National Tax Journal, June 2011, 64 (2, Part 1), 255–284

# MILLIONAIRE MIGRATION AND STATE TAXATION OF TOP INCOMES: EVIDENCE FROM A NATURAL EXPERIMENT

Cristobal Young and Charles Varner

*This paper examines the migration response to a millionaire tax in New Jersey, which raised its income tax rate on top earners by 2.6 percentage points to 8.97 percent, one of the highest tax rates in the country. Drawing on unique state tax micro-data, we estimate the migration response of millionaires to the rate increase, using a difference-in-differences estimation strategy. The results indicate little responsiveness, with semi-elasticities generally below 0.1. Tax-induced migration is estimated to be higher among people of retirement age, people living on investment income rather than wages, and people who work (and pay tax) entirely in-state. The tax is estimated to raise $1 billion per year and modestly reduce income inequality.*

*Keywords: state income tax, top earners, migration, tax competition, difference-in-differences estimator*

*JEL Codes: J61, H73, R23*

## I. INTRODUCTION

State governments in the United States have traditionally avoided policies that "tax the rich." While the federal government relies on a progressive income tax, states generally rely on more regressive sales and property taxes as well as relatively flat-rate income taxes (Piketty and Saez, 2007; Slemrod, 2000).[1] Over time, however, the progressivity of the federal income tax system has declined, while states are beginning to add high-income surtaxes. In the early 1960s, the top marginal income tax rate in the federal system was 91 percent. Successive reforms have brought this top rate down to

[1] The distributional incidence of sales and property taxes depends on the choice of annual versus lifetime measures of income and whether property taxes more heavily burden capital owners or labor (Caspersen and Metcalf, 1994; Fullerton and Metcalf, 2002; Zodrow, 2007).

Cristobal Young: Department of Sociology, Stanford University, Stanford, CA, USA (cy10@stanford.edu)

Charles Varner: Department of Sociology, Princeton University, Princeton, NJ, USA (varner@princeton.edu)

35 percent. In recent years, states have begun to compensate by raising the progressivity of their own income tax systems — a trend becoming known as the "millionaire tax" movement. This is a process of reclaiming progressivity by shifting it from the federal level to the state level.[2]

States have long been fearful of taxing people — particularly top income earners — to the point of migration. Indeed, state income taxes have traditionally been quite flat, with the highest marginal rates occurring at low thresholds. In 2007 the median state income tax system had a flat rate on income over $25,000. In contrast, the top federal tax rate occurs at about $370,000 — some 15 times higher. State income taxes are substantially less progressive than federal income taxes, but this is changing. What are the implications of the new state millionaire taxes? In the popular press, these taxes have been often criticized as expulsive agents, certain to provoke tax flight of the wealthy. In Maryland, for example, the tax was panned as the "get out of Maryland tax act" (Stanek, 2008). However, states may be able to tax high incomes without inducing migration because of location rents, high transaction costs of moving, and the family and social network ties that ground people in their communities. This study focuses on one of the first, and notably the largest, state millionaire taxes to be adopted in the United States — that of New Jersey. Drawing on administrative micro-data, we estimate the effect of the tax on migration, and further estimate revenues generated, the tax flight cost, and the overall impact on the distribution of income in the state.

Moving out of a state is much easier than moving out of the country. This fact suggests that states should avoid high-rate income taxes and rely on the federal government to impose progressive taxes. Feldstein and Wrobel (1998) argue further that state governments simply *cannot* redistribute income. By raising taxes on the wealthy and providing transfers to the poor, states will see an out-migration of the wealthy (fleeing taxes) and an in-migration of the poor (seeking transfers). This not only erodes the tax base, but also triggers a market wage adjustment by creating a shortage of high-skill workers and a surplus of low-skill workers. The market bids up wages for high-skill workers, and bids down wages for low-skill workers. The resulting increase in wage inequality counteracts the equalization due to progressive tax and transfer systems. The state is left with fewer rich people earning higher market incomes, and more poor people earning lower market incomes.

Empirically, Feldstein and Wrobel (1998) test the *wage element* of this hypothesis, calculating the elasticity of gross wages to the tax rate, and find that when an individual's tax rate is high, their wages also tend to be higher. This, they argue, is evidence consistent with their thesis. However, this is also the definition of a progressive tax rate,

---

[2] In New Jersey, Governor McGreevey specifically cited the Bush tax cuts when the millionaire tax was enacted (Office of the Governor, 2004). Seven other states have since enacted similar millionaire taxes: California (2005), Maryland (2008), Hawaii (2009), New York (2009), Wisconsin (2009), Connecticut (2010), and Oregon (2010).

and the causal direction remains unclear in our view.[3] Further studies have followed up Feldstein and Wrobel's (1998) analysis of wages, and find smaller effects, concluding that pre-tax wages do not fully adjust to changes in income taxation (Thompson, 2009; Leigh, 2008).

These empirical approaches tacitly assume — but do not demonstrate — the causal pathway of a migration response to taxes. Given the centrality of migration in the theory, much more compelling tests can be achieved by directly investigating tax-induced migration. As Day and Winer emphasize, migration "cannot be taken for granted" in economic theories (2006, p. 536). Likewise, Mirrlees argued that while "high tax rates encourage emigration," it is "the propensity to migrate" that determines how the incentive is transformed into actual behavior (Mirrlees, 1982, pp. 319, 323). Feldstein and Wrobel (1998), using instrumental variables, find that wages seem to adjust *as if* migration were occurring. But this does not demonstrate that people *do* actually migrate in response to taxes. Thus, empirical evidence of migration is key — and conceptually foundational — to testing the constraints that state governments face in utilizing progressive income taxes. Most importantly, there is virtually no research on the "propensity to migrate" among wealthy individuals.[4] This study fills a salient gap by examining how an increase in state income tax progressivity produces changes in the migration patterns of very high-income earners (the top 1 percent and the top 0.1 percent).

## II. EXISTING RESEARCH

The literature suggests that the general propensity to migrate in response to tax changes is low. Day and Winer (2006), using more than 20 years of Canadian income tax records, find that marginal changes in tax rates and social policies had no observable effect on inter-provincial migration. They did find, however, that large-scale calamitous events — such as the closing of the cod fishery in Eastern Canada — produce substantial out-migration. Coomes and Hoyt (2008) studied the locational choices of people moving into "multi-state" cities — metropolitan areas that encompass more than one state (and thus offer a choice of different tax regimes). They found very little response to tax differentials, noting that for "most high-tax states, the effect is likely to be only

[3] Feldstein and Wrobel control for state fixed effects, which eliminates cross-state variation in tax rates. They are aware of the reverse causation issue, and use an instrumental variables strategy in an attempt to eliminate the problem. Specifically, they instrument an individual's actual tax rate with an imputed tax rate calculated from their predicted gross wages (as determined by their demographic characteristics rather than their actual wage and hours of work). As has been widely noted, with instrumental variables, the "cure can be worse than the disease" (Bound, Jaeger, and Baker, 1993). In our view, this strategy does not offer a clear and vivid identification strategy and does not persuade us of strong exogenous variation (Young, 2009), as Feldstein and Wrobel seem to simply describe a progressive tax system — higher incomes mean higher tax rates.

[4] An important new paper on millionaire migration in Europe came to the authors' attention after this paper was finished: Kleven, Landais, and Saez, 2010.

a few hundred potential taxpayers lost."[5] This finding is particularly noteworthy, since these multi-state cities offer the greatest opportunity to arbitrage tax systems. Bakija and Slemrod (2004) examine state inheritance taxes in the United States, testing whether older citizens avoid states that will more heavily tax their estates. They find "robust evidence of some sort of behavioral response to estate taxes by the rich" (Bakija and Slemrod, 2004, p. 32), but the size of the effect was clearly small in comparison to the revenues generated.

Finally, a series of studies has examined fiscally-induced migration in the highly decentralized income tax system of Switzerland. Liebig, Puhani, and Sousa-Poza (2006, p. 8) highlight the ideal conditions for tax competition:

> Even between communities less than 20 km apart, differences in average and marginal tax rates of more than 5 percentage points are quite common. These differences…may prompt people to change their residence solely for tax purposes while still commuting to the same job.

In short, like Coomes and Hoyt (2008), Liebig, Puhani, and Sousa-Poza (2006) offer a "most likely" research design that maximizes the chance of empirically detecting a migration response to taxation (and thus maximizing power to reject the main hypothesis).[6] Overall, they find little evidence of fiscally-induced migration. The strongest effects are found for young college graduates, and even for this group the effect is small relative to revenues generated.

The consensus emerging from the migration literature — and from a range of research designs — is that people do not generally migrate in response to tax increases (or to tax differentials that would be "easy" to arbitrage).[7] The reasons for this are no doubt plentiful: (1) people do not like commuting (Kahneman et al., 2004); (2) they do not want to give up their jobs (Winkelmann and Winkelmann, 1998); (3) they do not want to separate from their family, friends, and neighborhoods (Dahl and Sorenson, 2010); and thus they have a general aversion to migration. For homeowners, brokerage fees associated with selling their existing home and buying a new one consume a large portion of annual income (in the range of 25 percent) (Wildasin, 1993). Moreover, because taxes tend to finance public goods that people value, resistance to migration may allow people time to acclimatize to a higher-tax, higher-public services environment (i.e., give people time to observe the impact of their tax dollars).

---

[5] Coomes and Hoyt (2008) also produce a very counter-intuitive result. States can reduce locational tax competition by taxing based on the location of the employer, so that workers gain less advantage by working in a high-tax state but living in a low-tax state. Nevertheless, Coomes and Hoyt (2008) find the largest migration effects in places that have reduced the incentive for locational tax competition.

[6] For a discussion of "most likely" cases and research designs, see King, Keohane, and Verba (1994).

[7] It is worth noting that poor people likewise do not generally migrate in response to greater welfare benefits (Gensler, 1996; Levine and Zimmerman, 1999; Kaestner, Kaushal, and Ryzin, 2003).

But perhaps, as Alm and Wallace (2000, p. 165) argue, "the rich are different." The taxable income elasticity literature does suggest that the affluent may be more sensitive to marginal changes in the tax rate than middle- or low-income taxpayers. Feldstein (1995) found that reported taxable income notably dropped in response to tax increases, suggesting tax evasion or a reduction of labor supply or other behavioral adjustments (see also Feenberg and Poterba, 1993). A large empirical literature has since tempered this result, but still shows a strong response from wealthy taxpayers (Saez, Slemrod, and Giertz, 2009). Goolsbee (2000), using a panel of top corporate executives, found a large spike in exercised stock options immediately prior to the 1993 federal tax increase, but no long-term change in earnings. Thus, the greater tax responsiveness of the wealthy may be largely facilitated through their greater control over the timing of their compensation and their greater ability to preempt a tax increase. Nonetheless, there is sufficient evidence to suggest that the wealthy are more responsive to changes in the tax structure than is the general populace, and thus are also more inclined towards a tax flight response. We test this expectation empirically.

## III. THE MILLIONAIRE TAX POLICY EXPERIMENT

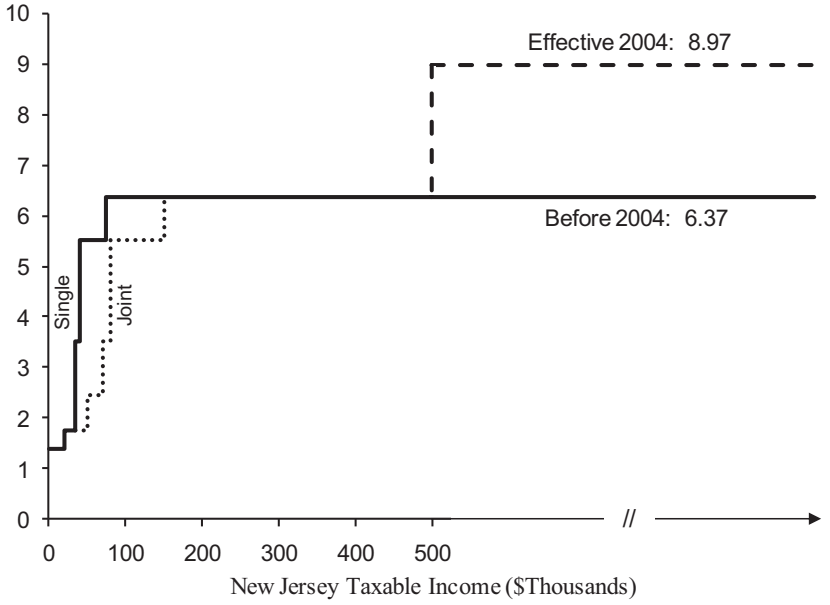
Our empirical strategy is based on identifying the migration patterns of high-income earners, and then observing how these patterns change in response to a new millionaire tax. The new bracket was introduced in 2004, and raised the marginal rate by 2.6 percentage points on income above $500,000.[8] The legislation was passed mid-year and applied retroactively, so taxpayers had little ability to migrate in advance of the tax increase (Office of the Governor, 2004). We treat the 2004 policy change as a natural experiment, and test whether it caused an observable shift in migration patterns. We demonstrate that this policy change was large in two ways. First, Figure 1 shows the change to the New Jersey tax schedule. The step up in the marginal rate at $500,000 is clearly substantial, and a salient shift given the flat marginal rate over $150,000. It is doubtful that the new tax went unnoticed by many millionaire tax filers.

Second, the millionaire tax was a major policy change compared to other state tax regimes. New Jersey does not have the highest marginal income tax rate in the United States, but it introduced, by a wide margin, the largest increase in top marginal rates among any state during the period of study. Figure 2 shows the changes in the top marginal rates from 2000–2007. New Jersey's rate increase of 2.6 percentage points vastly exceeds that of its neighbor, Connecticut, which had the second highest increase of 0.5 points. Most states showed very small changes (either increases or decreases) in their top marginal rates — and Figure 2 excludes the 18 states that had no change at all. One fact that does not come through in this figure is that New York had a temporary

[8] We will use the term "millionaire" for all tax filers whose annual income exceeded $500,000, consistent with the term commonly used for the new bracket ("the millionaire tax").

**Figure 1**

Schedule of New Jersey Marginal Income Tax Rates (Percent)

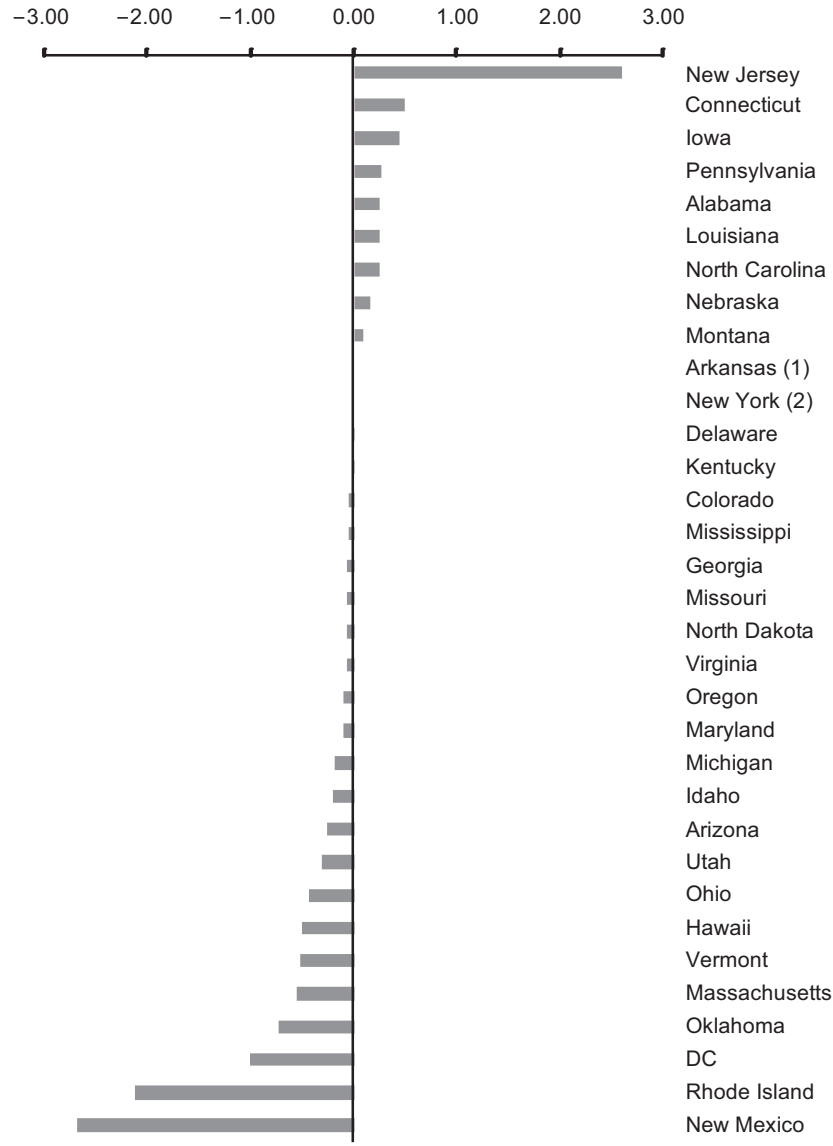



millionaire surtax of 0.85 percent from 2003–2005. However, even this surtax was only one-third of the rate increase in New Jersey.

The millionaire tax is a major policy experiment both in the context of the New Jersey tax system, and in the context of what other states were doing during this time (which, for the most part, were cutting rather than raising top income taxes). Another factor that makes New Jersey an ideal case study is its unique location as a core part of the New York metropolitan area, which includes 21 million residents across four states: New York, New Jersey, Connecticut, and Pennsylvania. Figure 3 shows the geography of the tax systems in this area. On one hand, being situated across the river from Manhattan — with its cultural draws and high-paying employers — might seem to support New Jersey's ability to tax the rich. Yet, the wealthy from New Jersey have three other state tax systems they can arbitrage without leaving the New York metropolitan area. For example, high earners living in Bergen County, New Jersey, can move about 30 miles to Fairfield County, Connecticut, and watch their marginal tax rate fall from 8.97 percent to 5 percent. Few other places in the country make it easier to move to a different state without leaving one's city or completely separating from the social ties of friends and family. This jurisdictional proximity would suggest unusually intense regional tax competition. Nevertheless, large differences remain in top marginal tax rates.

**Figure 2**

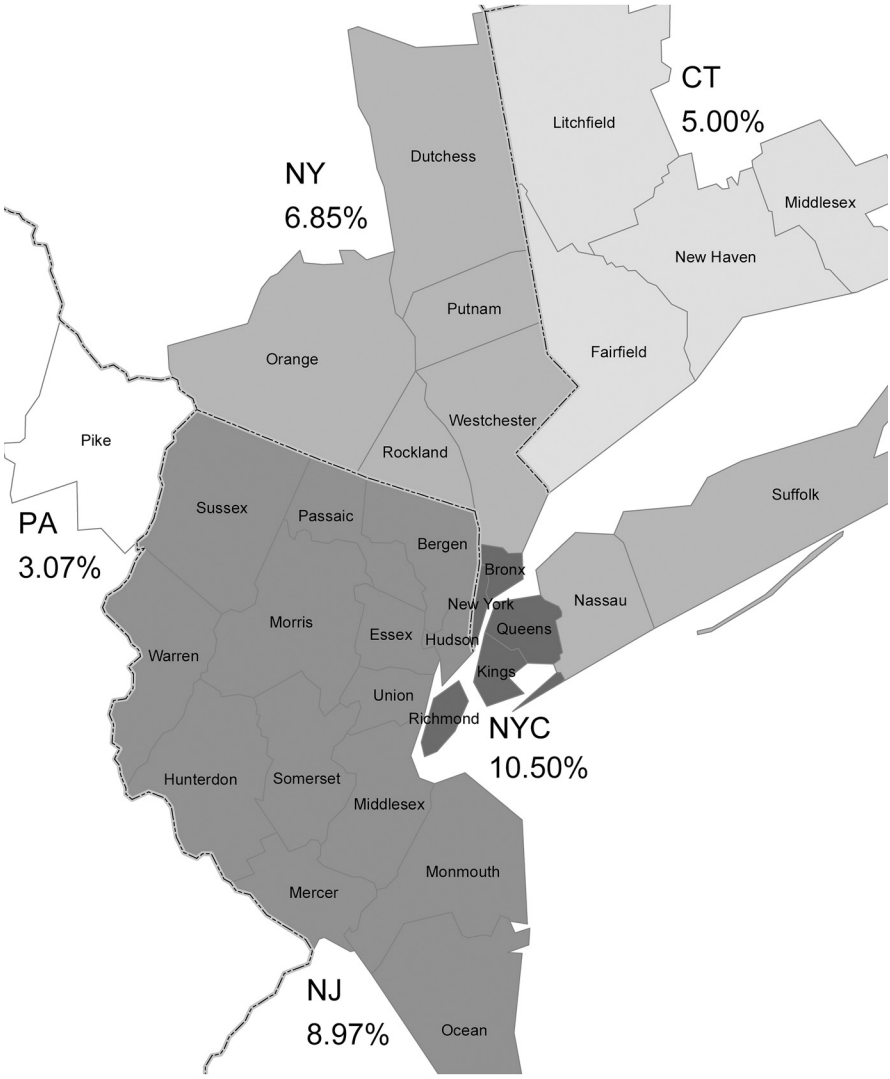
State Changes in Top Marginal Tax Rates, 2000–2007




Notes: There were 18 states (not shown) that had no changes for couples in the top bracket. Rates were computed using the NBER's TAXSIM program (Feenberg, 2010; Feenberg and Coutts, 1993).
(1) Arkansas had a temporary increase of 0.21 percentage points that expired.
(2) New York had a temporary increase of 0.85 percentage points that expired.

**Figure 3**

Top Marginal State and Local Income Tax Rates in the NY-NJ-CT-PA Consolidated Metropolitan Statistical Area, 2007



Regional competition for tax filers is partially reduced when states tax employment earnings where people work. Most people in the New York metropolitan area (as in most places) fall under this law. New Jersey employees cannot avoid New Jersey taxes on employment earnings by moving to Connecticut or New York. However, New Jersey and Pennsylvania have a reciprocal tax treaty under which employment income is taxed where people live, not where they earn it. Though many of New Jersey's richest residents live in the northern part of the state and have ties to New York City, the potential for regional tax competition around the Philadelphia metropolitan area is very strong. Without changing jobs, top earners in central and southern New Jersey *can* avoid the millionaire tax by moving across the state line to Pennsylvania; New Jersey and Pennsylvania maintain a 5.9 percentage point gap in their top marginal income tax rates.

For New Jersey residents who work in New York, the new millionaire tax would in many cases have little effect on their income tax bill. Although New Jersey added a higher top rate (8.97 percent), effective rates remained lower than New York State effective rates for many top earners. This is because New York rates are higher than New Jersey rates in the lower income brackets and because the New York "claw back" feature applies the top rate (which ranged from 7.7 to 6.85 percent during the 2004–2007 period) to all income for sufficiently high earners, as the benefits of lower bracket rates are phased out. Thus, New York State's effective tax rate was higher than New Jersey's on joint filers' taxable income between $0 and $1.34 million (2004–2005) and between $0 and $804,000 (2006–2007).[9] We cannot observe in our data who works in New York specifically, but we can identify people who have employment earnings from outside New Jersey. This allows us to estimate the behavioral response among people who definitively pay all their tax in New Jersey.

Finally, it is important to note that earnings from investments (which make up about 30 percent of income in our data set) are taxed only where people live. For a substantial portion of the income of wealthy taxpayers, location of employment is *not* a constraint on tax competition.

The regional story is notably different for states like California, where the major urban areas are far from state boundaries that might invite regional tax competition. Arbitraging state tax systems when alternative states are far away means uprooting one's life and one's family, leaving behind social and business networks, and making a new life and a new career in a new part of the country. The intangible costs of migration are far higher in a state like California than they are in a state like New Jersey. Thus, both because of the magnitude of the policy experiment, and because of the potential for intense regional tax competition, New Jersey's millionaire tax is an excellent testing ground for the effects of taxation on millionaire migration.

[9] This is an additional reason why the top 0.1 percent (who earn more than $3 million) might be more sensitive to the new tax.

For this study, the New Jersey Division of Taxation (NJDT) granted us unique access to the complete NJ-1040 tax records for the years 2000–2007. This provides a virtual census of high-income earners, with information on income, taxes paid, and some limited demographic data retrievable from a standard tax form (such as marital status and number of dependents).[10] To identify an episode of migration, we use the reported dates of New Jersey residency on each NJ-1040 filed. Households that move into or out of New Jersey between January 2 and December 30 must file a part-year resident return for the tax year in which they moved. Non-migrant households, on the other hand, file full-year resident returns. This distinction in the filing process allows us to distinguish in- and out-migrant from non-migrant households.[11] The data set has an average of almost 40,000 millionaires per year, giving roughly 300,000 observations in total.

NJDT did not provide us with individual identifiers, meaning we cannot track individual returns over time. If we had these data, we could estimate not only the migration response to the tax increase, but also the elasticity of adjusted gross income (AGI) for those who do not migrate (Feldstein, 1995; Gruber and Saez, 2002).

The empirical problem with using part-year tax filers is that the full-year incomes of migrants are unknown. Consider an individual who lived in New Jersey for six months. From their tax record, we know their half-year income. Is this representative of their full year income? One strategy is to annualize part-year earnings. This strategy leads to some questionable imputations, particularly for people who earned high average daily incomes over a short period of residency. In some cases, tax filers reported more than $100,000 of income for a one-day period of residency. Annualizing this average daily income is clearly doubtful. We set a one-month (28-day) screen, and annualized the incomes of all migrants with a period of residency longer than that. Those with residencies of more than 28 days have their incomes annualized; those with shorter residencies are dropped. Obviously, there are many alternative annualization strategies. We find, in practice, that different strategies affect the volume of migration counts, but have little impact on estimates of the tax policy effect. Two alternate strategies — no annualization, and annualization using no residency period screen — do not substantially change our conclusions and make the estimates of the tax policy effect *smaller* than the results we report in the baseline model below.[12]

---

[10] While many low-income earners do not file tax returns, higher-income earners have a strong incentive to file a tax return. Our discussions with NJ tax officials support this view. Virtually all high-income part-year residents have withheld taxes that entitle them to positive refunds. High-income migrants who fail to file their part-year tax returns would thus forfeit non-trivial sums of income.

[11] The one exception is that we are not able to identify households who changed their legal residency status at the turn of the year. These January 1 in-migrants and December 31 out-migrants cannot be distinguished from non-migrants in the NJ-1040 data, and we must treat them as non-migrants in our analysis. This treatment will generate small underestimates of both out-migration and in-migration. Our estimates of net out-migration are accurate to the extent that January 1 in-migrants and December 31 out-migrants make up roughly equal proportions of total annual in-migrants and out-migrants, respectively.

[12] The results using these alternate strategies are available from the authors upon request.

The data set was generated in May 2008, roughly three weeks after the deadline for 2007 tax returns. Late tax-filers are mostly missing for tax year 2007. We doubt that this affects our analytical results, but it does lead us to report fewer millionaires (and fewer millionaire migrants) for 2007.

## IV. DESCRIPTIVE RESULTS: TRENDS IN MILLIONAIRE MIGRATION

New Jersey experienced net out-migration of millionaires in every year from 2000–2007, averaging a net outflow of 459 per year, or 1.2 percent of the state's millionaires. Nevertheless, the *stock* of millionaires increased substantially over this period, rising 43 percent (from about 33,000 in 2002 to about 47,000 in 2006). New Jersey is a *producer* of millionaires, not an importer. At current trends, migration is not an important determinant of the stock of millionaires in the state. Changes in net migration represent only 3.3 percent of the typical year-to-year fluctuation (standard deviation) in the number of millionaires in New Jersey. Income dynamics, rather than migration trends, are the central force that determines the tax base for the millionaire bracket. Migration, nonetheless, has certainly increased since the new tax was introduced in 2004. In the pre-tax period (2000–2003), net out-migration averaged 9.3 per thousand millionaires. Since the new tax was imposed, net out-migration has risen to 14.5 per thousand, an increase of 56 percent. Yet, as the baseline migration rates are so low, the impact on the stock of millionaires is very small. The increase represents a total loss of 5.2 households per thousand.

This initial analysis offers two basic conclusions: (1) migration has a small impact on the millionaire tax base, accounting for only 3 percent of the variation in the number of millionaires each year; and (2) there *is* an observable increase in migration associated with the introduction of the new millionaire tax bracket.

## V. DIFFERENCE-IN-DIFFERENCES MODEL

To further probe the impact of the new tax bracket, we develop a difference-in-differences estimator. For this, we exploit the fact that there is a plausible control group of high-income earners *not* subject to the new tax — those earning $200,000 to $500,000 per year (Saez, Slemrod and Giertz, 2009). For this group, the new millionaire tax has no effect, and thus should have no impact on their migration patterns. In short, we use households in the 95$^{th}$–99$^{th}$ percentiles of the income distribution as a control group for households above the 99$^{th}$ percentile.

Formally, our model begins with two similar high-income groups: the treatment group whose income falls within the new tax bracket (taxable income > $500,000), and a control group of very high earners that fall below the new bracket (those earning $200,000–$500,000 per year). Both groups experience two time periods: pre-millionaire tax ($P = 0$) and post-millionaire tax ($P = 1$). Migration status is coded as 1 = out-migrant, –1 = in-migrant, and 0 = non-migrant. This variable is then scaled by

**Table1**

Number of Millionaires and Net Out-Migration, New Jersey, 2000–2007

| Tax Year | Millionaire Tax Filers | Net Out-Migration | | Top Marginal Tax Rate |
|---|---|---|---|---|
| | | Households | Per 1,000 Stock | |
| 2000 | 41,358 | 239 | 5.8 | 6.37 |
| 2001 | 35,621 | 372 | 10.4 | 6.37 |
| 2002 | 32,726 | 342 | 10.5 | 6.37 |
| 2003 | 33,696 | 383 | 11.4 | 6.37 |
| 2004 | 39,235 | 577 | 14.7 | 8.97 |
| 2005 | 42,504 | 614 | 14.4 | 8.97 |
| 2006 | 46,651 | 686 | 14.7 | 8.97 |
| 2007 | 27,867 | 390 | 14.0 | 8.97 |
| 2000–2006 avg. | 38,827 | 459 | 11.7 | |
| Standard deviation | 5,085 | 166 | | |

Notes: Income is in constant 2007 dollars. Tax filers are included as of the beginning of the tax year, excluding part-year returns with residency periods less than 28 days and any tax returns filed after May 6, 2008; this cutoff implies a substantial shortfall for TY2007 relative to the total tax return count for the year. NJDT waits 10.5 months after the original filing deadline (April 15, 2008 for TY2007) to summarize data for its Statistics of Income report. However, TY2007 net out-migration per 1,000 stock is accurate to the extent that the filing date is not correlated with migration propensity.
Source: NJDT micro-data.

1,000 to report migration flows per thousand population (the stock of millionaires). We model out-migration as

$$(1) \quad M_{it} = \alpha + \beta G_i + \lambda P_{it} + \delta(G_i * P_{it}) + \varepsilon_{it},$$

where $\beta G_i$ is a fixed effect for each group, $\lambda P_{it}$ is a common period effect, and $\varepsilon_{it}$ is a random error with mean zero ($E[\varepsilon_{it}] = 0$). The interaction term ($G_i * P_{it}$) equals one if $G_i = 1$ (treatment group) and $P_{it} = 1$ (post-millionaire tax period). The coefficient $\delta$ captures how much migration among the treatment group changed relative to the control group (whose migration change is captured by $\lambda P_{it}$). In other words, $\delta$ is the difference-in-differences parameter, which measures the effect on migration of establishing the new tax bracket.

The key identifying assumption for the difference-in-differences (DiD) estimator is that the group of high earners *just below* the new tax bracket is a strong control group for

those above the new bracket (subject to the tax). Other readily available DiD estimates could use households with a small increase in effective tax rates (e.g., those earning $600,000) as a control for those with a larger tax effective increase (those earning $1 million). Our model allows the groups to have *different* baseline migration propensities, but assumes that their trends over time would be the same without policy changes.

As Donald and Lang (2007) argue, DiD designs that measure the effect of a group-level policy change on an individual-level outcome may underestimate the standard error of the policy effect. This downward bias may occur when the error structure ($\varepsilon_{it}$) is common within groups. In our study, a common error structure can occur because people in similar income ranges might migrate at similar rates for reasons we cannot observe. To account for this structure, we follow Bertrand, Duflo, and Mullainathan (2004) and use robust clustered standard errors, allowing for an unrestricted covariance structure within income groups.[13] Thus, the standard errors we report below are robust to error correlation across people and time within a given income group and to arbitrary forms of heteroskedasticity across income groups.

Before proceeding to the regression results, we provide a graphical look at the DiD model, plotting migration rates before and after the tax for detailed income (both control and treatment) groups. Specifically, Figure 4 plots the relationship between migration and income for the two main time periods (pre-tax and post-tax). The cut-point for the new tax bracket is shown by the bar at $500,000.[14] In visual terms, the DiD estimator looks for *divergence* between the two slopes. The vertical distance between the slopes gives the before-after (or difference) estimate at each income level. The DiD estimator uses *changes* in the vertical distance between the slopes ("the difference in differences"). If migration is responding to the new tax rate, there should be a growing gap between the two slopes as income increases above the $500,000 bracket. In contrast, Figure 4 shows a fairly constant difference. Most notably, migration rates increased for those below the tax bracket by approximately the same amount as for those *above* the tax bracket. This suggests that the policy effect is close to zero.

## VI. REGRESSION RESULTS

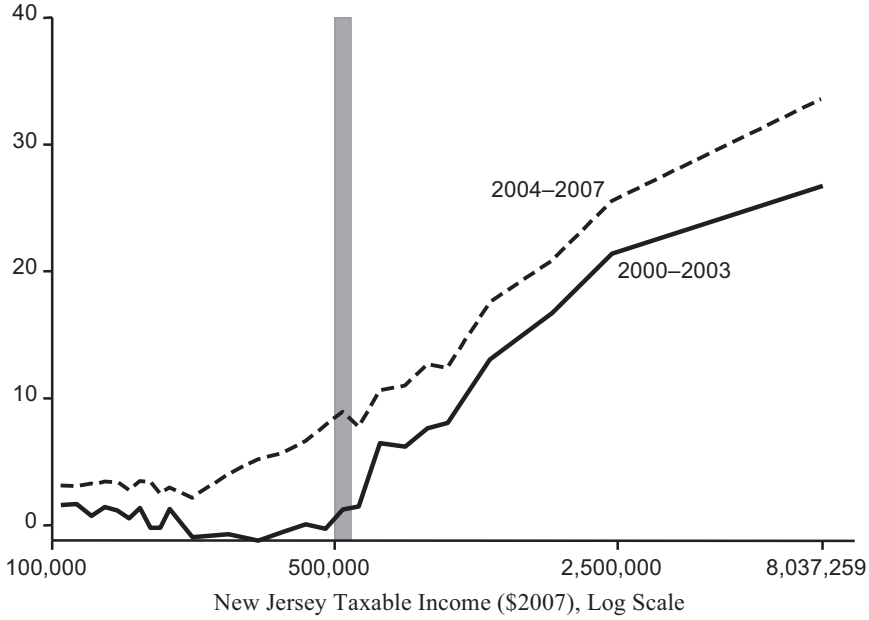
The main regression results are reported in Table 2. First, we reproduce the simple before-after estimate (Model 1). This model estimates the change in migration over time for the millionaire group alone (no control group). Net out-migration among millionaires

[13] For the clustering, we defined 20 income groups, in increments of $100,000 up to $1,000,000 and then widening. As a variant, we also clustered with 50 income groups, which yielded substantively equivalent results.

[14] This is actually a cut-interval, due to bracket-creep caused by our adjustment for inflation. Adjusting incomes up to constant 2007 dollars causes some people who were below the bracket in 2004–2006 to appear as if they fell inside the new bracket. In practical terms, this creates a very small degree of noise, especially given that this is a marginal, rather than a "claw-back" tax. The width of the band in Figure 4 shows the extent of bracket-creep.

**Figure 4**

Net Out-migration per 1,000 Population, by Income Level




Note: There are 26 income groups that are plotted at each group mean.

increased by 5.1 per thousand in the post-millionaire tax period, and the coefficient is much larger than its standard error. Model 2 gives the DiD results — similar to the graphical analysis from Figure 4 presented above. This shows that the Period 2 effect (introducing the tax) is nearly the same for those earning $200,000–$500,000 (4.6 per thousand), while the difference-in-differences estimate is only 0.5 and smaller than its standard error. In other words, the estimated policy effect has the expected sign but is small and statistically insignificant. Model 3 adds a battery of controls for individual characteristics, all of which are significant but do not have a substantive effect on the DiD estimate. Baseline migration rates are higher for retirement-age people, and lower for wage-earners, married people, those with dependent children, and business-owners. These findings are suggestive of the socio-economic factors that facilitate or constrain wealthy people's ability or willingness to migrate in response to changing circumstances. Finally, Model 4 examines the top 0.1 percent of income earners. The DiD estimate for this group is 1.8 per thousand — larger than for less affluent millionaires (0.3 per

**Table 2**

Regressions for Millionaire Migration

| | Model 1 | Model 2 | Model 3 | Model 4 |
|---|---|---|---|---|
| | Before-After | DiD | DiD with Controls | DiD with Controls and Top 0.1% |
| Period 2 (2004–2007) | 5.123*** | 4.644*** | 4.358*** | 4.362*** |
| | (0.541) | (0.828) | (0.813) | (0.815) |
| Millionaire | | 9.896*** | 8.255** | |
| | | (2.266) | (2.187) | |
| * Period 2 (DiD) | | 0.479 | 0.413 | |
| | | (0.987) | (0.927) | |
| Share of income from wages | | | –10.35*** | –9.998*** |
| | | | (2.179) | (2.332) |
| Aged 65+ | | | 6.815*** | 6.870*** |
| | | | (0.437) | (0.443) |
| Married | | | –4.879* | –4.906* |
| | | | (2.225) | (2.235) |
| Number of children | | | –1.593* | –1.608* |
| | | | (0.760) | (0.768) |
| Business owner | | | –2.038*** | –1.905*** |
| | | | (0.225) | (0.209) |
| Millioniares excluding top 0.1% | | | | 7.187** |
| | | | | (2.079) |
| * Period 2 (DiD) | | | | 0.345 |
| | | | | (0.919) |
| Top 0.1% | | | | 24.19*** |
| | | | | (3.392) |
| * Period 2 (DiD) | | | | 1.776 |
| | | | | (3.830) |
| Intercept | 9.125*** | –0.771** | 13.06*** | 12.81*** |
| | (2.274) | (0.109) | (1.517) | (1.445) |
| N | 305,404 | 1,420,652 | 1,420,652 | 1,420,652 |
| Adjusted R-squared | 0.0001 | 0.0005 | 0.0012 | 0.0013 |

Notes: Asterisks denote significance at the 5% (*), 1% (**), and 0.1% (***) levels (using two-tailed tests). The outcome variable is migration status, coded as 1 (out-migrant), –1 (in-migrant), 0 (non-migrant). All models use Ordinary Least Squares regression with robust clustered standard errors. Model 1 looks only at those earning more than $500,000 per year (defined as "millionaires"). Models 2–4 use those earning $200,000–$500,000 as a control group for the difference-in-differences estimates.
Source: NJDT micro-data, 2000–2007.

thousand) — but still not statistically significant (and also much smaller than the simple before-after estimate).

In Table 3, we apply the Model 4 specification to particular groups in the millionaire population we expect to be more sensitive to the tax increase. To demonstrate the economic significance of the estimates, we also show the increase in effective tax rates for the treatment group in each case, and use this to compute the semi-elasticity of the population with respect to the tax rate (the percentage drop in the population due to a one percentage-point increase in the effective tax rate — a metric comparable to that used by Bakija and Slemrod, 2004). Table 3 first reproduces Model 4 from above, showing that the estimated semi-elasticities are very low: a one percentage-point increase in effective tax rate leads to a 0.04 percent decrease in the number of millionaires, and a 0.08 percent decrease in population among the top 0.1 percent of earners. Model 5 focuses on people who earn all of their wages in New Jersey, and thus paid all of their state income tax in-state. This group represents 62 percent of the overall sample (those earning more than $200,000), meaning that 38 percent earned some of their wages out of state.[15] Model 5 shows that the DiD estimate for millionaires is 2.5 (semi-elasticity of 0.28) but does not achieve statistical significance. For the top 0.1 percent, the estimate is (a non-significant) 9.8 with an implied semi-elasticity of 0.42. While not statistically significant, the findings have economic significance (McClosky and Ziliak, 1996) and are clearly suggestive: in states where fewer people work (and pay income tax) out of state, other things being equal, the effects of a millionaire tax may be larger than in New Jersey.

Model 6, in contrast, focuses on people who earn all their income from investments. This group should be particularly sensitive to the tax rate for two reasons: (1) they are not tied to the state by an employer; and (2) like the previous group, all of their income is taxed in New Jersey. The estimates indicate the new tax raised migration by 6.4 per thousand among millionaires and by 27.4 per thousand among the top 0.1 percent of earners. The semi-elasticities are 0.64 and 1.17 respectively, although only the effects for the top 0.1 percent are statistically significant. While these individuals represent a small portion of the overall sample (9 percent), they seem more sensitive to the tax rate, particularly when their incomes are extremely high.

Model 7 focuses on persons of retirement age (over 65). The estimates are similar to those of Model 6, and indeed, there is much overlap between the two groups. Millionaires aged over 65 are substantially more sensitive to the tax rate than are younger millionaires. The results (semi-elasticities) here are closely comparable to the lower-bound estimates in Bakija and Slemrod's (2004) study of wealthy seniors.

Finally, Model 8 focuses on business owners. Our expectation is that business ownership reduces sensitivity to the tax rate, due to the extra costs associated with moving or closing a business operation. Nevertheless, the migration of business owners is a salient issue because their moves directly imply the migration of employment opportunities

[15] We assume that out-of-state employment is typically in New York, but our data set does not indicate the state to which income tax was paid.

**Table 3**

Additional Regressions for Millionaire Migration

| | Model 4 | Model 5 | Model 6 | Model 7 | Model 8 |
|---|---|---|---|---|---|
| | Baseline | Earned All Income in New Jersey | Earned All Income from Investments | Aged 65+ | Business Owner |
| Millionaires (up to top 0.1%) | | | | | |
| DiD estimate (per 1,000 population) | 0.35 | 2.47 | 6.41 | 7.06* | –0.58 |
| Standard error | 0.92 | 1.29 | 4.15 | 3.18 | 1.35 |
| Δ Effective tax rate (% points) | 0.93 | 0.88 | 1.00 | 0.96 | 0.89 |
| Semi-Elasticity | 0.04 | 0.28 | 0.64 | 0.73 | –0.07 |
| Top 0.1% | | | | | |
| DiD estimate (per 1,000 population) | 1.78 | 9.84 | 27.44*** | 17.70** | 11.11 |
| Standard error | 3.83 | 5.93 | 4.74 | 4.71 | 6.73 |
| Δ Effective tax rate (% points) | 2.34 | 2.32 | 2.34 | 2.34 | 2.34 |
| Semi-elasticity | 0.08 | 0.42 | 1.17 | 0.76 | 0.47 |
| N | 1,420,652 | 885,071 | 121,262 | 128,080 | 263,688 |
| Portion of sample (%) | 100 | 62 | 9 | 9 | 19 |
| Adjusted R-squared | 0.0013 | 0.0019 | 0.0035 | 0.0017 | 0.0007 |

Notes: Asterisks denote significance at the 5% (*), 1% (**), and 0.1% (***) levels (using two-tailed tests). The outcome variable is migration status, coded as 1 (out-migrant), –1 (in-migrant), 0 (non-migrant). All models use Ordinary Least Squares regression with robust clustered standard errors, and generally include the same controls as model 4 above (period 2, share of income from wages, aged 65+, marital status, number of children, and business ownership). Model 6 drops the share of income from wages; model 7 drops aged 65+; and model 8 drops business ownership. Semi-elasticities are computed as the DiD estimates divided by 10 (giving the percentage change in population), over the percentage point change in the effective tax rate.
Source: NJDT micro-data, 2000–2007.

(a particular concern for state governments). Model 8 shows that for most millionaire business owners, the new tax had no significant effect, and the estimate has the "wrong sign." However, among the top 0.1 percent, business ownership could make people more sensitive to the tax, with a migration estimate of 11.1 per thousand (though not statistically significant) and a semi-elasticity of 0.47.

In summary, the difference-in-differences estimates indicate that the effect of the new tax bracket is negligible overall. Even among the top 0.1 percent of income earners, the new tax did not appreciably increase out-migration. For both groups, the semi-elasticity of migration with respect to a percentage-point increase in the tax rate is less than 0.1 (i.e., a drop in population of less than 0.1 percent). However, there are subgroups of the millionaire population that seem more sensitive to the tax. People who work entirely in-state (and thus pay all their taxes in-state) may be more sensitive. This is relevant to a state like California, which likely has fewer residents who work out of state. Persons of retirement age are substantially more sensitive to the tax. This is relevant to a state like Florida, which has a very large population of retired people. Business ownership is a mixed case, which for the most part has no effect on tax sensitivity; however, the very richest business owners seem more sensitive — although their semi-elasticity is still less than 0.5.

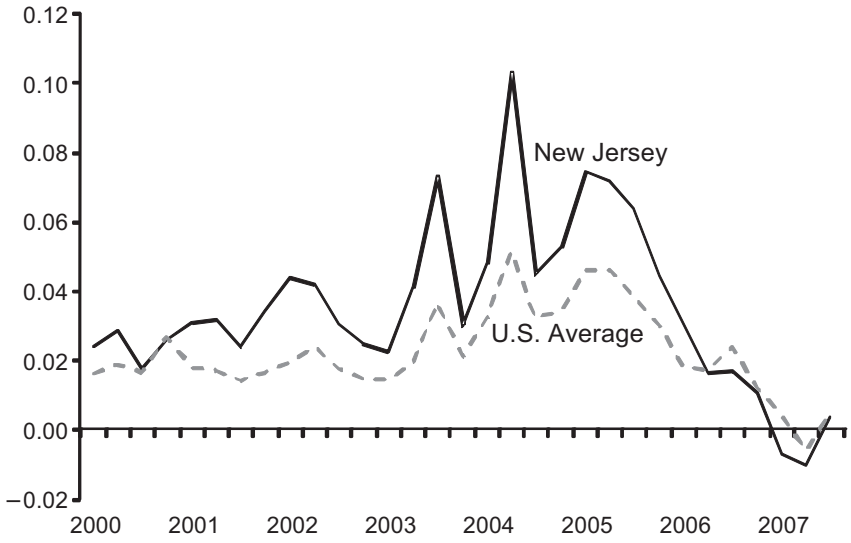
## VII. DISCUSSION

This analysis has shown that while millionaire migration increased after the new millionaire tax in New Jersey came into effect, so did the migration of very high-income people *not exposed* to the new tax. Why has out-migration increased for both (taxed and non-taxed) high-income groups? The boom in New Jersey's housing market is a compelling explanation. From the third quarter of 2003 to the first quarter of 2006, housing prices in New Jersey rose by a striking 47 percent. At the peak of the boom (during 2004), New Jersey housing prices rose 10 percent in a single quarter. As Figure 5 shows, these growth rates were also much higher than for the United States as a whole. Prices did not begin to fall until the second quarter of 2007, and then only dropped by 1 percent per quarter until mid-2008. In short, the housing boom is highly collinear with the period of the millionaire tax.

Housing booms increase migration because they make it easy and attractive for people to sell their homes (Zabel, 2009). Indeed, since the housing market collapse in 2008 (and the economic meltdown in general), domestic migration in the United States has hit its lowest rate in at least 60 years (U.S. Census Bureau, 2009). During the boom years of 2003–2007, acute housing price inflation in New Jersey stimulated out-migration (encouraged people to sell their homes) but for the same reason housing costs discouraged in-migration. (Price inflation, we expect, was driven by internal demand, rather than by the small number of in-migrants.) Thus, New Jersey's overheated housing market provides a plausible explanation of why out-migration has increased across the top of the income distribution, regardless of the new tax bracket.

**Figure 5**

Annual Change in Housing Prices for New Jersey and the United States




Source: Federal Housing Finance Agency, All Transactions Index, http://www.fhfa.gov/Default.aspx?Page=87.

With respect to the validity of the DiD estimator, it is worthwhile to outline potential problems of the analysis. Unobserved heterogeneity is an ever-present issue. We can identify two forms of heterogeneity that would undermine our DiD estimator and obscure our ability to detect a strong tax policy effect on migration. At issue is the presence of some "third variable" that (1) shifts migration trends over time; and (2) has different effects on the treatment and control groups. Unobserved variables that meet these criteria may bias the estimator either upwards or downwards. To substantially change our conclusions, there must be *downward* bias in the estimator. This requires at least one of two conditions for a problematic unobserved "third variable": the variable *raises* migration and affects the *control* but not treatment groups, or the variable *lowers* migration, and affects the *treatment* but not control groups.

One possibility is that persons in the control group, earning just below $500,000, anticipate future income growth that will push them into the new tax bracket (with future income being the unobserved variable). This would mean that the new tax

bracket *does* affect the tax rate on their lifetime income, giving people an incentive to migrate. However, if the control group ($200,000–$500,000 per year) expects future income growth, the treatment group (more than $500,000 per year) may have similar expectations as well.

Suppose all households expect their income to rise by 20 percent. For the treatment group, all of their future income growth falls inside the new marginal tax bracket and is taxed at 8.97 percent. For the control group, people making $400,000 would have *none* of their future income growth subject to the millionaire tax, and for those making $450,000, less than half of their income growth is taxed at the higher rate. Hence, if expectations of future income growth are biasing our results, one would need to assume that the control group anticipates much higher income growth than does the treatment group.

The evidence around income growth expectations for these groups is mixed. On one hand, the income of the top 1 percent has increased dramatically over the last 30 years. In 1977, the top 1 percent of Americans collected 9 percent of national income; by 2007, their share had nearly tripled to 24 percent (Atkinson, Piketty and Saez, forthcoming). In contrast, our control group (the 95$^{th}$–99$^{th}$ percentile) nationally has seen only a modest increase in their income share (from 13 percent to 15 percent) over the same period. This suggests that the richest individuals should have the strongest expectations of income growth. This would mean that our estimates are actually too large in magnitude, and that the true policy effect is even smaller than what we report.

On the other hand, there seems to be substantial turnover among the specific individuals that make up the top 1 percent income group. Auten and Gee (2009) linked individuals' federal income tax files across a ten-year period from 1996–2005. Among people who made up the richest 1 percent in 1996, almost 40 percent saw their incomes cut in half by 2005. In contrast, only about 10 percent of the moderately rich (the top 20 percent) saw such a drop in income over the decade, and many more saw increases. The median rich person (from the top 1 percent) saw a 25 percent *drop* in income, while the median moderately-rich person (from the top 20 percent) saw a 15 percent *increase*. Auten and Gee do not report estimates for the income range of our control group (the 95$^{th}$–99$^{th}$ percentiles), but their findings suggest that our control group is likely to have stronger expectations of future income growth than the top 1 percent affected by the tax. It is not clear that these expectations would be high enough to overcome the threshold effect mentioned above — the fact that many need significantly higher income growth before they enter the new marginal tax bracket.

This discussion also helps to explain why the true (rather than just estimated) policy effect is likely to be small. If the population that earns more than $500,000 in a given year is a continuously changing group, then the millionaire tax targets *transitory* spikes rather than *permanent* incomes.[16] In aggregate, it is a tax on the extreme right-tail of

[16] Our correspondence with NJ tax officials supports this view. Without citing any specific numbers, they emphasized that many people are subject to the millionaire tax only for a year or so. Relatively few people continuously earn more than $500,000 per year. Without unique individual identifiers, we are unable to estimate this directly.

the income distribution, but because this group is constantly changing, the tax has only a small effect on any individual's "permanent" tax rate (i.e., the effective tax rate on their permanent income). This, in turn, means that while high incomes are more highly taxed, there are few specific individuals with an incentive to use migration as a way to avoid the tax. In short, the transitory nature of very high incomes improves the efficiency of millionaire taxes, raising substantial revenues while creating few adverse incentives. Taxes on transitory income spikes are certainly less distortionary (and less migration-inducing) than taxes on permanent incomes.

This is not a bias in our estimate, but rather provides a potential explanation of why the tax seems to have little effect on migration behavior. This also highlights the value of obtaining individual identifiers for our data, linking tax files over time to identify a subset of people that have permanently (or at least continuously) high incomes. Such "permanent" millionaires should be much more sensitive to the tax than "transitory" millionaires. Indeed, this would be an excellent direction for future research.

Another issue of estimator validity, salient in New Jersey politics, is property taxes. This is a mixed story. Property tax bills increased in each year of our analysis, more so during period two (owing to the housing boom). However, average property tax *rates* — as a percentage of home value — did not fully keep pace, and fell slightly from 2.8 percent to 2.5 percent of home value. It is not clear which quantity residents are more sensitive to: the property tax bill or the property tax rate. In any event, we think property taxes are at best a minor factor in millionaire migration for a key reason: especially in New Jersey, property taxes are steeply regressive. In New Jersey's richest municipalities, property tax rates are very low — in the range of 0.6 percent of home value (one-quarter of the average rate in the state).[17] Relative to income, and factoring in business properties, the top 1 percent of earners in New Jersey pay less than 2 percent in property taxes, compared to 4–6 percent for the bottom 80 percent of earners (Davis et al., 2009). In short, the small shifts in property taxes do not lead to clear migration incentives, particularly for wealthy residents who face a very low rate of property tax.

Finally, a possible concern is that our period of analysis — four years before the tax, and four years after the tax — is insufficient to capture the potentially very long term effects on migration of raising the tax rate. We believe that potential migration effects should happen fairly quickly. When a new tax is imposed, people have an incentive to move as quickly as possible. Immediate migration allows movers a longer period over which to amortize the fixed costs of moving and gives more years to accumulate the benefits of a lower tax regime.

Empirically, studies that report significant migration effects have not required very long-term data. Bakija and Slemrod (2004), looking at estate taxes, found that five-year lagged tax rates produced a slightly larger migration response than current-year tax rates, but the difference in the estimates was not statistically significant. This suggests that migration responses happen quickly. Day and Winer (2006) found that three-year

[17] These figures are based on the authors' calculations from public NJ property tax data.

windows were sufficient to capture large migration responses to salient events such as political disruption in Quebec or closing the cod fishery in Atlantic Canada.[18] Finally, Feldstein and Wrobel (1998) report that some 60 percent of their migration effect happened within two years of the tax change, and *all* of their estimated effect occurred within six years; they conclude, "states cannot redistribute income for a period of even a few years" (Feldstein and Wrobel, 1998, p. 396). Thus, we believe that four years of data following the introduction of the millionaire tax is a substantial window for observing migration effects.

In short, New Jersey's millionaire tax experiment, which generated eight years of NJ-1040 micro-data with over 300,000 observations on millionaires, offers a clear and compelling testing ground for a difference-in-differences analysis of state progressive taxation. In the following section, we translate our results into estimates of the key factors that matter for state policy makers: revenue yield, tax flight losses, and income distribution.

## VIII. REVENUE YIELD FROM THE MILLIONAIRE TAX

In Table 4, we provide a simple estimate of how much revenue the state raised from the new tax. To do this, we recalculate taxes payable for each millionaire tax return, comparing the actual taxes with the counterfactual amounts payable under the pre-2004 rate. For example, in 2006, total income taxes payable by millionaire filers was $3.87 billion. Recalculating the tax payable using the pre-2004 tax rules, this would have amounted to $2.79 billion. The difference attributable to the new tax, shown in column three, is $1.08 billion. Such an analysis ignores the possibility that households manipulate their AGI in response to the new tax (Feldstein, 1995; Goolsbee, 2000;

**Table 4**

Millionaire Tax Revenue Yield in $Billions

| Tax Year | Balance of New Jersey Income Tax (Actual) | Tax Assuming pre-2004 Rates | Millionaire Tax Revenue Yield |
|---|---|---|---|
| 2004 | 2.78 | 2.04 | 0.74 |
| 2005 | 3.22 | 2.36 | 0.87 |
| 2006 | 3.87 | 2.80 | 1.08 |
| Mean | 3.29 | 2.40 | 0.90 |

Source: NJDT micro-data.

[18] In contrast, provincial tax differences did not lead to observable migration responses even over a period of 17 years (Day and Winer, 2006).

**Table 5**

Millionaire Migration Tax Flight Costs, 2004–2007

| Income Level | | Tax | Income | Tax Revenues |
|---|---|---|---|---|
| Amount | Percentile | Filers | (Millions of 2007 Dollars) | |
| $500,000–$3 million | 99–99.9 | 51.4 | 48.5 | 3.6 |
| Above $3 million | Above 99.9 | 18.3 | 146.3 | 12.8 |
| Total | | 69.7 | 194.7 | 16.4 |

Notes: Estimates assume migrating tax filers earn the mean income for that income level. Tax revenue costs are based on single filers with no out of state tax credits.
Source: NJDT micro-data.

Gruber and Saez, 2002), for example by taking greater efforts to hide income, earn less of it, or earn or spend it in tax-favored ways. As such, our estimate of revenues in the counterfactual case may be too low, making these estimates an upper bound.

We also estimate the foregone revenues due to our estimates of tax flight. These numbers are, at best, indicative. When people move away, they do not always take their jobs with them. Particularly when people move out of the region, they may create a "vacancy chain" within employment hierarchies, and set off a series of promotions. However, in our data we cannot observe the degree to which out-migration creates new income-earning potential for non-migrants. In Table 5, we invoke a simple assumption that out-migration represents lost income and lost tax revenues. Using the DiD estimates from Model 4, we calculate that a loss of 69.7 millionaire tax filers results in losses of $194.7 million in taxable income and $16.4 million in state income tax revenues. These numbers are largely due to the migration response of the top 0.1 percent of tax filers.

Finally, we estimate the impact of the new tax on the distribution of income in New Jersey. To do this, we assume that the additional state tax revenues are distributed to the bottom 99 percent of income earners (less the loss due to tax flight). In 2007, without the new tax, the top 1 percent would account for 27.3 percent of total income. With the tax in place, this share falls to 26.9 percent. Thus, the overall effect of the tax is to reduce the share of income held by the top 1 percent by roughly one-half of 1 percentage point. This emphasizes that while state tax policy plays a non-trivial role in determining the after-tax income distribution, it is mostly driven by market earnings.

## IX. CONCLUSION

Drawing on a comprehensive set of microdata on individual income taxes in New Jersey — a near census of top income earners — this study examines the impact of a new progressive state income tax. Do progressive state income taxes cause tax flight among the wealthy? The New Jersey millionaire tax experiment offers a potent testing

ground, given the magnitude of the policy change and the relative ease of relocating to a different state tax regime without leaving the New York or Philadelphia metropolitan areas. Using a difference-in-differences estimator, we find a minimal effect of the new tax on the migration of millionaires. Using the 95th–99th percentiles of the income distribution as a "non-taxed" control group, we find that the 99th percentile (those subject to the new tax) show much the same trends in migration patterns after enactment of the millionaire tax. There are small subsets of the millionaire population that are more sensitive to state taxation. Nonetheless, the broad conclusion holds even when looking at the richest 0.1 percent of households.

These findings mesh well with existing research that shows that the migration response to marginal tax policy changes is generally quite small. Our work also addresses the question, "are the rich different?" (Alm and Wallace, 2000), and follows the recommendations of Piketty and Saez (2003) to focus on the behavior of the top 1 percent (and even top 0.1 percent) of income earners. We conclude that, at least in terms of the migration response to state income taxes, the rich are *not* different — they seem to have much the same non-response as the general population.

There are, however, at least some rich people that are different. Rich people of retirement age, and rich people who earn their income from investments, are different — and much more sensitive to the millionaire tax. Rich business owners are not different, unless they are extremely rich (top 0.1 percent). Finally, a key source of difference is not wealth, but location of employment. People who work in-state (and thus pay tax on all their employment earnings in-state) are potentially more sensitive to the tax. This is relevant to the generalization of our results: states with more people who work in-state and states with more retired people may experience more tax flight than New Jersey (other things equal). Of course, most other states have geographies much less favorable to low-cost migration. Tax flight from a state like California to a lower tax state is much more costly — in both economic and social respects — than relocating from northern New Jersey to lower-tax southern Connecticut, or from southern New Jersey to even lower-tax Pennsylvania.

Overall, our results suggest that there seems to be little empirical reason why progressive taxation should be the exclusive domain of the federal government (Feldstein and Wrobel, 1998; Leigh, 2008). While in principle it is easier for tax avoiders to migrate out of state than out of country, the reluctance of people to do so gives states significant room to tax top incomes. Indeed, we estimate that New Jersey's new tax raises nearly $1 billion per year and tangibly reduces income inequality, with little cost in terms of tax flight.[19]

Future research could expand the difference-in-differences estimation strategy by incorporating comparable states that did not impose a millionaire tax, such as Con-

[19] There is, of course, *some* level of progressive taxation that would provoke substantial millionaire migration. It is not clear what that level is for New Jersey, much less for other states. Raising the top marginal tax rate by 2.6 percentage points led to a loss of less than one-tenth of 1 percent of the stock of millionaires. However, it is unlikely that, say, a 10 percentage point tax increase would have a linearly proportional effect (i.e., a loss of four-tenths of 1 percent).

necticut (a comparable state within the New York metro area). This would allow a multiple difference-in-differences estimator, offering a comparison of three non-taxed control groups, $NJ_{(under\ 500k)}$, $CT_{(under\ 500k)}$, $CT_{(over\ 500k)}$, with the treatment group $NJ_{(over\ 500k)}$. This would be especially valuable if the underlying migration trends are fundamentally different for the top percentile than they are for the 95th–99th percentile. With data from multiple states, one could use synthetic control methods, along the lines described by Abadie, Diamond, and Hainmueller (2007), to quantify the uncertainty associated with any particular control group.

Further, a number of other states have recently passed millionaire taxes (including New York, California, Maryland, Hawaii, Wisconsin, and Oregon), offering great potential for comparative study. Oregon, in particular, is a state that deserves research attention in the future: in 2009, Oregon established the highest marginal tax rate in the country (11 percent on incomes over $225,000), while its neighbor Washington continues to have no state income tax at all.[20] Moreover, Oregon and Washington share a major metropolitan area (Portland-Vancouver), suggesting strong potential for regional tax competition. Feldstein and Wrobel (1998) would predict that the future of this city is to become the Vancouver-Portland metropolitan area (with the wealthy population migrating from the Oregon to the Washington side). The results here, in contrast, suggest that Oregon will achieve lower income inequality and obtain greater resources for public services.

The present difficulty in obtaining state income tax records is a severe constraint in developing knowledge about state tax policies. We were granted rare access to the New Jersey data, but could not obtain unique individual identifiers that would allow us to follow non-migrant tax filers over time.[21] Nor have we been able to access micro-data from New York or Connecticut. We strongly advocate an initiative to "liberate" state tax data, by housing these data in a central location with a standardized confidentiality agreement and a process for IRB approval.[22]

The most important lingering research question, in our view, is whether millionaire taxes target transitory spikes or permanent incomes — whether millionaire taxes are incident on the same people year after year, or rather incident on a constantly shifting group of people with one-time, unexpectedly high incomes. A tax on transitory income is likely to be much less distortionary and generate less of an incentive to migrate, which would help explain why there seems to be little migration response to state taxation of top incomes.

---

[20] In contrast, Washington has a 6.5 percent sales tax while Oregon has no sales tax at all. This means that Oregon has much lower taxes on the poor, and much higher taxes on the wealthy (Davis et al., 2009).

[21] It is worth noting that the New Jersey Division of Taxation has been under-staffed for years.

[22] The Stanford Secure Data Center – which specializes in managing sensitive and confidential federal government data — is an excellent example of how to facilitate researcher access to data that cannot be made publicly available. State tax departments could easily include, as part of their annual reporting process, an upload to the Secure Data Center. Even if only a dozen states agreed to participate, this would greatly increase data availability and allow many innovative studies of state fiscal policies. Participating states, in turn, would benefit from a multitude of research studies that would facilitate a more evidence-based policy process.

## ACKNOWLEDGMENTS

This paper is a joint collaboration; the order of authors is random and non-meaningful. We thank Doug Massey and Rich Keevey for encouragement and feedback. Orley Ashenfelter, Dalton Conley, Paul DiMaggio, and two anonymous reviewers provided constructive criticism of earlier drafts. Michael Benediktsson contributed cartographic expertise. The Policy Research Institute for the Region at the Woodrow Wilson School of Public and International Affairs provided financial support. The New Jersey Division of Taxation allowed us access to the individual tax data, which made this research possible.

## REFERENCES

Abadie, Alberto, Alexis Diamond, and Jens Hainmueller, 2007. "Synthetic Control Methods for Comparative Case Studies: Estimating the Effect of California's Tobacco Control Program." NBER Technical Working Paper No. 0335. National Bureau of Economic Research, Cambridge, MA.

Alm, James, and Sally Wallace, 2000. "Are the Rich Different?" In Slemrod, Joel (ed.), *Does Atlas Shrug?: The Economic Consequences of Taxing the Rich*, 165–187. Russell Sage Foundation, New York, NY.

Atkinson, Anthony, Thomas Piketty, and Emmanuel Saez, forthcoming. "Top Incomes in the Long Run of History." *Journal of Economic Literature*.

Auten, Gerald, and Geoffrey Gee, 2009. "Income Mobility in the United States: New Evidence from Income Tax Data." *National Tax Journal* 62 (2), 301–328.

Bakija, Jon, and Joel Slemrod, 2004. "Do the Rich Flee from High State Taxes? Evidence from Federal Estate Tax Returns." NBER Working Paper No. 10645. National Bureau of Economic Research, Cambridge, MA.

Bertrand, Marianne, Ester Duflo, and Sendhil Mullainathan, 2004. "How Much Should We Trust Difference-In-Differences Estimates?" *The Quarterly Journal of Economics* 119 (1), 249–275.

Bound, John, David A. Jaeger, and Regina Baker, 1993. "The Cure Can Be Worse than the Disease: A Cautionary Tale Regarding Instrumental Variables." NBER Technical Working Paper No. 0137. National Bureau of Economic Research, Cambridge, MA.

Caspersen, Erik, and Gilbert Metcalf, 1994. "Is a Value Added Tax Regressive? Annual Versus Lifetime Incidence Measures." *National Tax Journal* 47 (4), 731–746.

Coomes, Paul A., and William H. Hoyt, 2008. "Income Taxes and the Destination of Movers to Multistate MSAs." *Journal of Urban Economics* 63 (3), 920–937.

Dahl, Michael S., and Olav Sorenson, 2010. "The Social Attachment to Place." *Social Forces* 89 (2), 633–658.

Davis, Carl, Kelly Davis, Matthew Gardner, Robert S. McIntyre, Jeff McLynch, and Alla Sapozhnikova, 2009. *Who Pays? A Distributional Analysis of the Tax Systems in All 50 States*. Institute on Taxation & Economic Policy, Washington, DC.

Day, Kathleen M., and Stanley L. Winer, 2006. "Policy-Induced Internal Migration: An Empirical Investigation of the Canadian Case." *International Tax and Public Finance* 13 (5), 535–564.

Donald, Stephen G., and Kevin Lang, 2007. "Inference with Difference-in-Differences and Other Panel Data." *The Review of Economics and Statistics* 89 (2), 221–233.

Feenberg, Daniel, 2010. "TAXSIM Related Files at the NBER." National Bureau of Economic Research, Cambridge, MA, http://www.nber.org/taxsim/.

Feenberg, Daniel R., and Elizabeth Coutts, 1993. "An Introduction to the TAXSIM Model." *Journal of Policy Analysis and Management* 12 (1), 189–194.

Feenberg, Daniel R., and James M. Poterba, 1993. "Income Inequality and the Incomes of Very High-Income Taxpayers: Evidence from Tax Returns." In Poterba, James M. (ed.), *Tax Policy and the Economy Volume 7*, 145–177. National Bureau of Economic Research, Cambridge, MA.

Feldstein, Martin, 1995. "The Effects of Marginal Tax Rates on Taxable Income: A Panel Study of the 1986 Tax Reform Act." *Journal of Political Economy* 103 (3), 551–572.

Feldstein, Martin, and Marian Wrobel, 1998. "Can State Taxes Redistribute Income?" *Journal of Public Economics* 68, 369–396.

Fullerton, Don, and Gilbert E. Metcalf, 2002. "Tax Incidence." In Auerbach, Alan J., and Martin Feldstein (eds.), *Handbook of Public Economics, Volume 4*, 1787–1867. North-Holland, Amsterdam, Netherlands.

Gensler, Howard, 1996. "The Effect of Welfare on Migration." *Social Science Research* 25 (3), 281–291.

Goolsbee, Austan, 2000. "What Happens When You Tax the Rich? Evidence from Executive Compensation." *Journal of Political Economy* 108 (2), 352–378.

Gruber, Jon, and Emmanuel Saez, 2002. "The Elasticity of Taxable Income: Evidence and Implications." *Journal of Public Economics* 84 (1), 1–32.

Kaestner, Robert, Neeraj Kaushal, and Gregg Van Ryzin, 2003. "Migration Consequences of Welfare Reform." *Journal of Urban Economics* 53 (3), 537–576.

Kahneman, Daniel, Alan B. Krueger, David Schkade, Norbert Schwarz, and Arthur Stone, 2004. "Toward National Well-Being Accounts." *American Economic Review* 94 (2), 429–434.

King, Gary, Robert O. Keohane, and Sidney Verba, 1994. *Designing Social Inquiry: Scientific Inference in Qualitative Research*. Princeton University Press, Princeton, NJ.

Kleven, Henrik, Camille Landais, and Emmanuel Saez. 2010. "Taxation and International Migration of Superstars: Evidence from the European Football Market." NBER Working Paper 16545. National Bureau of Economic Research, Cambridge, MA.

Leigh, Andrew, 2008. "Do Redistributive State Taxes Reduce Inequality?" *National Tax Journal* 61 (1), 81–104.

Levine, Phillip B., and David J. Zimmerman, 1999. "An Empirical Analysis of the Welfare Magnet Debate Using the NLSY." *Journal of Population Economics* 12 (3), 391–409.

Liebig, Thomas, Patrick Puhani, and Alfonso Sousa-Poza, 2006. "Taxation and Internal Migration: Evidence from the Swiss Census Using Community-Level Variation in Income Tax Rates." IZA Discussion Paper No. 2374. Forschungsinstitut zur Zukunft der Arbeit, Bonn, Germany.

McCloskey, Deirdre N., and Stephen T. Ziliak, 1996. "The Standard Error of Regression." *Journal of Economic Literature* 34 (1), 97–114.

Mirrlees, James A., 1982. "Migration and Optimal Income Taxes." *Journal of Public Economics* 18 (3), 319–341.

Office of the Govenor, 2004. "Govenor McGreevey Signs Property Tax Relief Bill." Office of the Governor, Trenton, NJ, http://www.njstatelib.org/NJLH/lh2004/govmess/ch40gov.pdf.

Piketty, Thomas, and Emmanuel Saez, 2003. "Income Inequality in the United States, 1913–1998." *Quarterly Journal of Economics* 118 (1), 1–39.

Piketty, Thomas, and Emmanuel Saez, 2007. "How Progressive is the U.S. Federal Tax System? A Historical and International Perspective." *Journal of Economic Perspectives* 21 (1), 3–24.

Saez, Emmanuel, Joel Slemrod, and Seth Giertz, 2009. "The Elasticity of Taxable Income with Respect to Marginal Tax Rates: A Critical Review." NBER Working Paper No 15012. National Bureau of Economic Research, Cambridge, MA.

Slemrod, Joel, 2000. "The Economics of Taxing the Rich." In Slemrod, Joel (ed.), *Does Atlas Shrug?: The Economic Consequences of Taxing the Rich*, 3–28. Russell Sage Foundation, New York, NY.

Stanek, Steve, 2008. "Md. Millionaires Hit by Tax Bracket for Wealthy." *Budget and Tax News*, July. The Heartland Institute, Chicago, IL, http://www.heartland.org/policybot/results/23325/Md_Millionaires_Hit_by_Tax_Bracket_for_Wealthy.html

Thompson, Jeffrey P., 2009. "Costly Migration and the Incidence of State and Local Taxes." Working Paper. Syracuse University, Syracuse, NY.

U.S. Census Bureau, 2009. "Residential Mover Rate in U.S. is Lowest Since Census Bureau Began Tracking in 1948." Census Bureau, Washington, DC, http://www.census.gov/newsroom/releases/archives/mobility_of_the_population/cb09-62.html.

Wildasin, David, 1993. "State Income Tax with Mobile Labor." *Journal of Policy Analysis and Management* 12 (1), 51–75.

Winkelmann, Liliana, and Rainer Winkelmann, 1998. "Why Are the Unemployed So Unhappy? Evidence from Panel Data." *Economica* 65 (257), 1–15.

Young, Cristobal, 2009. "Model Uncertainty in Sociological Research: An Application to Religion and Economic Growth." *American Sociological Review* 74 (3), 380–397.

Zabel, Jeffery, 2009. "The Role of the Housing Market in the Migration Response to Employment Shocks." NEPPC Working Paper 09-2. New England Public Policy Center, Federal Reserve Bank of Boston, Boston, MA.

Zodrow, George R., 2007. "The Property Tax Incidence Debate and the Mix of State and Local Finance of Local Public Expenditures." *CESifo EconomicStudies* 53 (4), 495–521.