American Sociological Review
2016, Vol. 81(3) 421–446
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DOI: 10.1177/0003122416639625
http://asr.sagepub.com

Millionaire Migration and Taxation of the Elite: Evidence from Administrative Data

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Abstract

A growing number of U.S. states have adopted "millionaire taxes" on top income-earners. This increases the progressivity of state tax systems, but it raises concerns about tax flight: elites migrating from high-tax to low-tax states, draining state revenues, and undermining redistributive social policies. Are top income-earners "transitory millionaires" searching for lower-tax places to live? Or are they "embedded elites" who are reluctant to migrate away from places where they have been highly successful? This question is central to understanding the social consequences of progressive taxation. We draw on administrative tax returns for all million-dollar income-earners in the United States over 13 years, tracking the states from which millionaires file their taxes. Our dataset contains 45 million tax records and provides census-scale panel data on top income-earners. We advance two core analyses: (1) state-to-state migration of millionaires over the long-term, and (2) a sharply-focused discontinuity analysis of millionaire population along state borders. We find that millionaire tax flight is occurring, but only at the margins of statistical and socioeconomic significance.

Keywords

elites, migration, income tax, administrative data, regression discontinuity

Rising income inequality is one of the deepest challenges facing U.S. society in the twenty-first century (Keister 2014; McCall and Percheski 2010; Piketty 2014; Volscho and Kelly 2012). Yet there have been few clear policy responses to growing inequality. Indeed, over the past three decades, federal tax policy has shifted away from taxation of the elite, reducing tax rates on top incomes, capital gains, and multi-million dollar inheritances—a process to "untax the one percent" (Martin 2013; Piketty and Saez 2007). Increasingly, state governments are tempted to fill this void with "millionaire taxes" on top incomes (Young and Varner 2011). In essence, states are "going where the money is" to find new revenues at the very top of the income distribution (Fairfield 2013:42; see also Piketty and Saez 2007; Volscho and Kelly 2012).

Taxation, as Morgan and Prasad (2009: 1350) emphasize, "is one of the central social obligations of the modern world." However, the size of this tax obligation varies over time and place and is subject to political negotiation and unintended consequences, such as tax

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migration. This may be particularly true for the highest-income earners, who have marketable skills and deep pockets to invest in relocation. In a federal system with free migration, can different states sustain significantly different policies of elite taxation? Understanding how elites respond to progressive taxation is central to the sociology and political economy of taxation.

In a globalizing world, many countries and regions are concerned about capital flight and the migration of top taxpayers. The United States provides an ideal empirical testing ground: a "world" composed of 51 small open economies with free migration between them (cf. Fligstein and Mara-Drita 1996). Millionaire migration across U.S. states sheds light on how, with the ongoing advancement of globalization, top international tax rates may affect the geographic distribution of the world's elites.

Millionaire taxes provide revenue to support public services and serve to moderate the growing inequality in market incomes. However, millionaire migration—the flight of the largest taxpayers—can drain state revenues and undermine state-level redistributive social policies (Feldstein and Wrobel 1998; Mirrlees 1982). The potentially out-sized impact of millionaire migration on state tax revenues may be one mechanism by which elites exert disproportionate influence over state policy (Dobbin, Simmons, and Garret 2007; Khan 2012; Martin 2010; Page, Bartels, and Seawright 2013). Indeed, the threat of millionaire migration is powerful leverage in an "exit versus voice" political negotiation over top tax rates (Carruthers and Lamoreaux 2014; Hirschman 1970).

We contrast two core perspectives on millionaire migration. The "transitory millionaire" hypothesis presents top income-earners as highly mobile actors searching for lower-tax places to live. The "elite embeddedness" hypothesis, in contrast, suggests that most top income-earners have strong social and economic ties to place, making it difficult to move away from places where one has achieved exceptional success. These perspectives offer two very different views on the likelihood of tax-induced migration, and thus on the social consequences of progressive taxation.

We develop a new framework and critical dataset for demographic analysis of the elite, and apply it to understanding elite response to tax policy. Elites are difficult to study using conventional data sources. However, they must file their taxes—providing census-scale, panel data on how much they earn and where they live (cf. Chetty et al. 2014; Piketty and Saez 2003). This study draws on restricted IRS data on the tax returns filed by all million-dollar income-earners in all U.S. states between 1999 and 2011. The panel nature of these data allows us to track the state and county from which millionaires file their taxes.

Previous studies on elite tax flight have struggled with data limitations either by using narrow segments of the millionaire population (e.g., professional athletes) or by analyzing narrow geographic regions (e.g., one or two U.S. states). A study of the migration of elite European soccer players (Kleven, Landais, and Saez 2013) found clear evidence of top players moving away from teams in high-tax countries. However, athletes are not representative of top income-earners in general, and for demographic and occupational reasons are probably an especially mobile segment of elite earners (as Kleven and colleagues [2013] note). In the United States, studies have used administrative data on the full population of millionaires, examining the effect of natural experiments in raising or lowering millionaire taxes (Varner and Young 2012; Young and Varner 2011). These studies found little or no elite migration response to top tax rates, but they were limited to two U.S. states (New Jersey and California) that have high concentrations of millionaires and locational advantages that, compared to other states, may allow greater capacity to tax the rich.

This study provides an ideal combination of the broad-geography, multi-state lens of Kleven and colleagues (2013), and the scaled-up administrative data of Young and Varner (2011). We draw on data on all millionaire

earners, from all occupations, across 50 states and the District of Columbia. This allows new analyses that give a comprehensive understanding of how top tax rates affect millionaire demography. First, we focus on millionaire migration in response to progressive state income taxes. Is there a pattern of millionaires moving from high-tax to low-tax states? Are the migration patterns of the elite different from those of the general population? Second, we analyze millionaire population along state borders. Do millionaires tend to cluster on the low-tax side of state borders? This provides a sharply-focused regression discontinuity analysis of border-county regions, examining small geographic zones where tax responsiveness should be most visible (Keele and Titiunik 2014).

We find that millionaire migration is indeed responsive to top income tax rates. However, the magnitude of the migration response is small and has little effect on the millionaire tax base. The implied revenue-maximizing tax rates on top incomes are much higher than current state policies—upward of 68 percent on incomes above $1 million. Moreover, evidence for tax flight rests entirely on high migration rates into Florida, and not to any other low-tax state. Finally, when we focus on states' border regions, we do not find compelling evidence that millionaires cluster on the low-tax side of state borders. Elites are embedded in the regions where they achieve success, and they have limited interest in moving to procure tax advantages.

CHALLENGES OF ELITE TAXATION

The U.S. public generally supports the principle of reducing inequality but remains ambivalent over how to do it (Page et al. 2013; McCall 2012). There are intense debates over how to fund programs that reduce inequality and support economic opportunity (Kenworthy 2014; Martin 2008; Morgan and Prasad 2009; Newman and O'Brien 2011; Prasad 2014). From a political economy perspective, flat taxes on sales and consumption may be more politically viable and help sustain elite support for safety net policies. European countries, for example, tend to rely heavily on flat taxes to finance broad welfare states (Morgan and Prasad 2009; Prasad 2014). In contrast, progressive income taxes may be more politically polarizing but offer the potential of greater redistribution of income and economic opportunity across socioeconomic classes (Fairfield 2013; Martin and Prasad 2014).

A central question in these debates is whether some regions can have systems of elite taxation when others do not. In an open economic system with free migration, states will face pressure to reduce the tax burden on highly mobile residents, and increase the tax burden on the less mobile (Slemrod 2010). Indeed, Feldstein and Wrobel (1998) argue that progressive income taxes at the state level are quickly self-defeating. In principle, raising taxes on the wealthy and providing transfers and services to the poor directly reduces inequality in a state. However, in a context of free migration, states will see an out-migration of top income-earners (fleeing taxes) and an in-migration of the poor (seeking services). For the state's labor market, this means a shortage of high-skill workers and an oversupply of low-skill workers. In response, the market bids up wages for high-skill workers and bids down wages for low-skill workers. Inequality in the state returns to its initial, equilibrium level.

Tax flight is closely related to questions of how economic globalization creates pressures for an international race to the bottom in social welfare states (Beckfield 2013; Brady, Beckfield, and Seeleib-Kaiser 2005; Brady, Beckfield, and Zhao 2007). Over the twentieth century, distinct varieties of capitalism and social welfare states have coexisted among developed countries (Esping-Andersen 1990; Hicks and Kenworthy 2003). At least in Europe, this variety has narrowed over the past two decades. "E.U. citizens in various countries are living in an increasingly similar welfare regime"—primarily one that offers

fewer social protections than in the past (Beckfield 2013:99). This convergence suggests that greater economic integration and market openness limit the range of viable socioeconomic policies.

The Transitory Millionaire Hypothesis

The view that millionaires are highly mobile has gained much political traction in recent years and has become a central argument in debates over millionaire taxes. Before Oregon voters approved a new millionaire tax, Nike chairman Phil Knight predicted the tax would set off a "death spiral" in which "thousands of our most successful residents will leave the state" (Knight 2010). In Washington state, a millionaire tax referendum was defeated after opposition from the state's top companies: Microsoft warned that the tax would "make it harder to attract talent," and Boeing stated the tax would "erode Washington state's competitiveness" (Garber 2010). New Jersey Governor Chris Christie simply declared, "Ladies and gentlemen, if you tax them, they will leave" (Office of the Governor 2010).[1]

In some areas, compelling evidence shows that tax and regulatory discontinuities along state borders lead to migration-like reactions, including changes in the location of sales, manufacturing, and corporate domicile. Sales and excise taxes, for example, frequently lead to cross-border shopping (Goolsbee, Lovenheim, and Slemrod 2010; Merriman 2010). In online shopping, the effects of sales taxes appear quite strong. Analyses of eBay.com transactions show that online shoppers avoid buying from retailers located in states with high sales taxes, indicating that such taxes "play a significant role in shaping the geography . . . of online retail trade" (Einav et al. 2014:1). Similarly, corporations tend to incorporate or "domicile" in states with minimal regulatory restrictions or tax burdens. An overwhelming number of large U.S. firms are incorporated in Delaware, even when their operations and physical headquarters are located elsewhere (Carruthers and Lamoreaux 2014; see also Holmes 1998). Internationally, corporate "inversion" strategies allow U.S. companies to shift their legal address to a foreign country with preferred regulatory and tax structures (Marian 2015; Marples and Gravelle 2014). Individuals with high incomes may deploy similarly sophisticated strategies to arbitrage state borders and locate in low-tax states.

The Elite Embeddedness Hypothesis

Some scholars, however, note reasonable skepticism about the ready mobility of the elite. In principle, top income-earners are mobile in the sense that they have fewer financial constraints on where they choose to live. In practice, their actual migration rates may or may not be particularly high or sensitive to tax rates. Two core factors may embed elites in their regions and states: lifecycle constraints and place-specific social capital.

First, millionaires are not typically at a lifecycle stage where migration is common (Geist and McManus 2008). The top 1 percent are primarily the "working rich" who have employers and derive most of their income from wages and salaries (Piketty and Saez 2003). In general, high-income earners are more likely to be married, to be in a dual-career household (Alm and Wallace 2000; Schwartz 2013), to have school-age children, to own rather than rent their home, and to own a business—all factors that discourage migration (Geist and McManus 2008; Hernández-Murillo et al. 2011; Keister 2014; Molloy, Smith, and Wozniak 2011; Young and Varner 2011). College-educated workers are more mobile than those with less education (Hernández-Murillo et al. 2011; Wozniak 2010). However, migration mostly occurs early after graduation, when income is lowest, rather than at advanced career stages when income is highest. Also, millionaires are unlikely to be unemployed and searching for work—a key factor that encourages migration. Thus, elite income-earners tend to have many social attributes that deter migration, and fewer attributes that encourage migration.

Second, the socioeconomics of location points to tangible limits on the easy migration of elite income-earners. Tax-induced migration models typically assume that income is exogenous to location, and that income does not depend on social or economic ties to place (Mirrlees 1982; Simula and Tannoy 2011). However, most millionaires are at their peak years of earnings and are drawing on long personal investments in a career or business line from which they cannot easily migrate away (Saez 2015; Varner and Young 2012). Income-earning capacity derives not just from individual talent and human capital (which is movable) but also from *place-based social capital*—social and business connections to colleagues, collaborators, funders, and co-founders.

Entrepreneurs, for example, tend to cluster and thrive in their home markets, where they have deep roots, social ties, and accumulated local market knowledge (Dahl and Sorenson 2009, 2012; Michelacci and Silva 2007; Sorenson and Audia 2000). Co-founders and other allies are often critical to a successful entrepreneurial enterprise (Ruef, Aldrich, and Carter 2003). Moreover, successful team work is difficult to accomplish without face-to-face interaction and co-presence. Despite modern communications technology, distance is still an impediment to communication, collaboration, information-sharing, and trust (Olson and Olson 2000). When economic success is a joint product—rather than a purely individual accomplishment—there is a difficult network coordination problem for migration: one's own willingness to migrate for tax purposes must align with that of co-founders, collaborators, and perhaps even clients (Young and Lim 2014). Migrating away from these social connections is costly. "Unlike human capital, which entrepreneurs carry with them wherever they go, social capital depreciates as one transports it from the regions in which it had been developed" (Dahl and Sorenson 2012:1061).

People who achieve top incomes, in this view, are deeply embedded insiders who yield remarkable returns in part because of their social placement in a localized economic world. Top-level income status makes players more, rather than less, bound to the regional economy.

The embeddedness of earning potential means that people making $1 million a year in Silicon Valley or Manhattan often cannot leave those regions without a (potentially large) drop in income (Baldwin and Krugman 2004; Powell et al. 2002; Saxenian 1994). Elites become enmeshed in the regions where they make their fortunes and are increasingly tied to those regions for their best economic opportunities.

Existing Evidence on Elite Mobility and Tax Flight

Are top income-earners "transitory millionaires" searching for lower-tax places to live? Or are they "embedded elites" reluctant to migrate away from places where they have been highly successful? The evidence so far on elite mobility and tax flight is limited and equivocal. The world's billionaires, for example, appear quite grounded in their home countries, with some 87 percent residing in their country of birth (Sanandaji 2014). Moreover, the few billionaires who do move are more likely to migrate to large market economies such as the United States than to tax havens like Monaco (Sanandaji 2014). Among the world's top physicists, however, only about 50 percent live in their country of birth, indicating high mobility among top academics and a problem of brain drain facing many small countries (Hunter, Oswald, and Charlton 2009; Zucker and Darby 2007). Top academics appear to be much more mobile than business elites.

A few studies specifically address the role of income taxes in elite mobility. Kleven and colleagues' (2013) study of elite European soccer players' migration finds clear evidence of players migrating toward teams in low-tax countries. After restrictions on foreign players were lifted in 1996, top players migrated from teams in high-tax countries (e.g., France and Sweden) to teams in low-tax countries (e.g., England and the Netherlands). Teams in low-tax countries were "better able to attract

good foreign players and keep good domestic players at home" (Kleven et al. 2013:1905). Kleven and colleagues (2013:1923) note, however, that European soccer players are a "particularly mobile segment of the labor market," suggesting that their results represent an "upper bound on the migration response."

In the United States, researchers have conducted two studies of natural experiments in taxing millionaires in New Jersey and California (Varner and Young 2012; Young and Varner 2011). These studies use microdata from state income tax records to measure millionaire migration before and after changes in the top tax rate. They find that increases in the top tax rate had little effect on millionaire migration, raised substantial revenues (on the order of $1 billion annually in both states), and modestly reduced income inequality. A skeptical replication of the New Jersey study (Cohen, Lai, and Steindel 2015) found similar migration effects, narrowing the question to whether that state's millionaire tax migration is small or very small (Young and Varner 2015). However, these two states may be unrepresentative of the United States as a whole.

DATA

This article uses confidential IRS tax return information to examine how top tax rates influence elite migration. Our data include all federal income tax filers with reported earnings of $1 million or more in any year between 1999 and 2011. These data provide 45 million tax records, representing 13 years of panel data on 3.7 million unique tax filers, yielding census-scale evidence on the top income-earners in the United States. We obtained annual income as reported on 1040 tax returns, and we adjusted incomes for inflation to constant 2005 dollars. Tax filers who ever report annual income of at least $1 million are pulled into our dataset, and we track their income and residency for the full 13 years regardless of annual income in any other year. On average, we have 12.5 years of tax returns for each tax filer. The unit of analysis is tax records, which often include married couples filing jointly. For simplicity, we refer to millionaire tax returns as "millionaires." The term "millionaire" often connotes accumulated wealth, but our focus is on top annual incomes—people who earn in one year what few ever accumulate in wealth (Keister 2014).

For comparison, we also draw a 1 percent sample of the total population of tax filers. This gives us an additional 24 million tax records from 2.6 million unique filers from across the income distribution. We can then ask, are the rich different? Do they have higher migration rates than the general population? Is elite migration more sensitive to income tax rates?

State residency in each year comes from the home address reported on the 1040 form. Migration is identified by changes in the state from which households file their federal taxes. For example, suppose an individual files a tax return from New York in 2005 and then files from Florida in 2006. Such an individual is simultaneously classed as an outmigrant from New York and an in-migrant to Florida. Millionaire migration is defined as people who earned $1 million or more in year t, and changed their state of residency between years t and $t + 1$. From this, we construct a state-to-state matrix of millionaire migration, which shows migration flows between each possible pairing of states, such as New York to Florida, or New York to California.

We drew state income tax rates from the NBER TAXSIM program (Feenberg and Coutts 1993), estimating the combined federal and state effective income tax rate for couples earning $1.7 million in labor income (the median income of millionaires in our data), taking into account the cross deductibility of federal and state taxes (Stark 2004).[2] We also use state-level data on a range of characteristics relevant to residential desirability. These include sales and property taxes, which are the core revenue sources for states with low income taxes. Economic conditions are captured with state per capita income and

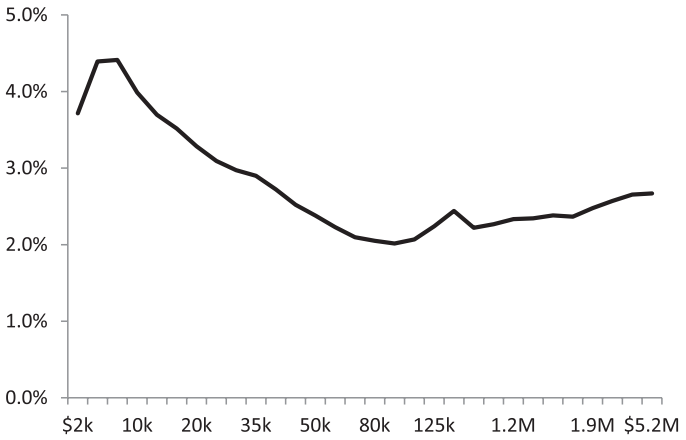

Figure 1. Migration Rates by Income Level, 1999 to 2011
Source: Office of Tax Analysis microdata. One percent sample of all tax filers (N = 24 million), and 100 percent sample of people making $1 million or more ($N$ = 45 million).

the unemployment rate. Finally, we include the price of residential land in each state; this measure subtracts out the "structure cost" of home prices, focusing on the intuition that land prices reflect the market value of a home's location (Davis and Heathcote 2007). These variables aim to capture factors that influence migration and may be correlated with the adoption of millionaire taxes. Table A1 in the Appendix lists our variables, descriptive statistics, and sources.

Basic Facts

Little is known about the migration patterns of the rich and their broader demography. We begin our analysis by describing the core empirical facts of elite mobility. In any given year, roughly 500,000 households file tax returns reporting $1 million or more (constant 2005 dollars). From this population, only about 12,000 millionaires change their state in a given year. The annual millionaire migration rate is 2.4 percent, which is lower than the migration rate of the general population (2.9 percent). Figure 1 shows the income–migration curve over the whole distribution of income, as income rises from nearly zero to millions of dollars per year. The highest rates of migration are seen among low-income tax filers: migration is 4.5 percent among people who earn around $10,000.[3] The migration rate drops steadily with income, and migration is lowest (2.0 percent) for people making around $90,000. Above this point, and into millionaire-level incomes, we see a curvilinear effect: migration rates begin to rise again, but only gradually. The migration rate of people making $5 million or more is still only 2.7 percent. The elite are mobile only relative to the upper-middle class. Overall, higher-income earners show greater residential stability and geographic embeddedness than do low-income earners.

What factors help explain low migration among elite earners? Tax returns show basic social and economic characteristics, including marital status, dependent children, age 65 or older, and ownership of a business. In Table 1, we examine basic evidence of embeddedness—factors that ground people in their states and lower their migration rates.

Marital status stands out as a prominent factor in millionaire migration. Single individuals have roughly twice the migration rate of married couples (4.1 versus 2.2 percent), and we see a similar pattern for the general population. However, nearly all millionaires are married (90 percent, compared to only 58 percent of the general population). Similarly, millionaires are more likely to have children at home (50 percent, compared to 40 percent among the

Table 1. Migration Rates by Socioeconomic Group

	Millionaires		All Population	
	Migration Rate	Share of Sample	Migration Rate	Share of Sample
Overall	2.4%	100%	2.9%	100%
Married, filing jointly	2.2%	90%	2.3%	58%
Single /non-joint filer	4.1%	10%	3.7%	42%
Difference	−1.8%**		−1.4%**	
One child or more	2.0%	50%	2.5%	40%
No children	2.9%	50%	3.3%	60%
Difference	−.9%**		−.8%**	
Age 65 +	2.2%	20%	1.6%	15%
Under age 65	2.5%	80%	3.1%	85%
Difference	−.2%*		−1.4%**	
Business owner	2.0%	23%	1.6%	4%
Not a business owner	2.6%	77%	2.9%	96%
Difference	−.5%**		−1.4%**	

Note: One percent sample of all tax filers (N = 24 million), and 100 percent sample of people making $1 million or more per year (N = 45 million).
Source: Office of Tax Analysis microdata, 1999 to 2011.
*$p < .05$; **$p < .01$, using robust standard errors clustered by state (two-tailed tests).

general population). High levels of family responsibilities—marriage and children—ground elites in their communities and states.

Business ownership is also a strong embedding factor. Among millionaires, those who own a business have a migration rate of 2.0 percent, well below that of non-business owners (2.6 percent). We see a similar pattern—but even stronger difference—in the general population: business owners have strong economic attachment to where they live. Notably, millionaires are much more likely to own a business (23 percent) than is the population overall (4 percent), making business ownership an important distinguishing factor that embeds millionaires in their states.

These simple findings do not bode well for the transitory millionaire hypothesis. Millionaires have lower migration rates than the general population, and they are rooted in their states through family responsibility ties, business ownership, and ultimately by high income itself. However, these descriptive facts do not speak directly to the dynamics of tax flight. Despite low migration rates, millionaires may still be keenly focused on ensuring that migration leads them to a lower-tax state. To understand this, we turn to the rich evidence found in the state-to-state migration flows of millionaire earners.

STATE-TO-STATE MILLIONAIRE MIGRATION FLOWS

In this section, we analyze long-run millionaire migration flows between all states and the District of Columbia over 13 years, using both simple and complex models.[4] State tax rates have long-standing differences. For example, Florida, Texas, and Nevada have never had an income tax, whereas New York, New Jersey, and California have long had progressive tax regimes. Over the long-term,

is there a general pattern of millionaires moving from high-tax to low-tax states?

First, we illustrate our analysis intuitively using raw migration data, after which we proceed to formal log-linear gravity models of migration. Figure 2 shows net out-migration flows of millionaires for several key states, plotted against the tax differences between these key states and other states. The *x*-axis shows whether the other states have lower (−) or higher (+) taxes on the elite; the *y*-axis shows whether there is net out-migration from (−) or net in-migration to (+) the other states. If tax flight is occurring, states with higher taxes would show disproportionate flows of millionaires moving to lower-tax states. Specifically, the data in Figure 2 should show a downward sloping pattern.

The evidence from Figure 2 is affirmative but modest. Florida has net in-migration from virtually every other state—shown as negative values on the *y*-axis. More importantly, migration into Florida is more likely from states that have *higher* tax rates. The greater Florida's tax rate advantage over another state, the more likely millionaires from that state will migrate to Florida. However, the correlation is low (less than −.1) and shows considerable noise. Texas (panel 2) also has no state income tax, but it has different migration patterns: Texas has both net in-migration from and net out-migration to other states. In-migration tends to come from higher tax states like New York and California, and out-migration tends to go to other low-tax states. But much of the relationship is driven by high out-migration from Texas to Florida. New York (panel 3) is a strong contrast to Florida: a high-tax state with net *out*-migration to most states. The negative slope indicates that millionaires leaving New York are more likely to choose a state that has a low tax rate. However, this is due to very high levels of migration to Florida; other states with low tax rates do not disproportionately attract millionaires from New York. The last case study, Illinois (panel 4), has millionaire migration patterns that look very similar to New York: net out-migration to virtually every state, with greater out-migration to lower-tax states. The correlation is −.29, although it is visually clear that the negative relationship between tax advantage and migration flows is driven by Florida as a powerful outlier.

The final two panels of Figure 2 pool together the entire migration matrix—the flows between every state pair. In panel 5, using all states, the overall correlation of migration and tax rate difference is −.24, suggesting a consistently modest relationship. Closer inspection shows that the upper-left quadrant is mostly every state's net out-migration to Florida (the bottom-right quadrant reproduces the graph of Florida's net in-migration from these states). This is further illustrated in panel 6: excluding the Florida observations leaves a flat relationship between taxes and migration and a correlation of −.08. Migration to Florida appears to be the core pathway for tax-induced migration.

Gravity Model of Migration

To formally analyze these data, we use the gravity model of migration (Conway and Rork 2012; Herting et al. 1997; Santos Silva and Tenreyo 2006). The number of millionaire migrants (Mig_{ij}) from state i (origin) to state j (destination) is a function of the size of the base millionaire populations in each state (Pop_i, Pop_j), the distance between the states ($Distance_{ij}$), and a variable indicating if the states $\{i, j\}$ have a shared border ($Contiguity_{ij}$). These are the core elements that define the basic laws of gravity for interstate migration (see Santos Silva and Tenreyro 2006). To this core model we add the difference in top income tax rates between each state pair ($Tax\_Difference_{ij}$). Finally, we specify this as a log-linear model, taking logs of the right-hand side count variables, and estimating with Poisson:

$$Mig_{ij} = \exp\begin{pmatrix} \alpha + \beta_1 \log Pop_i + \beta_2 \log Pop_j \\ +\beta_3 \log Distance_{ij} + \beta_4 Contiguity_{ij} \\ +\beta_5 Tax\_Difference_{ij} \end{pmatrix} + \varepsilon_{ij} \quad (1)$$

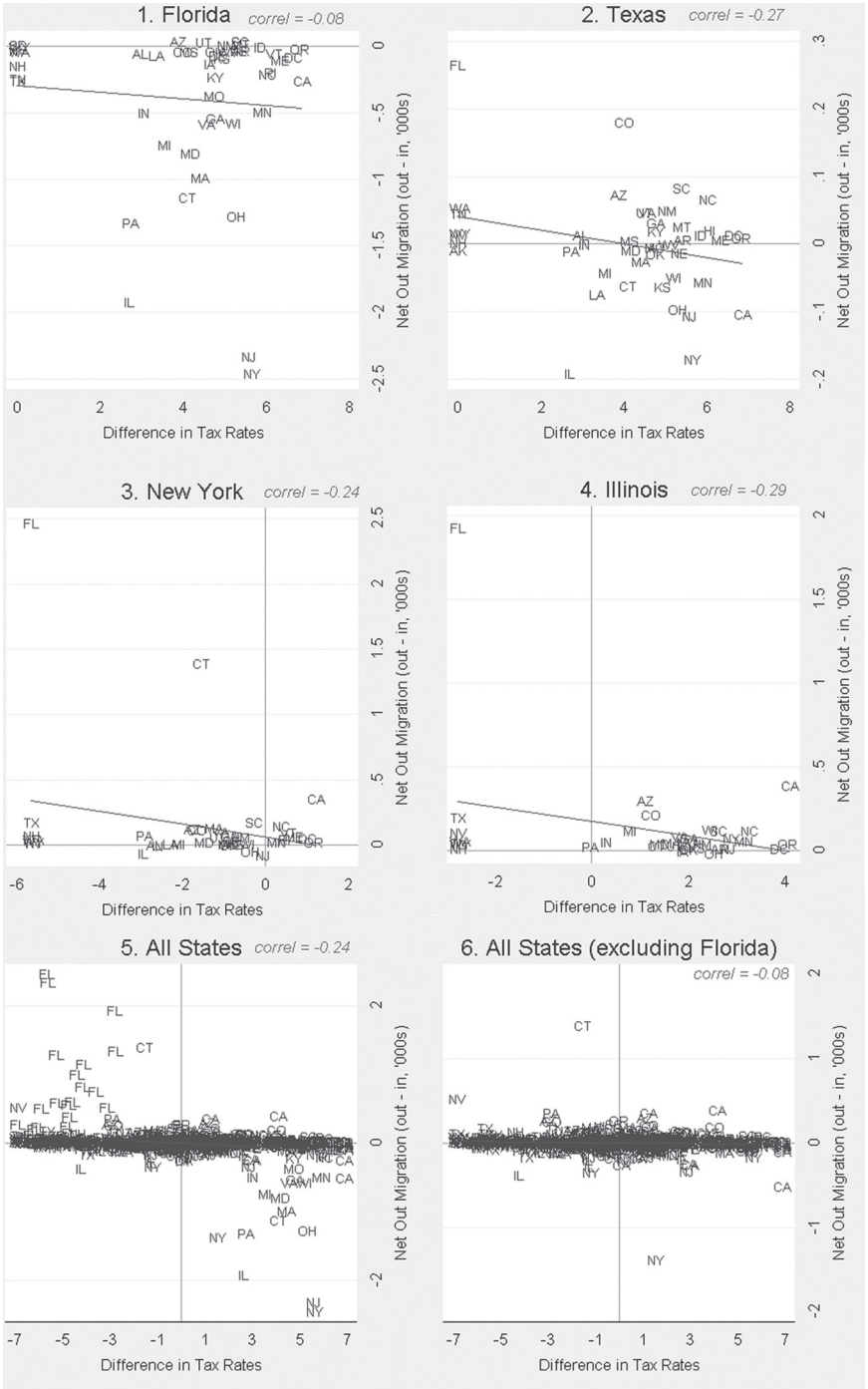

Figure 2. State-to-State Millionaire Migration, by State of Origin, 1999 to 2011
Source: Office of Tax Analysis microdata and the NBER TAXSIM program.

The coefficients from the log-linear model give the semi-elasticity of migration counts with respect to the tax rate—the percent change in migration flows for each percentage point difference in tax rates.

Results

Table 2 shows our regression results. Model 1 reports coefficients from the core gravity variables and the top tax rate difference. The populations of the origin and destination states show nearly-unit elasticities: a 1 percent higher millionaire population leads to .94 percent higher migration flows. As the distance between states grows, migration flows are less frequent, so that a 1 percent increase in distance reduces migration flows by .26 percent. Contiguity has a very strong effect: states with shared borders have especially high millionaire migration volumes between them.[5] Finally, the top tax rate has a significant impact on millionaire flows, with a semi-elasticity of −.07. Migration tends to flow from high-tax to low-tax states, and migrations flows are larger when the tax advantage is larger.

Model 2 incorporates a basic set of state-level controls, addressing winter climate, alternative tax instruments (sales and property tax rates), states' economic strength, and the price of residential land. These variables have little impact on our coefficient of interest: the effect of the top tax rate barely changes (−.08) and is still significant.[6] The main contribution of the controls is to show that millionaires tend to move to states with high residential land prices. This is an important result, as it shows that millionaires are not focused on finding low-cost places to live, but rather are attracted to expensive locations. Millionaires, it seems, are not gentrifiers.

Model 3 applies the same model to our sample of the total population of tax filers, at all income levels. Are the rich different? For the gravity variables, estimates for the whole population are strikingly similar to the millionaire population. The origin and destination populations have similar, although slightly smaller, elasticities. The distance elasticity is the same for millionaires as for the general population, and the contiguity effect is somewhat smaller for millionaires. But the most striking difference is that for the general population, there is no significant tax-migration effect.[7] Millionaires are more sensitive to income tax rates than is the general population.

The Florida Effect

Descriptive analysis suggested that evidence for tax migration is largely driven by Florida as an attractive destination for U.S. millionaires. Are elites more able to exploit geographic tax opportunities, or are they just more likely to move to Florida? We test this in Model 4 by excluding Florida migration flows from the analysis. Model 4 shows that, outside of Florida, differences in tax rates between states have no effect on elite migration. Other low-tax states, such as Texas, Tennessee, and New Hampshire, do not draw away millionaires from high-tax states.

The uniqueness of the Florida effect is a very robust finding. In supplemental models, we tested the effect of excluding each state from the analysis one at a time. In essence, this is a Cook's-D examination of influential observations (in this case, sets of observations associated with each state) (Andersen 2008; Cook 1977). When we exclude any other state but Florida, the results are stable and always achieve statistical significance. The main results depend fundamentally on Florida: when Florida is excluded, there is virtually no tax migration; when any other state is excluded, our core finding of tax-induced migration is supported.

Florida is the leading destination for millionaire migration, and this state is critical to the evidence for tax-induced migration. Florida has no state income tax, but it is also attractive in other unique ways—for example, it is the only state with coastal access to the Caribbean Sea. It is difficult to know whether the Florida effect is driven by tax avoidance, unique geography, or some especially appealing combination of the two. Disentangling

Table 2. Log-Linear Regressions for Millionaire Migration

	Model 1.	Model 2.	Model 3.	Model 4.
	Millionaires	Millionaires	All Population	Millionaires (excl. Florida)
Log pop. origin	.943***	.960***	.836***	.965***
	(.052)	(.065)	(.069)	(.055)
Log pop. destination	.947***	.929***	.786***	.813***
	(.041)	(.036)	(.035)	(.028)
Log distance	−.256***	−.263***	−.259***	−.254***
	(.055)	(.032)	(.040)	(.033)
Contiguity	.756***	.818***	1.156***	1.086***
	(.101)	(.124)	(.066)	(.072)
Income tax difference$_{ij}$	−.068*	−.077*	.014	−.033
	(.029)	(.037)	(.020)	(.025)
Winter temp. / 10		.087	.042	.019
		(.054)	(.043)	(.036)
Sales tax		−.052	−.011	−.030
		(.033)	(.019)	(.026)
Property tax		−.055	.028	−.014
		(.062)	(.076)	(.063)
Unemployment rate		−.012	−.014	.016
		(.038)	(.040)	(.038)
Average income		−.031*	−.012	−.025
		(.012)	(.011)	(.014)
Residential land value		.192**	.033	.145**
		(.069)	(.047)	(.050)
Constant	−.655***	−.735***	−18.24***	−.674***
	(.142)	(.146)	(1.17)	(.147)
N (state pairs)	2,550	2,550	2,550	2,450
N (migrations)	139,573	139,573	593,365	98,211
Pseudo *R*-sq.	.754	.788	.793	.805

Note: Robust standard errors clustered by state are in parentheses. The outcome variables represent counts of millionaire (or all population) migration flows between each state-pair, summed over 1999 to 2011. Model 3 uses a 1 percent sample of the total population, rather than just millionaires, and the income tax rate at the median. Model 4 excludes Florida migration flows.
Source: Office of Tax Analysis microdata.
*$p < .05$; **$p < .01$; ***$p < .001$ (two-tailed tests).

these factors for one specific state is beyond the scope of this research but is an important venue for future study.

Millionaire Heterogeneity

Next, we explore differences in migration responsiveness among distinctive subsets of millionaires. We estimate separate regression models for the migration of elites by different economic status, such as business owners and people with super-elite income of $10 million or more. We also run separate models for people of retirement age, people with children at home, and people who are married—looking separately at families with one primary earner and families with significant dual earnings. Finally, we run models by the persistence of millionaire income—the total number of years that households earn $1 million or more in our 13-year time frame. For each group, Table 3 reports the tax effect coefficient, as well as the

Table 3. Tax-Migration Effects by Socioeconomic Groups

	Tax-Migration Coefficient	SE	Overall Migration Rate	Share of Millionaires
All Millionaires (Table 2, Model 2)	−.077*	(.037)	2.4%	100%
Economic Status				
Business owner	−.089*	(.039)	2.1%	23%
Capital gains 75%+	−.071	(.037)	3.0%	11%
$10M+ annual income	−.075	(.042)	2.6%	4%
Retirement Age				
Under age 65	−.072*	(.029)	2.5%	80%
Age 65+	−.075	(.055)	2.3%	20%
Family Status				
Children at home	−.046	(.026)	2.0%	50%
No children at home	−.086*	(.037)	2.9%	50%
Single filer	−.049	(.028)	3.6%	7%
Married, one primary earner	−.078*	(.034)	2.5%	81%
Married, dual earners	−.099*	(.039)	1.7%	10%
Persistence of Millionaire Income				
One year	−.022	(.026)	3.2%	15%
2 to 3 years	−.054	(.027)	3.1%	18%
4 to 7 years	−.083*	(.032)	2.6%	29%
8 years +	−.123**	(.044)	1.9%	38%

Note: Robust standard errors clustered by state are in parentheses. Estimates are income tax rate coefficients from log-linear migration models (Table 2, Model 2 specification), run separately for each socioeconomic group. The outcome variables represent counts of millionaire migration flows between each state-pair, summed over 1999 to 2011.
Source: Office of Tax Analysis microdata.
*$p < .05$; **$p < .01$ (two-tailed tests).

group's overall migration rate and the share of the millionaire population they represent. Most models in Table 3 show consistent estimates that are close to the Model 2 result of −.08.

Tax migration is not driven by retirees, nor is it any higher among people earning $10 million. However, one set of findings that stands out is the *persistence* of millionaire income over time. "One-time" millionaires show no sensitivity to the top tax rate (−.02); households that routinely earn $1 million have the highest tax responsiveness (−.12).[8] This suggests that tax avoidance is indeed an element of elite migration: the migration patterns of people with a greater lifetime exposure to top tax rates are more sensitive to these rates. In other words, income tax rates are more salient to people who routinely earn elite incomes.

However, persistent millionaires also have the lowest overall migration *rates*. One-time millionaires have an overall migration rate of 3.2 percent, compared to only 1.9 percent among the most persistent millionaires. This supports the hypothesis that elite incomes have a strong place-specific component that ties millionaires to their home states. These results help explain how elite income embeds people in their local regions: people who can expect continuous flows of million-dollar income over time do not tend to move.

Thus, evidence from the persistence of millionaire income gives support to *both* the tax-migration and embeddedness perspectives. On one hand, persistent millionaires are less likely to ever change their state of residence, but when they do move, they are more attentive to top tax rates and are more likely

to choose a lower-tax state as their destination. For state tax policy, these two factors would seem to largely cancel each other out. For socioeconomic theory, the findings shed new light on the dynamics of elite migration. People with the strongest incentive to avoid state taxes are also most strongly embedded in their state.

Implied Optimal Tax Rates

Our core estimate is that a one point increase in the tax rate leads to an 8 percent drop in migration flows. However, the practical effect of interest is how this translates into the share of the millionaire population lost to migration. Because migration rates are low, changes in migration flows have a muted impact on the population. To illustrate, we calculate millionaire population loss for each state on an annualized basis, using the parameter estimates from Table 2, Model 2. For each state, we calculate how many millionaires would be lost if the state raised its tax rate on millionaires by one percentage point (with tax rates constant in all other states).[9] For the average state, a one-point tax increase leads to 12 fewer in-migrations and 11 additional out-migrations, for a total population loss of 23 millionaire households. Because the average state has an annual millionaire population of more than 9,000, this is clearly a small effect size. The millionaire *population elasticity* (η)—defined as the percent change in the population for a percent change in the top tax rate—is .1. In other words, a 10 percent increase in the top tax rate leads to a 1 percent loss of millionaire population.

More formally, we incorporate our results into models for the optimal tax rate on top incomes (Kleven et al. 2013; Mankiw, Weinzierl, and Yagan 2009). From the perspective of revenue maximization, the optimal top state tax rate, τ^*, is driven by three factors: (1) a measure of the portion of total income held by millionaires, a, (2) the elasticity of taxable income, e, and (3) the millionaire population elasticity, η. The formula for optimal tax rates on top incomes, taking into account both migration and income effects, is given as follows (Piketty and Saez 2013:429):

$$Optimal\ rate: \tau^* = \frac{1}{1 + a \cdot e + \eta} \qquad (2)$$

Roughly speaking, when the tax rate increases, people with top incomes (reflected in the parameter a) may react negatively by reporting lower earnings (given by e), or by moving to a lower-tax jurisdiction (given by η). We do not estimate a and e but draw on credible estimates from existing literature (a = 1.5, e = .25) (reviewed in Saez, Slemrod, and Giertz 2012). Inputting these values with our population elasticity estimate (η = .1) into Equation 2 gives an optimal tax rate on top incomes of 68 percent.

Table 4 provides a range of optimal tax rate calculations, according to different possible estimates of the migration (and income) elasticity. When there is no tax migration at all (η = 0), the optimal rate on top incomes is 73 percent. With the level of tax migration we find (η = .1), the rate is five points lower (68 percent). To substantially reduce the optimal rate, there would need to be a population elasticity in the area of η = 1.0—roughly 10 times greater than our estimate. Even assuming a higher-range estimate for the income elasticity (e = .60), the optimal top tax rate is still 50 percent given our migration findings. At low-range estimates for the income elasticity, the optimal rate is 80 percent. All of these rates are higher than the current combined federal and state top tax rate in any state.[10] To rationalize current tax rates, the migration response to taxes would need to be 10 to 15 times greater than what we actually observe.

Caution is needed in interpreting these rates. It is difficult to forecast the effect of tax rates that are so much higher than what we currently observe. Such higher rates could become more salient to elites, leading to nonlinear increases in migration. Nonetheless, these estimates suggest that currently, elite migration is not a significant limitation on tax policy for states.

Table 4. Revenue-Maximizing Top Marginal Tax Rates on Income above $1 Million

		Estimate of Population Elasticity (η)				
		η = .0	**η = .1**	η = .2	η = .5	η = 1.0
Estimate of Income Elasticity (e)	e = .10	87%	80%	74%	61%	47%
	***e* = .25**	73%	**68%**	63%	53%	42%
	e = .60	53%	50%	48%	42%	34%

Note: Estimates calculated using Equation 2, at a = 1.5. Shown in bold is our millionaire population (migration) estimate of η = .1, and a representative estimate of income elasticity, e = .25, from the published literature (reviewed in Saez et al. 2012). We also show the higher- and lower-end estimates of the income elasticity (.60 and .10, respectively).

Finally, to clarify the implications of our results for understanding elite behavior, we ask how much millionaire migration in the United States is due to different top tax rates across states. If we eliminated any tax incentive to migrate, by setting all state tax rates to be the same, how much migration among elites would continue to occur? We use the parameter estimates from Model 2 to conduct a counterfactual analysis. At existing state income tax rates, our model predicts 11,250 migrations per year. When we reset the top tax rates to be equal in all states, the model predicts 11,000 migrations—roughly 2.2 percent fewer. Little more than 2 percent of elite migrations appear to have an income tax motivation.

MILLIONAIRE POPULATION ALONG STATE BORDERS

State-to-state millionaire migration flows give positive but limited evidence of tax migration among top income-earners in the United States. We triangulate these findings with a sharply-focused discontinuity analysis of millionaire populations along state borders. Do millionaires tend to cluster on the low-tax sides of state borders? This is a regression discontinuity design in which "a geographic or administrative boundary splits units into treated and control areas . . . in an as-if random fashion" (Keele and Titiunik 2014:2). In narrow geographic border regions, there are sharp discontinuities in top tax rates but few barriers to crossing the border, and social and economic differences between states are at their minimums. Border regions usually span short commuting distances, allowing continuity of family, social, and business ties (Dahl and Sorenson 2010). Researchers have used similar quasi-experimental strategies to study how state minimum wage rates affect employment (Dube, Lester, and Reich 2010), and how anti-union right-to-work laws affect the location of manufacturing employment (Holmes 1998) and Walmart stores (Rao, Yue, and Ingram 2011).

Counties along the border of Washington and Oregon (Figure 3) illustrate the analytic strategy. Oregon has long had one of the most progressive income tax regimes in the United States, whereas Washington has never had a state income tax (Pearson 2014). The distance between the major cities of these two states (Portland and Seattle) is large: they are roughly 170 miles apart, which imposes potentially significant migration costs, especially in the form of separation from family, friends, colleagues, and business partners. However, moving just across the border—from Portland, OR, to Vancouver, WA—is a small life change and is more like changing neighborhoods within a city. Indeed, most points along the border seem readily commutable, substantively similar, and arbitrarily separated by a state border. This is an area in which the costs of migration are smaller and tax flight should be most clearly visible.

Figure 4 maps all the counties in our border analysis. There are 1,134 counties adjacent to

Figure 3. Border Counties of Washington and Oregon

interstate borders, containing 32 percent of the U.S. population and 35 percent of all millionaires in our dataset. The mean cross-border tax difference is 2.3 percentage points, with the sharpest differences greater than 7 points. Among the largest differences are Oregon–Washington (7.3), Vermont–New Hampshire (6.7), and North Carolina–Tennessee (6.4). The map shows many large tax differences at state borders.

The border county analysis can be understood as a matching algorithm, matching a treatment county (with higher taxes) to one or more control counties on the opposite side of the state border (Keele and Titiunik 2014). A key question then is the covariate balance between the treatment and control cases (Ho et al. 2007). Are the county pairs well-matched and comparable on observables? If the matching algorithm is successful, border-county pairs will be effectively identical on all explanatory factors except the income tax rate, creating "as if" random assignment to the treatment and control conditions. We consider the covariate balance across county pairs for a broad set of observable characteristics, including natural amenities, real estate values, and other state policies (e.g., sales taxes and right-to-work laws) that may differ at borders. Balance statistics, available upon request, show that the counties are indeed well-matched and largely equivalent on a broad set of non-income-tax characteristics. Based on observables, the contiguous border county framework appears to provide good quasi-experimental matching of treatment and control cases.

Spatial Discontinuity Model of Population

Our formal model of millionaire population first considers the basic state-level relationship between millionaire population and top tax rates. The outcome variable is log millionaire population in state i in year t ($\log M_{it}$), which we expect to vary with a state's overall population ($\log pop_{it}$), and potentially with its effective top tax rate (tax_{it}). We also include year fixed effects (λ_t).

$$\log M_{it} = \alpha + \beta_1 tax_{it} + \beta_2 \log pop_{it} + \lambda_t + \varepsilon_{it} \quad (3)$$

Next, we move to the matched sample of contiguous county-pairs. All border counties match to at least one cross-border county, and on average they pair with 2.1 cross-border counties. This yields 1,172 county pairs (each with two counties). With 16 years in our millionaire population dataset, this gives a sample of 37,504 county-years.[11] In this model, we estimate the effect of the top tax rate on millionaire population *within* county pair-years. We define a unique pair-year term for each county pair in each year (τ_{pt}), and the model is identified solely on the remaining cross-border variation in a given year. In other words, within each county pair, and in a given year, does millionaire population cluster in the county on the low-tax side?

$$\log M_{cpt} = \alpha + \beta_1 tax_{ct} + \beta_2 \log pop_{ct} + \tau_{pt} + \varepsilon_{cpt} \quad (4)$$

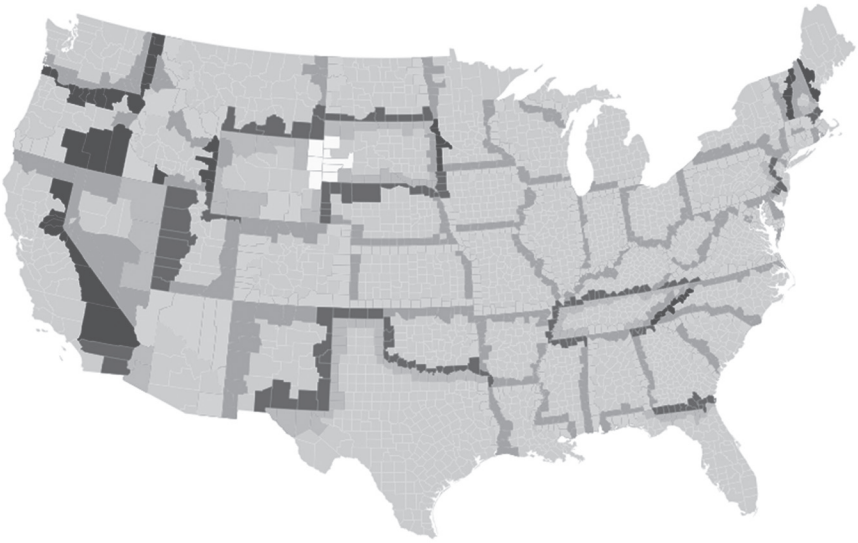

Figure 4. Border Counties and Tax Differences in the United States
Note: In the color version online, high-tax sides are shaded blue, and low-tax sides are shaded orange.

We then focus on changes in tax rates over time, within county pairs. For example, if a state raises its top tax rate but its neighboring states do not, the tax difference at the border increases. We isolate these changes in tax rates by adding fixed county effects (θ_c) to the model. Within county pairs, what happens when the top tax rate changes in one county?

$$\log M_{cpt} = \alpha + \beta_1 tax_{ct} + \beta_2 \log pop_{ct} + \tau_{pt} + \theta_c + \varepsilon_{cpt} \quad (5)$$

This gives the short-run or immediate effects of tax changes, whereas Equation 4 gives the long-run effect of established tax differences (Baltagi and Griffin 1984). We estimate these models using OLS, with standard errors clustered by state and border segments (Dube et al. 2010). Statistical routines that allow for multidimensional clustering of standard errors are not implemented for Poisson regression.[12]

Results

Table 5 shows regression results for the millionaire population models. First, we test whether states with higher tax rates have smaller millionaire populations. Beyond the observed migration flows already analyzed, are there simply fewer millionaires in high-tax states? Model 5 shows that the effect of the tax rate is indeed negative, but it is small and not statistically significant. The implied elasticity is .08, meaning that a 10 percent higher tax rate could lead to a .8 percent lower millionaire population. This is similar in magnitude to our findings from the state-to-state migration flows analysis.

Models 6 and 7 make specific cross-border comparisons between contiguous counties. Do higher tax rates reduce the millionaire population when we compare sharply-focused regions that seem otherwise equivalent? Model 6 shows supportive evidence of clustering on the low-tax side. Among border-county pairs, the county on the high-tax side has a significantly lower millionaire population. The implied elasticity is .19, which is still modest but suggests greater tax sensitivity in border regions than what we see across states overall.

However, some border counties included in Model 6 are large geographic areas that are not realistic commuting zones and do not form strong test cases. Some border counties are "larger than the state of New Jersey" (Holmes 1998:681) but are home to a scant

Table 5. Log-Linear OLS Models for Millionaire Population

	Model 5.	Model 6.	Model 7.	Model 8.	Model 9.	Model 10.
	States	Border Counties	Border Counties: 40 Miles or Less	Cross-State MSAs	FE: Border Counties: 40 Miles or Less	FE: Cross-State MSAs
Log overall pop.	1.095***	1.252***	1.329***	1.330***	.883***	.860***
	(.047)	(.052)	(.034)	(.042)	(.219)	(.138)
Tax rate	−.021	−.049**	−.036	−.045	−.011	−.002
	(.018)	(.018)	(.021)	(.024)	(.026)	(.028)
Implied elasticity (η)	.08	.19	.14	.18	.04	.01
Year effects	Yes	No	No	No	No	No
County-pair (or MSA) x year effects	No	Yes	Yes	Yes	Yes	Yes
County effects	No	No	No	No	Yes	Yes
N	816	37,504	28,224	5,616	28,224	5,616
adj. *R*-sq.	.914	.891	.903	.871	.380	.492

Note: Standard errors in parentheses are clustered by state in Models 5, 8, and 10; and by state and interstate border in Models 6, 7, and 9. The implied elasticity is the percent change in population for a percent change in the tax rate, evaluated at the mean state tax rate and millionaire population.
Source: Office of Tax Analysis microdata, 1996 to 2011; U.S. Census Bureau, Intercensal Population Estimates, 1996 to 2011.
**$p < .01$; ***$p < .001$ (two-tailed tests).

population. In California, for example, San Bernardino County shares a border with Clark County, Nevada—home to Las Vegas. The population centers of these two counties are 184 miles apart, and in between them is the Mojave Desert. These are technically border counties, but their large geographic expanse and sparse population near the border make them poor test cases.

In Model 7 we limit the analysis to border counties that span plausible commuting zones, where the population centers of the county pairs are no more than 40 miles apart. This retains 75 percent of counties, and over 90 percent of the millionaire population, while eliminating county pairs that do not represent small, commutable geographic areas. The results in Model 7 show that in the narrower border regions that motivate this analysis, the tax effect is not statistically significant (with an elasticity of .14).

To triangulate and help clarify these results, we also look at metropolitan areas that cross state borders (Coomes and Hoyt 2008). Metropolitan statistical areas (MSAs) are designed to capture distinct labor markets—they are areas of high economic integration based on commuting patterns. There are currently 381 MSAs in the United States, and 50 of these span at least one state border. These cross-state cities provide an alternative way to focus on small, regionally integrated, commutable zones.[13] Model 8 applies the same basic regression model to counties on different sides of a cross-state city. The tax rate coefficient is again negative, but it is not statistically significant. Within cities that cross state lines, there is limited evidence that millionaires cluster in the part of the city that has lower state income taxes.

Finally, we revisit the border county and city analyses focusing purely on changes in the top tax rates. For example, in 2004, New Jersey raised its top tax rate, but Delaware, Pennsylvania, and New York did not, leading

to a change in the tax difference at the border. By incorporating county fixed effects into these models, we isolate changes over time in the tax rates. Over our period of analysis, there were eight tax policy changes of roughly one percentage point or more (similar to common state millionaire tax proposals), as well as many smaller changes. In border regions, these policy shifts did not lead to observable changes in the millionaire population. In commutable border counties (Model 9) and cross-state cities (Model 10), the results are insignificant and the elasticities are essentially zero. In other words, we see no evidence of short-run effects of (modest) tax policy changes. Even in long-run models with larger and long-standing tax differences, the evidence that millionaires choose to live on the low-tax side of state borders is weak.

CONCLUSIONS: ELITE DEMOGRAPHY AND SOCIAL CONSEQUENCES OF PROGRESSIVE TAXATION

Taxes on elite income-earners provide a way to moderate the sharp growth in inequality seen over the past several decades, particularly the rising share of income held by the top 1 percent (Keister 2014; Piketty 2014; Volscho and Kelly 2012). However, in contemporary policy debates, millionaire migration from higher tax regions is often presented as a key threat to redistributive social and fiscal policies. For this reason, the mobility of the elite is a salient concern for policymakers not only in U.S. states, but for governments in many countries (Beckfield 2013; Martin and Prasad 2014).

We presented two core frameworks for understanding elite mobility. In the "transitory millionaires" hypothesis, top earners are residentially mobile and sharply attuned to locational tax advantages. Redistributive policy initiatives are quickly defeated by out-migration of the rich, to the detriment of states with progressive taxation (Feldstein and Wrobel 1998; Slemrod 2010). In contrast, the "embedded elites" perspective emphasizes social and network costs of migration that limit the attractiveness of moving for tax reasons, and that ground millionaires in the regions where they became successful (Dahl and Sorenson 2009, 2012; Ruef et al. 2003; Saxenian 1994). In this view, progressive taxation is simply part of the regional cost of living for an elite that is not especially concerned with residential affordability.

We draw on big administrative data from restricted IRS tax records, providing a census of top income-earners in the United States from 1999 to 2011. Elites are often difficult to interview in conventional surveys, but their tax returns document state and county residence over time. This allows multiple and detailed analyses of millionaire migration, using a sample of 45 million observations on millionaires' income and location.

The most striking finding of this research is how little elites seem willing to move to exploit tax advantages across state lines in the United States. Millionaire tax flight is occurring, but only at the margins of statistical and socioeconomic significance. First, millionaires are not very mobile and actually have lower migration rates than the general population. This is in part because family responsibilities and business ownership are higher among top income-earners, which embeds individuals in their local regions. Nevertheless, there is an observable pattern of elite migration from high-income-tax to low-income-tax states; when millionaires migrate, their relocation decisions are influenced by tax rates, in a way that we do not see for the general population. Yet, because migration flows represent a very small share of top income-earners, the observed patterns of migration have little impact on the millionaire population tax base even over 13 years. Our core migration estimate translates into a population elasticity of roughly .1, meaning that a 10 percent increase in the top tax rate leads to a 1 percent loss of the millionaire population. Incorporating this estimate into optimal tax rate models (Mankiw et al. 2009; Piketty and Saez 2013) suggests that the revenue-maximizing top marginal tax rate on income above $1 million is much higher than the current tax rate in any state.

We expand on these results by looking at the millionaire population along state borders and in cities that cross state borders. Border regions create spatial discontinuities in top tax rates that offer a quasi-experimental identification strategy and provide an upper-bound estimate (Keele and Titiunik 2014; Rao et al. 2011). Overall, states with higher tax rates do not have fewer millionaires. But along state borders, we do see noticeable differences, consistent with millionaire tax flight within these small geographic zones. However, among the more compelling, easily commutable border regions, the difference in millionaire population at the state border is not significant. Nor is the difference significant within cross-state cities that represent small, commutable, economically integrated zones. Finally, in short-run fixed-effects models, we find no population response to changes in the tax difference at the border.

The United States has increasingly become a winner-take-all society, where the most successful competitors reap a disproportionate share of economic rewards (Frank and Cook 1995; Hacker and Pierson 2010). The gap between the winners and everyone else has grown sharply in recent decades. The challenge of rising inequality is frequently seen as requiring greater coordination and harmonization of progressive tax policies across countries (Beckfield 2013; Genschel and Scwharz 2011). The hallmark of tax policy coordination is the proposed global tax on wealth, as advocated by Piketty (2014). A global tax ameliorates the problem of capital flight by setting a worldwide minimum tax rate on the wealthy, narrowing the window for tax migration. However, in the United States, political stalemate and growing polarization between red and blue states suggests that greater tax cooperation and harmonization is unlikely. Our findings show that state—and by extension, national—governments have considerable leeway for independent tax policy. States can make policy choices that contribute to the reduction of inequality without waiting for national or international agreements.

The transitory millionaire hypothesis, in its simple form, contains a grain of truth: millionaires pay more attention to tax rates than does the general population. Yet, in its strong forms, the transitory millionaire hypothesis is a misperception of both elites and the attractiveness of moving to a different state.

First, the hypothesis incorrectly portrays millionaires as frictionless agents who have little or no social ties to place. Under this assumption, the primary constraints on migration are simply the "moving truck" costs, which seem easy for top earners to absorb. However, our results suggest high social and economic costs of migration, even for the rich. Millionaires do not use their higher income to achieve greater mobility across states, but rather are more grounded in their states. The rich *are* different from the general population. They more often have family responsibilities—spouses and school-age children that embed them in place. They own businesses that tie them to place. And their elite income itself embeds them in place: millionaires are not searching for economic opportunity—they have found it.

Migration is a discourse of empowerment. Mobility and migration are engrained ideals in U.S. culture, and it fits with intuition that the rich are more geographically mobile than the poor. "To move, to change—that is what enjoys prestige, as against stability, which is often synonymous with inaction" (Boltanski and Chiapello 2005:155; quoted in Costas 2013:1469). The discourse of migration elevates the elite as possessing the mobility that is widely admired. For example, in California, the Senate Republican leader asserted: "There's nothing more portable than a millionaire and his money" (Yamamura 2011). The fact that it is the poor who most "enjoy" this fluidity of place—who most often change their state of residence—should give pause to our understandings of migration. Despite its evocative resonance with ideals of freedom, interstate migration has been declining for decades (Ferrie 2005; Molloy, Smith, and Wozniak 2011). Today, migration seems to be

not a privilege of riches, but rather a burden of dislocation and a loss of social ties—something that high-income earners can and do avoid.

Finally, the transitory millionaire hypothesis assumes that top earners' lifetime income is independent of where in the country they live. In this view, income derives simply from an individual's own merits and abilities and is unrelated to location or one's proximity to others. The role of social capital and network ties in the production of elite income is often underappreciated and not well connected to an understanding of elite demography. Most millionaires are the "working rich," and their incomes derive in part from place-based social capital in highly networked industries (Powell et al. 2002; Saez 2015; Saxenian 1994; Varner and Young 2012). Low levels of elite migration and limited responsiveness to top tax rates suggests that an important portion of income is place-specific and not portable. This leaves us with a future research agenda to better understand the economic embeddedness of the elite, and to study the specific social and economic dynamics that ground millionaires in the places where they achieve success.

APPENDIX

Table A1. Variables, Descriptive Statistics, and Data Sources (1999 to 2011)

	Mean	Std. Dev.	Min.	Max.	Source
State-to-State Relational (Matrix) Variables					
Millionaire migrants	53	195	0	3,637	Office of Tax Analysis microdata
All migrants	239	485	0	6,416	Office of Tax Analysis microdata
Distance	1,221	912	20	5,112	Nichols 2003; U.S. Census Bureau 2010
Contiguity	.1	.3	.0	1.0	Merryman 2005
State Attributes					
Millionaire population	109,966	167,090	5,923	877,643	Office of Tax Analysis microdata
All population	405,595	442,032	33,415	2,407,673	Office of Tax Analysis microdata
Income tax rate, $1.7M	38.6	2.1	34.6	41.4	Feenberg and Coutts 1993
Income tax rate, $53K	12.1	1.8	9.0	15.5	Feenberg and Coutts 1993
Winter temperature	32.3	12.2	2.6	67.4	NOAA 2013
Sales tax rate	4.8	1.9	.0	7.0	Tax Foundation 2013
Property tax rate	1.0	.4	.2	1.8	Tax Foundation 2013
Unemployment rate	5.6	1.0	3.4	7.6	Bureau of Labor Statistics 2013
Residential land value	68,558	89,692	7,518	407,016	Davis and Heathcote 2007
Average income	34,731	5,712	26,553	56,659	U.S. Bureau of Economic Analysis 2013

Acknowledgments

The authors wish to thank Monica Prasad, Emmanuel Saez, David Pedulla, Pablo Mitnik, David Grusky, Douglas Massey, Paul Starr, Olav Sorenson, Mike Hout, Sarah Quinn, Andrew Friedson, Michael Weber, Christof Brandtner, and Patricia Young for helpful comments and feedback in preparing this manuscript. Daniel Allen, Brandon Baum, Adam Ginzberg, and Ryan Leupp provided valuable research assistance. Previous versions of this article were presented at the annual meetings of the American Sociological Association, National Tax Association, Population Association of America, and American Economic Association.

Funding and Data

This research was supported by the Russell Sage Foundation (Project Number 83-15-04) and a seed grant from the Institute for Research in the Social Sciences at Stanford University. This research uses confidential taxpayer information from the Internal Revenue Service that is not publicly available. Interested researchers may contact the Office of Tax Analysis to inquire about data access. The views expressed are those of the authors and not necessarily those of the U.S. Department of the Treasury.

Notes

1. Similar arguments are common in Europe. Debate was especially heated in 2013, after the French actor Gerard Depardieu renounced his citizenship and moved to Russia to avoid the high French tax burden. Russia's Deputy Prime Minister Dmitry Rogozin, commenting on his country's flat 13 percent income tax, remarked, "The West has an especially poor knowledge of our tax system. When they learn about it, we expect a mass migration of wealthy Europeans to Russia" (Quoted in Erb 2013).
2. We also examine the tax rates of people earning 50 and 100 percent of their income through capital earnings, to measure state-level tax advantages for capital. We do not find clear effects for capital tax rate differences, and we do not report these models.
3. One concern with using tax data on low-income earners is that they do not all need to file tax returns. However, the Earned Income Tax Credit (EITC) leads most families with children to file a tax return, even if they do not owe taxes (Jones 2014). Unattached individuals have lower filing rates and are also more mobile than families with children. This pattern of non-filing suggests that, if anything, we are *under*estimating migration rates of the poor.
4. Similar models have been applied to census data by Herting, Grusky, and Rompaey (1997), to international migration by Beine, Docquier, and Ozden (2011), and to elderly migration in the United States by Conway and Rork (2012). Santos Silva and Tenreyo (2006) provide an excellent discussion of the core model. Note that although our base dataset contains 13 years of data, one year is lost because we require two years of information to define migration.
5. Note that in log-linear models, the coefficients of dummy variables need to be exponentiated for interpretation (Giles 2011). In Model 1, contiguity raises migration flows by 113 percent = $100 \times [\exp(.76) - 1]$.
6. In alternative specifications, we included a coarse dummy variable for a state-level inheritance tax, and computed effective top tax rates under different assumptions about capital gains income (which mostly affects the federal tax rate). Neither affects the results.
7. Note that in Model 3, we use the income tax rate at the median income level (roughly $53,000). As a placebo test, we also estimated the model using the tax rates that apply to millionaires, and likewise found a non-significant result.
8. The difference between these two coefficients is statistically significant at the 5 percent level.
9. The full table of these results is available on request. We estimate these quantities by predicting migration flows for each state using actual tax rates, and then predicting migration flows after increasing the tax rate in one state by one percentage point. We calculate this for each state, one at a time. Of course, if all states increased their tax rates at the same time, this would leave the tax differences unchanged and have no expected impact on migration.
10. Note that historically, the top *federal* tax rate was 70 percent as recently as 1980, and it has been as high as 90 percent.
11. The data draw for this millionaire county population analysis allows three extra years of data (1996 to 1998), as it does not use the detailed W-2 data that we leveraged in the state-to-state migration flows analysis (Table 3). The detailed W-2 data are not available for 1996 to 1998.
12. When we run these models using Poisson, we achieve the same coefficients but standard errors that are biased by an order of magnitude. Thus, these parameter estimates appear to be robust to the estimator employed.
13. This captures a different set of treatment and control counties for two reasons. First, it excludes border counties that are not part of an MSA. Second, it adds counties that, although not exactly contiguous with a state border, are nonetheless part of cross-state cities.

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