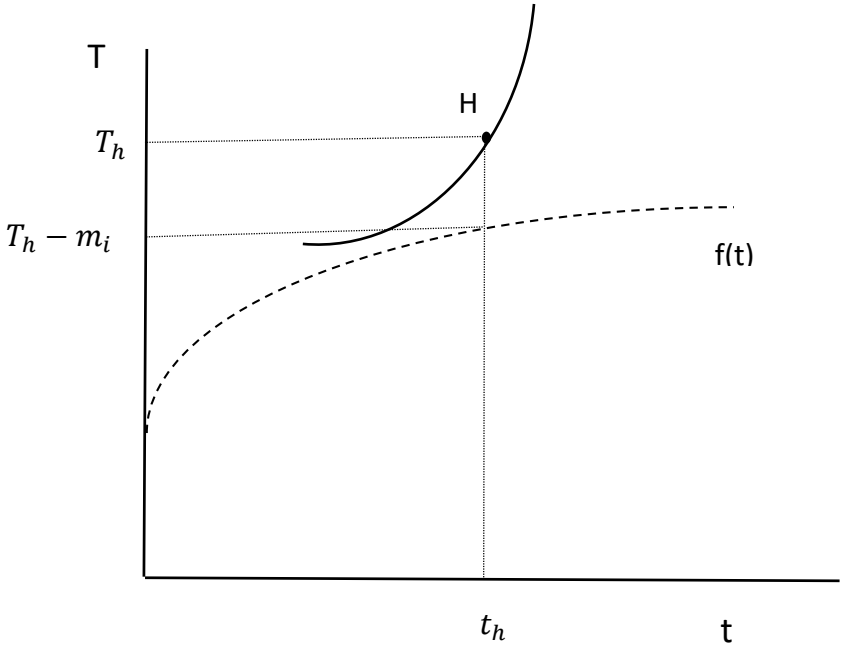

Figure 2
State Choice of Tax Rate

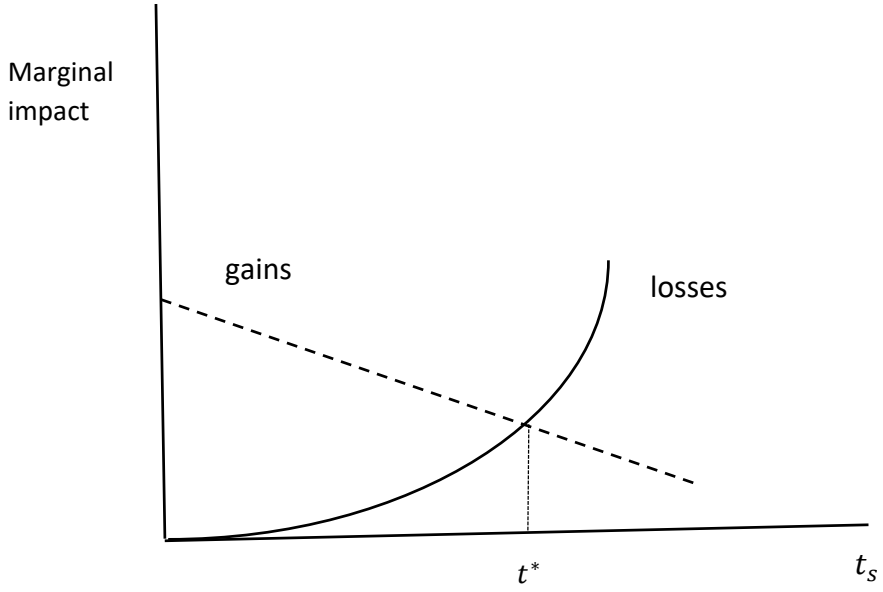

Figure 3
Migration Patterns