# Wealth Taxation & Migration Patterns of the Very Wealthy*

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**Abstract**

Using administrative data on wealth, firm ownership structure and migration in Sweden and Denmark, we document international migration patterns of the very wealthy, their impact on the economy and how they are affected by wealth taxation. We show that more than 20% of taxpayers liable to the wealth tax own businesses, and that the employment, investments and value-added of these firms are negatively affected when their owner migrates out of the country. Exploiting three large reforms, we then isolate the causal effects of wealth taxation on international location choices of the wealthy, and find significant positive responses of out-migration flows to increases in the effective tax rate on wealth. But, most importantly, we also document that the overall levels of these migration flows were remarkably small (with annual net-migration rates inferior to .01%). As a result, we find that the aggregate economic effects of wealth tax-induced migration were surprisingly modest in Scandinavia: a one percentage point increase in the average effective tax rate on wealth for the top 2% is estimated to decrease the population of these wealthy taxpayers by at most 2% in the long run, and lead to at most a reduction of .03% in aggregate employment, or of .1% in aggregate value-added.

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# 1 Introduction

Following recent proposals in the US and elsewhere to raise the taxation of wealth at the top of the distribution (Saez and Zucman, 2019), a growing body of literature on wealth taxes has emerged (Seim, 2017; Duran-Cabré et al., 2019; Jakobsen et al., 2020; Brülhart et al., 2021; Londoño-Vélez and Avila-Mahecha, 2022). But this literature remains silent on the potential for international migration responses to the wealth tax, which has been the primary concern in the policy debate.

To date, most studies of tax-induced mobility have focused on the migration responses of high-income earners to changes in personal income taxation across countries (Kleven et al., 2013, 2014; Akcigit et al., 2016; Muñoz, 2023). However, these studies are insufficient to fully understand the implications of taxing wealth for international migration. First, wealth holders differ from top earners along various dimensions. If these demographic differences are associated with varying abilities to move across borders, the migration effects of wealth taxation could theoretically differ from those of income taxation alone. Secondly, avoidance and tax optimization strategies may differ for wealth (a stock) and income (a flow). It might be easier to relocate personal wealth than individual residence, potentially resulting in lower incentives to evade wealth taxes compared to income taxes (Kleven et al., 2020). However, wealth is determined by pre-existing allocation of assets and market prices (Jakobsen et al., 2020), which may limit the availability of alternative avoidance channels beyond migration. Third, a significant portion of top wealth holders are entrepreneurs. For example, in Sweden, almost 40% of the top 0.1% own a company. If the expatriation of wealthy entrepreneurs influences the economic activity of their firms in the home country, the economic implications of international migration responses to the wealth tax may be much more substantial compared to other forms of taxation.

The international migration responses to wealth taxes have been understudied primarily due to a lack of microdata on wealth, migration, and entrepreneurship, along with the absence of credible identifying variation. This is because few countries have taxed wealth, and even fewer countries collect high-quality data on personal wealth and international migration. Furthermore, linking wealthy individuals to their firms poses a considerable challenge, limiting the measurement of the full effects of out-migration events at the top of the wealth distribution. Few recent exceptions managed to overcome some of those challenges (Brülhart, Gruber, Krapf and Schmidheiny, 2021; Agrawal, Foremny and Martínez-Toledano, 2020; Moretti and Wilson, 2022) and credibly identify migration responses to wealth taxation.[1] Those studies must however focus on within-country

[1] Agrawal, Foremny and Martínez-Toledano (2020) compare the number of wealthy filling taxes in Madrid and non-Madrid after a change in wealth taxation in Madrid; Brülhart et al. (2021) use the same strategy comparing two cantons in Switzerland. In the U.S., Moretti and Wilson (2022) investigate Forbes 400 individuals cross-states location responses to the estate tax, a one-time wealth tax at death; while Dray, Landais and Stantcheva (2022) focus on the introduction of property taxes in the 19th century.

migration decisions, and cannot measure economic spillovers of wealthy migration choices.

In this paper, we leverage data on wealth, entrepreneurship and international migration in Sweden to document the migration patterns of the very wealthy, their responsiveness to wealth taxation and the implications of their expatriation for the aggregate economy. Sweden has had a progressive wealth tax since the beginning of the 20th century. In Sweden, we can track the international migration history of the entire population, while observing all components of taxable and non-taxable wealth, including the shares of individuals in closely-held unlisted companies.[2] We use this data to provide a detailed description of the real economic implications of the wealthy out-migration, for tax revenue and the economy. We then exploit the repeal of the tax in to causally identify international migration responses to the wealth tax in Sweden.

Our unique administrative datasets allow us to document three central facts for the study of international migration responses to wealth taxes. First, entrepreneurs are disproportionately represented among wealth tax payers: less than 3% in the bottom decile own a firm as opposed to 19% for those in the top 2% subject to the wealth tax. Second, firms owned by the wealthy are larger and often serve as parent companies of other firms. Employment at these top 2% owned firms (excluding owners' employment) constitutes 8.6% of total Swedish employment and 15% of total Swedish value added. Without our data on ownership links, we would underestimate the economic activity linked to the firms held by the wealthy by a factor of three. Third, our migration register shows that migration events reflect real mobility responses rather than bogus changes in tax residency. One year after their migration event, the average time spent in Sweden by the wealthy is less than 50 days. After establishing those facts, we present three main sets of results.

We start by documenting international migration patterns of the very wealthy when wealth is taxed. We show that despite the public discourse, international migration flows are extremely small among the very wealthy. For instance, in Sweden, 0.2% of individuals in the top decile of the wealth distribution leave the country each year, against 0.6% in the bottom 50%. While out-migration rates increase at the very top of the wealth distribution, in particular above the wealth tax exemption threshold, these outflows remain small in magnitude with less than 0.4% of the top 0.1% out-migrating each year. The taxable wealth of out-migrants in the top 2% (the "wealthy" subject to the wealth tax) of the wealth distribution represents only 0.09% of total taxable wealth in Sweden, and 0.1% of total wealth in Sweden. We find that the size and patterns of out-migration flows at the top of the wealth distribution are extremely similar in Denmark, despite being measured in a different context, a different period, and with a different dataset.

[2]This administrative dataset thuse alleviates the usual worries on measurement errors when capitalizating capital incomes (Agrawal et al., 2020), relying on public non-administrative wealth data sources (Moretti and Wilson, 2022) or using self-reported measures of taxable wealth (Brülhart et al., 2021).

We use the granularity of our joint dataset on wealth and migration to study who selects into migration among the very wealthy and how that differs from rest of the population. There is much less brain drain at the top of the wealth distribution than in the rest of the population: their education and ability are negatively correlated with their propensity to out-migrate. Wealthy individuals are however more likely to out-migrate when they own a business, while the effect has the opposite sign when focusing on the entire population. This confirms that wealthy entrepreneurs were more likely to leave Sweden when the wealth tax was in place, and the effects of wealthy migration on firms' outcomes thus deserves special attention.

In the second part of the paper, we estimate the real economic implications of wealthy taxpayers out-migration, including on their closely-held businesses. We compare the path of individuals subject to the wealth tax before leaving the country, to randomly chosen wealthy taxpayers staying in Sweden over the same period. We find that after leaving Sweden, wealthy individuals decrease their wealth tax payments by 57% and their income tax payments by 67%. These findings illustrate the importance of measuring the total tax revenues implications of mobility responses to the wealth tax, rather than only focusing on the wealth tax base.

We also investigate how the wealthy reallocate their portfolio upon leaving Sweden. We show that wealthy migrants sell real estate property just before migration, confirming that out-migration events at the top of the wealth distribution reflect real responses. We also document that the wealthy substantially reduce their financial assets held in Sweden after out-migrating.

We then turn to the effects of wealthy out-migration events on their closely-held businesses outcomes. We can link our registries of closely-held businesses with balance-sheets data on those firms. Similar to before, we compare the evolution of firms where wealthy owners leave to firms where wealthy owners stay. We show that after an entrepreneur subject to the wealth tax out-migrates, employment at the directly owned closely-held business drops by 33%, value-added by 34%, tax payments by 50% and gross investments by 21%. Those large effects are mostly driven by the extensive margin: the probability that the firm remains alive decreases by 27% after the wealthy owner leaves Sweden. Those findings hold when considering total economic activity linked to the wealthy migrants; including that linked to subsidiaries. We find no evidence of selection into out-migration based on past firm growth in terms of economic activity, suggesting the timing of expatriation is not correlated with past differential evolution in outcomes across firms. It is only after wealthy owners move abroad that their firms start experiencing reduced economic activity.

To establish what part of wealthy out-migration can be attributed to wealth taxes, the last part of the paper estimates the causal effect of wealth taxation on international location choices of wealthy taxpayers. We exploit the unexpected repeal of the wealth tax following a surprise win of the right coalition at the 2006 elections. Our main identification strategy is a difference-in-

differences design comparing out-migration patterns of the wealthiest taxpayers subject to the wealth tax, to wealthy taxpayers not subject to the wealth tax repeal (e.g., located just below the wealth tax exemption threshold), before and after the reform. We measure exposure to the reform by predicting taxable wealth at the time of the reform, using pre-reform portfolio allocation and income and transfers flows. Before 2007, out-migration rates were almost twice as large for wealthy taxpayers subject to the wealth tax compared to the control group. But after the repeal of the wealth tax, out-migration flows dropped dramatically for wealthy taxpayers exposed to the wealth tax shock and remained unaffected for the "just wealthy" not subject to the tax. We estimate that the reform causally reduced the propensity to leave Sweden by more than 30% for the full population of wealth taxpayers (top 2%). We document that the change in migration patterns was persistent over time: in 2013, seven years after the repeal of the wealth tax, the initial gap in out-migration rates between the treated and the control group had fully closed.

We relate those migration responses to the actual changes in effective wealth tax rates and compute semi-elasticities of migration with respect to wealth tax rates. A one percentage point increase in the wealth tax rate decreases out-migration rates of wealthy taxpayers by .17 percentage point. We uncover limited heterogeneity in wealthy taxpayers' responsiveness to wealth taxation through international migration. Migration semi-elasticities are twice larger at the very top of the wealth distribution, suggesting that the wealthiest have more ability to avoid wealth taxes through migration. But other demographics, such as education or occupation, are not associated with different migration elasticities.

We can translate our reduced-form estimates into elasticities of the population stock with respect to the capital income tax induced by the wealth tax. We do this to get a better sense of the magnitude of our effects, and to compare our results to those of the income tax literature. Our baseline coefficient yields an elasticity of .1 which is very close to international migration elasticities for top earners (Kleven et al., 2020).

In our context, however, the indirect effects of wealthy out-migration through reduced non-wealth tax payments and lower economic activity at closely-held businesses, must be considered in order to draw policy recommendations. We estimate that tax-induced migration of the wealthy in Sweden accounted for .03% of aggregate employment and .1% of aggregate value added. Those effects remain small on aggregate, due to the small magnitude of out-migration rates at the top of the wealth distribution. Because out-migration rates are so small in the first place, even at the very top, the aggregate implications of wealthy expatriation, even if all of it were to be attributed to the wealth tax, remain minuscule.

# 2 Institutional Background

## 2.1 Wealth Taxation in Sweden

Sweden has a long history of progressive wealth taxation: from 1911 to 2007, Sweden levied an annual progressive wealth tax on the value of assets, net of debt, held by the wealthy. While the wealth tax schedule varied significantly over a hundred years, wealth tax revenue typically represented between 0.5 and 1% of total tax revenue, that is between 0.2 and 0.4% of GDP (Henrekson and Du Rietz, 2014).Our focus is on the twenty year window around the abolition of the Swedish wealth tax in 2007. We describe below the key institutional features of the wealth tax during that period.

**Tax Base** The Swedish wealth tax was a comprehensive tax on all forms of wealth. Net taxable wealth was defined at the household level and included all financial and non-financial assets, assessed at market value, minus debt. However, important exemptions did affect the tax base. First, a 25% exemption was applied to the value of real estate assets. Second, certain asset categories such as pension savings, art and jewellery were fully exempt from the wealth tax. Third, certain stocks benefited from exemptions which varied depending on firm type and ownership structure. Stocks registered on a stock exchange ("A-list" shares) were taxable at 80% of their full market value.[3] From 1991 on, shares of unlisted firms and of firms on the so-called O-list of the Stockholm stock-exchange (small caps and start-ups) were fully exempt. Finally, and most importantly, wealth from closely-held businesses was tax exempt. That is, individuals owning more than 25% of a firm were fully exempted from the wealth tax on the value of these stocks. This type of exemption for corporate equity was widespread among European countries with wealth taxes (e.g. France, Germany, Denmark, etc.)

**Reporting & Enforcement** The long history of wealth taxation in Sweden, and the requirement to assess wealth at market value, meant that reporting and enforcement were quite sophisticated and advanced relative to similar European countries operating a wealth tax. Assessment was conducted each year, with most wealth components being third-party reported. At the end of each year $t$, third-parties sent detailed reports about taxpayers' financial and real estate assets, as well as liabilities, to the tax authority. The government could use market prices from stock markets and real-estate prices to value those assets. Information was carefully reported in comprehensive administrative registries: the land registry, the financial asset registry (KURU). Taxpayers then received pre-populated wealth tax returns at the beginning of the year $t+1$ and had to self-report non-third-party reported components of their wealth holdings and liabilities. Self-reported components of taxable

[3]This rule varied over time: A-list shares were taxable at 75% of their value from 1978 through 1996 and at 100% prior to 1978.

wealth included cars and other durables, and, most importantly stocks in closely-held businesses held directly. For the latter, taxpayers were required to report in a dedicated form (K10 tax form) the number and prices of shares of their closely-held businesses, as well as any transaction or dividend payments related to those shares. To prevent households from evading the wealth tax by artificially registering their personal assets as (tax-exempt) business assets, firm owners had to prove to the tax authority that the assets they registered on the firm were essential for the firms' operation. The tax authority used several concrete methods to enforce these rules. For instance, if a firm's *quick ratio* (i.e. the ratio of quickly available or liquid assets to current liabilities) exceeded 200 percent, then the excess liquidity was not considered as business asset and thus was taxed as personal wealth.[4]

**Residence Rules** The Swedish wealth tax applied to Swedish residents, who were taxed on the value of their worldwide assets.[5] Residence for tax purposes is evaluated as living in Sweden, staying permanently in Sweden, or having a significant economic connection to Sweden. Note that, for tax authorities, owning a business in Sweden is a sufficient condition to be considered as a Swedish resident for tax purposes.[6] Furthermore, even if deemed non-resident for tax purposes, households still had to pay wealth taxes on the value of their assets held in Sweden, according to the "limited tax liability regime" (*begränsad skattskyldighet*).[7] This means that in theory, migrating out of Sweden was not enough to avoid the wealth tax: one would also have to reallocate assets out of Sweden, creating potential distortions to wealth allocation and investment decisions. In practice though, it seems that the enforcement of the wealth tax for non-residents was relatively weak, and special bilateral treaties offered additional grey area.[8] Therefore little is known on the impact of the Swedish wealth tax on asset location. Our investigation below allows to shed unique light on this issue.

**Tax Schedule** The Swedish wealth tax was levied at the household level. After the 1991 reform, and until its abolition in 2007, the Swedish wealth tax had a simple two-bracket schedule: the tax rate was zero below an exemption threshold, while wealth above this threshold was taxed at a 1.5% marginal tax rate.[9] This exemption threshold varied over time: from SEK 800K in

[4]The tax authority used a second rule of thumb, by which a firm could not have liquid assets amounting to more than 1 million SEK. Amounts exceeding 1 million were not considered as pivotal for the firm's operations and therefore were subject to the wealth tax.

[5]Sweden had tax agreements with most countries to prevent double taxation of assets.

[6]See e.g. https://skatteverket.se/privat/internationellt/bosattutomlands

[7]We also note that there are no formal exit taxes in Sweden, but the government introduced a rule to tax realized capital gains upon migration. The "ten-year rule" allows the Swedish government to tax capital gains realized within a period of ten years after a Swedish resident left Sweden.

[8]We list those special bilateral treaties in Table B.9 and discuss later what agreements hold for the main destination countries of Swedish wealthy out-migrants.

[9]A tax credit for the wealth tax applied through a tax ceiling mechanism capping the amount of wealth tax owed by taxpayers as a fraction of their taxable income. However, the wealth tax could not be reduced below the amount

1991, it was progressively increased in the early 2000s to reach 3,000K in 2006. In 2001, a separate (lower) threshold was also introduced for single individuals. Panel A of Appendix Figure A.1 shows the evolution of the wealth tax threshold over time, expressed as a percentile of the household taxable wealth distribution. The threshold was at its lowest in 1999, at which point all households above the 92-th percentile of the taxable wealth distribution were taxable. In 2006, the threshold had increased significantly so that only couples belonging to the top 2% of the taxable wealth distribution were liable to the tax. For singles, the lower threshold meant that in 2006 they remained taxable if their taxable wealth was above the 92-th percentile of the distribution. Panel B of Appendix Figure A.1 shows a similar exercize but where we rank household by their net wealth (instead of their taxable wealth). The graph displays, for various top fractiles of the net wealth distribution, average taxable wealth against the tax threshold for singles and couples in 2006. It confirms that single household were taxable if they belonged to the top 8% of the net wealth distribution, while couples were taxable if they belonged to the top 2% of that distribution. In what follows, we therefore consider all individuals belonging to households with total net wealth in the top 2% of the distribution as "treated" by the wealth tax over the period 1999-2006, and we consider individuals belonging to households with total net wealth in the top 8% to top 2% of the distribution as "partially treated" by the wealth tax over the period 1999-2006. All households with net wealth below the 92-th percentile were never affected by the wealth tax.

**Abolition of the wealth tax in 2007** During the period 1999-2006, despite the increase in the level of the tax exemption threshold, the Swedish wealth tax continued to generate substantial tax revenues: annual wealth tax payments accounted for $\approx 1.2\%$ of total annual tax revenues over that period. For households in the top 2% of the wealth distribution, the effective wealth tax rate remained stable, amounting to an annual average tax of $\approx .5\%$ on their total net wealth (Figure 9 panel A). After the general election of October 2006, following the surprise ousting of the Social Democrats after twelve years in power, a coalition of centre-right parties took office, and decided to abolish the wealth tax with immediate effect on January 2007.[10] We use this large and surprise decline in the wealth tax to identify the elasticity of migration to wealth taxation in section 6.

**Other taxes on capital income** Sweden taxes capital gains at a 30 percent rate. If capital gains are sufficiently large, the amount above the exemption threshold will also be subject to the wealth tax. The gains can however be reinvested as working capital in other firms and be exempted from the wealth tax base (if re-invested capital satisfies the exemption rules detailed above).

due on 50% of taxable wealth, which provided a floor for wealth tax payments.

[10]The main argument used by the coalition to justify the abolition of the tax related to its negative migration effects on the wealthy. For instance, Bengt Westerberg, the leader of the Swedish Liberal Party who spearheaded the abolition of the tax said during the legislative debate: *"The wealth tax rate must be so low that successful entrepreneurs are not forced to move from Sweden due to taxation. The owners of all the companies that've grown large during the post-war period - IKEA, Tetra Pak, Hennes & Mauritz have all moved abroad."*

Sweden's personal dividend tax rate is also 30%. This source tax is levied on all dividends paid by Swedish companies to Swedish residents and individuals living abroad.[11] Since 1991, Sweden has special rules to avoid that entrepreneurs shift their income to dividends and avoid progressive tax rates on wages. Closely held businesses (*fåmansbolag*) are defined by the Swedish authorities as companies where the four largest owners (or fewer) together have more than 50% of the votes in this company.[12] The so-called "3:12 rules" caps the amount of dividends and capital gains that get taxed as capital income for owners of closely held businesses, while the rest gets taxed as salary income. This cap does not apply to indirect participation: it is only when the holding company pays out dividends to the individual, or when the individual sell shares in the holding company, that the 3:12 rule applies.

### 2.2 Wealth Taxation in Denmark

Wealth taxes in Sweden and Denmark shared many similarities: Table B.1, Panel A, summarizes the similarities and differences between the two regimes. We provide more details on the Danish tax in Appendix B.1. In Denmark, two important reforms of the wealth tax were introduced. First, the marginal tax rate was decreased from 2.2% to 1.5% in 1982. Second, the wealth tax was fully repealed in 1996. We can leverage those reforms to identify migration elasticities from alternative identifying variation and to assess the external validity of our results.

## 3 Wealth and Migration Data in Sweden

We have access to granular and exhaustive administrative registries on income, wealth, migration and firms' ownership in Sweden. These datasets share three important features for the study of the migration patterns of the wealthy. First, the data on income and wealth is not censored nor top coded. Due to our focus on the top of the wealth distribution, this is an important property. Second, we can link individuals to their closely-held businesses. This is essential for measuring the aggregate implications of the out-migration of wealthy individuals. Third, the registry-based measure of international migration events is very precise, which is key to assess the persistence and intensity of migration events.

**Wealth and Income Registers** We use comprehensive administrative migration, income and wealth registers covering the population of all Swedish residents from Statistics Sweden. Data on wealth comes from the wealth tax register (*Förmögenhetsregistret*), which covers the asset portfolios for the universe of Swedish individuals. This register includes detailed third-party reported

[11] A lower rate may be applicable if this is specified by a tax convention between Sweden and the beneficial owner's country of residence.

[12] All close relatives are counted as one person in this aspect to avoid that family members split ownership to avoid being subject to the 3:12 rule.

information on the stock of all financial assets and real estate assets as of each December, spanning the years 1993 to 2007. In terms of financial assets, we have access to data on all savings categorized by asset class, including bank accounts, bonds, stocks, mutual funds, private retirement accounts, and more. The dataset also contains information on the total outstanding debt including mortgage debt, consumer credit or student debt. Regarding real estate, we observe all asset holdings at market value, as used for the property tax assessment. We also incorporate comprehensive information on financial asset transactions and real estate transactions using financial and housing registers from 1999 to 2007.

We link the wealth tax register with the longitudinal dataset LISA which merges several administrative and tax registers for the universe of Swedish individuals aged 16 and above. In addition to rich socio-demographic information (such as age, occupation, education, cognitive ability), LISA contains exhaustive information on all labor earnings, taxes and transfers and capital income on an annual basis for the period 1990 to 2017.[13]

We only observe the comprehensive composition of individuals' wealth until 2007. After 2007 and the repeal of the wealth tax, we no longer observe total taxable wealth, but we still observe many wealth components, such as real estate. Because we observe the comprehensive composition of wealth before 2007, and all income flows (capital, labor, taxes and transfers) from 1999 to 2017, we can build a rich model that is based on iteration of individuals' law of motion of wealth, which we describe in detail in Appendix C. Our prediction model performs exceptionally well, as showed in Figure A.17, and much better than usual capitalization methods often used to proxy wealth in the absence of proper administrative registers on wealth (Saez and Zucman, 2016).

**Firms' Ownership Registries** We complete our measure of individuals' wealth with information on business assets held by Swedish residents in private (unlisted) companies.

We have access to the administrative register of closely-held businesses in Sweden, covering the period from 2000 to 2017. This register builds on the *K10* tax returns and was established to monitor dual taxation avoidance and ensure that wages are not categorized as dividends for optimization purposes. The *K10* tax returns must be filed yearly and for each company when an individual (i) owns the firm, (ii) works in the firm and (iii) and at least 50% of the shares are owned by at most four individuals. This register thus records the number of shares held by Swedish residents actively participating in the firm, along with the tax identifier of that firm. We also measure the dividends distributed to individuals linked to these shares, in addition to tracking any profits or losses associated with the sale of these shares on an annual basis.

One limitation is that the *K10* tax returns only link individuals to the private firms they own di-

[13] Additional information on this dataset can be found in Kolsrud et al. (2018).

rectly. This is potentially problematic because the largest closely-held businesses are likely to be held through holdings and other complex ownership vehicles. To overcome this challenge, we use an additional dataset that records the ownership structure of all private companies in Sweden based on information sent to the Swedish Companies Registration Office. *Serrano* tracks all ownership links between Swedish firms and provides detailed consolidated and unconsolidated financial statements for subsidiaries and parent companies. We develop an algorithm to map the entire network of ownership links among Swedish private companies.[14] We then calculate integrated ownership shares for every company in the country. We match the ownership links and corresponding integrated ownership shares to our dividend tax files on closely-held firms. This enables us to identify all closely-held firms that are part of a group, either as a parent or subsidiary company, and to track both direct and indirect ownership of firms for each individual listed in our dividend tax records.

Each listed or unlisted company that appears in our individual-level assets registries can be matched to firm-level financial data collected by Statistics Sweden. This dataset contains rich balance-sheet information such as value-added, wage bill, investments or assets.

Figure 1 shows the importance of measuring entrepreneurship among wealth tax payers. We focus on closely-held businesses (unlisted private companies) and LLC (limited private companies) and do not analyze ownership of listed companies, or ownership of foreign companies.[15] Panel A describes direct ownership of companies by level of net worth and type of firms in Sweden. Firms are mostly held by wealthy individuals: less than 3% of individuals in the bottom decile of the wealth distribution own a firm, as opposed to 10% in the top decile. The fraction of entrepreneurs increases dramatically at the top of the wealth distribution: it is only 10% for individuals in the 90th-95th percentiles of the wealth distribution, but reaches 38% in the top 0.1%. At the very top of the wealth distribution, roughly 9.7% of individuals own a non-active closely-held business that only employs themselves, while 8.9% own at least one closely-held business that employs at least one employee. There is also a noticeable share of wealthy taxpayers owning more than one type of firms, for instance by owning LLC and unlisted companies simultaneously.

Panel B illustrates the contribution of wealthy taxpayers' firms to the overall Swedish economy. We exclude owners when calculating employment at closely-held businesses, to only capture the employment externality of wealthy individuals. Since we include all employment in Sweden (including the self-employed) in our denominator, these figures represent lower-bound estimations for the employment weights of closely-held businesses in the Swedish economy.[16] A significant

[14]

[15] We however do observe ownership of shares in listed companies and the related identifiers of listed firms in the financial registry KURU.

[16] In Sweden, approximately 33% of individuals work in the public sector, 3% in non-profit organizations, 13% in closely-held businesses, and the rest (roughly 50%) are either self-employed or employed at listed companies or

fraction of Swedish employment is concentrated in firms held by the wealthy: firms owned by individuals in the top decile employ 13% of total Swedish employment compared to 1% in the bottom decile. Furthermore, the employment externality increases substantially at the higher end of the wealth distribution: it is only 0.5% for entrepreneurs in the 90th-95th percentiles of the wealth distribution but rises to 3% of total Swedish employment in the top 0.1%. Panel B also highlights an important insight: measuring the indirect ownership of firms through holdings is crucial to fully understand the aggregate employment impact of wealthy taxpayers. Without our unique data on ownership links in Sweden, we would underestimate the economic activity linked to the firms held by the wealthy by a factor of three. This is due to a third of unlisted firms owned by the wealthy acting as parent companies for at least one subsidiary in the Swedish economy.

**Migration Register** Migration registers enable us to measure precisely when migration events occur and for how long. Upon arrival in Sweden, any taxpayer is required to request a national identification number. Similarly, if taxpayers want to stop paying taxes in Sweden, they need to report their move to the local tax authorities. Furthermore, Swedish citizens leaving the country for 12 months or longer must annually report the number of days spent in Sweden for population registry purposes and to determine tax residency. This means that our administrative data source on migration is very precise. This also means that we can investigate migration decisions both at the extensive and the intensive intensive margin, by using our information on the time spent in Sweden each year. In our baseline analysis, an out-migration event is when an individual started the year out of Sweden and finished the year outside Sweden. Similarly, an in-migration event is when an individual started the year outside Sweden, and was in Sweden at the end of the year. Note that people can move multiple times during the same year, but we aggregate all moves at the annual level to define those migration events.

In Figure 2, we show the probability to remain outside Sweden following an out-migration event for individuals with different level of wealth. For all groups, mobility is a real response and is quite persistent over time. One year after out-migrating, the probablity to remain outside Sweden is around 90% for both wealthy and non-wealthy individuals. However, migration also appears to be transitory for a large fraction of migrants: for instance, roughly 40% of the wealthy are back after 5 years. Migration events are also less persistent among the very wealthy than for the rest of the population.

**Wealth and Migration Data in Denmark** We also have access to administrative datasets on wealth and migration in Denmark. We describe those datasets in Appendix B.2. Table B.1, Panel B, summarizes the availability and coverage of wealth and migration data in Sweden and in Denmark.

foreign firms.

# 4 Migration Patterns Among the Wealthy

## 4.1 Migration Flows

We start by describing gross migration flows by wealth level in Sweden and in Denmark in Figure 3. We rank individuals by level of net wealth at market value in year $t$, and then compute the fraction of individuals who out-migrate in $t+1$ for each wealth fractile in $t$. Similarly for in-migration rates, we rank individuals by level of wealth in year $t$ and we look at fraction who in-migrated in $t-1$ for each wealth fractile in $t$. We compute those statistics focusing on the period where the wealth tax is still in place, which corresponds to 1999-2006 for Sweden (Panel A) and to 1989-1996 for Denmark (Panel B).

Out-migration flows are much smaller in the top decile than in the rest of the population. For instance, in Sweden, 0.2% of individuals in the top decile of the wealth distribution leave the country each year, against 0.6% in the bottom 50%.[17] The fraction of individuals leaving Sweden is however increasing at the very top of the wealth distribution, in particular above the wealth tax exemption threshold. For instance, out-migration rates in the top 0.1% are twice larger than for the wealthy not subject to the wealth tax. Nevertheless, those outflows remain small in magnitude, with less than 0.4% of these very wealthy individuals out-migrating each year. This finding holds even after weighting those outflows by the level of wealth of out-migrants at the top of the wealth distribution. The taxable wealth of out-migrants subject to the wealth tax represents 0.09% of total taxable wealth in Sweden, while their total wealth represents 0.1% of total wealth in Sweden.

Though public attention often focuses on the wealthy leaving, our data also allows us to look into their arrival, which is equally important. Panel A2 shows that the in-migration patterns of the very wealthy are similar to their out-migration behavior, with small inflows on average, but larger in-migration rates at the very top. If we put these in- and out-migration rates together to compute net migration rates, we observe a small positive net migration rate of about 0.05% in Sweden at the top of the wealth distribution. Far from seeing an exodus of wealthy taxpayers, Sweden was therefore experiencing small net migration gains at the top of the wealth distribution in the period preceding the abolition of the wealth tax.[18]

Our unique setting and data environment enables us to benchmark our analysis in two countries. This is useful to show that the patterns we document are not driven by a specific context but rather capture generalizable trends about international migration of the very wealthy. We find that the size and patterns of out-migration flows at the top of the wealth distribution are extremely similar in Denmark. The overall out-migration rate in the top decile is around 0.1% and we observe the

[17] In Figure A.2, we show the distribution of out-migration rates for all deciles.

[18] See Figure A.3 for year by year out-migration and in-migration figures.

same increasing pattern in wealthy migration rates above the exemption threshold in Denmark too, with larger international mobility rates at the very top: about 0.4% of individuals in the top 0.1% of the wealth distribution migrate out of Denmark every year. The net migration rate is very close to zero, except for the top 0.1%, where it is slightly negative, with a net-migration of around -0.1%.

We also describe the geographic patterns of migration at the top of the wealth distribution. In Figure A.4, we decompose destination and origin countries for Swedish citizens with different level of wealth before (respectively after) their migration event. We also list special bilateral tax treaties between Sweden and the top 10 destination countries for wealthy Swedes before the repeal of the wealth tax in Table B.9.[19] Figure A.4 shows that the top destination for wealthy Swedes is the UK. Capital taxes are lower in the UK compared to Sweden and there has been no tax on wealth. The second top destination is the US. Another noteworthy destination is Switzerland, while in comparison, the share of migrants to Switzerland is considerably smaller among the wealthiest not treated by the wealth tax. The group of other destinations is larger, while the share of migrants to the UK and the US is also smaller.

## 4.2 Who migrates in and out?

We use the granularity of our joint dataset on wealth and migration to study selection into migration out of and in Sweden.We perform the analysis during the period 2000-2006 when the wealth tax was in place. We start by asking what individual characteristics can predict out-migration (respectively in-migration) in Sweden. We run a first regression model:

$$\mathbb{P}\{Y = 1\} = \boldsymbol{\beta}' \mathbf{X}_0 \tag{1}$$

where $\mathbf{X}_0$ is vector of individual characteristics. The set of characteristics includes age bins, education bins, a dummy for being a closely-held active business owner, a dummy for being an independent contractor, a dummy for being foreign born, and cognitive skills quartiles.[20] To ease computation, we run this specification on the full population of the wealthy (top 2% of wealth distribution) and on a 10% random sample of the rest of the population.[21]

[19] Countries make tax treaties to avoid double taxation, i.e., to avoid that income made by foreigners in one country is taxed both in that country and in the foreigners' country of residence. Tax treaties may need to be renegotiated from time to time to keep up with tax regulation in other countries and with the development of tax treaties between other nations. Not updated, tax treaties may contain loopholes which prevent taxation in both the source country and the country of residence.

[20] Active closely-held businesses are firms that have at least one employee beyond the owner. For cognitive skills, we proceed by running a separate regression because cognitive skills come from enlistment data and are therefore available for a limited subset of people.

[21] When using a 10% random sample of the entire population, we found similar results. The baseline approach

The blue coefficients in Figure 4 correspond to the estimated coefficients on each of those demographics estimated on the full Swedish population. We rescale the coefficients by the average predicted probability of out-migration, in order to interpret our coefficients in relative terms. In the general population, we find that younger individuals are much more mobile than others. Education is also a strong predictor of mobility, with the more educated more likely to move-out, or move-in Sweden, although PhDs are much more likely to out-migrate than in-migrate. The gradient of self-selection into mobility follows the same pattern for cognitive ability, with higher skills leading to more mobility out and in the country. On the contrary, in the full population, entrepreneurs and business owners are less likely to migrate than others. This suggests that owning a firm could be associated with large mobility costs and frictions that make it harder to leave the country.

We then focus on self-selection into migration at the top of the wealth distribution. To understand if selection patterns into migration are different for the very wealthy, we estimate:

$$\mathbb{P}\{Y=1\} = \mathbb{1}\{W < P_W\} \cdot \boldsymbol{\beta}' \mathbf{X}_0 + \mathbb{1}\{W \geq P_W\} \cdot \boldsymbol{\beta}'_{\boldsymbol{w}} \mathbf{X}_0 \tag{2}$$

Where we use $\mathbf{X}_0$ to denote vectors and we set $P_W$ =P98, i.e. the 98th percentile of the wealth distribution. The red coefficients in Figure 4 plot the estimated vector of coefficients $\beta_w$ representing the effects of the various components of $\mathbb{X}_0$ on the out-migration (respectively in-migration) probability for individuals in the top 2% of the wealth distribution.

The results show that selection patterns differ among the very wealthy. For individuals in the top 2% of the wealth distribution, the age gradient is inverted, and we observe much less drain on younger people than on older people. The same pattern appears for the cognitive ability and education gradients. Despite the public discourse, there is in fact much less brain drain at the top of the wealth distribution than in the rest of the population. However, wealthy business owners do appear to be more likely to out-migrate, but not to in-migrate. The estimated (rescaled) coefficient of 0.41 in the top panel means that all else equal, individuals in the top 2% who own an active CHB are 40% more likely than non-entrepreneurs to outmigrate. The effect was of the opposite sign when focusing on the entire population. On the contrary, being an entrepreneur is not associated with higher propensity to become a Swedish resident for wealthy individuals during that period, as showed in the bottom panel. In Table B.2, we also investigate whether owners of fast-growing firms are more likely to leave Sweden than others. We find that wealthy owners of active CHB with high value added growth rates are between 48% and 71% more likely to out-migrate compared to

instead allows to exploit all variations in our migration events at the top, that we will study later in section 5.

wealthy non-entrepreneurs.

Overall, these effects seem to confirm that wealthy entrepreneurs were more likely to leave Sweden during the period where the wealth tax was in place, and the effects of wealthy migration on firms' outcomes thus deserves special attention.

# 5 What Happens When the Wealthy Migrate?

We now study the implications of out-migration and in-migration events at the top of the wealth distribution on individual and firm-level outcomes.

## 5.1 Individual-level event-studies

To understand the implications of the wealthy out-migration responses to the wealth tax, we investigate the evolution of wealthy individuals' outcomes before and after out-migrating from Sweden. Of course, all migration events are not necessarily triggered by the wealth tax, as wealthy taxpayers may leave Sweden for a myriad of non-tax reasons. We will isolate the causal effects of wealth taxes on international migration in Section 6.

**Selection of events** We define as our event of interest the first time an individual in the top 2% of the net worth distribution out-migrates from Sweden.[22] We define this event over the 2000-2007 time period, which corresponds to the time frame where we observe both migration events, levels and composition of wealth, and other individuals' outcomes. During that same period, wealth was taxed in Sweden. Note that we later check the external validity of our approach by looking at out-migration events occuring after the repeal of the wealth tax, using predicted measure of wealth.

**Control group** We build a control group for out-migration events at the top of the wealth distribution. We assign a random placebo date to the wealthy that never out-migrate from Sweden. Each wealthy taxpayer observed in year $t$ in our administrative registry ends up with an out-migration date (true or placebo) assigned in year $t+1$.

In our final dataset, we have 3,517 out-migration events of wealthy taxpayers leaving Sweden, and 255,888 corresponding control events. Using this sample, we proceed to estimate an event-study to investigate the dynamic effects of out-migration on individuals' outcomes. Our specification is:

$$y_{it} = \alpha + \sum_{j=\underline{T}}^{\bar{T}} \beta \times \text{Emig}_i \times \mathbb{1}(t=j) + \gamma \times \text{Emig}_i + \sum_{j=\underline{T}}^{\bar{T}} \delta_j \times \mathbb{1}(t=j) + \varepsilon_{it} \quad (3)$$

[22] We keep taxpayers who have been at least once in the top 2% in the years that precede migration. We tried restricting this condition to the year before out-migration and found very similar patterns.

Where $y_{it}$ is an individual-level outcome (for instance tax payments) measured in calendar year $t$, $\text{Emig}_i$ is a treatment dummy equals to one if the individual has out-migrated from Sweden, and $j$ are time to event dummies. We estimate Equation 3 using OLS, clustering standard errors at the individual-level, and omitting $\beta_{-1}$. The estimated coefficients $\beta_j$ thus capture the differential evolution of outcomes for out-migrants before and after the migration event, relative to the level of outcome in the year preceding migration, and relative to control individuals. We measure individual-level outcomes in our exhaustive registry on income, transfers and assets, and always winsorize the bottom 1% and top 5% of outcome values in order to limit noise in our estimates.

**Effects on Tax Payments** We plot the series of estimated $\beta_j$ for several individual-level outcomes, focusing on the population of wealthiest tax payers always treated by the wealth tax. Similar figures for the top 10% are systematically showed in the Appendix. To ease interpretation, we present in each panel our estimate of $\beta_1$ and $\beta_5$ that we rescaled by the average value of the outcome variable for the treated group in the year before the event.[23]

We first look at the effects of out-migration events on total tax payments in Figure 5. We find that the wealthy pay 66% less taxes in Sweden after they leave the country, compared to wealthy taxpayers in the control group. We then break down this total effect by type of tax payments. We estimate that, on average, out-migration events are associated with a 68% decrease in income tax payments, a 57% decrease in wealth tax payments, and a 90% decrease in taxable wealth. Those effects dimish over time, reflecting that a fraction of the wealthy move back to Sweden five years after their out-migration event.

The average effects hide significant differences in tax payment variations after out-migration events, as many outcomes end up becoming zero following migration. In Figure A.5, we estimate a median regression and find much larger effects, with a median 86% drop in total tax payments. We also detect a distinctive pattern for capital income taxes in Panel F. Out-migration is associated with a temporary jump in capital income tax payments that occurs exactly in the year of the event. This suggests that Swedish residents liquidate some of their assets and pay related taxes on capital gains upon leaving. To better understand changes in assets composition following change in residence, we next investigate portfolio reallocation upon the out-migration event.

**Portfolio reallocation** Our assets registers enable us to investigate how the wealthy reallocate their portfolio before and after they leave Sweden. Results are presented in Figure 6. We use the real estate register to identify all real estate transactions. We show in Panel A that wealthy taxpayers sell their real estate property in Sweden when leaving the country, with most of the effect being concentrated on the year of the out-migration event. This is consistent with the duration

[23] For capital income tax payments the rescaling uses the average value of the outcome for the treated group two years before the event.

analysis performed in Figure 2 and confirms that out-migration events at the top of the wealth distribution reflect real responses rather than bogus changes in tax residency. We then use the financial asset register to detect sales of assets in one individual's portfolio. We find evidence of a significant change in transactions on financial assets after an out-migration event in Panel B.[24] We also find a large response at the extensive margin, with the probability to report positive financial wealth in Sweden decreasing by 21% after leaving the country (Panel C). Panel D also shows evidence of a response at the intensive margin. Conditional on reporting positive financial wealth in Sweden, wealthy out-migrants decrease their financial wealth held in Sweden. Overall, out-migration is associated with lower reported financial wealth in Sweden, which indicates that the wealthy reallocate their financial portfolio when leaving the country.

We also detect substantial reallocation of professional assets, even if those assets are exempted from the wealth tax. In Panel E, we track the number of firms with at least one employee owned in Sweden by wealthy individuals, before and after the migration event. The wealthy substantially reduce their entrepreneurial activity in Sweden after leaving: there is a 67% drop in the number of firms owned in Sweden one year after out-migration. Panel F shows that the same is true for subsidiaries: the wealthy decrease their indirect participation in Swedish firms when they leave the country. While business assets were not included in the wealth tax base during the period we study, the wealthy still decreased their ownership of firms in Sweden when leaving the country.[25]

## 5.2 Firm-level event-studies

We linked our registries of closely-held businesses with balance-sheet data on those firms to describe which unlisted companies are owned by the top 2% (respectively top 10%). Figure A.14, Panel A, starts by describing unlisted companies' sectoral activity by level of wealth of their owner.[26] Economic activities such as hospitality or construction are less represented in firms held by wealthy owners as opposed to companies held by low-wealth individuals. Overall, most closely-held businesses with wealthy owners operate in the wholesale and retail trade sector as well as in real estate, renting and business activities.

We next present descriptive statistics on closely-held businesses by wealth level of owners in Table 2. The average company held by wealthy taxpayers has an average size of 14 employees, which is almost twice larger than the average closely-held business in Sweden. Despite being bigger on average, unlisted companies held by wealthy owners are not characterized by higher value added per employees than the average unlisted firm in the economy. Closely-held businesses owned by

[24] We define transactions as year-to-year changes in stocks and bonds.

[25] We also show in Figure A.6 that the temporary jump in capital income tax payments upon out-migration is the same for entrepreneurs and non-entrepreneurs.

[26] For multi-owner firms, we take the maximum wealth rank of the firm's owners.

the wealthy however have higher gross investments on average, in absolute and per employees, than average firms. Consistent with their larger size, those firms also have more owners than others: 56% of active closely held businesses owned by an individual in the top 2% have more than one owner, against 46% for the full population of active CHBs.

The last two columns of Table 2 quantify the contribution of wealthy taxpayers' firms to the overall Swedish economy. Closely-held businesses directly owned by top wealth owners (top 2%) account for 3.5% of total employment in Sweden, 6.9% of aggregate value-added, and 10.7% of firms' tax payments.[27] The economic weight of those companies is even bigger when compared to aggregate economic activity in active unlisted companies, as showed in the last column of Table 2. For instance, firms held by top 2% taxpayers represent 38% of total tax payments from active closely-held businesses, 35.8% of all gross investments in those firms, and 26.3% of employment in this category of firms.

Table 2 exclusively examines (active) firms directly owned by the wealthy. However, we also observe indirect ownership of private firms through holdings. Table 3 reveals that when considering subsidiaries held by wealthy taxpayers, the average number of employees at firms owned by individuals in the top 2% increases to 22. Value-added and net turnover are also approximately 60% larger than when exclusively analyzing firms directly held by the wealthy. Once we factor in the economic activity of their subsidiaries, companies held by the wealthy contribute to 8.6% of total employment in Sweden, 14.5% of aggregate value-added, and 18% of aggregate tax payments from firms. Given the economic weight of businesses held by the rich, it is therefore important to understand what happens to those firms when their wealthy owners leave Sweden.

**Selection of Events** We define as our event of interest the first time an owner in the top 2% (respectively 10%) of the wealth distribution out-migrates from Sweden.[28] To identify this event we need to deal with firms that change owners over time, or firms that have multiple owners each year. In the firms where the owner changes over time, we consider first whether at least one of the owners emigrates. If this is the case, we set the event date as the first emigration date among all the emigrant owners of that firm. The events are at the individual level. Therefore, simultaneous valid events (e.g., two spouses co-owning a firm and emigrating together in the same year) are considered as separate events. Out of all firms in the sample of estimation, only 3.4% experience simultaneous events. We also restrict our analysis to closely-held businesses that are active (have at least one employee that is not the owner) in the year before the emigration event. Because of this condition, our migration events for firms start in 2001 not 2000, as we do not observe whether

[27] To compute employment at closely-held businesses, we exclude owners, but we include all employment in Sweden (including self-employed), in our denominator.

[28] Like in the individual-level analysis, a top 2% owner is such that the individual was at least once in the top 2% of the net worth distribution in the years that precede the out-migration event.

a firm is active before 2000, the year where our panel on employment starts. We first consider the effects of wealthy owners' out-migration both on the outcome of firms held directly.

**Control Group** We build a control group for firms where at least one wealthy owner emigrates from Sweden. We do so by assigning a random placebo date to the wealthy owners who have never emigrated. We then keep only the firms held by at least one owner who was in the top of the wealth distribution for at least one year before the placebo event date, and who has never emigrated. We also drop from our control group firms where other owners (not in the top of the wealth distribution) have emigrated during the period. To be consistent with our construction of the control group, we finally restrict the firm to be active in the year before the placebo event time. Each owner ends up with at least one emigration date (true or placebo), and those event-time dates are evenly distributed (see Figure A.11).

Once we selected our control and placebo groups, we balance our firm-year level dataset by attributing zero outcomes (e.g., employment, turnover, investment etc.) when the firm is not active. To limit noise in our estimates, we also winsorize the top 5% of the distribution of our outcomes, and the bottom 1% of the distribution of outcomes that are not bounded by zero (e.g., that can take negative values). We will however show the robustness of our results using different strategies to handle outliers. To show how those procedures change our main outcomes of interest, we provide descriptive statistics on the sample of treated and control firms during our estimation period, before and after this sample restriction, in Table B.4. In our final dataset, we have 539 events of top 10% rich owners leaving and 298 events of top 2% rich owners leaving. The treated and control firms included in our event-study sample are described in Table B.5. Those firms are rather small, with a mean size of 18 employees for firms with an out-migrant owner in the 2% of net worth. Treated firms appear to be bigger in terms of size, employment and value-added, suggesting that out-migrants own firms that are larger than non out-migrants with the same level of net worth.

**Effects on Directly Owned Private Firms** We proceed to estimate a firm-level event-study to investigate the dynamics of firms' outcomes before and after one of their owner leaves Sweden. We start by focusing on directly owned unlisted firms. We estimate the specification:

$$(4) \quad y_{ft} = \alpha + \sum_{j=-5}^{5} \beta_j \times \text{Emig Owner}_f \times \mathbb{1}(t=j) + \gamma \text{Emig Owner}_f + \sum_{j=-5}^{5} \delta_j \times \mathbb{1}(t=j) + \varepsilon_{ft}$$

Where $y_{ft}$ is a firm-level outcome (for instance employment) measured in calendar year $t$, Emig Owner$_f$ is a treatment dummy equals to one if one of the firms' wealthy owner has out-migrated from Swe-

den, and $j$ are time to event dummies. We estimate Equation 4 using OLS, clustering standard errors at the owner-level. We omit $\beta_{-1}$ and the estimated coefficients $\beta_j$ capture the evolution of firms' outcomes in year $j$ to the out-migration event, relative to the level of outcome in the year preceding that event, and relative to the control group.

We present the main results in Figure 7. In Panel A, we first describe the survival probability of firms before and after one wealthy owner out-migrates. We find a large decrease in the probability that the firm remains alive after the event, with an average decrease of -28%. Thus, out-migration events at the top of the wealth distribution are associated with increased probability to shut businesses for wealthy entrepreneurs, which is consistent with the portfolio reallocation showed in Figure 6.[29]

We then investigate the evolution of firm-level outcomes after the same event. We find large and persistent negative effects on employment, value added, net turnover, tax payments and investments. For instance, the number of Swedish residents employed at those firms decreases by more than 30% after one of the owners leaves the country. The effects on other components of firms' balance sheets showed in Figure 7 have similar magnitudes and are mostly driven by the extensive margin showed in Panel A, although we also detect small employment responses at the intensive margin too (Figure A.7).

Table B.6 compares our baseline reduced-form estimates to estimates using different levels of winsorization. The results are stable and consistent across all specifications, although estimates using non-winsorized monetary outcomes yield sometimes different and much noisier effects because of few extreme outliers. Overall, Figure 7 confirms that out-migration of wealthy individuals has negative spillovers through the effects of the firms' they own before leaving. Those effects refer to the usual argument that wealth taxes deter economic activity, because wealth tax payers are also entrepreneurs and business owners. Even if we cannot attribute a causal effect meaning to our estimates, we provide the first systematic evidence that out-migration events for the wealthy, whatever their cause is, are associated with reduced economic activity within their firms.

The effects in Figure 7 only reflect part of the potential spillovers of wealthy out-migration on firms. We next investigate the effects of those events on all firms they own, including firms held through other private companies. We estimate the same equation but we consider incomes of all firms (e.g parent and subsidiaries) owned by the wealthy. We report our estimates in Table B.7. We show very similar effects once we account for economic activity at firms held indirectly. Five year after the out-migration of their wealthy (direct or indirect) owner, employment at those firms

[29] Figure A.8 shows the specification using probability of closure as the outcome. Out-migration of wealthy owners is associated with a 7.2 percentage points increase in the probability that the firm closes relative to the year before out-migration, and relative to the firms held by wealthy entrepreneurs that do not move.

decreases by 19%, value added decreases by 33% and tax payments decrease by 45%.

**In-migration events** To get a full picture of the economic implications of the international migration of the wealthy, we turn our attention to the in-migration of wealthy entrepreneurs in Sweden. We conduct a firm-level analysis, focusing on firms owned by wealthy entrepreneurs who arrived in Sweden between 1998 and 2006.[30] We apply the same sample restrictions and balancing procedures as in our baseline analysis. We estimate Equation 4 by replacing $\text{Emig Owner}_f$ with a dummy variable set to one if the firms' wealthy owner has migrated to Sweden. In Figure 8 we plot the estimates of $\beta_j$ for in-migration events. To benchmark the magnitude of those estimates, we further present in Table B.3 a test of equality for the effects of out-migration and in-migration events.

Our analysis reveals that the probability of owning an active business in Sweden rises after in-migration. Wealthy entrepreneurs establish businesses in Sweden only after setting their residence there. The effects on firm-level employment, value-added, and net turnover mirror those observed after out-migration, but with opposite signs. The estimated effects of in-migration are larger in relative terms, which is driven by the fact that pre-migration outcomes are very small, since most immigrants set-up their firms after they migrate to Sweden. Overall, Figure 8 confirms that both in and out-migration of wealthy entrepreneurs are associated with substantial changes in business activity of the firms they own.

**Discussion and Interpretation** There are several reasons why those numbers are upper bounds for the negative economic spillovers of wealthy entrepreneurs migration responses to the wealth tax. While obtaining an upper bound is crucial to gauge the potential importance of this policy question, we next attempt to document and quantify upwards bias in our estimated effects.

First, some companies that disappear could in fact be merged to existing firms. If this is the case, real economic activity in Sweden remains the same, but the company appears with a new tax identifier in our dataset. To examine this phenomenon, we develop an algorithm described in Appendix D that traces employees' transitions between firms subsequent to a closure event. We then detect event where employees were employed together at a given firm, and end up working together at a new firm after the closure. We find that, among closely-held businesses held by wealthy out-migrants with a least 5 employees before the event, roughly 50% have half of their employees move to the same new firm after the closure event. Thus, some of our estimated effects can be attributed to firms being sold or merged following the owner's departure. However, this does not appear to be specific to closure events trigerred by out-migration, since a similar pattern is observed in our control firms that do not experience any out-migration events (but experience closure events for other reasons).

[30] For in-migrants, we focus on taxpayers who are at least once in the top 2% after they in-migrate.

Second, firm-level event-studies show substantial economic effects of wealthy migration, but does not capture potential reallocation effects across firms. An individual-level approach, that tracks the labor market trajectories of all individuals employed at firms in our treatment and control group in the year before the real (and respectively placebo) out-migration event, would be needed to tackle this question.

Third, not all out-migration events are caused by responses to the wealth tax. In the next section, we use compelling variations in wealth tax rates to isolate the causal effects of wealth taxes on wealthy out-migration.

# 6 International Migration Responses to Wealth Taxation

After showing the effects of out-migration of wealthy taxpayers on individuals' tax payments and portfolio reallocation, as well as on their firms' economic outcomes, we now turn to our second research question: do the wealthy respond to wealth taxation through international migration? We answer this question by studying the repeal of the wealth tax in Sweden.

## 6.1 Identification and Graphical Evidence

Our main source of variation is the repeal of the wealth tax in Sweden. As described in Section 2, the reform led to a sharp decrease in marginal tax rate on wealth from 1.5% to 0% that year.

Our main estimation strategy compares out-migration patterns of taxpayers just below (control) and just above (treated) the wealth tax exemption threshold, before and after the repeal of the wealth tax. The identifying variation in wealth tax rates caused by the reform is showed in the top panel of Figure 9. We show both changes in the statutory marginal tax rate above the exemption threshold, and the implied changes in average tax rates above the exemption threshold, which is the relevant measure of taxation to compute migration elasticities (Kleven et al., 2020). The reform led to a large decrease in the effective tax rate at the very top of the wealth distribution, without affecting effective wealth tax rates for wealthy taxpayers in the top 10-20%. We thus always use taxpayers in the top 10-20% of the wealth distribution as our control group. Our identification assumption is that the "just wealthy" and the "very wealthy" should be exposed to the same economic shocks while being differentially exposed to the change in wealth tax rates induced by the 2007 reform. We confirm this assumption later when discussing identification threats and potential confounders.

Panel B of Figure 9 shows graphically the differences-in-difference setting provided by the Swedish reform. It plots the out-migration rates for taxpayers subject to the wealth tax (red, treatment) and for wealthy taxpayers just below the exemption threshold (blue, control). The red vertical line denotes the repeal of the wealth tax in Sweden. Out-migration rates were evolving similarly in the treated and control groups before the reform. After the repeal of the wealth tax, there is a large

drop in the out-migration rates of individuals subject to the wealth tax, compared to out-migration rates of wealthy individuals not subject to the tax. The figure provides compelling evidence that the wealth tax cut significantly reduced out-migration rates of wealthy taxpayers exposed to the reform relative to wealthy taxpayers with no exposure.

**Predicting Exposure to the Reform** One measurement challenge in comparing out-migration rates of wealthy individuals eligible or not eligible to the wealth tax is that we do not observe individuals' wealth components after 2008. However, we observe the comprehensive composition of wealth before 2007, and all income flows (capital, labor, taxes and transfers) from 1999 to 2017. We can thus circumvent this challenge by predicting individuals' wealth levels after 2008. The obtained measure of predicted wealth enables us to tackle two issues. First, we can compare out-migration patterns of treated and control individuals in the entire post-reform period, allowing to better gauge the credibility of our design and estimates. Second, using predicted instead of actual level of wealth avoids capturing potential endogenous responses to the reform through other channels than migration, for instance through savings responses following the change in wealth taxes (Jakobsen et al., 2020).

Figure A.9 illustrates this empirical strategy. We use 1996-1998 wealth levels as the simplest predictors of wealth levels (and therefore exposure to the wealth tax reform) at the time of the reform. We define individuals with household taxable wealth above SEK 3,000K in 1996-1998 as high exposure to the reform, as they were already above the highest wealth tax exemption threshold of SEK 3,000K. We define individuals with taxable wealth below SEK 800K in 1996-1998 as the low exposure group. We use the minimum wealth tax exemption threshold applying to singles to be conservative in our definition of the control group. To verify that those categories of wealth levels in 1996-1998 translate to differences in exposure to the reform, Panel A shows the changes in wealth tax rates faced by those taxpayers, and can thus be interpreted as the first stage. The figure confirms that past levels of wealth are strong predictors of the differential changes in wealth tax rates after the repeal of the wealth tax. Panel B shows the corresponding out-migration patterns for the same taxpayers. Out-migration rates of taxpayers with high exposure to the reform dropped suddenly in 2007, compared to the control group. Compared to our previous specification in Figure 9 , we can see that those patterns last after 2008. This confirms that the drop in out-migration rates for the very wealthy persisted several years after the repeal of the wealth tax.

We then move to a difference-in-differences equivalent that generalizes this approach but relies on our full-fledge prediction model, using not only past level of wealth, but also all past and current income flows. For each individual, we regress the yearly probability to out-migrate on the interaction between a year fixed effect and a dummy $T_i$ equals to one if the individual is treated by the reform.

$$Y_{it} = \alpha + \sum_{t=2000}^{\bar{t}} \beta_j \cdot \mathbb{1}(t = j) \cdot \mathbb{1}(T_i = 1) + \gamma_t + \delta \cdot \mathbb{1} \cdot (T_i = 1) + u_{it} \tag{5}$$

This dummy is based on true or predicted levels of wealth in a given year depending on our specification. We set $\bar{t} = 2008$ when using actual wealth, and $\bar{t} = 2013$ when we use predicted level of wealth. We cluster standard errors at the individual level. We then plot the estimated coefficients $\beta_j$ (and their confidence interval) in Figure 10. The results show that the reform is associated with a large and permanent decrease of the probability to out-migrate for treated individuals. We find no evidence of significant pre-trends in out-migration before the reform, which confirms that the mobility patterns of wealthy individuals just below the exemption threshold form a credible counterfactual for the mobility patterns of the wealthy individuals subject to the wealth tax. Our estimates indicate that one year after the reform, the probability to out-migrate decreased by 0.05 percentage points for individuals at the top of the wealth distribution. This represents a 30% reduction in the propensity to leave Sweden for the treated group compared to the year before the event, and compared to the control group. Hence the effects are small in absolute magnitude, but show that a substantial part of wealthy out-migration flows were driven by the wealth tax before 2007. Specifically, more than one-third of expatriation events were tax-induced before the repeal of the wealth tax.

**Threat to Identification and Robustness** The main threat to identification concerns unobserved shocks simultaneous to the reform, which could differentially affect individuals just above and just below the wealth tax exemption threshold. For instance, one concern is that changes in dividend taxation in 2007 might have affected those groups differently, even if we always compare taxpayers within the top decile of the wealth distribution. To check this, we plot in Figure A.12 the effective labor taxes and capital income taxes (excluding the wealth tax) paid by our treatment and control groups, both before and after the repeal of the wealth tax. Panel A shows that effective capital income tax rates (excluding wealth taxes) did not drop for either our treated nor control group in 2007 and evolved similarly in both groups. Panel B further confirms that effective tax rates on labor income evolved similarly in our treated and control groups during the period. On the contrary, Figure A.13 shows that it is only when wealth tax payments are taken into account that effective tax rates on capital income evolve differentially in the treatment group relative to our control group. Overall, we find no evidence that individuals just above and below the wealth tax exemption threshold experienced differential taxation shocks after 2006, except for the wealth tax repeal which is our main source of identification.

Another worry is that changes in inheritance taxation in 2004 could affect the very wealthy more

than the just wealthy. However, we find no evidence of significant differential out-migration patterns for those years, as showed in the pre-trends of Figure 10. This is consistent with the fact that the law limits the ability of individuals to avoid inheritance taxation through international migration, due to strict rules on tax residency definition at death.

Ultimately, the best way to confirm that our main result is not driven by other factors is to reproduce the same analysis in a different context. We use Denmark to test the robustness of our approach in Sweden. Net taxable wealth in Denmark was taxed every year at 2.2% until two major reforms. In 1988, the marginal tax rate on wealth above the exemption threshold was reduced to 1%. While the change in tax rate was large, this change was also gradual, and scattered over three years, as showed in Figure A.10, Panel A and B. The wealth tax was then entirely abolished between 1996 and 1997. Those two reforms provide alternative identifying variation to study migration responses to the wealth tax.

We use the same identification strategy and compare out-migration patterns of wealthy tax payers just above the wealth tax exemption threshold, to those of taxpayers just below that threshold. The evolution of out-migration patterns around those changes for treated (red series) and control (blue series) individuals are showed in Panel C and D. Consistent with our previous findings in Sweden, we find that reduced wealth tax rates are associated with a decrease in out-migration rates for taxpayers subject to the tax, with no corresponding changes for wealthy taxpayers not subject to the tax. The graphical evidence is noisier in Denmark, mostly for two reasons. First, we have more power in Sweden because the share of taxpayers subject to the wealth tax is larger in Sweden prior to the 2006 reform, and Sweden is a larger country. Second, the design offered by the Swedish context is better for identification. The Danish reforms are gradual whereas the Swedish change in wealth tax rate is large, sudden and not expected. As we will show in the next section, however, the migration elasticities we obtain exploiting the Danish and Swedish reforms are very close, and not statistically different, despite being performed in different countries, contexts, and datasets.

## 6.2 Identifying Migration Elasticities to the Wealth Tax

The past section has showed compelling graphical evidence of international migration responses to the wealth tax in Sweden. We now proceed to estimate migration elasticities with respect to the wealth tax, the policy-relevant parameter in our context. For this, we relate the differences in out-migration patterns of the treatment and control group to the change in effective wealth tax rates induced by the reform. We obtain estimates of the elasticities from a 2SLS regression of the form:

$$Y_{it} = \alpha_0 + \varepsilon \ln(1 - \tau_{it}) + \beta_1 \cdot \mathbb{1}(i = T) + \beta_2 \cdot \mathbb{1}(t \geq t_0) + u_{it} \tag{6}$$

instrumented with $\mathbb{1}(i = T) \times \mathbb{1}(t \geq t_0)$, where $Y_{it}$ is the out-migration rate (or alternatively in-migration rate) of group $i = \{T, C\}$ in year $t$, and $t_0$ is the year of the reform. Because $\tau_{it}$ is very small in our context, $\varepsilon$ has a simple interpretation: if $\tau$ increases by 1 percentage point, out-migration rate at the top of the wealth distribution increases by $\varepsilon$ percentage point.

We estimate the regression model using OLS and we collapse the data at the year-wealth group level, which is the level at which the exogenous wealth tax variation occurs. We estimate this specification separately in Sweden and in Denmark. We also estimate Equation 6 separately for different groups of taxpayers, in order to illustrate potential heterogeneous migration responses to the wealth tax. We cluster standard errors at the individual level.

The estimates from Equation 6 are showed in Panel A of Figure 11, using out-migration rate as the outcome variable in the top panel, and in-migration rates in the bottom panel. The estimated $\varepsilon$ is around -.17 for the entire population of wealthy taxpayers subject to the wealth tax in Sweden, meaning that a 1 percentage point increases in the wealth tax in Sweden increases out-migration of wealth taxpayers by 0.17 percentage point on average. We do not find evidence of substantial heterogeneity when focusing on other demographics: international migration elasticities do not vary much by age or level or education. We also find that wealthy entrepreneurs and non-entrepreneurs are similarly responsive to a given change in wealth taxes. As this finding suggests that there is no differential selection into responding to the wealth tax reform by occupation, we can connect the aggregate response to the wealth tax to the event-studies showing the average effects of out-migration events for entrepreneurs described in the previous section.

Another important takeaway from Figure 11 is that migration elasticies are not statistically different in Sweden and in Denmark. While performed in different contexts, using different datasets and policy variations, our approach yields remarkably similar parameters. In Denmark, we can also estimate in-migration elasticities because we observe the level of wealth for newly arrived taxpayers after the wealth tax reforms. Panel B of Figure 11 shows in-migration semi-elasticities are also substantial, although sligthly smaller in terms of magnitude.

**Interpreting the Magnitude: Stock Elasticity** Our quasi-experimental setting and dataset enables us to obtain a well identified estimate of the effects of wealth taxation on migration flows. To capture the effects of migration responses to the wealth tax on the overall wealth tax base, we next translate those estimates into the effect on population size (stock) using a simple overlapping generation (OLG) model. This is necessary because wealth is a stock: any taxable wealth loss in one year due to migration responses to the wealth tax remains absent from the tax base in the subsequent years. Using the average number of years spent in the top 1% (24 years), we quantify that $\varepsilon_{N,1-\tau} \approx 2.16$.

Another particular aspect of our setting is that wealth taxes are applied to the stock of wealth, while

capital income taxes are applied to the flow generated by the stock. To compare our elasticity to the larger literature on income tax elasticities, we compute the change in capital income taxation induced by the wealth tax. To do this, we need to compute the implied capital income that wealth taxpayers receive each year. We define $t \approx \tau/r$ the average tax rate on capital income. Over our period of study, we observe in our data $r = .042$ and $\tau \approx .006$ which means that $t = 14.3\%$. Therefore, we obtain:

$$\varepsilon_{N,1-t} = \varepsilon_{N,1-\tau} \cdot \frac{d\ln(1-\tau)}{d\ln(1-t)} \approx .078 \ \ (..013) \tag{7}$$

When appropriately rescaled, the implied migration elasticity is thus small. Figure 12 shows that our estimates are very close in magnitude to cross-border migration elasticities of top incomes estimated in other contexts. It is smaller than the migration elasticity obtained by Agrawal et al. (2020) when comparing wealthy taxpayers' migration to Madrid against the rest of Spain. This is consistent with the fact that we focus on international migration responses, rather than within-country moves, and that we measure real relocation responses, rather than avoidance through artificial changes in reporting, for instance.

## 6.3 Aggregate Implications of Wealth Tax-Induced Migration

We showed that the out-migration of wealthy tax payers has persistent implications for tax revenues and economic activity of their firms in Sweden, and that the repeal of the wealth tax has permanently reduced out-migration rates for individuals previously subject to the wealth tax. We now combine our two main results to quantify the aggregate implications of wealth-tax induced migration.

This quantification exercise requires no differential selection into responding to the wealth tax reform based on characteristics that would also affect the spillovers estimated in section 5. The heterogeneity analysis confirmed that entrepreneurs have similar migration elasticities than the rest of the wealthy population. Furthermore, we did not detect any selection into migration responses to the wealth tax based on a large set of demographics. Those findings provide support for our main quantification approach.

Another worry is that the repeal of the wealth tax changed the way out-migration events and the out-migrants' firms outcomes co-vary. This could occur, for instance, if the reform changed migration decisions specifically for entrepreneurs who would exhibit different behavior (in terms of their firms outcomes) when they move. Alternatively, the repeal of the wealth tax could have changed the incentives for wealthy out-migrants to close their firms in Sweden, or to change their firms'

activity. To tackle those issues, we investigate potential heterogeneities in the spillover effects of wealthy out-migration events, before and after the repeal of the wealth tax. To do this, we run our baseline analysis separately on all out-migration events that occured before and after the reform. We show the results in Appendix Figure A.15. The effects of wealthy owners' out-migration are quantitatively and qualitatively similar before and after the repeal of the wealth tax. This means that while the reform affected the rate at which the wealthy outmigrated from Sweden, it did not change the way their out migration decisions interacted with their firms' economic activity in Sweden. This also means that wealth tax-induced migration events (that existed before 2007 but not after) do not have a differential impact on firms' activity compared to other migration events.

**Quantification of aggregate effects** To quantify the causal effects of tax-induced migration on aggregate economic outcomes, we can simply combine our estimated migration elasticities with our reduced-form estimates of the effects of wealthy out-migration on firm outcomes from Section 5. We have estimated that a 1 percentage point increase in the effective average tax rate on wealth causally decreases the steady-state stock of wealthy entrepreneurs by 2.17%. These entrepreneurs control (directly or indirectly) firms that represent 8% of total employment in the Swedish economy (Table 3). And their migration causes a 18% reduction in employment in the firms they own directly or indirectly (Table 1). As a consequence, we estimate that a one percentage point increase in the effective average tax rate on wealth causally decreases aggregate employment by $(2.17\% * 18\% * 8\%) = 0.03\%$ through tax-induced migration of the wealthy. Similarly, we estimate a -.1% effect on value-added and -.048% on investments.

Thus, while out-migration of wealthy taxpayers leads to negative spillovers through lower economic activity in firms held by out-migrants, the overall economic effects remains very small compared to overall economic activity in Sweden.

# 7 Conclusion and Policy Implications

This paper has analyzed the international migration patterns of the very wealthy in Scandinavia, and their responsiveness to wealth taxation. Using exhaustive administrative registries on international migration, assets and transactions, we provided a detailed description of the real economic implications of wealthy out-migration, for tax revenue and the economy. We showed that wealthy out-migration is associated with substantial tax revenue losses in the home country through income and local tax payments. We also find evidence of negative spillovers of out-migration through reduced employment, investments and tax payments at unlisted firms held by wealthy entrepreneurs. To isolate the contribution of wealth taxation to out-migration, we finally exploit three large reforms in Scandinavia. We show compelling graphical evidence of international migration responses to the wealth tax. We show that a one percentage increase in the wealth tax rate

increases out-migration by 0.17 percent.

We provide the first evidence of whether tax-induced migration responses to taxes induces real changes in aggregate business activity in the home country. This is important as most opponents to wealth taxes argue that the negative spillovers of wealthy out-migration for economic growth and competitiveness would outweigh the tax revenue gains of those taxes. Scaling-up our reduced form estimates with total employment at firms owned by wealthy expatriates, we quantify that total out-migration at the top of the wealth distribution affects no more than .03% of total Swedish employment each year. Because out-migration rates are so small in the first place, even at the very top, the aggregate implications of wealthy expatriation, even if all of it were to be attributed to the wealth tax, remain minuscule.

There are limits to the external validity of the results presented in this paper. First, Sweden and Denmark are small open economies, which means that international migration elasticities in these countries can plausibly be interpreted as upper bounds, since this elasticity typically decreases with country size (Kanbur and Keen, 1993). Second, wealth taxes in Scandinavia were well enforced thanks to third-party reporting. International migration responses to the wealth tax, and their downstream effects on firms, could be different in contexts where avoidance is high, for instance because of low reporting requirements and weak enforcement. Third, wealth is a stock and non-myopic agents may engage into dynamic capital accumulation. If taxpayers are able to foresee their future tax liability, taxing wealth could lead to anticipatory migration effects, including before taxpayers become subject to the wealth tax. Those dynamic effects are hard to capture with a reduced-form difference-in-differences approach, and may no be fully accounted for in our empirical estimates.

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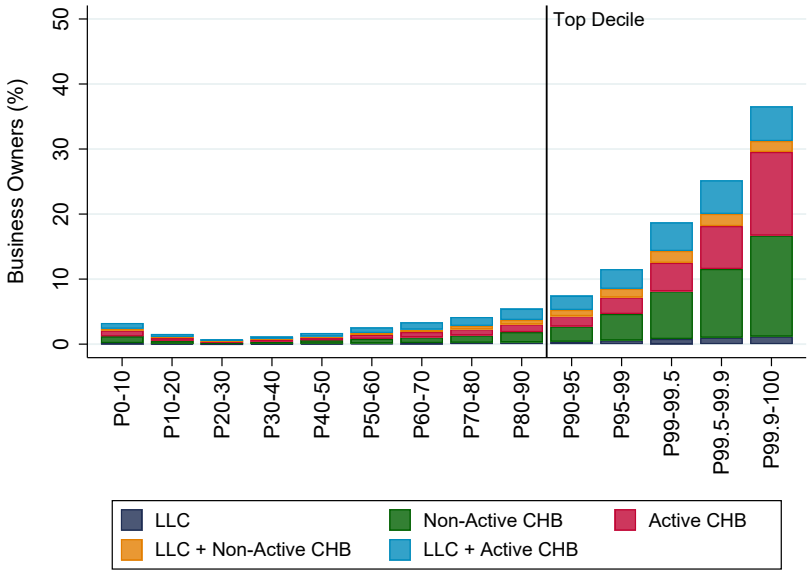
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# 8 Figures and Tables

Figure 1: **Wealth and Entrepreneurship in Sweden**

**A. Business Owners by Level of Net Worth in Sweden**

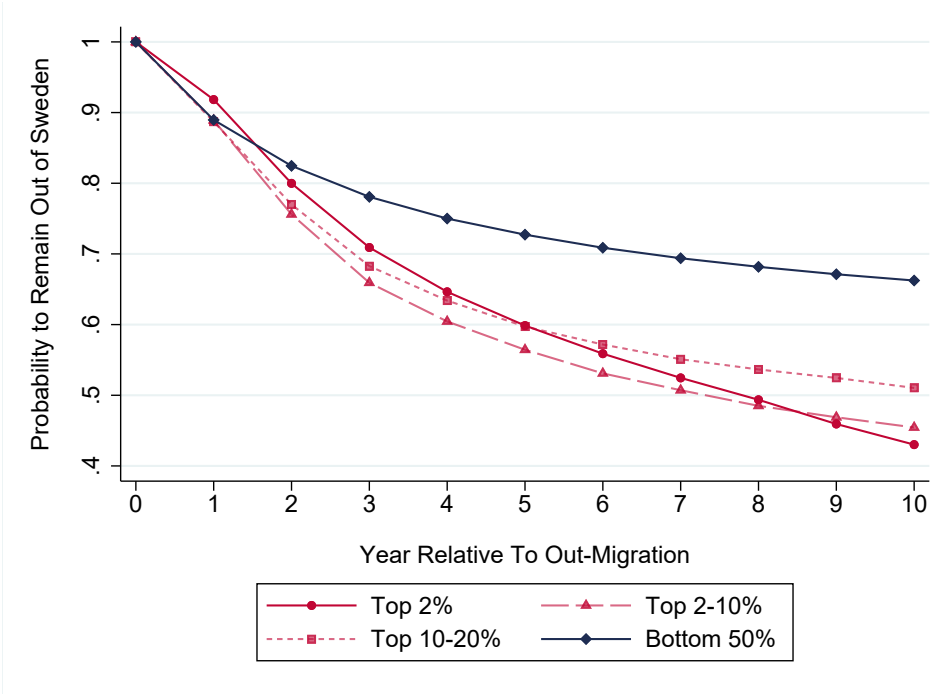



**B. Employment at Firms Owned by the Wealthy**



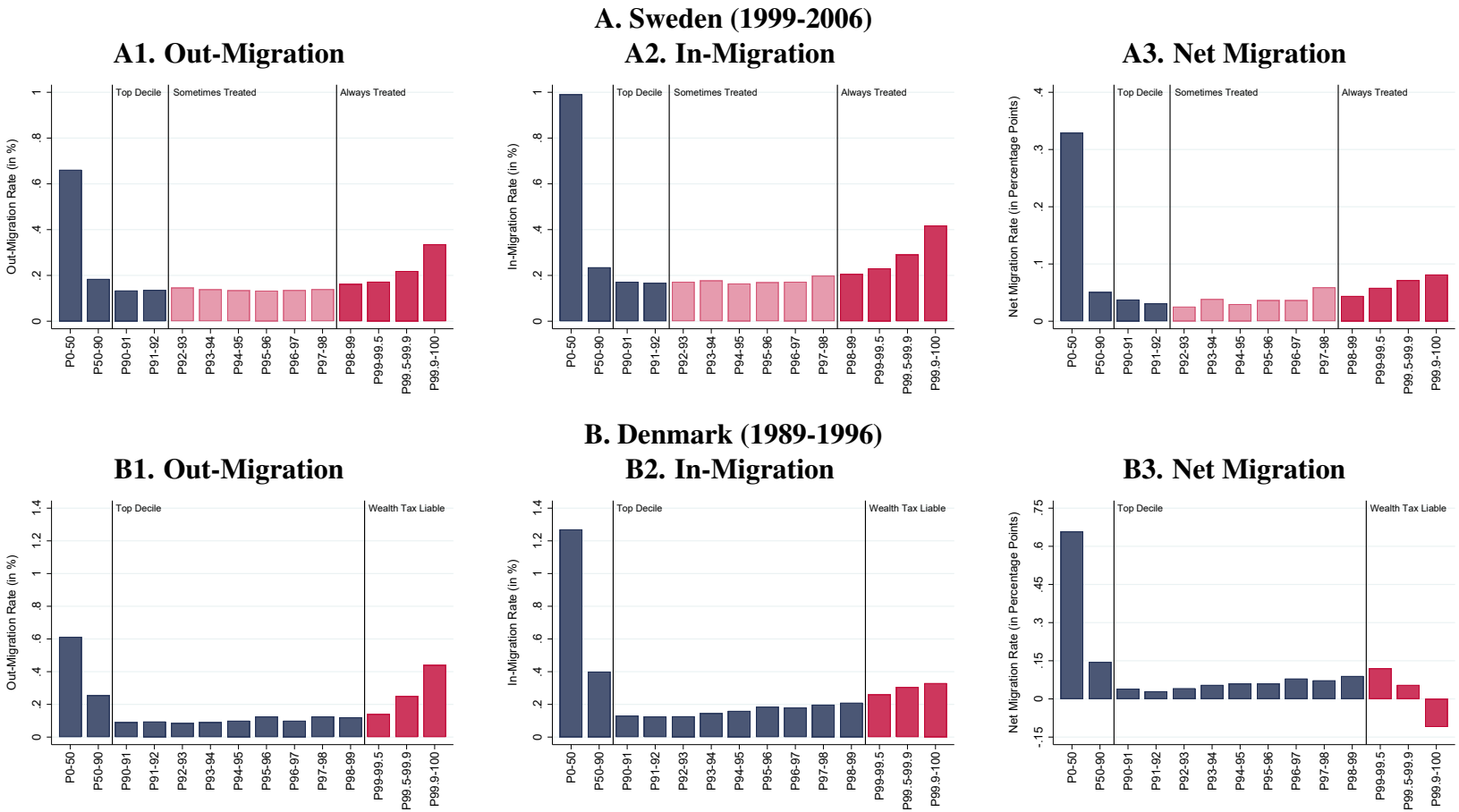

Notes: Panel A shows the share of individuals owning at least one firm in Sweden by level of their household net wealth during the period 2000-2006. Each year $t$, we rank households by their net wealth level and assign this rank to the individuals in the household. For each wealth fractile, we then compute the percentage of individuals who own firms of each category. Active closely-held businesses (CHB) are defined as closely-held businesses employing at least one person beyond the owners. In Panel B, we classify firms based on the highest household wealth rank of their ultimate owners in 2003. For each wealth fractile, we then compute aggregate employment in firms that ultimate owners hold directly and aggregate employment in firms they hold indirectly (e.g., subsidiaries), weighted by their ownership share in these firms.

Figure 2: **Probability to Remain Out of Sweden After an Out-Migration Event**



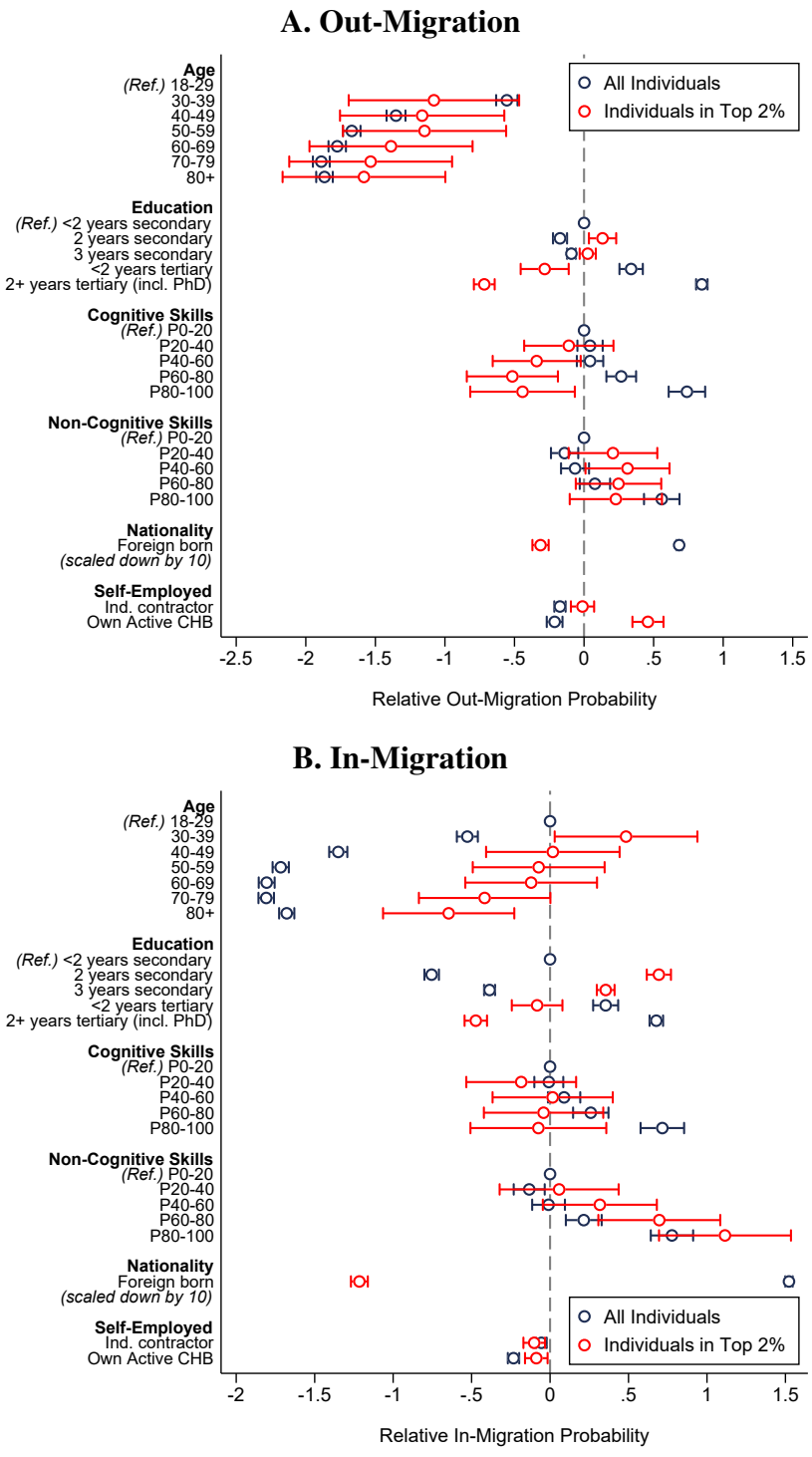

Notes: This figure shows the probability to remain out of Sweden after an out-migration event. The out-migration events considered for this plot cover the years 2000-2007. Individuals were assigned to each wealth category based on the net wealth of their household in year $t = -1$ relative to their out-migration date. To compute these survival rates, we created a dummy equal to 1 that switches to 0 when the individual in-migrates back into Sweden, if she ever does so and regardless of other future out-migrations.

Figure 3: **Out-Migration at the top of the Wealth Distribution in Scandinavia**



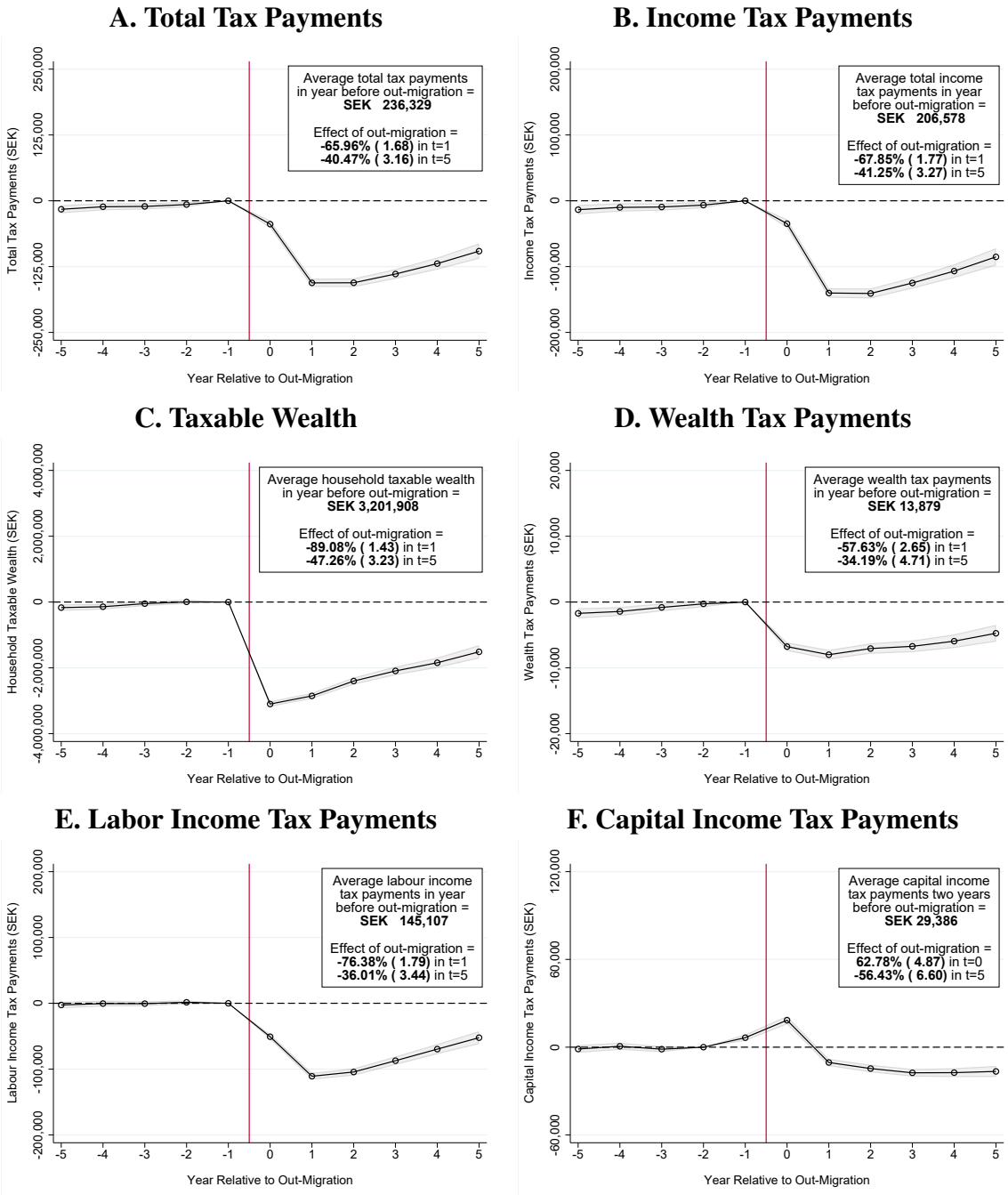

Notes: This figure shows in-migration, out-migration and net-migration rates by level of total household net wealth in Sweden (Panel A) and total individual net wealth in Denmark (Panel B). We compute those statistics during the last years when the wealth tax was still in place in each country, which corresponds to the period 1999-2006 in Sweden and the period 1989-1996 in Denmark. We rank individuals by level of net worth in year $t$, and then we compute fraction of individuals who outmigrate in $t+1$ for each wealth fractile in $t$. For in-migration rate: we rank individuals by level of wealth in year $t$ and we look at the fraction who immigrated in $t-1$ for each wealth fractile in $t$. The red vertical lines denote the level of wealth above which individuals become liable to the wealth tax. In Sweden, the exemption threshold varied significantly over the time period 1999-2006, so we indicate the level of the lowest exemption threshold, and of the highest exemption threshold during that period.

Figure 4: **Selection into Out-Migration and In-Migration in Sweden**



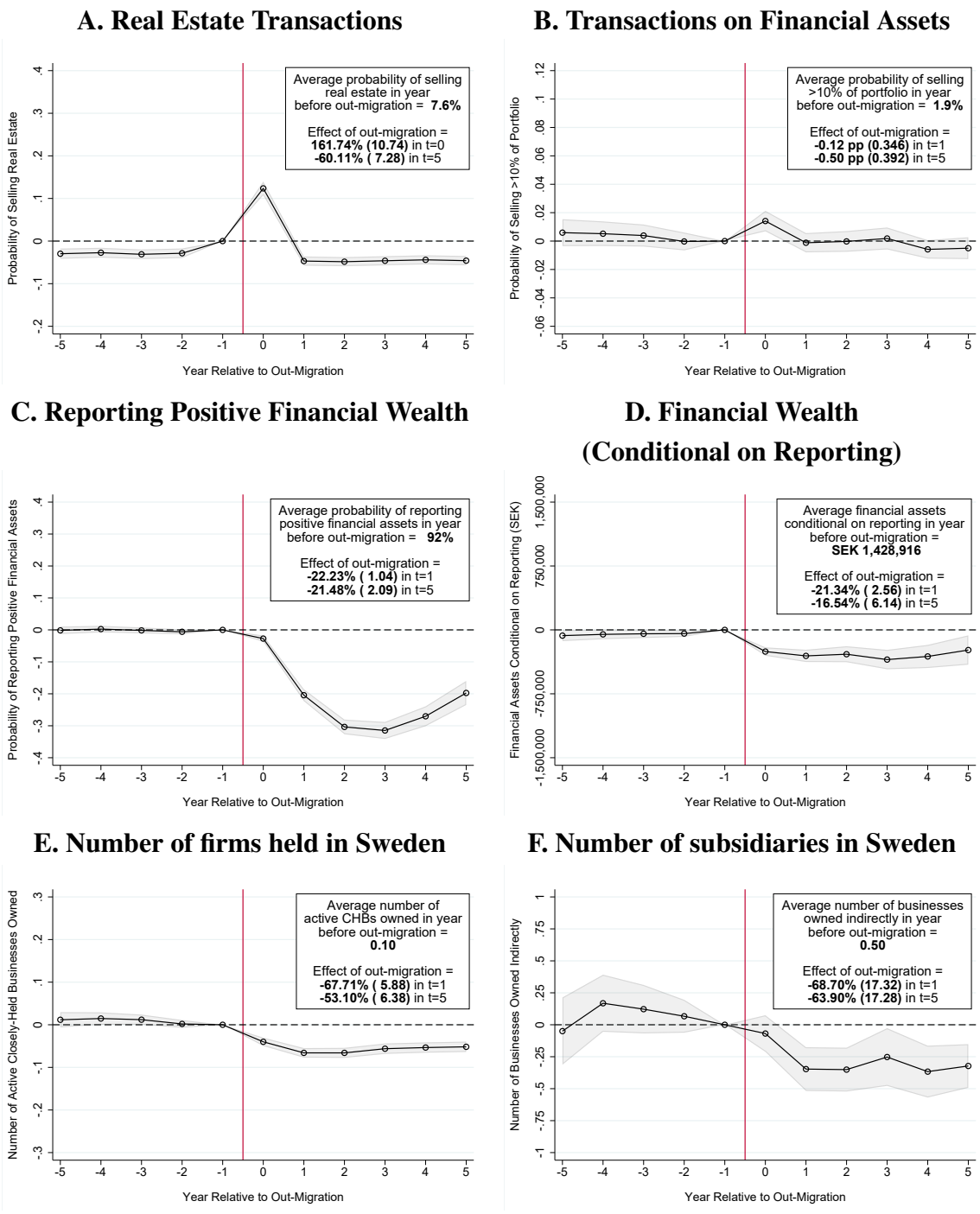

Notes: This figure describes selection into out-migration (Panel A) and in-migration (Panel B) in Sweden. Blue coefficients come from estimates of Equation 1 detailed in the text, while red coefficients are estimated on the interaction term of Equation 2. All coefficients are rescaled by the average predicted probability of out-migration (Panel A) or in-migration (Panel B). The estimation sample includes all taxpayers with wealth in the top 2% and a 10% random sample of all other Swedish individuals.

Figure 5: **Effects of Wealthy Out-Migration on Tax Payments, Top 2%**



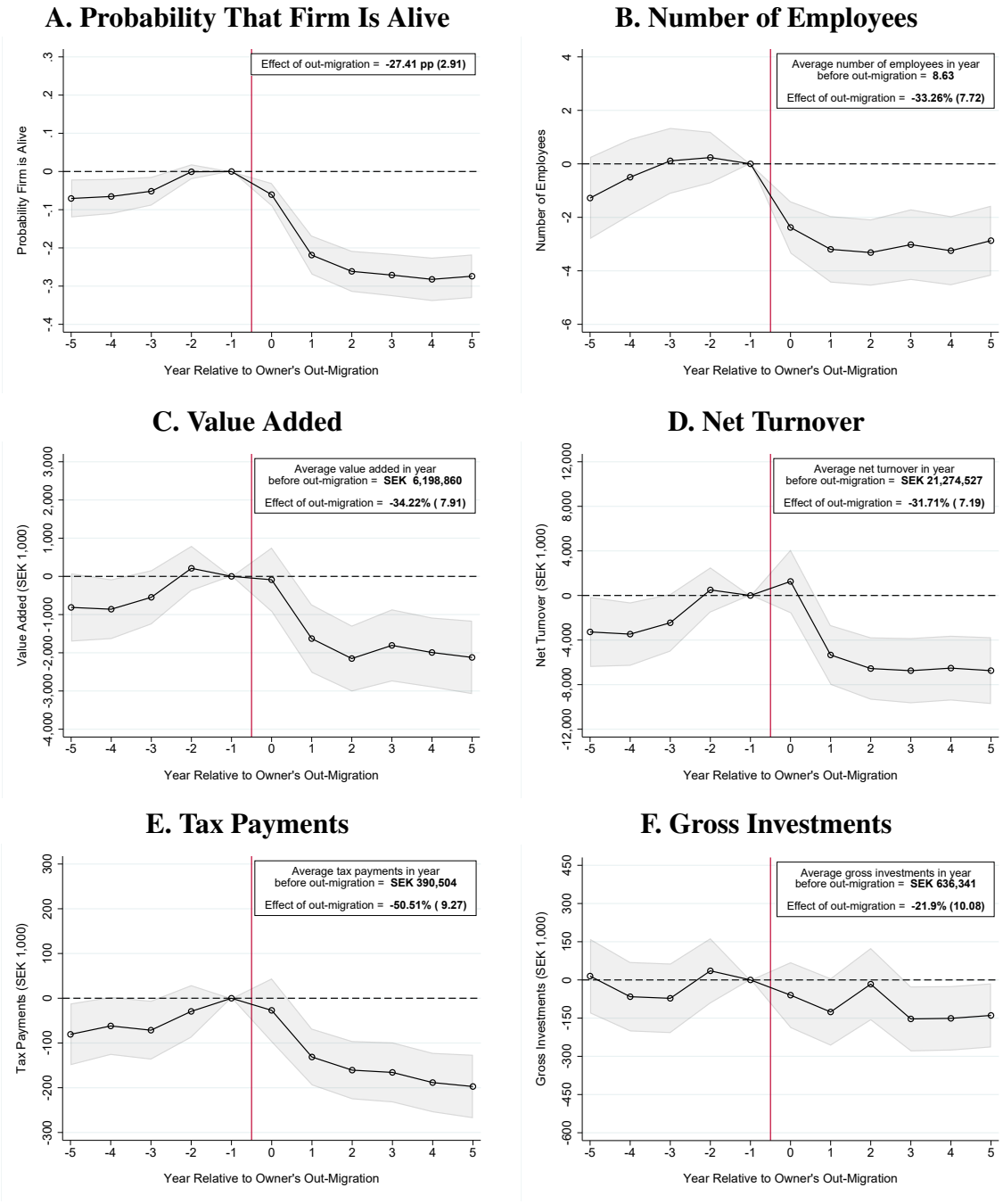

Notes: This figure describes the evolution of wealthy individuals' outcomes before and after they leave Sweden, compared to control wealthy individuals who do not move that same year. The sample includes individuals who were in the top 2% of the household net worth distribution in Sweden in the year before their true or placebo out-migration date. We winsorised the bottom 1% and top 5% of all outcomes. We plot the estimates $\beta_j$ from Equation 3. For all outcomes except capital income tax payments, the estimates displayed in the text boxes are computed as the estimate of $\beta_j$ when $t = 1$ or $t = 5$ divided by the average outcome in the treatment group in $t = -1$, multiplied by 100. The standard errors are rescaled using the same approach. For capital income tax payments, we show the estimate of $\beta_j$ when $t = 0$ or $t = 5$ divided by the average outcome in the treatment group in $t = -2$, multiplied by 100.

Figure 6: **Effects of Wealthy Out-Migration on Portfolio Reallocation, Top 2%**




This figure describes the evolution of wealthy individuals' outcomes before and after they leave Sweden, compared to control wealthy individuals who do not move that same year. The sample includes individuals who were in the top 2% of the household net worth distribution in Sweden in the year before their true or placebo out-migration date. We winsorised the bottom 1% and top 5% of all outcomes. We plot the estimates $\beta_j$ from Equation 3. The estimates displayed in the text boxes are computed as the estimate of $\beta_j$ when $t = 1$ (for real estate transactions we use $t = 0$) or $t = 5$ divided by the average outcome in the treatment group in $t = -1$, multiplied by 100. The standard errors are rescaled using the same approach.

Figure 7: **Effects of Wealthy Out-Migration on Closely-Held Businesses Outcomes, Top 2%**



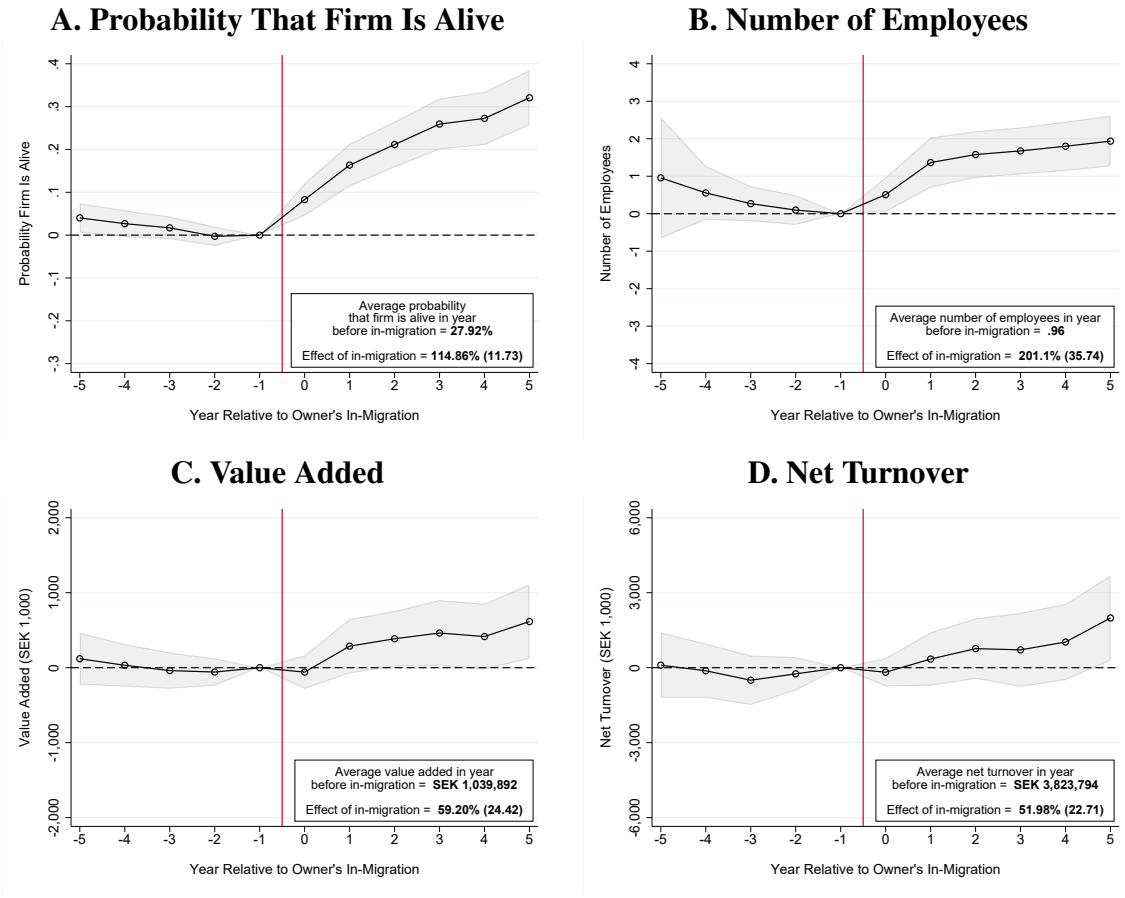

Notes: This figure shows the effects of wealthy owners' out-migration events on firm-level outcomes. The sample includes firms that in $t = -1$ were active closely-held businesses owned by individuals whose real or placebo out-migration happened in year $t$ and who were in the top 2% of the household net worth distribution in Sweden for at least one year before $t$. We winsorised the bottom 1% and top 5% of all outcomes except for the number of employees, for which we winsorised only the top 5%. We plot the estimates of $\beta_j$ from Equation 4. The effect displayed in the text boxes is computed as the estimate of $\beta_5$ divided by the average outcome in the treatment group in $t = -1$, multiplied by 100. The standard errors are rescaled using the same approach.

Table 1: **Effects of Wealthy Out-Migration on Closely-Held Businesses Owned Directly and Indirectly**

| Outcome | Only Directly-Held Firms | | Directly and Indirectly-Held Firms | |
|---|---|---|---|---|
| | **Average Outcome for Treated in** $t = -1$ | **Effect in** $t = +5$ | **Average Outcome for Treated in** $t = -1$ | **Effect in** $t = +5$ |
| *Panel A. Sample of firms with owner in the top 2% of net worth* | | | | |
| Prob. Firm Is Alive (pp) | 1.00 | -27.41% (2.91) | 1.00 | -21.08% (3.44) |
| Number of Employees | 8.63 | -33.26% (7.72) | 21.17 | -18.79% (5.52) |
| Value Added (SEK 1,000) | 6,198.86 | -34.22% (7.91) | 11,874.08 | -33.13% ( 7.81) |
| Net Turnover (SEK 1,000) | 21,274.53 | -31.71% (7.19) | 39,673.01 | -27.11% (5.04) |
| Tax Payments (SEK 1,000) | 390.50 | -50.51% (9.27) | 483.27 | -45.00% (11.25) |
| Gross Investments (SEK 1,000) | 636.34 | -21.90% (10.08) | 877.68 | -19.49% (6.13) |
| *Panel B. Sample of firms with owner in the top 10% of net worth* | | | | |
| Prob. Firm Is Alive (pp) | 1.00 | -27.54% (2.13) | 1.00 | -23.75% (2.48) |
| Number of Employees | 7.65 | -39.61% (5.20) | 16.70 | -24.58% (4.43) |
| Value Added (SEK 1,000) | 4,897.37 | -36.24% (5.24) | 8,766.36 | -34.89% (5.86) |
| Net Turnover (SEK 1,000) | 15,674.65 | -34.70% (5.07) | 28,749.12 | -31.81% (4.57) |
| Tax Payments (SEK 1,000) | 263.87 | -52.49% (6.39) | 347.41 | -47.37% (7.77) |
| Gross Investments (SEK 1,000) | 449.47 | -29.67% (7.73) | 631.57 | -23.16% (5.22) |

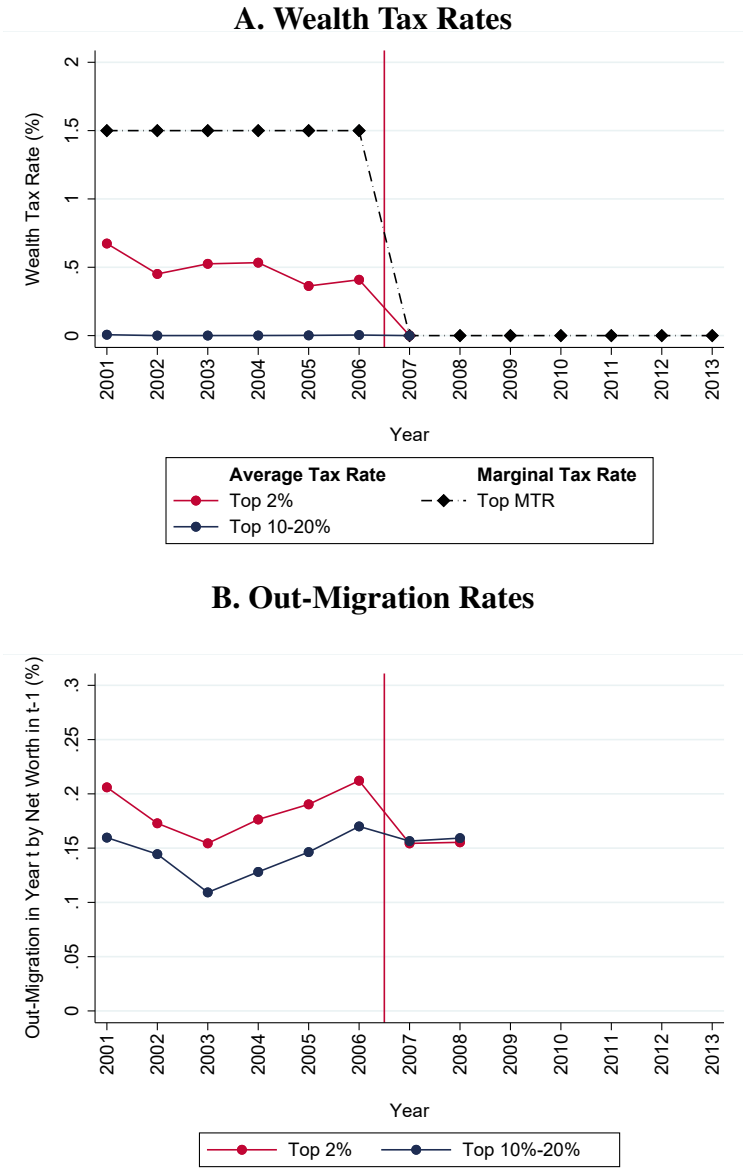
Notes: This table shows the effects of wealthy owners' out-migration events on firm-level outcomes. In the first two columns, the estimates come from the event study that only includes firms that in $t = -1$ were active closely-held businesses owned by wealthy individuals. The estimates in the last two columns come from the event study that includes active businesses owned directly or indirectly by wealthy individuals in $t = -1$.

Figure 8: **Effects of Wealthy In-Migration on Firm Outcomes, Top 2%**



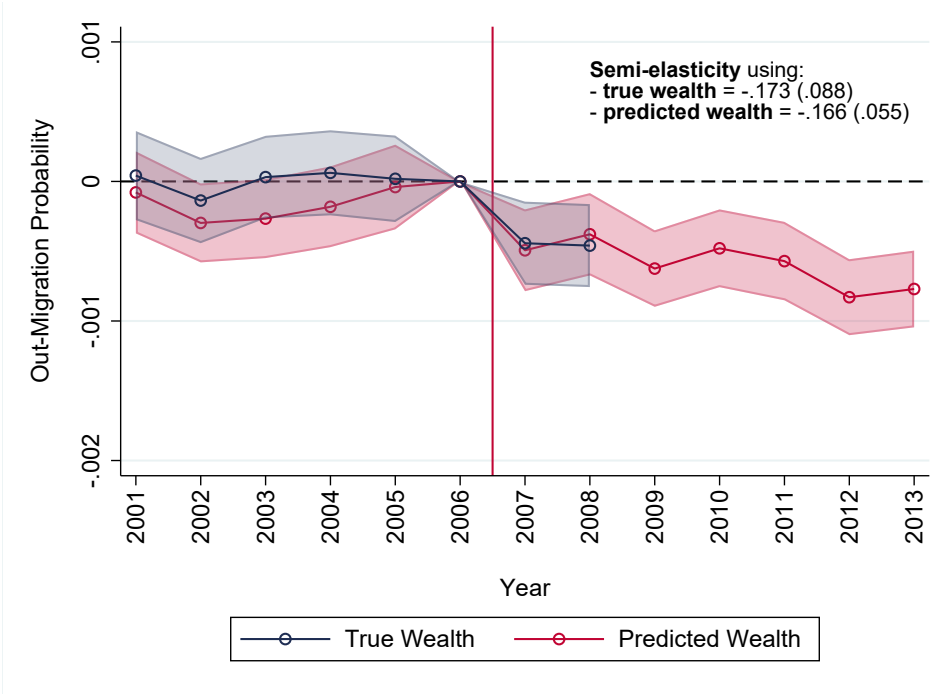

Notes: This figure shows the effects of wealthy owners' in-migration events on firm-level outcomes. The sample includes firms that were held by individuals who were in the top 2% of the household net worth distribution in Sweden for at least one year after their true or placebo in-migration date and before their potential following out-migration. The sample is further restricted to firms who were active closely-held businesses in at least one of the years in which they were held by the wealthy true or placebo in-migrant owner (between her true or placebo in-migration date and her potential following out-migration). We winsorised the bottom 1% and top 5% of all outcomes except for the number of employees, for which we winsorised only the top 5%. We plot the estimates of $\beta_j$ from the in-migration counterpart of Equation 4. The effect displayed in the text boxes is computed as the estimate of $\beta_5$ divided by the average outcome in the treatment group in $t = -1$, multiplied by 100. The standard errors are rescaled using the same approach.

Figure 9: **Effect of the Swedish Wealth Tax Reform on Wealth Tax Rates and Out-Migration Rates**



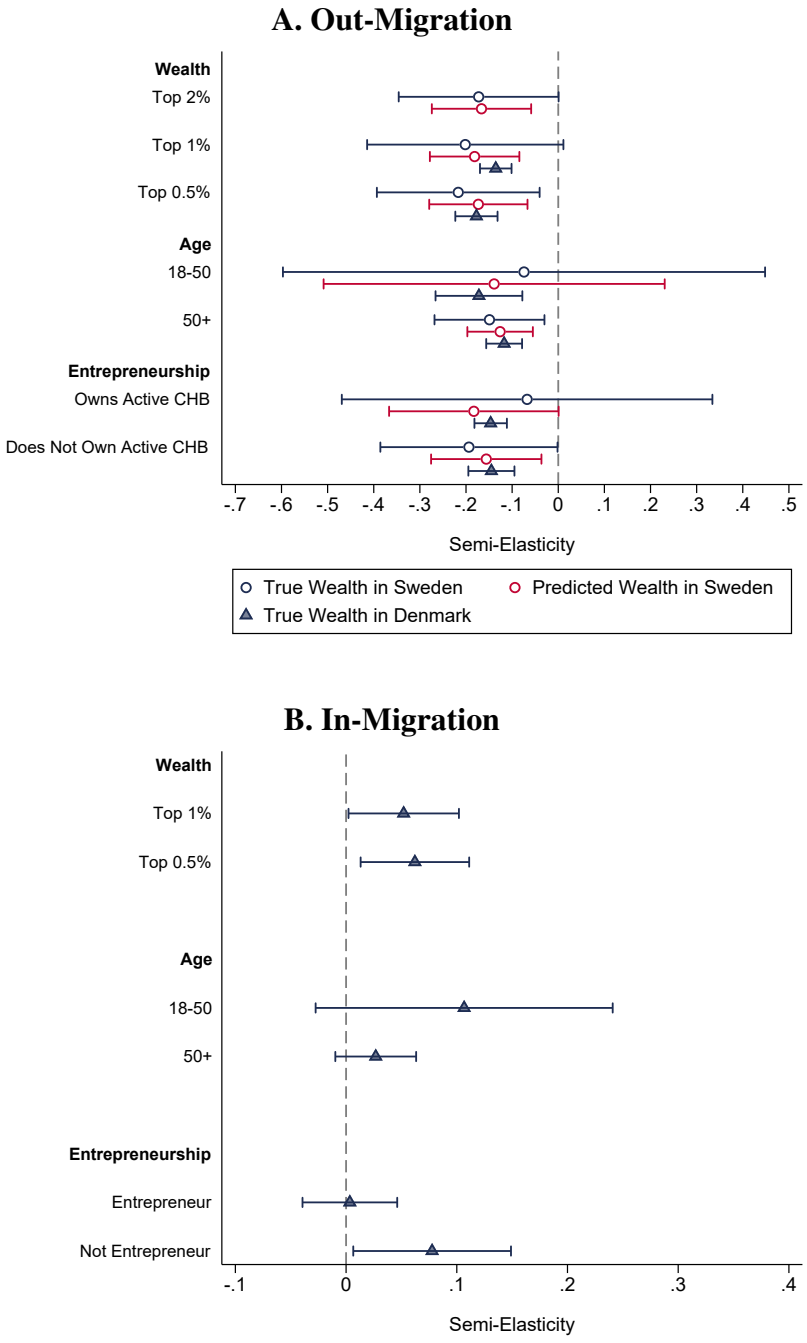

Notes: Panel A shows the evolution of wealth tax rates before and after the repeal of the wealth tax in Sweden. The black line displays the change in the marginal tax rate on wealth above the exemption threshold implied by the reform. Moreover, the evolution of the average effective wealth tax rates before and after the end of the wealth tax in Sweden for taxpayers subject to the wealth tax (treated, red line) compared to wealthy individuals not subject to the wealth tax (control, blue line) are presented. Panel B shows the out-migration rates of individuals below and above the wealth tax exemption threshold in Sweden, before and after the repeal of the wealth tax in 2007.

Figure 10: **Out-Migration Responses to the Wealth Tax Repeal: Difference-in-Differences**



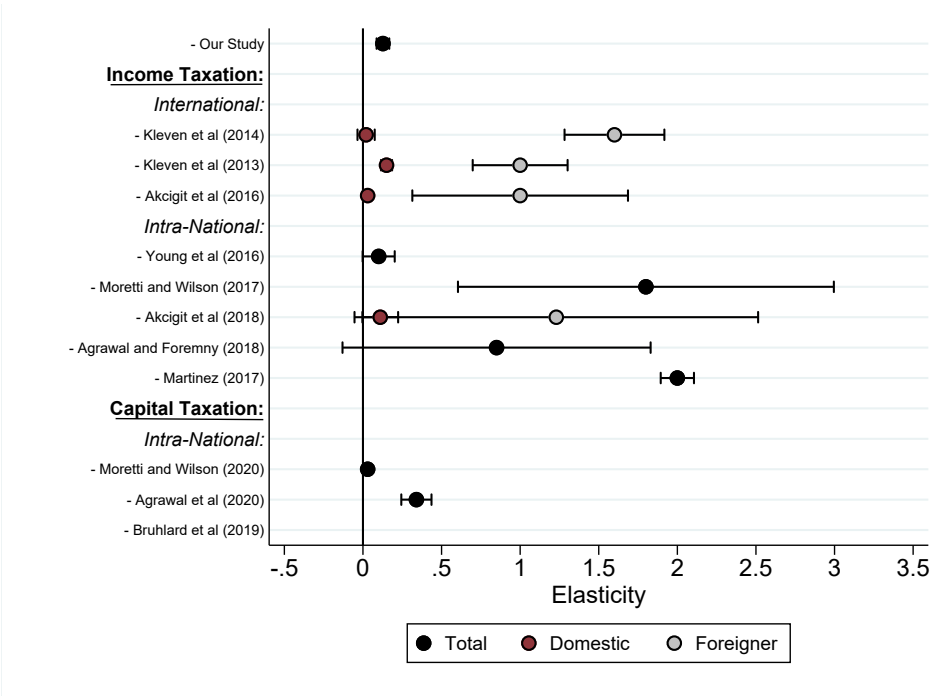

Notes: This figure shows the differential effects of the repeal of the wealth tax on the out-migration probability of treated (top 2% of the household net wealth distribution, liable to the wealth tax) and control (top 10-20%, not liable to the wealth tax) individuals. We regress the yearly probability to leave Sweden on an interaction between year fixed effects and a dummy variable equals to one if the individual is subject to the wealth tax (treated). We define exposure to the reform using true level of wealth (blue) or predicted level of wealth based on pre-reform assets and income flows (red). We omit year 2006 to interpret the effects relative to the year before the reform. We plot the estimated coefficients on that interaction variable and their 95 percent confidence intervals. The semi-elasticities shown in the plots correspond to $\epsilon$ estimated from Equation 6. For example, the semi-elasticity computed using true household net wealth indicates that a 1 percentage point decrease in the wealth tax rate decreased the out-migration rate of individuals in the top 2% of the household net wealth distribution in Sweden by 0.17 percentage points.

Figure 11: **Semi-elasticities of international migration**




Notes: This Figure shows estimates of semi-elasticities of international migration exploiting three large reforms in Scandinavia. We estimate those elasticities on different sample of individuals to explore heterogeneities in location choices responsiveness to wealth taxation within wealthy taxpayers.

Figure 12: **Comparison to Migration Elasticities in the Literature**




Notes: This figure compares our estimates of migration elasticities with respect to the wealth tax (converting taxes on stock to taxes on flows as explained in the text) to comparable estimates in the literature, focusing on income or capital taxation.

Table 2: **Descriptive Statistics on the Characteristics of Closely-Held Businesses**

| Variable | Mean | Median | Std. Dev. | Obs. | % of Swedish Aggregates | % of Active CHBs |
|---|---|---|---|---|---|---|
| *Panel A. All Active CHBs* | | | | | | |
| Nr. of Owners | 1.78 | 1 | 7.05 | 589,788 | | |
| Nr. of Employees | 8.03 | 3 | 40.49 | 589,788 | 13.53% | 100.00% |
| Value Added | 3,398 | 1,518 | 30,859 | 541,097 | 21.84% | 100.00% |
| Net Turnover | 10,610 | 3,878 | 61,029 | 541,097 | 17.68% | 100.00% |
| Tax Payments | 138 | 21 | 4,708 | 541,097 | 27.64% | 100.00% |
| Gross Investments | 534 | 55 | 4,661 | 541,097 | 17.88% | 100.00% |
| *Panel B. Active CHBs with at least one owner in the top 10% of net worth* | | | | | | |
| Nr. of Owners | 2.12 | 2 | 11.06 | 237,077 | | |
| Nr. of Employees | 10.29 | 3 | 54.36 | 237,077 | 6.98% | 51.60% |
| Value Added | 4,922 | 1,883 | 47,012 | 220,194 | 13.13% | 60.13% |
| Net Turnover | 15,592 | 4,867 | 86,796 | 220,194 | 10.80% | 61.11% |
| Tax Payments | 249 | 39 | 7,345 | 220,194 | 21.20% | 76.69% |
| Gross Investments | 781 | 68 | 6,960 | 220,194 | 10.70% | 59.82% |
| *Panel C. Active CHBs with at least one owner in the top 2% of net worth* | | | | | | |
| Nr. of Owners | 2.44 | 2 | 17.91 | 89,485 | | |
| Nr. of Employees | 14.08 | 4 | 82.3 | 89,485 | 3.56% | 26.32% |
| Value Added | 7,098 | 2,238 | 54,677 | 82,473 | 6.90% | 31.58% |
| Net Turnover | 23,598 | 6,034 | 126,880 | 82,473 | 6.13% | 34.65% |
| Tax Payments | 386 | 56 | 3,653 | 82,473 | 10.68% | 38.64% |
| Gross Investments | 1,271 | 100 | 10,940 | 82,473 | 6.41% | 35.88% |

Notes: The unit of measure for value added, net turnover, tax payments, and gross investments is SEK 1,000. The sample includes active closely-held businesses between 2000 and 2006. The shares are computed using the year 2003. Value added, net turnover, tax payments, gross investments as percentages of Swedish aggregates (column 5) are obtained by dividing total value added, net turnover, tax payments, gross investments from active closely-held businesses by the total of the same variables for all Swedish firms in 2003. For employment, the total number of individuals employed in active closely-held businesses in 2003 (excluding owners) is divided by the total number of individuals reporting taxable income in Sweden in the same year (including self-employed and public servants). In the last column, we divide by total employment, value added, net turnover, tax payments, gross investments in all active closely-held businesses in 2003.

Table 3: **Descriptive Statistics on the Characteristics of Direct and Indirect Firms**

| Variable | Mean | Median | Std. Dev. | Obs. | % of Swedish Aggregates |
|---|---|---|---|---|---|
| *Panel A. All active firms held by ultimate owners* | | | | | |
| Nr. of Ultimate Owners | 2.44 | 1 | 32.63 | 692,054 | |
| Nr. of Employees | 10.46 | 4 | 49.92 | 692,054 | 20.82% |
| Value Added | 4,374 | 1,655 | 30,526 | 638,841 | 32.73% |
| Net Turnover | 14,796 | 4,330 | 102,400 | 638,841 | 28.90% |
| Tax Payments | 175 | 22 | 4,694 | 638,841 | 37.63% |
| Gross Investments | 666 | 59 | 7,226 | 638,841 | 25.34% |
| *Panel B. Active firms with at least one ultimate owner in the top 10% of net worth* | | | | | |
| Nr. of Ultimate Owners | 3.54 | 2 | 48.91 | 307,612 | |
| Nr. of Employees | 14.71 | 4 | 70.86 | 307,612 | 13.19% |
| Value Added | 6,625 | 2,179 | 44,673 | 287,514 | 22.60% |
| Net Turnover | 23,294 | 5,892 | 148,637 | 287,514 | 20.75% |
| Tax Payments | 307 | 40 | 6,951 | 287,514 | 30.12% |
| Gross Investments | 1,003 | 76 | 10,413 | 287,514 | 17.08% |
| *Panel C. Active firms with at least one ultimate owner in the top 2% of net worth* | | | | | |
| Nr. of Ultimate Owners | 5.54 | 2 | 73.89 | 134,540 | |
| Nr. of Employees | 21.84 | 6 | 103.17 | 134,540 | 8.61% |
| Value Added | 9,996 | 2,844 | 51,218 | 125,324 | 14.53% |
| Net Turnover | 37,404 | 8,180 | 216,985 | 125,324 | 14.53% |
| Tax Payments | 480 | 55 | 4,934 | 125,324 | 17.98% |
| Gross Investments | 1,619 | 115 | 15,349 | 125,324 | 11.98% |

Notes: The unit of measure for value added, net turnover, tax payments, and gross investments is SEK 1,000. The sample includes active closely-held businesses held directly by ultimate owners and active firms held indirectly by ultimate owners between 2000 and 2006. The shares are computed using the year 2003. To obtain value added, net turnover, tax payments, gross investments as percentages of Swedish aggregates (column 5) we divide total value added, net turnover, tax payments, gross investments from the active closely-held businesses ultimate owners hold directly and the active firms they hold indirectly by the total of the same variables for all Swedish firms in 2003. For employment, the total number of individuals employed in active closely-held businesses held directly and in active firms held indirectly by ultimate owners in 2003 is divided by the total number of individuals reporting taxable income in Sweden in the same year (including self-employed and public servants). Owners are excluded from the count of employees in closely-held businesses.

# Appendix

## A Additional Figures and Tables

# B Additional Institutional Details

## B.1 Wealth Taxation in Denmark

An annual progressive wealth tax was implemented in Denmark from 1903 to 1997 and applied to Danish tax residents with net taxable wealth above an exemption threshold. This exemption threshold was always above the 98th percentile of the wealth distribution during the period we study.

**Tax base** Taxable wealth was defined as the total net wealth of households, excluding pension wealth. Taxable wealth components included cash, deposits, bonds, equities, housing, large durables and business assets, net of any debts. Only taxable wealth above a given exemption threshold, whose evolution is showed in Panel B of Figure A.1, was included in the wealth tax base.

The definition of the geographic scope of the wealth tax base was the same in Denmark and Sweden. Danish residents were taxed on their worldwide assets, including financial and non-financial assets held abroad, while non-residents were only taxed on their assets held in Denmark.

From 1980 onwards, the value of certain assets was reduced when calculating taxable wealth. Specifically, the value of physical business assets was reduced by 20%, while the value of large forests was reduced by 30%.[31] The relief for physical business assets was increased to 25% in 1982 and 30% in 1983. From 1986 onwards, the relief for both business assets and forests was increased to 40%. In addition to these reliefs, there was a wealth tax exemption for owners of closely-held corporations (*hovedaktionærnedslag*).

Finally, there was also a tax credit for the wealth tax through a tax ceiling mechanism capping the amount of wealth tax owed by taxpayers as a fraction of their taxable income. This mechanism varied for couples and single individuals and is described in Jakobsen et al. (2020).

**Tax rates** Like in Sweden, the Danish wealth tax had a simple two-bracket structure. Wealth in Denmark was taxed at a flat rate of 2.2% above the exemption threshold until two reforms in the late 1980s and 1990s. After 1989, the tax rate was reduced to 1%, while in 1997 the wealth tax was repealed.

**Reporting and enforcement** Most of the assets and liabilities were reported by third-parties to the Danish government. The value of bank deposits was reported by banks and the value of listed stocks and bonds was reported by financial institutions. The government used land and real estate registries to record non-financial assets. All other wealth components had to be self-reported by taxpayers.

## B.2 Danish Data

In Denmark, wealth and income registries are based on tax return data from the Danish Tax Agency (SKAT). Wealth levels are stated by the end of the year, and most of the components measuring

[31] Since forests were also considered a physical business assets, their taxable value was reduced by 50%.

wealth are reported by third-parties. For instance, cash value of real estate, deposits, bonds, and shares are third-reported. Until 1997, we also observe self-reported components that are subject to auditing by the tax authorities, such as the self-reported value of stocks (listed and non-listed), self-reported value of durables (cars, boats and caravans) and the self-reported value of share certificates for housing cooperatives, premium bonds and cash-holdings. Liabilities include third-party reported values of debt in financial institutions, mortgage credit debt, credit and debit card debt, student debt, and all other liabilities such as unpaid taxes which are not deposited. After 1997, the asset statement is based solely on third-party reporting. Unlike in Sweden, we do not observe closely-held businesses or unlisted shares held by taxpayers neither before or after the wealth tax repeal. More information of the Danish wealth tax data can be found in Jakobsen et al. (2020).

These data are linked with a longitudinal dataset containing rich information on all earnings, transfers and demographics from 1989 to 2006, which include information on age, family situation or occupation.

Like in Sweden, we have access to detailed citizenship and migration information such as daily dates of entry and exit in the country. Individuals working in Denmark must obtain a personal identification number (CPR) to pay taxes, rent an apartment, or register with health insurance. The application for a CPR contains detailed questions about citizenship, country of origin, and date of entry in Denmark. Individuals must also register their move to the CPR office to stop paying taxes in Denmark. The Danish migration register has previously been described by Kleven et al. (2014).

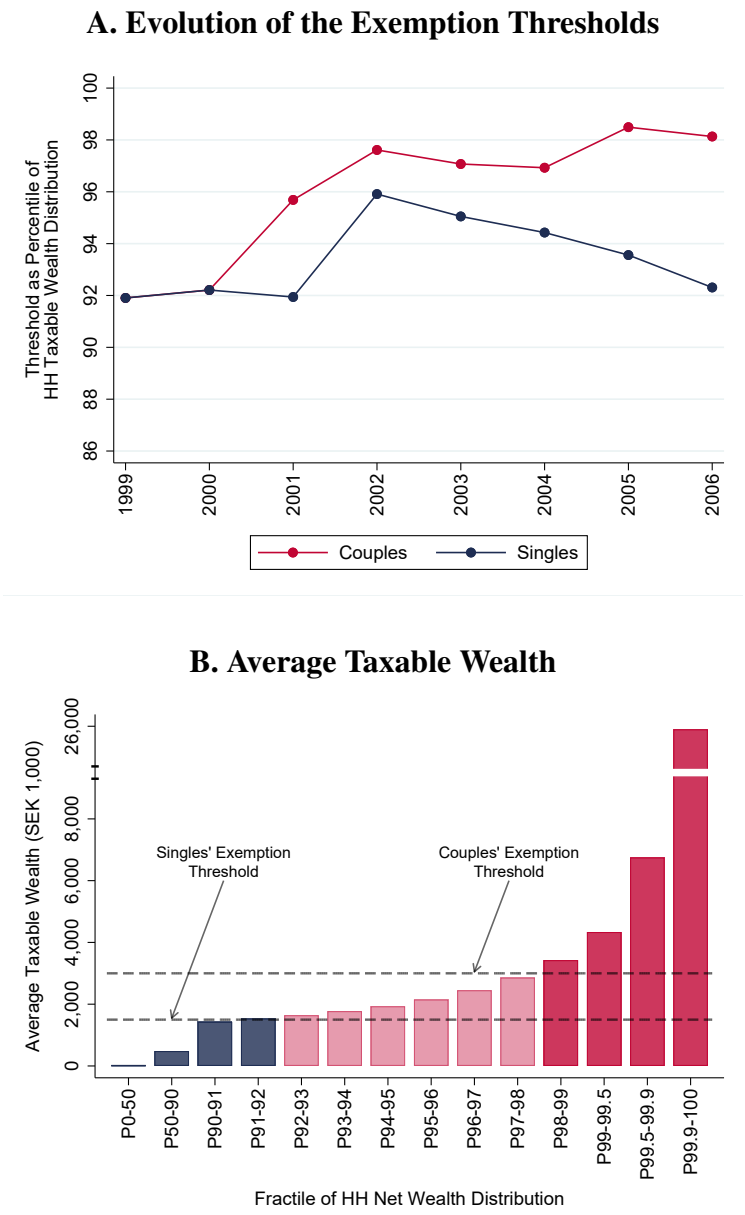
A summary of the different variables and datasets in Denmark and Sweden is presented in Table B.1. In Sweden, we have better information on unlisted companies, and will therefore focus on this country for our analysis of the effects of out-migration on firm-level outcomes.

Table B.1: **Sweden and Denmark**

| | Sweden | Denmark |
|---|---|---|
| *Panel A. Wealth Taxation* | | |
| Period of implementation | 1910-2007 | 1903-1997 |
| Exemption Threshold (percentile of wealth distribution) | 96th-98th | 98th |
| Tax ceiling | Y | Y |
| Exemptions (100%) | Business assets<br>Pension savings | Business assets<br>Pension savings |
| Number of brackets | 2 | 2 |
| Maximum Top MTR in the period | 1.5% | 2.2% |
| Revenue | 0.16% of GDP in 2006 | 0.06% of GDP in 1996 |
| *Panel B. Data Availability* | | |
| Migration (in or out) date | 1990-2019 | Y |
| Duration of stay abroad (days) | 1986-2019 | Y |
| Closely-Held Businesses | 2000-2017 | N |
| Income and transfers | 1990-2017 | Y |
| Inheritance | 2001-2005 | Y |

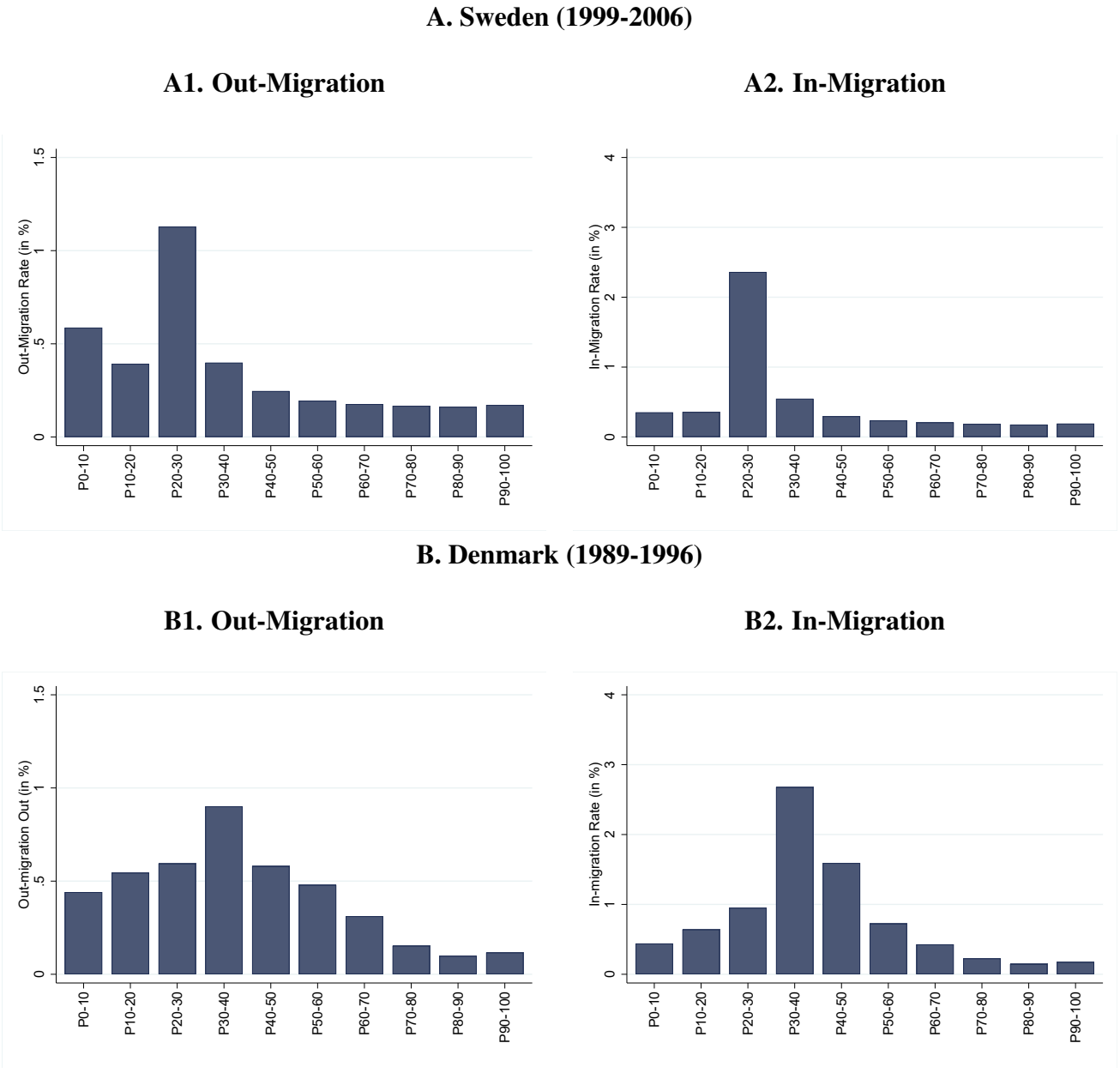
Notes: This Table summarizes the data and institutional environment for the wealth tax in Sweden and Denmark.

Figure A.1: **Exemption Threshold for the Wealth Tax in Sweden**



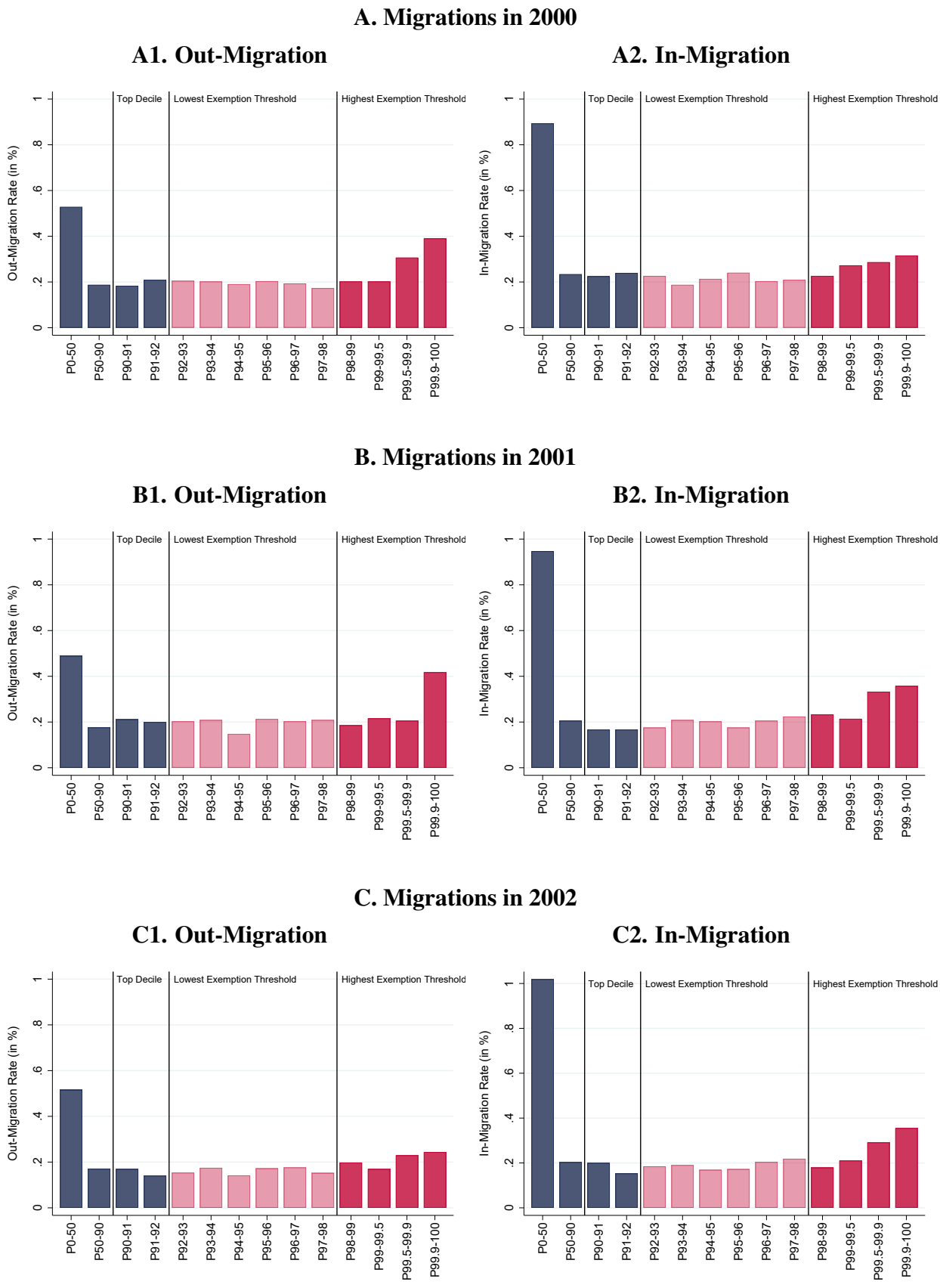

Notes: Panel A shows the evolution of the exemption threshold in the wealth tax for Sweden as a function of the household taxable wealth distribution. Panel B shows the average household taxable wealth in 2006. Households are ranked based on their total household net wealth in 2006.

Figure A.2: **Wealth and International Migration Patterns in Scandinavia**



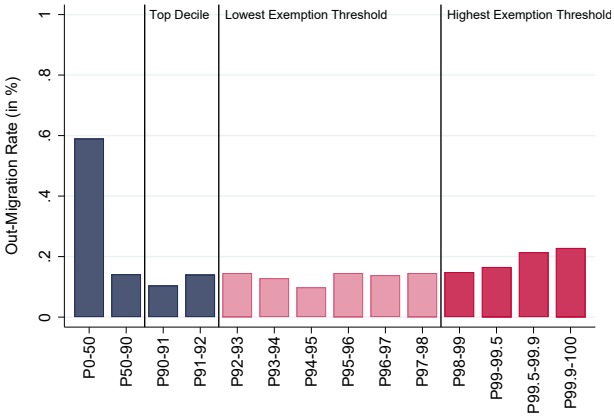

Notes: This figure shows in-migration and out-migration rates by level of total net worth, in Sweden (Panel A) and Denmark (Panel B). We compute those statistics during the last years when the wealth tax was still in place in each country, which corresponds to the period 1999-2006 in Sweden and the period 1989-1996 in Denmark.

Figure A.3: **Wealth and International Migration Patterns in Sweden Between 2000 and 2004**

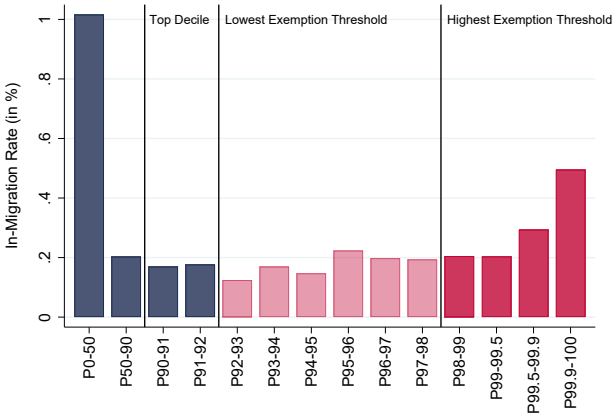


## D. Migrations in 2003

### D1. Out-Migration

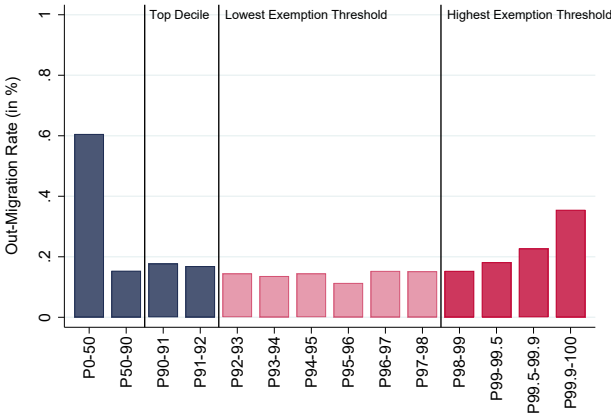



### D2. In-Migration

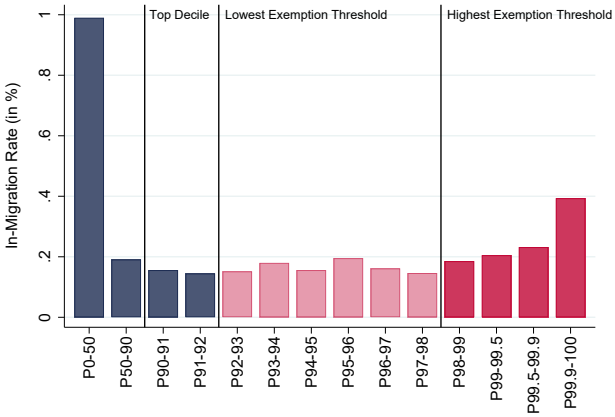



## E. Migrations in 2004

### E1. Out-Migration

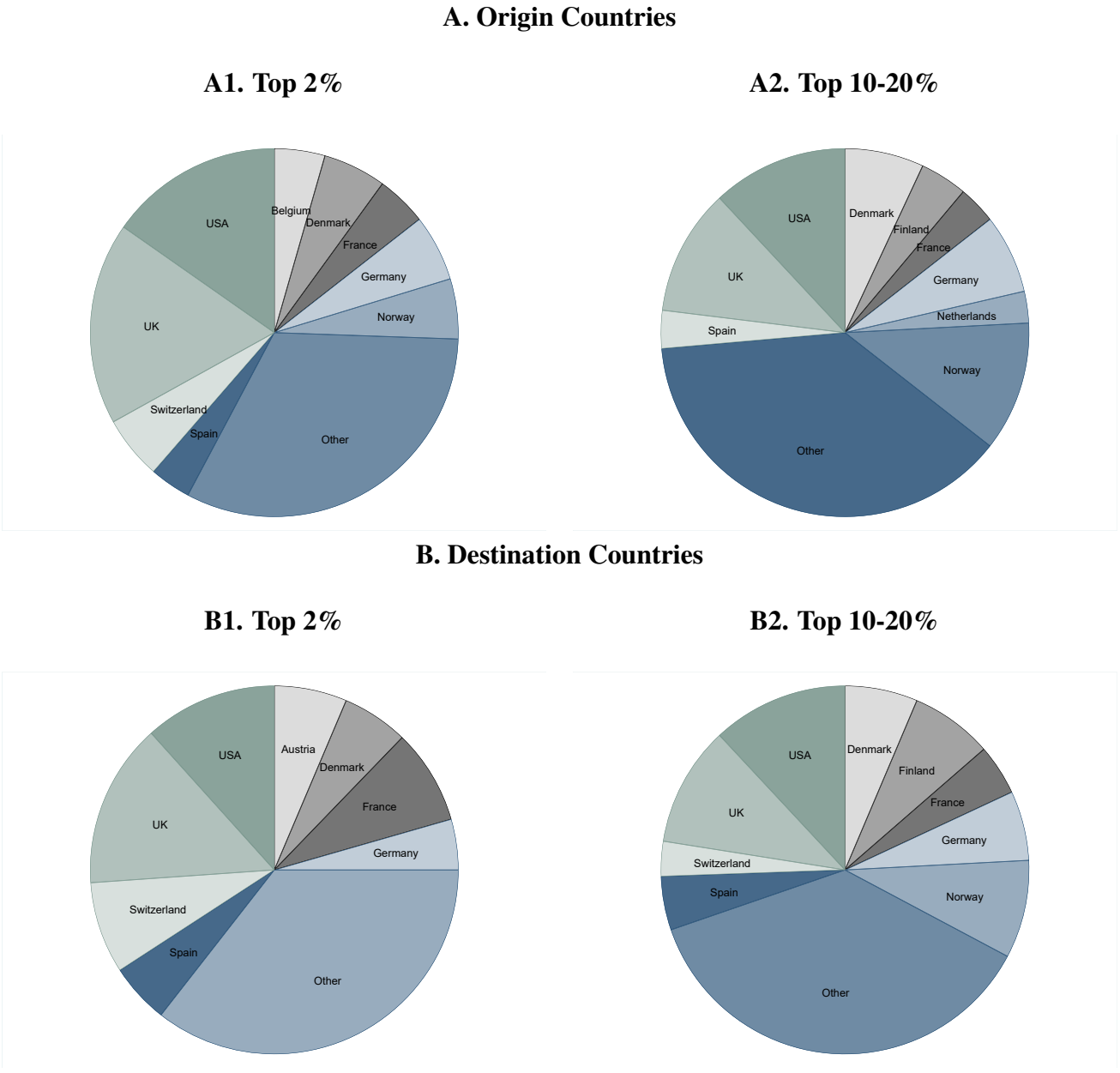



### E2. In-Migration




Notes: This figure shows in-migration and out-migration rates by level of total net worth in Sweden for each year between 2000 and 2004.

Figure A.4: **Migration at the top in Sweden: Main Origin and Destination Countries**



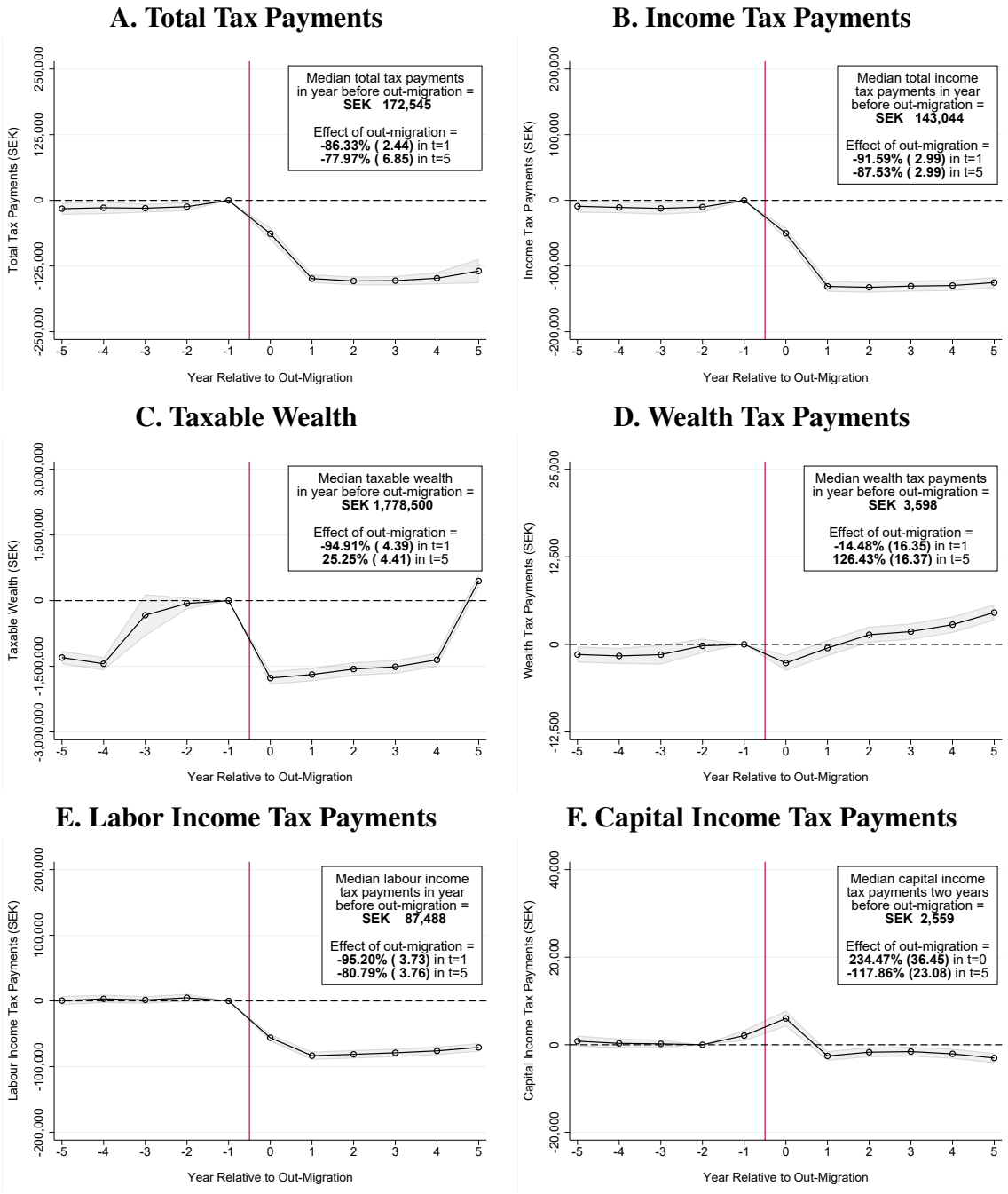

Notes: This figure describes the main origin countries of individuals in-migrating into Sweden (Panel A) and the main destination countries of individuals out-migrating from Sweden (Panel B) by wealth group (either individuals in the top 2% or in the top 10-20% of net wealth).

Table B.2: **Selection into Out-Migration from Sweden for Owners of Fast-Growing Active Closely-Held Businesses**

| | **All Individuals** | **Individuals in Top 2% of Net Wealth** |
|---|---|---|
| *Value Added Growth* | | |
| Year-on-Year, Top 25% | -6.84% | 47.90% |
| | (7.52) | (14.95) |
| Past 3 Years, Top 25% | -13.45% | 70.52% |
| | (7.60) | (15.34) |
| Past 5 Years, Top 25% | -21.32% | 63.16% |
| | (7.35) | (15.05) |
| Year-on-Year, Top 50% | -19.48% | 40.19% |
| | (4.51) | (9.03) |
| Past 3 Years, Top 50% | -21.80% | 39.86% |
| | (4.52) | (9.11) |
| Past 5 Years, Top 50% | -23.66% | 38.85% |
| | (4.51) | (9.14) |
| *Employment Growth* | | |
| Year-on-Year, Top 25% | -18.47% | 34.31% |
| | (7.36) | (14.85) |
| Year-on-Year, Top 50% | -19.39% | 24.90% |
| | (5.62) | (11.26) |

Notes: This table describes selection into out-migration for owners of fast-growing active closely-held businesses. Each row considers a different indicator of ownership of a fast-growing active CHB. More in detail, we computed the growth rate of each firm based on either its value added or its number of employees over different intervals of time (year-on-year, past 3 years, past 5 years). We then created yearly ranks of active CHBs based on such growth rates. In any given year, we defined an individual as the owner of a fast-growing active CHB if the highest growth rank among the active CHBs she owns in that year is in the top 25% or above the median. We used this indicator to estimate Equation 1 and Equation 2, together with age bins, education bins, a dummy for being foreign-born and a dummy for being an independent contractor. One regression was run for each indicator of ownership of a fast-growing active CHB shown in each table row. The equations were estimated on a sample including all individual-year observations where the individual was in the top 2% of net wealth and a random 10% of the remaining observations. The first column of the table displays the estimated coefficients on each ownership indicator from Equation 1. The second column displays the estimated coefficients on each ownership indicator interacted with a dummy for being in the top 2% of net wealth from Equation 2. All the coefficients displayed in the table were rescaled by the average predicted probability of out-migration and multiplied by 100 to be interpreted in relative terms.

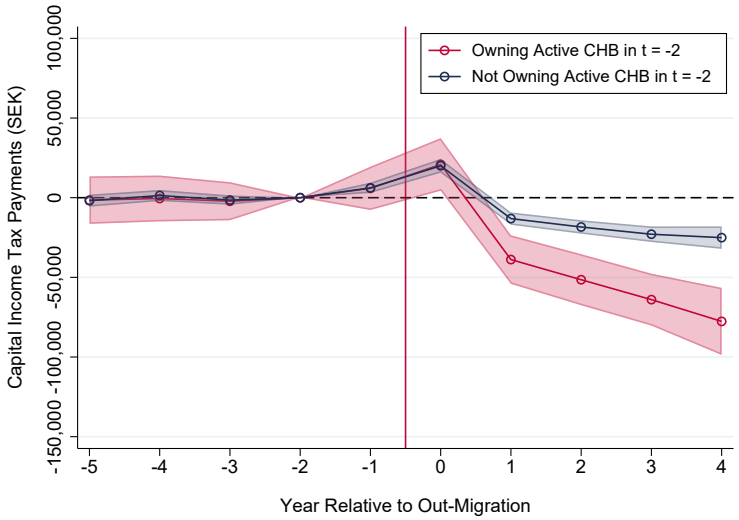
Figure A.5: **Median effects of Wealthy Out-Migration on Tax Payments, Top 2%**




Notes: This figure describes the evolution of wealthy individuals' outcomes before and after they leave Sweden, compared to control wealthy individuals who do not move that same year. The sample includes individuals who were in the top 2% of the net worth distribution in Sweden in the year before their true or placebo out-migration date. We plot the estimates $\beta_j$ from Equation 3 estimated via median regressions. For all outcomes except capital income tax payments, the estimates displayed in the text boxes are computed as the estimate of $\beta_j$ when $t = 1$ or $t = 5$ divided by the average outcome in the treatment group in $t = -1$, multiplied by 100. The standard errors are rescaled using the same approach. For capital income tax payments, we show the estimate of $\beta_j$ when $t = 0$ or $t = 5$ divided by the average outcome in the treatment group in $t = -2$, multiplied by 100.

Figure A.6: **Effect of Wealthy Out-Migration on Capital Income Tax Payments**

**A. Top 2%**




**B. Top 10%**

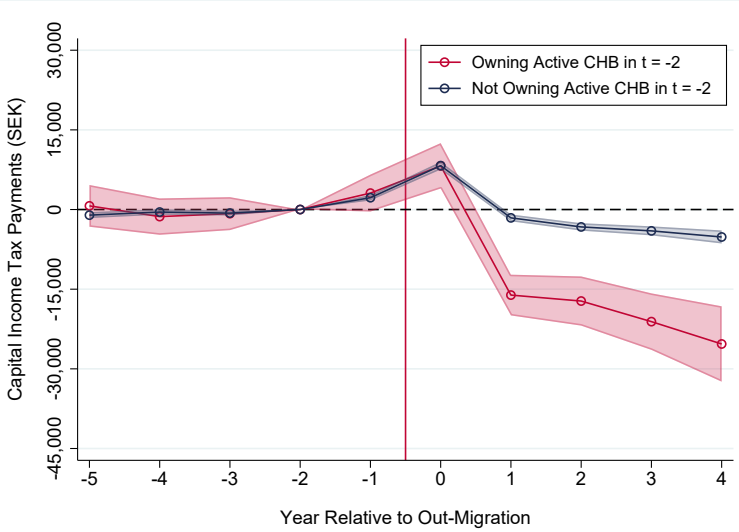
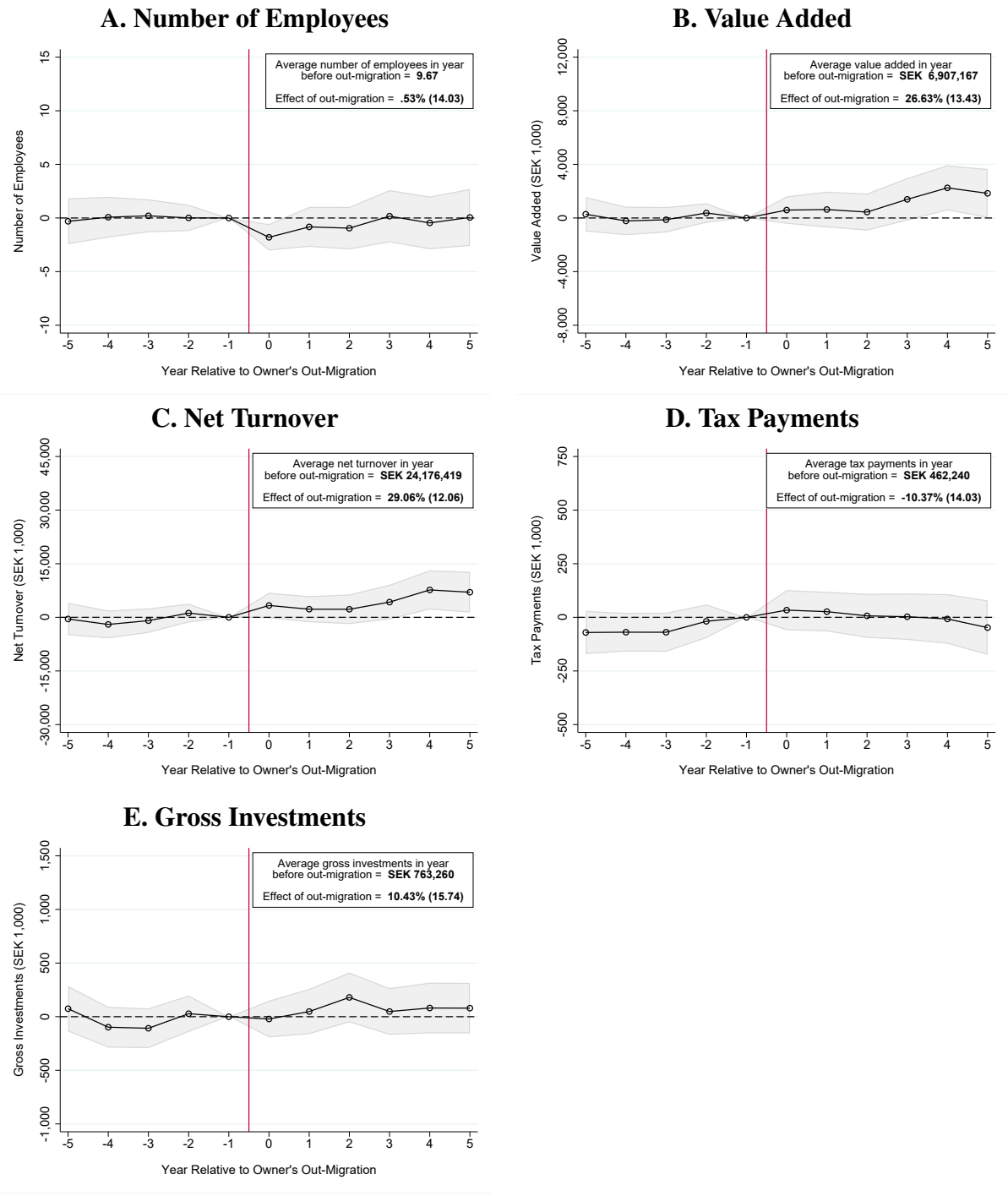


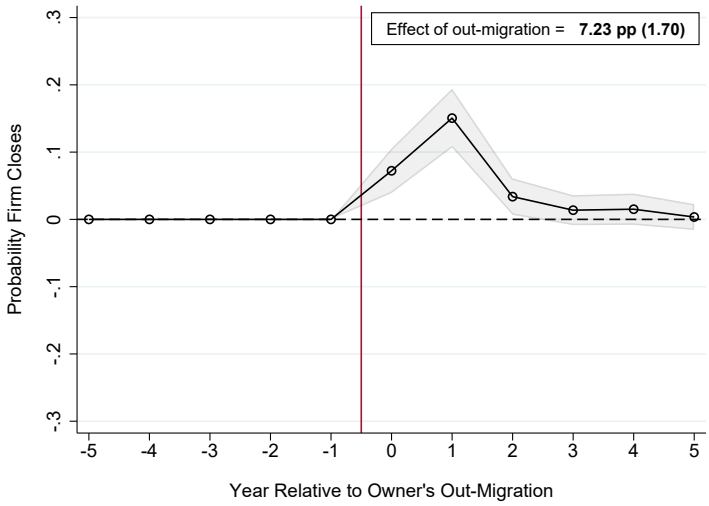
Figure A.7: **Effects of Wealthy Out-Migration on Closely-Held Businesses Outcomes Conditional on Existence of Firm, Top 2%**




Notes: This figure shows the effects of a wealthy owner out-migration events on firm-level outcomes conditional on the closely-held business being in existence. See main text for more details.

Figure A.8: **Effect of Wealthy Out-Migration on Closure of Closely-Held Businesses**

**A. Top 2%**




**B. Top 10%**

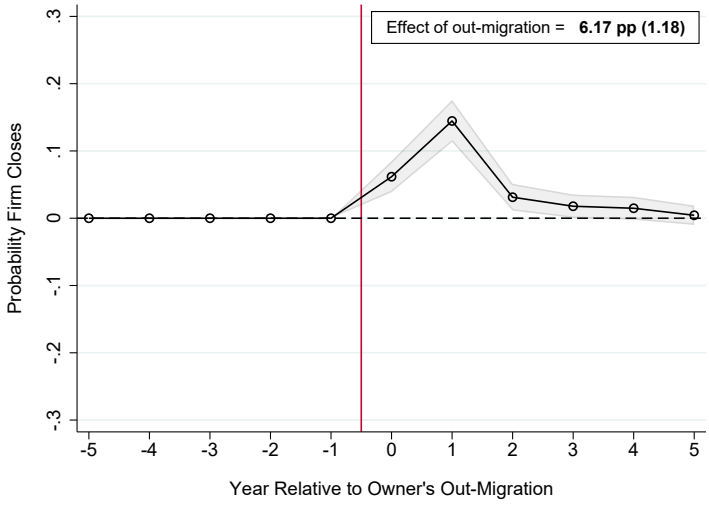
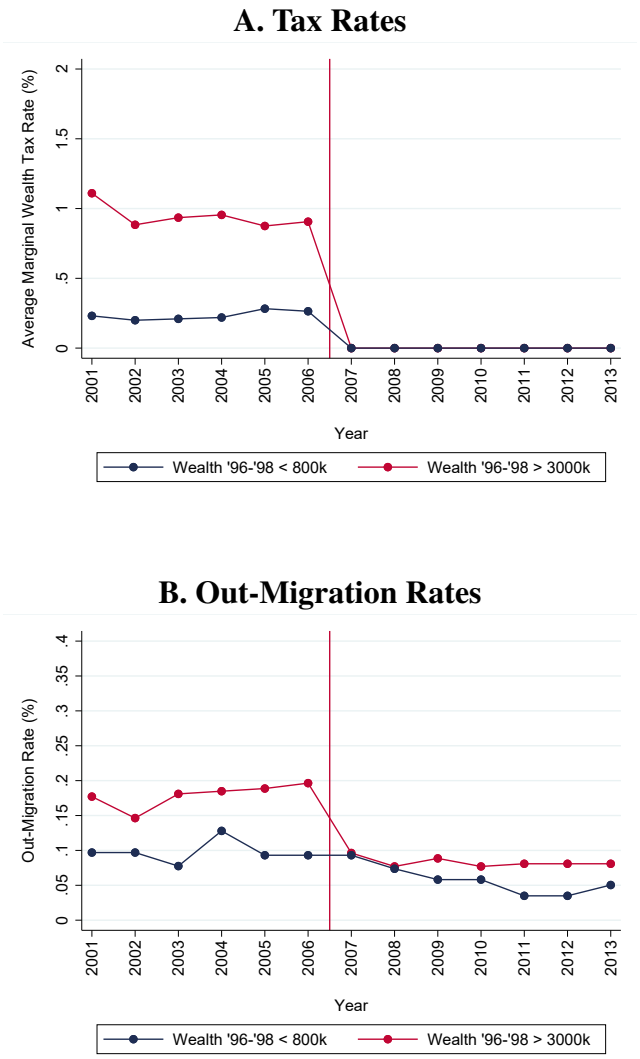


Table B.3: **Test of Equality of Out-Migration and In-Migration Effects in Firm-Level Event Studies**

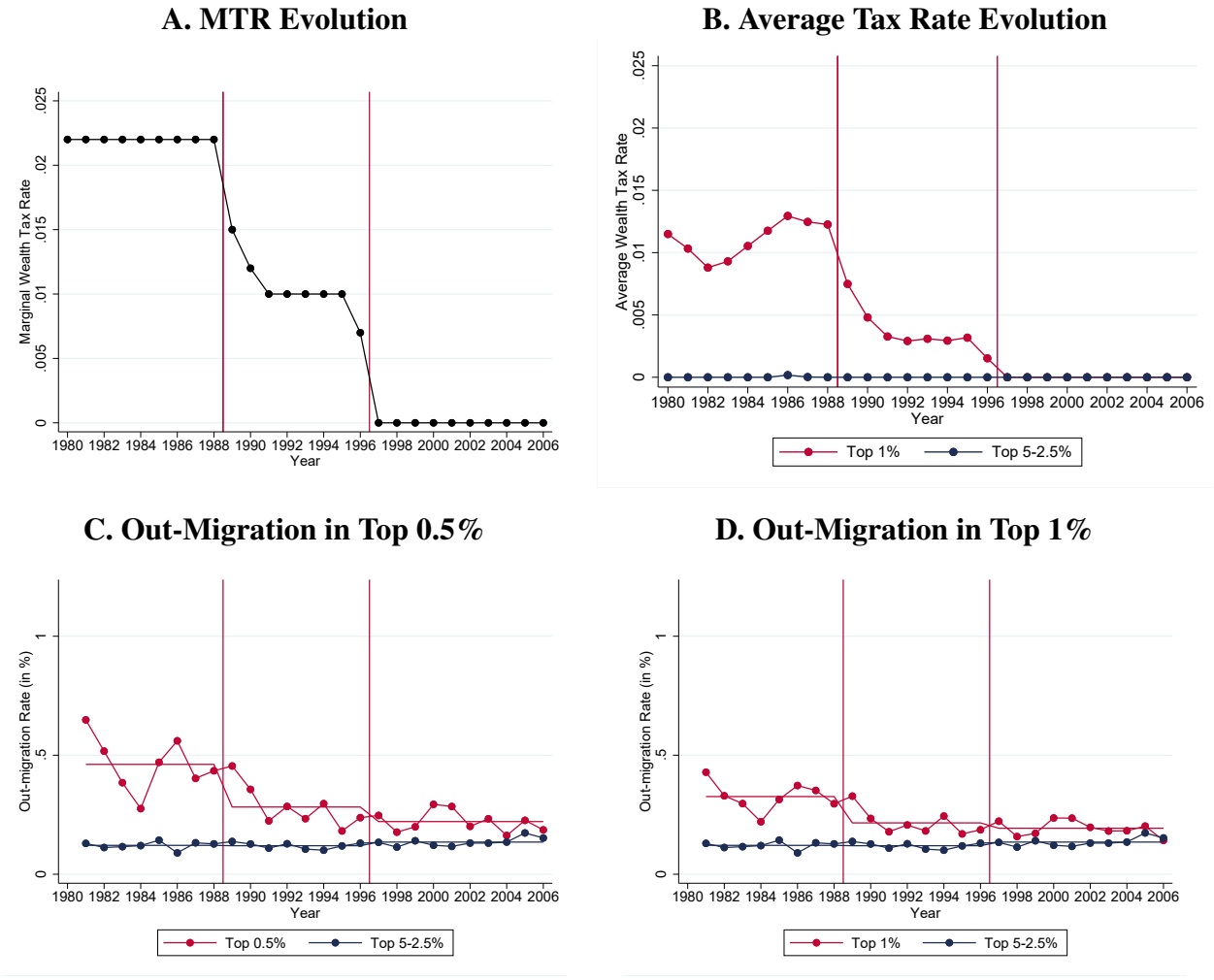
| Outcome | Effects In Levels | | | Percentage Effects | | |
|---|---|---|---|---|---|---|
| | **Out-Migration** $t_{out} = +5$ | **In-Migration** $t_{in} = +5$ | **T-Statistic** $t_{out} = t_{in}$ | **Out-Migration** $t_{out} = +5$ | **In-Migration** $t_{in} = +5$ | **T-Statistic** $t_{out} = t_{in}$ |
| *Panel A. Sample of CHBs with owner in the top 2% of net worth* | | | | | | |
| Prob. Firm Is Alive (pp) | -28.90 | 29.77 | 0.19 | -28.90% | 98.99% | 5.89 |
| | (2.98) | (3.47) | | (2.98) | (11.53) | |
| Number of Employees | -3.27 | 2.13 | -1.39 | -36.03% | 218.31% | 4.38 |
| | (0.72) | (0.40) | | (7.90) | (40.88) | |
| Value Added (SEK 1,000) | -2,140.79 | 430.68 | -2.92 | -32.92% | 39.04% | 0.25 |
| | (524.88) | (259.09) | | (8.07) | (23.48) | |
| Net Turnover (SEK 1,000) | -6,952.00 | 1,910.29 | -2.65 | -31.24% | 50.67% | 0.71 |
| | (1,621.51) | (991.08) | | (7.29) | (26.29) | |
| Tax Payments (SEK 1,000) | -215.34 | -1.19 | -5.05 | -51.55% | -2.21% | -1.50 |
| | (38.62) | (18.63) | | (9.24) | (34.71) | |
| Gross Investments (SEK 1,000) | -189.62 | -0.14 | -2.24 | -27.58% | -0.09% | -0.90 |
| | (69.36) | (48.63) | | (10.09) | (28.87) | |
| *Panel B. Sample of CHBs with owner in the top 10% of net worth* | | | | | | |
| Prob. Firm Is Alive (pp) | -27.46 | 29.50 | 0.69 | -27.46% | 135.65% | 11.27 |
| | (2.15) | (2.03) | | (2.15) | (9.36) | |
| Number of Employees | -3.18 | 1.64 | -3.34 | -40.04% | 204.75% | 6.67 |
| | (0.42) | (0.19) | | (5.27) | (24.12) | |
| Value Added (SEK 1,000) | -1,732.57 | 488.17 | -4.28 | -34.99% | 74.89% | 2.11 |
| | (266.02) | (117.93) | | (5.37) | (18.09) | |
| Net Turnover (SEK 1,000) | -5,439.72 | 1,491.35 | -4.39 | -34.36% | 68.48% | 1.90 |
| | (819.08) | (373.87) | | (5.17) | (17.17) | |
| Tax Payments (SEK 1,000) | -133.42 | 4.51 | -6.67 | -48.24% | 16.60% | -1.21 |
| | (18.07) | (6.87) | | (6.53) | (25.26) | |
| Gross Investments (SEK 1,000) | -133.65 | 53.57 | -2.05 | -29.76% | 79.32% | 2.00 |
| | (35.67) | (15.86) | | (7.94) | (23.48) | |

Figure A.9: **Out-Migration Rates by Predicted Exposure to the Wealth Tax Reform**




Notes: This figure shows the evolution of wealth tax rates (Panel A) and out-migration rates (Panel B) by exposure to the repeal of the wealth tax in Sweden, denoted by the vertical red line. We predict exposure to the reform by level of wealth in 1996-1998, comparing individuals above the highest exemption threshold during that period (3,000K, red) and individuals below the lowest exemption threshold (800K, blue).

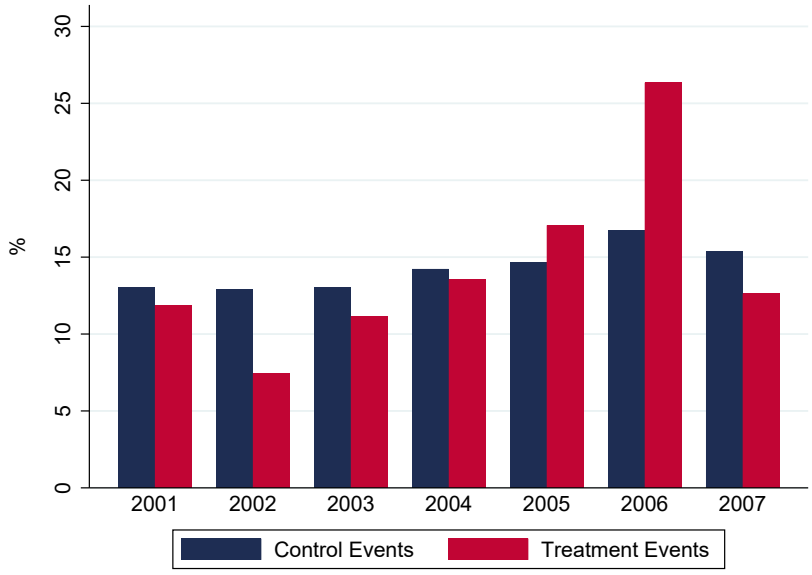
Figure A.10: **Effect of the Wealth Tax Reform on Out-Migration in Denmark**



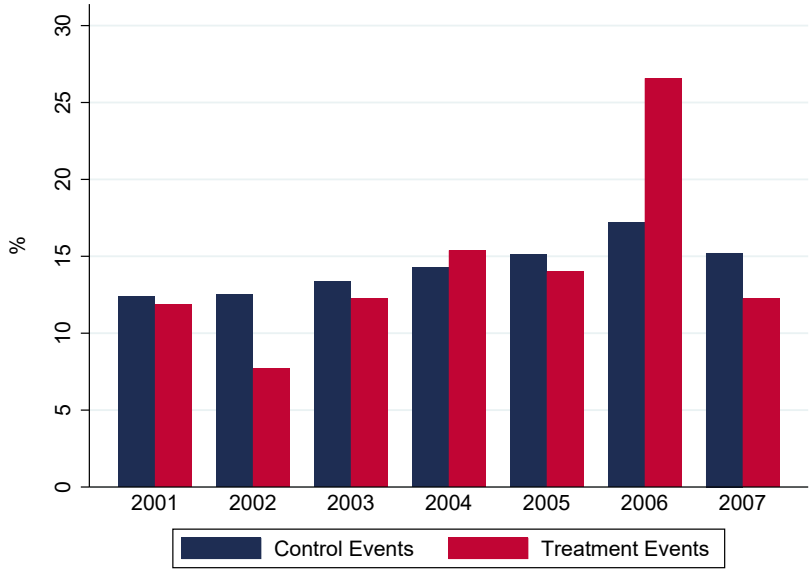

Notes: This figure shows the out-migration patterns of wealthy taxpayers in Denmark around two large reforms in the wealth tax.

Figure A.11: **Distribution of Out-Migration Event Dates in the CHB Event Study Samples**

**B. Sample of CHBs with owners in the top 10% of net worth**

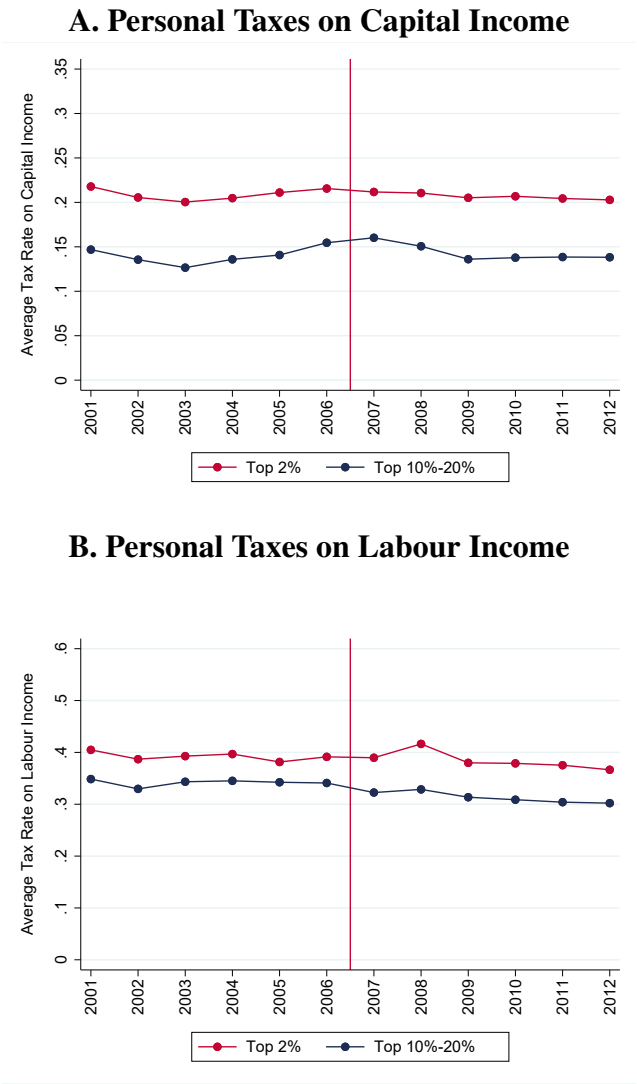



**B. Sample of CHBs with owners in the top 2% of net worth**




Notes: This figure displays the distribution of the out-migration event dates included in the sample of closely-held businesses with owners in the top 10% (Panel A) and with owners in the top 2% (Panel B) of net worth. A firm may appear more than once if it experienced simultaneous events, although this occurs for only 4.4% of firms in the sample of Panel A and 3.3% of firms in the sample of Panel B.

Figure A.12: **Effective Tax Rates on Capital and Labor Income**




Notes: This figure plots the effective tax rate on capital income (Panel A) and on labor income (Panel B) for our treated group (wealthy subject to the wealth tax, red lines) and for our control group (wealthy taxpayers not subject to the wealth tax, blue line). The tax rate on capital income (Panel A) is computed as the ratio of capital income tax payments over capital income. The top 2% of capital income tax payments among individuals in the top 20% of net wealth was winsorised. The tax rate on labor income (Panel B) is computed as the ratio of labor income tax payments over taxable income. The vertical red line denotes the year where the wealth tax was repealed in Sweden.

Figure A.13: **Effective Tax Rate on Capital Income and Wealth**




Notes: This figure plots the effective tax rate on the sum of capital income and wealth for our treated group (wealthy subject to the wealth tax, red line) and for our control group (wealthy taxpayers not subject to the wealth tax, blue line). The tax rate is the ratio of the sum of tax payments on capital income and wealth over net wealth. The top 2% of capital income tax payments among individuals in the top 20% of net wealth was winsorised. The vertical red line denotes the year where the wealth tax was repealed in Sweden.

Table B.4: **Descriptive Statistics on the Unbalanced, Balanced, and Winsorised Characteristics of Closely-Held Businesses in the Event Study Samples**

| | Unbalanced | | | Balanced | | | Winsorised | | |
|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **Median** | **Std. Dev.** | **Mean** | **Median** | **Std. Dev.** | **Mean** | **Median** | **Std. Dev.** |
| *Panel A. Sample of CHBs with owner in the top 10% of net worth* | | | | | | | | | |
| Nr. of Employees | 9.01 | 3.00 | 32.94 | 7.38 | 2.00 | 30.00 | 4.98 | 2.00 | 7.73 |
| Value Added | 6,747 | 2,128 | 41,620 | 5,429 | 1,455 | 37,431 | 3,485 | 1,455 | 5,020 |
| Net Turnover | 21,901 | 5,550 | 128,013 | 17,624 | 3,642 | 115,162 | 10,584 | 3,642 | 16,510 |
| Tax Payments | 323 | 44 | 4,039 | 260 | 17 | 3,625 | 137 | 17 | 255 |
| Gross Investments | 907 | 52 | 9,540 | 726 | 15 | 8,543 | 305 | 15 | 650 |
| *Panel B. Sample of CHBs with owner in the top 2% of net worth* | | | | | | | | | |
| Nr. of Employees | 11.63 | 3.00 | 48.23 | 9.57 | 2.00 | 43.96 | 5.88 | 2.00 | 9.70 |
| Value Added | 9,402 | 2,406 | 60,633 | 7,615 | 1,612 | 54,693 | 4,525 | 1,612 | 7,001 |
| Net Turnover | 32,344 | 6,621 | 190,622 | 26,197 | 4,241 | 172,022 | 14,824 | 4,241 | 24,651 |
| Tax Payments | 503 | 58 | 6,253 | 407 | 22 | 5,631 | 209 | 22 | 403 |
| Gross Investments | 1,521 | 75 | 15,456 | 1,221 | 23 | 13,863 | 452 | 23 | 960 |

Notes: The unit of measure for value added, net turnover, tax payments, and gross investments is SEK 1,000. The winsorisation was done on the balanced outcome, that is the outcome where zeros were imputed when the value was missing. For number of employees, only the top 5% was winsorised. For all other outcomes, the top 5% and the bottom 1% were winsorised. The data used to produce this tables comes from the event study samples.

Table B.5: **Descriptive Statistics on the Characteristics of Closely-Held Businesses in the Event Study Samples**

| | Control CHBs | | | | Treated CHBs | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Variable** | **Mean** | **Median** | **Std. Dev.** | **Obs.** | **Mean** | **Median** | **Std. Dev.** | **Obs.** | **% of Swedish Aggregates** | **% of Active CHBs** |
| *Panel A. Sample of CHBs with owner in the top 10% of net worth* | | | | | | | | | | |
| Nr. of Owners | 1.88 | 1 | 3.37 | 439,807 | 3.55 | 2 | 11.86 | 4,535 | | |
| Nr. of Employees | 8.95 | 3 | 32.45 | 439,897 | 15.02 | 2 | 64.68 | 4,537 | 0.03% | 0.20% |
| Value Added | 6,562 | 2,121 | 39,092 | 497,511 | 22,301 | 3,018 | 136,822 | 5,892 | 0.06% | 0.28% |
| Net Turnover | 21,336 | 5,529 | 123,227 | 497,511 | 69,608 | 8,592 | 340,066 | 5,892 | 0.06% | 0.31% |
| Tax Payments | 312 | 44 | 4,003 | 497,511 | 1,249 | 71 | 6,314 | 5,892 | 0.08% | 0.42% |
| Gross Investments | 899 | 52 | 9,560 | 484,122 | 1,561 | 79 | 7,673 | 5,846 | 0.02% | 0.13% |
| *Panel B. Sample of CHBs with owner in the top 2% of net worth* | | | | | | | | | | |
| Nr. of Owners | 1.87 | 1 | 3.4 | 168,646 | 4.48 | 2 | 14.82 | 2,280 | | |
| Nr. of Employees | 11.54 | 3 | 47.74 | 168,696 | 18.74 | 3 | 75.71 | 2,282 | 0.02% | 0.14% |
| Value Added | 9,040 | 2,394 | 56,568 | 190,607 | 31,403 | 3,572 | 179,293 | 3,137 | 0.04% | 0.20% |
| Net Turnover | 31,298 | 6,582 | 183,726 | 190,607 | 95,952 | 10446 | 434,895 | 3,137 | 0.04% | 0.22% |
| Tax Payments | 482 | 58 | 6,215 | 190,607 | 1,759 | 94 | 8,104 | 3,137 | 0.06% | 0.29% |
| Gross Investments | 1,511 | 75 | 15,534 | 182,094 | 2,146 | 99 | 9,860 | 3,096 | 0.02% | 0.09% |

Notes: The unit of measure for value added, net turnover, tax payments, and gross investments is SEK 1,000. To obtain the percentages of Swedish aggregates, for each firm included in the event study samples we considered the year before their owners' out-migration. For each such year (2000-2006), we summed value added, net turnover, tax payments, gross investments. Then, we divided these sums by the total of the same variables for all Swedish firms. Finally, we averaged our ratios using as weights the number of firms in each $t-1$ year. For employment, we followed the same approach. However, we defined total employment as the total number of individuals reporting taxable income in Sweden.

Figure A.14: **Distribution of Closely-Held Businesses Across Sectors by Owners' Net Worth**

**A. All Active Closely-Held Businesses, All Years**




**B. Only Active Closely-Held Businesses with Out-Migrant Owners**




Notes: "Other" includes fishing, mining/quarrying, electricity/water/gas supply, public administration/defence, private households employing domestic staff, and extra-territorial organisations. The data used covers the years 2000-2006. A closely-held business is defined as active if it employs at least one worker beyond the owners. The wealth rank of owners is obtained within each year from wealth data on the adult Swedish population. For each year, closely-held businesses are assigned the highest wealth rank among their owners. Panel B considers only firms with out-migrant owners in the year before their out-migration.

Table B.6: **Effects of Wealthy Out-Migration on Closely-Held Business Outcomes in t+5 by Winsorization Method**

| Winsorization | Number of Employees | Value Added | Net Turnover | Tax Payments | Gross Investments |
|---|---|---|---|---|---|
| | *Panel A. Sample of CHBs with owner in the top 10% of net worth* | | | | |
| None | -39.4% | 49.6% | 32.5% | 23.9% | 12.7% |
| | (19.28) | (36.39) | (27.97) | (34.37) | (26.67) |
| Top 1% | -44.0% | -20.4% | -22.7% | -63.2% | -21.9% |
| | (7.33) | (10.29) | (7.71) | (28.77) | (11.87) |
| Top 5% | -40.0% | -28.1% | -34.4% | -105.8% | -29.8% |
| | (5.27) | (10.39) | (5.17) | (53.08) | (7.94) |
| Top 10% | -37.2% | -26.9% | -35.1% | -150.3% | -29.5% |
| | (4.32) | (12.38) | (4.54) | (94.29) | (6.51) |
| Bottom 1% + Top 1% | | -26.2% | -22.7% | -36.0% | -21.9% |
| | | (7.67) | (7.71) | (9.00) | (11.87) |
| Bottom 1% + Top 5% | | -35.0% | -34.4% | -48.2% | -29.8% |
| | | (5.37) | (5.17) | (6.53) | (7.94) |
| Bottom 1% + Top 10% | | -35.9% | -35.1% | -46.8% | -29.5% |
| | | (4.71) | (4.54) | (5.69) | (6.51) |
| | *Panel B. Sample of CHBs with owner in the top 2% of net worth* | | | | |
| None | -44.1% | 55.0% | 37.2% | -3.4% | 35.5% |
| | (24.57) | (47.16) | (36.20) | (44.12) | (35.81) |
| Top 1% | -37.8% | -11.5% | -22.4% | -70.3% | -2.4% |
| | (11.37) | (15.17) | (11.11) | (35.90) | (17.17) |
| Top 5% | -36.0% | -21.7% | -31.2% | -125.9% | -27.6% |
| | (7.90) | (16.46) | (7.29) | (67.16) | (10.09) |
| Top 10% | -33.6% | -21.0% | -31.4% | -192.3% | -28.4% |
| | (6.33) | (21.15) | (6.53) | (122.97) | (8.82) |
| Bottom 1% + Top 1% | | -20.6% | -22.4% | -35.7% | -2.4% |
| | | (11.11) | (11.11) | (12.14) | (17.17) |
| Bottom 1% + Top 5% | | -32.9% | -31.2% | -51.5% | -27.6% |
| | | (8.07) | (7.29) | (9.24) | (10.09) |
| Bottom 1% + Top 10% | | -36.0% | -31.4% | -52.2% | -28.4% |
| | | (7.21) | (6.53) | (8.34) | (8.82) |

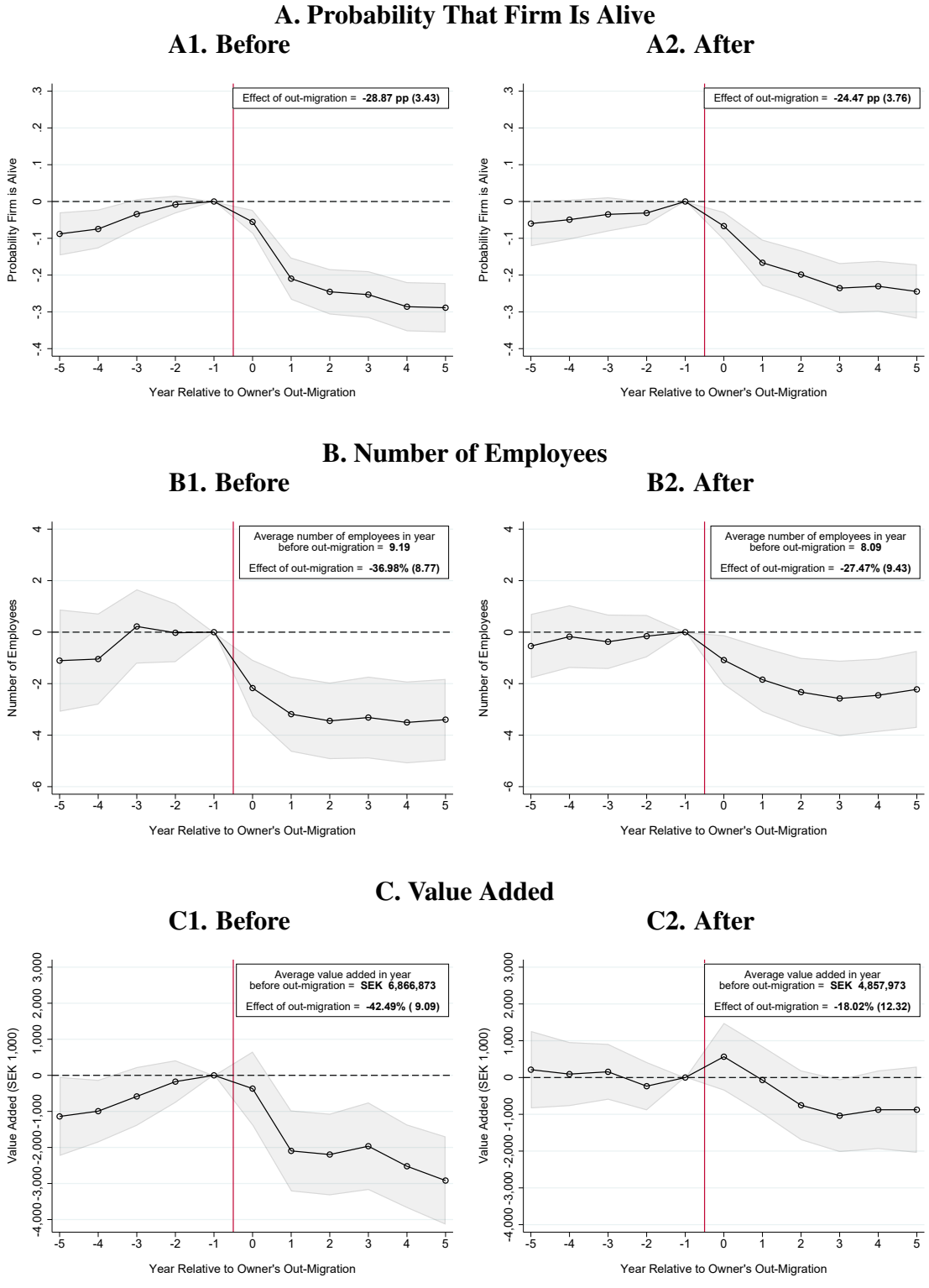
Notes: The table reports the estimated $\beta_j$ in $t = 5$ from Equation 4, rescaled by the average outcome of the treatment group in $t = -1$ and multiplied by 100. The standard errors are rescaled following the same approach. Each row considers a different winsorization for the outcome, as detailed in the first column.

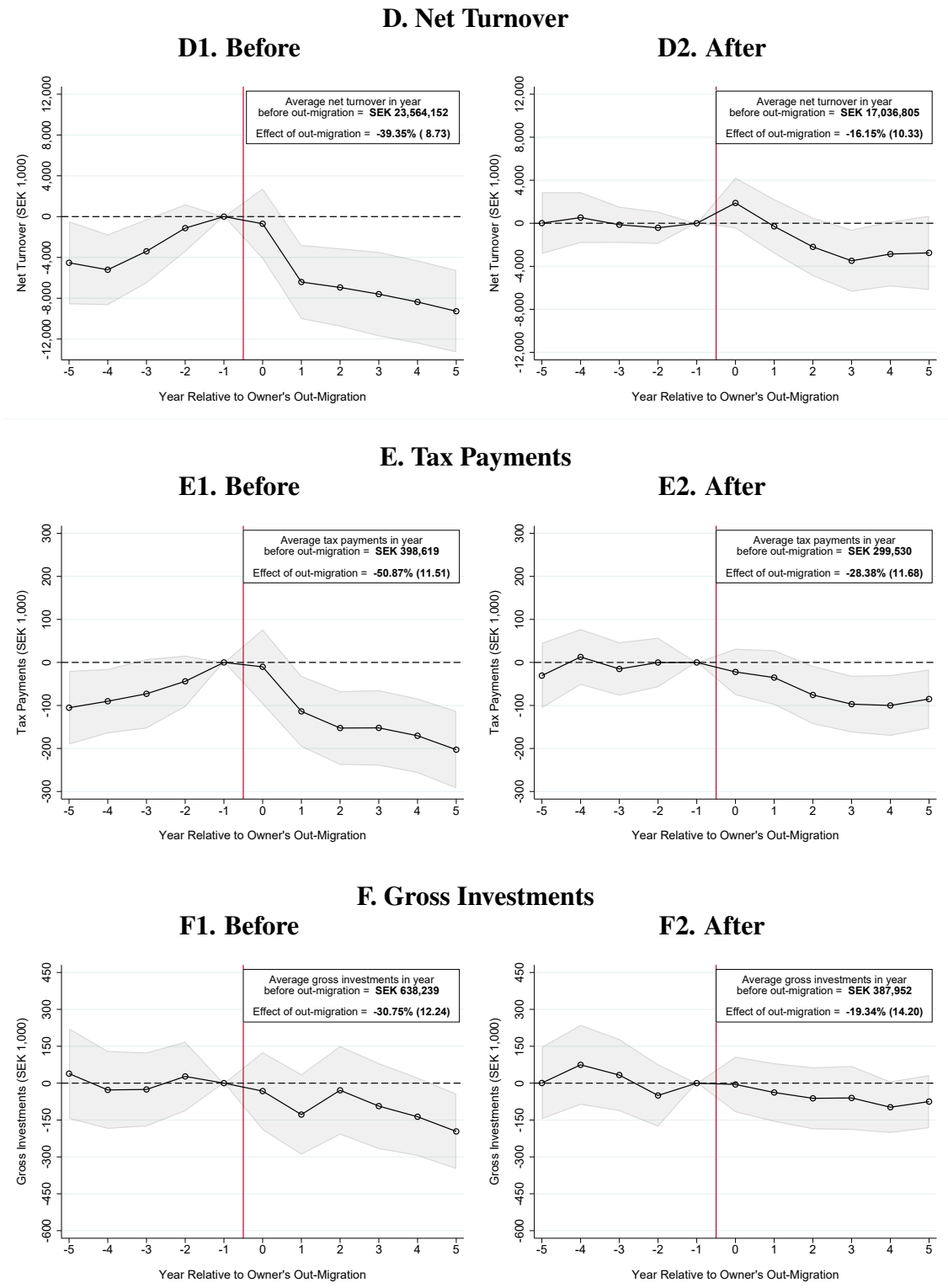
Table B.7: **Effects of Wealthy Out-Migration on Directly and Indirectly Owned Firms**

| Outcome | Only Directly-Held Firms | | Directly and Indirectly-Held Firms | |
|---|---|---|---|---|
| | **Average Outcome for Treated in** $t=-1$ | **Effect in** $t=+5$ | **Average Outcome for Treated in** $t=-1$ | **Effect in** $t=+5$ |
| *Panel A. Sample of firms with owner in the top 2% of net worth* | | | | |
| Prob. Firm Is Alive (pp) | 1.00 | -27.41% | 1.00 | -21.08% |
| | | (2.91) | | (3.44) |
| Number of Employees | 8.63 | -33.26% | 21.17 | -18.79% |
| | | (7.72) | | (5.52) |
| Value Added (SEK 1,000) | 6,198.86 | -34.22% | 11,874.08 | -33.13% |
| | | (7.91) | | ( 7.81) |
| Net Turnover (SEK 1,000) | 21,274.53 | -31.71% | 39,673.01 | -27.11% |
| | | (7.19) | | (5.04) |
| Tax Payments (SEK 1,000) | 390.50 | -50.51% | 483.27 | -45.00% |
| | | (9.27) | | (11.25) |
| Gross Investments (SEK 1,000) | 636.34 | -21.90% | 877.68 | -19.49% |
| | | (10.08) | | (6.13) |
| *Panel B. Sample of firms with owner in the top 10% of net worth* | | | | |
| Prob. Firm Is Alive (pp) | 1.00 | -27.54% | 1.00 | -23.75% |
| | | (2.13) | | (2.48) |
| Number of Employees | 7.65 | -39.61% | 16.70 | -24.58% |
| | | (5.20) | | (4.43) |
| Value Added (SEK 1,000) | 4,897.37 | -36.24% | 8,766.36 | -34.89% |
| | | (5.24) | | (5.86) |
| Net Turnover (SEK 1,000) | 15,674.65 | -34.70% | 28,749.12 | -31.81% |
| | | (5.07) | | (4.57) |
| Tax Payments (SEK 1,000) | 263.87 | -52.49% | 347.41 | -47.37% |
| | | (6.39) | | (7.77) |
| Gross Investments (SEK 1,000) | 449.47 | -29.67% | 631.57 | -23.16% |
| | | (7.73) | | (5.22) |

Notes: The table reports the estimated $\beta_j$ in $t=5$ from Equation 4, rescaled by the average outcome of the treatment group in $t=-1$ and multiplied by 100. The standard errors are rescaled following the same approach.

Figure A.15: **Effects of Wealthy Out-Migration on Closely-Held Business Outcomes Before and After the Repeal of the Wealth Tax, Top 2%**






Notes: This figure shows the firm-level event study using out-migrations between 2001 and 2006 (“before" the repeal of the wealth tax) and using out-migrations between 2007 and 2013 (“after" the repeal of the wealth tax). In order to classify owners as wealthy even beyond 2006, these event studies were produced using predicted net wealth.

Table B.8: **Test of Equality of Out-Migration Effects in Firm-Level Event Studies Estimated Before and After the Repeal of the Wealth Tax**

| | **Effects In Levels** | | | **Percentage Effects** | | |
|---|---|---|---|---|---|---|
| **Outcome** | **Out-Migration Years: [2001, 2006]** $t_{pre} = +5$ | **[2007, 2013]** $t_{post} = +5$ | **T-Statistic** $t_{pre} = t_{post}$ | **Out-Migration Years: [2001, 2006]** $t_{pre} = +5$ | **[2007, 2013]** $t_{post} = +5$ | **T-Statistic** $t_{pre} = t_{post}$ |
| *Panel A. Sample of CHBs with owner in the top 2% of net worth* | | | | | | |
| Prob. Firm Is Alive (pp) | -28.87 | -24.47 | -0.86 | -28.87% | -24.47% | -0.86 |
| | (3.43) | (3.76) | | (3.43) | (3.76) | |
| Number of Employees | -3.40 | -2.22 | -1.06 | -36.98% | -27.47% | -0.74 |
| | (0.81) | (0.76) | | (8.77) | (9.43) | |
| Value Added (SEK 1,000) | -2,917.69 | -875.50 | -2.36 | -42.49% | -18.02% | -1.60 |
| | (624.32) | (598.45) | | (9.09) | (12.32) | |
| Net Turnover (SEK 1,000) | -9,272.68 | -2,752.19 | -2.41 | -39.35% | -16.15% | -1.72 |
| | (2,056.28) | (1,759.98) | | (8.73) | (10.33) | |
| Tax Payments (SEK 1,000) | -202.78 | -85.00 | -2.04 | -50.87% | -28.38% | -1.37 |
| | (45.88) | (34.98) | | (11.51) | (11.68) | |
| Gross Investments (SEK 1,000) | -196.29 | -75.02 | -1.27 | -30.75% | -19.34% | -0.61 |
| | (78.13) | (55.09) | | (12.24) | (14.20) | |
| *Panel B. Sample of CHBs with owner in the top 10% of net worth* | | | | | | |
| Prob. Firm Is Alive (pp) | -29.43 | -21.42 | -2.28 | -29.43% | -21.42% | -2.28 |
| | (2.35) | (2.61) | | (2.35) | (2.61) | |
| Number of Employees | -2.99 | -1.25 | -2.83 | -37.64% | -19.31% | -2.13 |
| | (0.45) | (0.42) | | (5.63) | (6.49) | |
| Value Added (SEK 1,000) | -1,971.17 | -580.00 | -3.29 | -38.13% | -14.59% | -2.49 |
| | (302.86) | (295.85) | | (5.86) | (7.44) | |
| Net Turnover (SEK 1,000) | -6,343.26 | -1,402.27 | -3.82 | -37.72% | -11.64% | -2.86 |
| | (970.92) | (852.21) | | (5.77) | (7.08) | |
| Tax Payments (SEK 1,000) | -138.11 | -61.62 | -2.96 | -51.94% | -29.15% | -2.11 |
| | (19.93) | (16.46) | | (7.49) | (7.78) | |
| Gross Investments (SEK 1,000) | -162.77 | -58.51 | -1.98 | -32.94% | -20.27% | -0.93 |
| | (42.64) | (30.69) | | (8.63) | (10.63) | |

# C Prediction Model of Wealth

Recall that we do not observe individual-level information on wealth after 2007. We use our rich data environment to predict an individual wealth after 2007. We build an ensemble classification model and exploit the identify of budget constraint to predict the law of motion of wealth. More specifically, we predict current wealth using rich information on past wealth, parental wealth, past earnings and capital income, and rich set of demographics. We train random-forests on 10% of a random sample of the Swedish population and we then classify the population in groups of predicted net wealth.

We start with the law of motion of wealth:

$$\underbrace{W_t}_{\text{Wealth}} = \underbrace{(1+r_t)}_{\text{1 + Rate of return}} W_{t-1} + \underbrace{E_t}_{\text{Earnings}} + \underbrace{I_t}_{\text{Inheritance}} - \underbrace{C_t}_{\text{Consumption}} \tag{8}$$

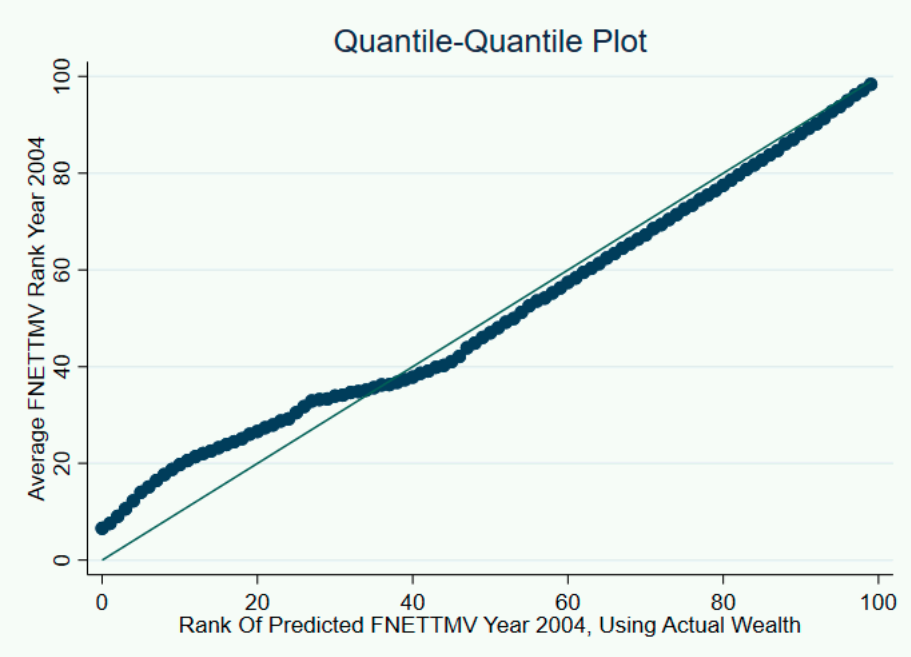
For individuals observed in $t$, even after the end of the wealth tax when the information on wealth disappears, we can use the rich information on their observed past wealth to predict their wealth forward. We get after X iterations:

$$W_t = W_{t-X} \prod_{j=t-X}^{t} (1+r_j) + \sum_{k=t-X}^{t} (E_k + I_k - C_k) \prod_{j=k+1}^{t} (1+r_j) \tag{9}$$

We then use our rich dataset to measure each component of our model of predicted wealth.

- We use past observed taxable wealth that is recorded in the IoT dataset from 1993 to 2007. For X=7, we can use our model to predict wealth from 2000 to 2017.
- We measure past disposable earnings recorded in the LISA dataset from 1990 to 2017, that allows us to account for all potential sources of income.
- To measure returns, we use cumulated capital income over the past X years that is recorded in LISA from 1990 to 2017. One caveat is that we only observe realized capital gains, by definition. However, as we observe those gains cumulated over time, this reduces the variance in realized capital gains and it should better capture overall returns.
- To predict inheritance we use parental wealth X years ago as well as the age of parents, which allows us to predict how individuals are likely to have received an inheritance over the past X years.

Figure A.17: **Predicting Wealth: Accuracy of our Model**




Notes: This figure plots the average rank of taxable wealth in 2004 based on the rank of predicted taxable wealth the same year using our prediction model.

Not that because the prediction model relies on past data, it is a good model to predict wealth for people about the move (outmigration effects) but does not work for individuals who just moved in (in-migration rates) for whom we do not have info on past wealth, parental wealth, past income, etc.

Table B.9: **Bilateral tax treaties with top 10 out migration countries for wealthy Swedes**

| Country | Tax treaty in place | Last renegotiation |
|---|---|---|
| UK | March 26, 1984 | - |
| USA | October 25, 1995 | September 30, 2005 |
| France | April 1, 1992 | - |
| Denmark | May 11, 1997 | October 6, 1997 |
| Switzerland | June 6, 1966 | March 10, 1992 |
| Spain | December 21, 1976 | - |
| Germany | October 13, 1994 | - |
| Norway | May 11, 1997 | - |
| Austria | December 29, 1959 | August 21, 2006 |
| Finland | May 11, 1997 | October 6, 1997 |

Notes: Last renegotiation refers to renegotiations taking place before 2007 and the repeal of the wealth tax in Sweden.

# D Tracking Employees After Firm Closure

We start from our firm-level event study samples. We select the treated firms whose last recorded year of activity (year $t$) falls between the owner's out-migration event date (included) and 2016. Given that our firm-level data is available until 2017, we can only identify firm closures until 2016.

We then move to our individual-level panel dataset (LISA). We remove the CHB owners, so that we are left with true firm employees.[32] Among the remaining workers, we keep those who were employed in one of the selected firms in its last year of activity (year $t$). If throughout time an individual is employed in different firms in their corresponding year $t$, we consider the first one among such occurrences.

Having defined a sample of workers employed in a treated firm in its last year of activity (origin firm), we then track their employment status in year $t+1$. An individual may be associated with a new firm (destination firm) or she may be unemployed. For each origin firm we compute its number of employees (excluding owners when possible) in year $t$. We also compute the number of employees in year $t+1$ in each destination firm coming from the same origin firm. For each origin-destination pair, we are thus able to compute the share of employees moving from the same origin firm in year $t$ to the same destination firm in year $t+1$, relative to the total number of employees in the origin firm in year $t$. We repeat the same exercise using the control firms in our event study sample.

Table B.10 shows the number of treated and control firms in our firm-level event study samples with at least 5 employees in their last year of activity (year $t$). It also displays the share of these firms where at least 50% of the employees end up in the same firm in year $t+1$.

Table B.10: **Tracking Employees After Firm Closure**

| | **Firms with at least 5 employees in last year** | **Share sending at least 50% of employees to same firm** |
|---|---|---|
| *Panel A: Top 2%* | | |
| Treated firms | 22 | 59.1% |
| Control firms | 683 | 56.7% |
| *Panel B: Top 10%* | | |
| Treated firms | 49 | 44.9% |
| Control firms | 1,619 | 55.5% |

Notes: This Table shows the number of firms closing with at least 5 employees by treatment group and event study sample. It also shows the share of these firms which send at least 50% of their employees to the same firm in the year after they stop their operations.

[32] We are only able to identify owners of closely-held businesses. Therefore, if a firm closes as a non-CHB we cannot eliminate its owners from the list of workers associated to the firm in its last year of activity.