Wealth Taxation and Migration Patterns of the Wealthy

Katrine Jakobsen, Henrik Kleven, Jonas Kolsrud, Camille Landais & Mathilde Munoz

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Migration responses central to debate on desirability of wealth taxes

- Literature on “intensive margin” responses to wealth tax (Jakobsen & al [2020])
- Evidence on top earners migration response to tax (Kleven et al. [2020])
- Work on within-country responses to wealth taxation only: Moretti & Wilson [2023], Bruhlart et al. [2022], Agrawal et al. [2023]
Do the Rich Move to Avoid Wealth Taxes?

- Migration responses central to debate on desirability of wealth taxes

Why important

1. Top earners ≠ wealth holders = responsiveness to taxes?
2. Wealth (stock) ≠ income (flow) = avoidance strategies?
3. Wealthy entrepreneurs = economic spillovers for the economy?
Do the Rich Move to Avoid Wealth Taxes?

- Migration responses central to debate on desirability of wealth taxes
- Why important
  1. Top earners ≠ wealth holders = responsiveness to taxes?
  2. Wealth (stock) ≠ income (flow) = avoidance strategies?
  3. Wealthy entrepreneurs = economic spillovers for the economy?
- Requires detailed data on (i) migration (ii) wealth (iii) firms’ ownership + (iv) exogeneous shock in wealth taxation
This Paper: Wealth and Migration in Scandinavia

Today we will mostly focus on Sweden → Denmark used as a robustness

1. Who migrates at the top of wealth distribution?
   - How large and how persistent?
   - Who is more likely to leave?

2. What are the economic implications of wealthy out-migration?
   - Real effects on individual-level outcomes (taxes, portfolio reallocation)
   - Economic spillovers on closely-held businesses (employment, profits..)

3. What is the (causal) effect of wealth taxation on migration?
   - International migration responses to repeal of the wealth tax

What are migration-induced implications of taxing wealth for the aggregate economy?
1 Introduction

2 Institutional Background & Data

3 Migration of the Wealthy: How Big and for Whom?

4 What Happens When the Wealthy Migrate?

5 Identifying Migration Elasticities

6 Implications
Wealth Taxation in Sweden (1910-2007)

- Annual tax on the market value of net wealth of wealthy households

Key features of the Swedish wealth tax before 2007:

- **Tax schedule**: 0% below exemption threshold, 1.5% MTR above

- **Reporting requirements**: Third-party reporting + assessments at market values

- **Tax exemptions**: real estate (25%), listed stocks (20%), assets in closely-held businesses (100%).

Residence rules: wealth tax applies to Swedish tax residents

- Non-residents liable for wealth held in Sweden
- Owning a firm in Sweden can be sufficient to be Swedish tax resident
- Capital gains taxable up to 10 years upon migration

- Wealth tax payments \( \approx 1.2\% \) of total tax revenues
- Annual average tax of \( \approx .5\% \) of total net wealth for the top 2%
- Other capital incomes taxed at 30% annually

2007: Abolition of wealth tax (Effective January 1st)

- Sharp and large decrease in MTR from 1.5% to 0.
- Followed surprise win of the right wing coalition at the October 2006 elections
Repeal of the Swedish Wealth Tax in 2007

- **Swedish wealth tax:** 1999-2007
  - Wealth tax payments $\approx 1.2\%$ of total tax revenues
  - Annual average tax of $\approx .5\%$ of total net wealth for the top 2%
  - Other capital incomes taxed at 30% annually

- **2007:** Abolition of wealth tax (Effective January 1st)
  - Sharp and large decrease in MTR from 1.5% to 0.
  - Followed surprise win of the right wing coalition at the October 2006 elections

- **Similar reforms in Denmark (1996), France (2017)...**
  - Denmark decreased top MTR from 2.2% to 1% in 1990
  - Fully repealed the wealth tax in 1996
  - We use this as "out of sample" test for the Swedish reform
Third-party reported information on wealth

- Net market value of real estate, listed stocks, bank accounts, bonds...
  ⇒ some info only available until 2007
  Prediction model

- List of all housing + financial transactions

- Shares in closely-held businesses (CHB):
  ⇒ link unlisted companies to Swedish owners

- Ownership register: all firm-to-firm ownership links + shares
  ⇒ measure both direct and indirect firm ownership

Population registers with rich demographic & economic info

- E.g. info on all earnings, capital income, transfers
- E.g. detailed info on education, occupation, etc.

Administrative international migration registers

- Dates of entry/exit, duration of stay each year
- Country of origin/destination
#1: Many Entrepreneurs Among the Wealthy

Fractile of HH Net Wealth Distribution

- LLC
- Non-Active CHB
- Active CHB
- LLC + Non-Active CHB
- LLC + Active CHB

Top Decile
Large Employment at Firms Held by the Wealthy

<table>
<thead>
<tr>
<th>Fractile of HH Net Wealth Distribution</th>
<th>Direct Employment</th>
<th>Indirect Employment</th>
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</thead>
<tbody>
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<td>P90-91</td>
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<td>P91-92</td>
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<td>P98-99</td>
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<td>P99-99.5</td>
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<td>0</td>
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<tr>
<td>P99.5-99.9</td>
<td>150</td>
<td>0</td>
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<tr>
<td>P99.9-100</td>
<td>200</td>
<td>0</td>
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</tbody>
</table>

Number of Employees (1,000)

Employment as a Share of Total Swedish Employment (%)
#3: Migration is Real But Sometimes Transitory

![Graph showing probability to remain out of Sweden over years relative to out-migration for different income quintiles.](image-url)
1 Introduction

2 Institutional Background & Data

3 Migration of the Wealthy: How Big and for Whom?

4 What Happens When the Wealthy Migrate?

5 Identifying Migration Elasticities

6 Implications
Out-Migration Rates by Wealth Level: 1999-2006

Out-migrants liable to wealth tax $\approx 0.1\%$ of total net wealth

0.34\% of individuals in top 0.1\% leave Sweden every year
In-Migration Rates by Wealth Level: 1999-2006

More in-migration as well at the top.

0.42% of individuals in the top 0.1% have moved to Sweden in the previous year.
Net-Migration Rates by Wealth Level: 1999-2006

Small positive net migration rates → No exodus of the wealthy

The population in the top 0.1% of wealth increases by **0.08 pp** every year through net migration.
Selection Into Out-Migration: Sweden

Linear Probability Model of Out-Migration 2001-2007

**Equations**

**Age**
- (Ref.) 18-29
- 30-39
- 40-49
- 50-59
- 60-69
- 70-79
- 80+

**Education**
- (Ref.) <2 years secondary
- 2 years secondary
- 3 years secondary
- <2 years tertiary
- 2+ years tertiary (incl. PhD)

**Cognitive Skills**
- (Ref.) P0-20
- P20-40
- P40-60
- P60-80
- P80-100

**Nationality**
- Foreign born
  (scaled down by 10)

**Self-Employed**
- Ind. contractor
- Own Active CHB

**Relative Out-Migration Probability**

- All Individuals
- Individuals in Top 2%
Selection Into Out-Migration: Sweden

No brain drain, but wealthy entrepreneurs 40% more likely to leave

Age
(Ref.) 18-29
30-39
40-49
50-59
60-69
70-79
80+

Education
(Ref.) <2 years secondary
2 years secondary
3 years secondary
<2 years tertiary
2+ years tertiary (incl. PhD)

Cognitive Skills
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P20-40
P40-60
P60-80
P80-100

Nationality
Foreign born
(scaled down by 10)

Self-Employed
Ind. contractor
Own Active CHB

Relative Out-Migration Probability
All Individuals
Individuals in Top 2%

-2 -1.5 -1 -0.5 0 0.5 1 1.5

Relative Out-Migration Probability
Effects of Out-Migration on Individual-Level Outcomes

- Focus on *all* out-migration events of wealth taxpayers (1999-2006)
  - During that period, wealth was taxed

- Individual-level outcomes before and after out-migration
  - Comparison group: wealthy staying in Sweden
  - Random allocation of placebo out-migration dates (no matching)

- Dynamic self-selection into out-migration? What happens after?

\[
\begin{align*}
\hat{y}_{it} &= \sum_{j=-5}^{5} \beta_j \times 1 \cdot (M_i = 1) \cdot 1(t = j) + \sum_j \delta_j \cdot 1(t = j) + \epsilon_{it} \\
\text{Indiv. outcome} &= \text{Migrant x time to event FE}
\end{align*}
\]
a. Wealth Tax Payments

Average wealth tax payments in year before out-migration = SEK 13,879
Effect of out-migration = -57.63% (2.65) in t=1
-34.19% (4.71) in t=5

b. Income Tax Payments

Average total income tax payments in year before out-migration = SEK 206,578
Effect of out-migration = -67.85% (1.77) in t=1
-41.25% (3.27) in t=5

c. Capital Income Tax Payments

Average capital income tax payments two years before out-migration = SEK 29,386
Effect of out-migration = 62.78% (4.87) in t=0
-56.43% (6.60) in t=5

d. Taxable Wealth in Sweden

Average household taxable wealth in year before out-migration = SEK 3,201,908
Effect of out-migration = -89.08% (1.43) in t=1
-47.26% (3.23) in t=5

Heterogeneity by CHB Ownership
a. Real Estate Transaction

Average probability of selling real estate in year before out-migration = 7.6%
Effect of out-migration =
161.74% (10.74) in t=0
-60.11% (7.28) in t=5

b. Reporting Financial Wealth

Average probability of reporting positive financial assets in year before out-migration = 92%
Effect of out-migration =
-22.23% (1.04) in t=1
-21.48% (2.09) in t=5

c. Firms Held Directly

Average number of active CHBs owned in year before out-migration = 0.10
Effect of out-migration =
-67.71% (5.88) in t=1
-53.10% (6.38) in t=5

d. Firms Held Indirectly

Average number of businesses owned indirectly in year before out-migration = 0.50
Effect of out-migration =
-68.70% (17.32) in t=1
-63.90% (17.28) in t=5
Closely-Held Businesses Owned by Wealthy Taxpayers
Smallish firms, but bigger than average unlisted firm

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Obs.</th>
<th>% of Swedish Aggregates</th>
<th>% of Active CHBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr. of Owners</td>
<td>1.8</td>
<td>1</td>
<td>7.1</td>
<td>589,788</td>
<td>13.53%</td>
<td>100%</td>
</tr>
<tr>
<td>Nr. of Employees</td>
<td>8</td>
<td>3</td>
<td>40.5</td>
<td>589,788</td>
<td>21.84%</td>
<td>100%</td>
</tr>
<tr>
<td>Value Added ($)</td>
<td>399.7k</td>
<td>178.5k</td>
<td>3,629.7k</td>
<td>541,097</td>
<td>21.84%</td>
<td>100%</td>
</tr>
<tr>
<td>Net Turnover ($)</td>
<td>1,247.9k</td>
<td>456.1k</td>
<td>7,178.2k</td>
<td>541,097</td>
<td>17.68%</td>
<td>100%</td>
</tr>
<tr>
<td>Tax Payments ($)</td>
<td>16.2k</td>
<td>2.5k</td>
<td>553.8k</td>
<td>541,097</td>
<td>27.64%</td>
<td>100%</td>
</tr>
<tr>
<td>Gross Investments ($)</td>
<td>62.8k</td>
<td>7.4k</td>
<td>548.2k</td>
<td>541,097</td>
<td>17.88%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Panel B. Active CHBs with at least one owner in the top 2% of net worth

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Obs.</th>
<th>% of Swedish Aggregates</th>
<th>% of Active CHBs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr. of Owners</td>
<td>2.4</td>
<td>2</td>
<td>17.9</td>
<td>89,485</td>
<td>3.56%</td>
<td>26.32%</td>
</tr>
<tr>
<td>Nr. of Employees</td>
<td>14.1</td>
<td>4</td>
<td>82.3</td>
<td>89,485</td>
<td>6.90%</td>
<td>31.58%</td>
</tr>
<tr>
<td>Value Added ($)</td>
<td>834.9k</td>
<td>263.2k</td>
<td>6,431.1k</td>
<td>82,473</td>
<td>6.13%</td>
<td>34.65%</td>
</tr>
<tr>
<td>Net Turnover ($)</td>
<td>2,775.6k</td>
<td>709.7k</td>
<td>14,923.5k</td>
<td>82,473</td>
<td>10.68%</td>
<td>38.64%</td>
</tr>
<tr>
<td>Tax Payments ($)</td>
<td>45.4k</td>
<td>6.6k</td>
<td>429.7k</td>
<td>82,473</td>
<td>6.41%</td>
<td>35.88%</td>
</tr>
<tr>
<td>Gross Investments ($)</td>
<td>149.5k</td>
<td>11.8k</td>
<td>1,286.8k</td>
<td>82,473</td>
<td>6.41%</td>
<td>35.88%</td>
</tr>
</tbody>
</table>

Notes: The values for value added, net turnover, tax payments, and gross investments were converted from SEK to USD using the average of the yearly currency exchange rates between 2000 and 2006.
## Firms Owned (Directly and Indirectly) by the Wealthy

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Obs.</th>
<th>% of Swedish Aggregates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nr. of Ultimate Owners</td>
<td>2.4</td>
<td>1</td>
<td>32.6</td>
<td>692,054</td>
<td>20.82%</td>
</tr>
<tr>
<td>Nr. of Employees</td>
<td>10.5</td>
<td>4</td>
<td>49.9</td>
<td>692,054</td>
<td>20.82%</td>
</tr>
<tr>
<td>Value Added ($)</td>
<td>514.5k</td>
<td>194.7k</td>
<td>3590.4k</td>
<td>638,841</td>
<td>32.73%</td>
</tr>
<tr>
<td>Net Turnover ($)</td>
<td>1,740.3k</td>
<td>509.3k</td>
<td>12,044.2k</td>
<td>638,841</td>
<td>28.90%</td>
</tr>
<tr>
<td>Tax Payments ($)</td>
<td>20.6k</td>
<td>2.6k</td>
<td>552.1k</td>
<td>638,841</td>
<td>37.63%</td>
</tr>
<tr>
<td>Gross Investments ($)</td>
<td>78.3k</td>
<td>6.9k</td>
<td>849.9k</td>
<td>638,841</td>
<td>25.34%</td>
</tr>
</tbody>
</table>

### Panel A. All active firms held by ultimate owners

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Obs.</th>
<th>% of Swedish Aggregates</th>
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</thead>
<tbody>
<tr>
<td>Nr. of Ultimate Owners</td>
<td>5.5</td>
<td>2</td>
<td>73.9</td>
<td>134,540</td>
<td>8.61%</td>
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<tr>
<td>Nr. of Employees</td>
<td>21.8</td>
<td>6</td>
<td>103.2</td>
<td>134,540</td>
<td>8.61%</td>
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<tr>
<td>Value Added ($)</td>
<td>1,175.7k</td>
<td>334.5k</td>
<td>6,024.2k</td>
<td>125,324</td>
<td>14.53%</td>
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<tr>
<td>Net Turnover ($)</td>
<td>4,399.4k</td>
<td>962.1k</td>
<td>25,521.6k</td>
<td>125,324</td>
<td>14.53%</td>
</tr>
<tr>
<td>Tax Payments ($)</td>
<td>56.5k</td>
<td>6.5k</td>
<td>580.3k</td>
<td>125,324</td>
<td>17.98%</td>
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<tr>
<td>Gross Investments ($)</td>
<td>190.4k</td>
<td>13.5k</td>
<td>1,805.3k</td>
<td>125,324</td>
<td>11.98%</td>
</tr>
</tbody>
</table>

### Panel B. Active firms with at least one ultimate owner in the top 2% of net wealth

Notes: The values for value added, net turnover, tax payments, and gross investments were converted from SEK to USD using the average of the yearly currency exchange rates between 2000 and 2006.
Effects of Out-Migration on Firm-Level Outcomes

- Firm outcomes before and after out-migration of their owners
  - Comparison group: firms held by wealthy stayers
  - Random allocation of placebo out-migration dates (no matching)
  - Focus on firms held in -1 with at least one employee

- Dynamic self-selection into out-migration? What happens after?

\[
\begin{align*}
\hat{y}_{ft} &= \sum_{j=-5}^{5} \beta_j \times 1 \cdot (M_f = 1) \cdot 1(t = j) + \sum_j \delta_j \cdot 1(t = j) + \varepsilon_{ft} \\
\text{Firm outcome} &\quad \text{Migrant Owner \times time to event FE}
\end{align*}
\]
Wealthy Owners Close Their CHB Upon Leaving

a. Probability Firm is Alive

Effect of out-migration = \(-27.41\) pp (2.91)

b. Probability of Closure

Effect of out-migration = 6.05 pp (1.55)
Average number of employees in year before out-migration = **8.63**

Effect of out-migration = **-33.26% (7.72)**
Average value added in year before out-migration = **SEK 6,198,860**

Effect of out-migration = **-34.22% (7.91)**
Economic Effects of the Wealthy Migration: Mechanisms

- Negative firm-level outcomes following owner out-migration
  - Mostly driven by extensive margin
  - Little effect at intensive margin
  - Effects on subsidiaries have similar magnitude
  - Economic effects of in-migration are symmetric

- Firm-level effects \( \neq \) net economic effects of wealth taxation:
  1. Part of firms’ closure events are buyouts
  2. Workers reallocate to other firms
  3. Not all migration events are driven by the wealth tax
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6 Implications
Wealth Tax Rates in Sweden

### Abolition of the wealth tax

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Tax Rate</th>
<th>Top 2%</th>
<th>Top 10-20%</th>
<th>Marginal Tax Rate</th>
<th>Top MTR</th>
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<td>2013</td>
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Effective Tax Rates
Out-Migration Rates of the Wealthy

Before 2007, out-migration for top 2% = 0.037 pp larger than out-migration for top 10-20%.

After 2007, out-migration for top 2% = out-migration for top 10-20%.

Abolition of the wealth tax
Effect of the reform on $Y_{it}$: out-migration rate of individual $i$

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

year FE × top 2% dummy
Estimation Strategy

- **Effect of the reform on** \( Y_{it} \): out-migration rate of individual \( i \)

\[
Y_{it} = \alpha + \sum_{t=2000}^{\tilde{t}} \beta_j \cdot 1(t = j) \cdot 1(T_i = 1) + \gamma_t + \delta \cdot 1(T_i = 1) + u_{it}
\]

*year FE × top 2% dummy*

- **Compute semi-elasticity of migration from IV using DD as instrument**

\[
Y_{lt} = \varepsilon \cdot \ln(1 - \tau_{lt}) + \beta \cdot (t \geq 2007) + \eta \cdot (T_l = 1) + u_{lt}
\]

*IV: \((T_l = 1) \cdot (t \geq 2007)***

- **\( Y_{it} \):** out-migration rate of group \( l = \{T, C\} \) in year \( t \)
- **Because** \( \tau \) small, \( \varepsilon \) has simple interpretation

- **Compute *predicted* wealth to investigate longer-run effects**
  - LLM model based on past wealth + past & current wealth

[Details]
Effect of the Wealth Tax Repeal

1 pct point increase in $\tau$ increases wealthy out-migration by 0.17 pct point

Semi-elasticity using:
- true wealth = -.173 (.088)
- predicted wealth = -.166 (.055)

Abolition of the wealth tax

Out-Migration Probability


Year

True Wealth
Predicted Wealth
Semi-Elasticities of Out-Migration by Characteristics

Very Little Heterogeneity in Out-Migration Semi-Elasticities

- Denmark DiD

Wealth
- Top 2%
- Top 1%
- Top 0.5%

Age
- 18-50
- 50+

Entrepreneurship
- Owns Active CHB
- Does Not Own Active CHB

Semi-Elasticity

- True Wealth in Sweden
- Pred. Wealth in Sweden
- True Wealth in Denmark
Interpreting the Magnitude: From Flows to Stock

- Well identified estimate of the effects on migration flows
- Translate into effect on pop. size (stock) using simple OLG model
- Elasticity of steady state population size $N$ w.r.t $1 - \tau$:

$$\Rightarrow \varepsilon_{N,1-\tau} \approx 2.16(0.620)$$

- Comparison with migration elasticities in the income tax literature?
  - Translate elasticity with respect to implicit capital income tax rate
  - Yields elasticity $\approx .1$
Direct effect: tax-induced migration decreases the wealth tax base

- A 1 pct point increase in $\tau$ decreases stock of wealthy by 2.16%
Aggregate Implications of Tax-Induced Migration

- **Direct effect**: tax-induced migration decreases the wealth tax base
  - A 1 pct point increase in $\tau$ decreases stock of wealthy by 2.16%
- **Indirect effect**: tax-induced migration may reduce other outcomes
Aggregate Implications of Tax-Induced Migration

- **Direct effect**: tax-induced migration decreases the wealth tax base
  - A 1 pct point increase in $\tau$ decreases stock of wealthy by 2.16%

- **Indirect effect**: tax-induced migration may reduce other outcomes

- Use estimated effects of wealthy out-migration events to gauge this:
  1. Tax-induced migration events must be similar in the way they shape firms’ and individuals’ outcomes
     - No selection based on demographics (homogeneous elasticities)
     - Spillover effects similar before and after repeal of the tax
  2. No simultaneous shock that would affect firms/individuals’ outcomes even absent migration
Aggregate Implications of Tax-Induced Migration

- **Direct effect**: tax-induced migration decreases the wealth tax base
  - A 1 pct point increase in $\tau$ decreases stock of wealthy by 2.16%

- **Indirect effect**: tax-induced migration may reduce other outcomes

- Use estimated effects of wealthy out-migration events to gauge this:
  - -0.11% individual tax payments (excluding wealth tax)
  - -0.18% in firms’ tax payments
  - -0.1% in aggregate value added
  - -.03% in aggregate employment
Aggregate Implications of Tax-Induced Migration

- **Direct effect**: tax-induced migration decreases the wealth tax base
  - A 1 pct point increase in $\tau$ decreases stock of wealthy by 2.16%

- **Indirect effect**: tax-induced migration may reduce other outcomes

- Use estimated effects of wealthy out-migration events to gauge this:
  - Quantify upper bounds assuming (1) and (2) hold
    - -0.11% individual tax payments (excluding wealth tax)
    - -0.18% in firms’ tax payments
    - -0.1% in aggregate value added
    - -.03% in aggregate employment

- Aggregate implications of tax-induced migration were modest
APPENDIX SLIDES
Top 2% for couples, top 8% for singles

Threshold as Percentile of HH Taxable Wealth Distribution

Year | Couples | Singles
--- | --- | ---
1999 | 86 | 86
2000 | | 90
2001 | | 92
2002 | | 94
2003 | | 96
2004 | | 98
2005 | | 100
2006 | | 98

Back 2 / 29
We define the wealthy based on total net wealth.
We define the wealthy based on total net wealth.

Average Taxable Wealth (SEK 1,000)

Fractile of HH Net Wealth Distribution
Definition of Closely-held businesses (CHB)
- 4 largest owners have more than 50% of the votes

Definition of tax-exempt business assets
- Must prove the assets are “essential” to firm’s activity
- Various concrete rules to check (e.g. quick ratio rule)

Limitations on income shifting (“3:12 rules”)
- The amount of income taxed as capital income is capped
Figure: Countries of Destination: Top 2% of Wealth Holders in Sweden

- USA
- UK
- Switzerland
- Spain
- France
- Germany
- Austria
- Denmark
- Other
Figure: Countries of Destination: Top 20% to 10% of Wealth Holders in Sweden
### Panel A. Sample of individuals in the top 2% of net worth

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Obs.</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Tax Payments ($)</td>
<td>25.3k</td>
<td>13k</td>
<td>128.8k</td>
<td>1,997,202</td>
<td>47.2k</td>
<td>14k</td>
<td>253.5k</td>
</tr>
<tr>
<td>Labour Income Tax Payments ($)</td>
<td>15.0k</td>
<td>9k</td>
<td>29.0k</td>
<td>1,997,202</td>
<td>26.3k</td>
<td>8k</td>
<td>111.7k</td>
</tr>
<tr>
<td>Capital Income Tax Payments ($)</td>
<td>7.1k</td>
<td>1k</td>
<td>111.7k</td>
<td>1,997,200</td>
<td>17.1k</td>
<td>0</td>
<td>211.7k</td>
</tr>
<tr>
<td>Wealth Tax Payments ($)</td>
<td>2.1k</td>
<td>0</td>
<td>14.7k</td>
<td>1,997,200</td>
<td>2.5k</td>
<td>0</td>
<td>16.9k</td>
</tr>
</tbody>
</table>

### Panel B. Sample of active CHBs with at least one owner in the top 2% of net worth

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
<th>Obs.</th>
<th>Mean</th>
<th>Median</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Employees</td>
<td>10.5</td>
<td>3</td>
<td>50.1</td>
<td>187,093</td>
<td>18.5</td>
<td>2</td>
<td>83.4</td>
</tr>
<tr>
<td>Value Added ($)</td>
<td>975.0k</td>
<td>278k</td>
<td>4,810.9k</td>
<td>210,706</td>
<td>3,766.2k</td>
<td>423k</td>
<td>21,257.4k</td>
</tr>
<tr>
<td>Net Turnover ($)</td>
<td>3,455.8k</td>
<td>756k</td>
<td>27,469.3k</td>
<td>210,706</td>
<td>10,659.5k</td>
<td>1,218k</td>
<td>50,444.0k</td>
</tr>
<tr>
<td>Tax Payments ($)</td>
<td>52.6k</td>
<td>7k</td>
<td>369.7k</td>
<td>210,706</td>
<td>195.8k</td>
<td>10k</td>
<td>930.9k</td>
</tr>
<tr>
<td>Gross Investments ($)</td>
<td>148.7k</td>
<td>8k</td>
<td>1,036.3k</td>
<td>201,686</td>
<td>269.1k</td>
<td>10k</td>
<td>1,199.1k</td>
</tr>
</tbody>
</table>
Capital Income Tax Payments (SEK)

Year Relative to Out-Migration

- Owning Active CHB in t = -2
- Not Owning Active CHB in t = -2
Average number of employees in year before out-migration = 9.19
Effect of out-migration = -0.81% (13.41)
<table>
<thead>
<tr>
<th>Outcome</th>
<th>Only Directly-Held Firms</th>
<th>Directly and Indirectly-Held Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average Outcome for Treated in $t = -1$</td>
<td>Effect in $t = +5$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(SEK 1,000)</td>
</tr>
<tr>
<td>Prob. Firm Is Alive (pp)</td>
<td>1.00</td>
<td>-27.41% (2.91)</td>
</tr>
<tr>
<td>Number of Employees</td>
<td>8.63</td>
<td>-33.26% (7.72)</td>
</tr>
<tr>
<td>Value Added (SEK 1,000)</td>
<td>6,198.86</td>
<td>-34.22% (7.91)</td>
</tr>
<tr>
<td>Net Turnover (SEK 1,000)</td>
<td>21,274.53</td>
<td>-31.71% (7.19)</td>
</tr>
<tr>
<td>Tax Payments (SEK 1,000)</td>
<td>390.50</td>
<td>-50.51% (9.27)</td>
</tr>
<tr>
<td>Gross Investments (SEK 1,000)</td>
<td>636.34</td>
<td>-21.90% (10.08)</td>
</tr>
</tbody>
</table>
Probability Firm Is Alive

Average probability that firm is alive in year before in-migration = 27.92%
Average number of employees in year before in-migration = 0.96
Among the firms with out-migrant owners, we focus on the ones closing in the year of the out-migration event or after. We select the individuals working at these firms in their last year of activity (year = $t$). We track these workers to their employment in year $t + 1$.

Approximately 50% of the firms closing with at least 5 employees send at least 50% of their workers to the same firm.
a. Capital Income Tax

b. Labor Income Tax

c. Capital Income Tax + Wealth Tax
Start with law of motion of wealth: Wealth = $W$, Return = $r$, Capital Income = $rW$, consumption=C, Earnings=E, Inheritance=I

\[ W_t = (1 + r_t)W_{t-1} + E_t + I_t - C_t \]

Interesting point = for individuals observed after end of wealth tax, we can use rich information about their observed past wealth to predict wealth forward this means we have one model to predict wealth in $t+5$ or $t+10$ say, based on wealth in $t$

By iteration we get, for instance after $X$ iterations

\[ W_t = W_{t-X} \prod_{j=t-X}^{t} (1 + r_j) + \sum_{k=t-X}^{t} (E_k + I_k - C_k) \prod_{j=k+1}^{t} (1 + r_j) \]
Above decomposition shows that difference and capital income stem from:

1. Past wealth (which we observe!)

2. Past earnings/consumption (or past savings behaviour) (life-cycle wealth)

3. Differences in net of returns $r_t$

4. Inheritance received (inherited wealth)

But good thing is, law of motion is an identity, and we observe a lot of elements of this identity!
Assessing Quality of Prediction Model

Figure: Prediction Model - Fit

Quantile-Quantile Plot

Rank Of Predicted FNETTMV Year 2004, Using Actual Wealth

Average FNETTMV Rank Year 2004
0 20 40 60 80 100
0 20 40 60 80 100
In-Migration Rates by Wealth Level in DK: 1989-1996
Top Wealth ATR - Denmark

![Graph showing average wealth tax rate for Top 1% and Top 5-2.5% in Denmark from 1980 to 2006. The graph indicates a decrease in tax rates for both groups after 1990.](image-url)
Danish Reforms: Migration Effects
Top 1%: Out Migration Rates
Danish Reforms: Migration Effects

Top 1%: In Migration Rates

- In-migration Rate (in %)
- Year

Graph showing the in-migration rates for Top 1% and Top 5-2.5% from 1980 to 2006.
Danish Reforms: Migration Effects

Top 1%: Net Migration Rates

![Graph showing net migration rates over years for Top 1% and Top 5-2.5%. The x-axis represents years from 1980 to 2006, and the y-axis represents net migration rate in percentage. The graph shows decreasing trends for both categories, with the Top 1% showing a more significant decrease.](image-url)
Danish Reforms: Migration Effects
Top .05%: Out Migration Rates
Danish Reforms: Migration Effects

Top .05%: In Migration Rates

![Graph showing in-migration rates over time with two lines representing Top 1% and Top 5-2.5%.](graph.png)
Danish Reforms: Migration Effects

Top 0.05%: Net Migration Rates

<table>
<thead>
<tr>
<th>Year</th>
<th>Top 1%</th>
<th>Top 5-2.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1982</td>
<td></td>
<td></td>
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<tr>
<td>1984</td>
<td></td>
<td></td>
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<tr>
<td>1986</td>
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<tr>
<td>1988</td>
<td></td>
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<tr>
<td>1990</td>
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<tr>
<td>1992</td>
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<tr>
<td>1994</td>
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<td>1996</td>
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<td>1998</td>
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<td>2000</td>
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<tr>
<td>2002</td>
<td></td>
<td></td>
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<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Net-migration Rate (in %)
Population size at time \( t \) = sum of pop. of all ages \( k \) at \( t \)

\[
N_t = \sum_k N^k_t
\]
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N_t^k$$
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

\[ N_t = \sum_k N_t^k \]
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N^k_t$$
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N_t^k$$
Population size at time $t = \sum$ of pop. of all ages $k$ at $t$

$$N_t = \sum_k N_t^k$$
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N_t^k$$
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N_t^k$$
Population size at time $t = \sum$ pop. of all ages $k$ at $t$

$$N_t = \sum_k N_t^k$$
Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N_t^k$$
Interpreting the Magnitude: From Flows to Stock

- Well identified estimate of the effects on migration flows
- Translate into effect on pop. size (stock) using simple OLG model
- Population size at time $t = \text{sum of pop. of all ages } k \text{ at } t$

$$N_t = \sum_k N^k_t$$

- At each age $k = 1, \ldots, T$ population size at time $t$ is

$$
N^1_t = B_t \\
N^2_t = (1 - \alpha^1_t)N^1_{t-1} = (1 - \alpha^1_t)B_{t-1} \\
N^3_t = (1 - \alpha^2_t)N^2_{t-1} = (1 - \alpha^2_t)(1 - \alpha^1_{t-1})B_{t-2}, \text{Etc.}
$$

- $B_t$: number of “births”
- $\alpha^k_t$: net migration rate of population of age $k$ at time $t$
Interpreting the Magnitude: Stock Elasticity

- At steady state: $B_t = B_{t-1}, \forall t$ and $\alpha_t^k = \alpha_{t-1}^k, \forall t, k$

$$N_t = B_t \sum_{k=0}^{T} \prod_{j=0}^{k} (1 - \alpha^{k-j})$$

- Elasticity of steady state population size w.r.t $1 - \tau$:
  - Assume (for simplicity) marginal effect of reform on $\alpha^k$ same $\forall k$

$$\varepsilon_{N,1-\tau} \approx -\frac{d\bar{\alpha}}{d \ln(1 - \tau)} \cdot \frac{T + 1}{2}$$

- Average number of years spent in top 1%: $T=24$ yrs

$$\Rightarrow \varepsilon_{N,1-\tau} \approx 2.16(0.620)$$

- **Conservative upper-bound** with anticipation effects ($T=50$ yrs):

$$\Rightarrow \varepsilon_{N,1-\tau} \approx 4.42(1.264)$$
Comparison to Elasticities in the Literature

**Intra-National: Capital Taxation:**
- Bruhlard et al (2019)
- Agrawal et al (2020)
- Moretti and Wilson (2020)

**Intra-National: Income Taxation:**
- Martinez (2017)
- Agrawal and Foremny (2018)
- Moretti and Wilson (2017)
- Young et al (2016)
- Kleven et al (2013)
- Kleven et al (2014)
- Akcigit et al (2016)
- Kleven et al (2013)
- Kleven et al (2014)
- Martinez (2017)

**International: Income Taxation:**
- Our Study

<table>
<thead>
<tr>
<th>Elasticity</th>
<th>Total</th>
<th>Domestic</th>
<th>Foreigner</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.5</td>
<td></td>
<td></td>
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<tr>
<td>0.0</td>
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<td></td>
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</tr>
<tr>
<td>1.0</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>1.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- Our Study
Transform estimate into elasticity w.r.t $1 - t$

- Where $t \approx \frac{\tau}{r}$: avg tax on K income

- Over period of interest, we find: $r = 0.042$, and $\tau \approx 0.006 \Rightarrow t = 14.3\%$

$$\varepsilon_{N,1-t} = \varepsilon_{N,1-\tau} \cdot \frac{d \ln(1 - \tau)}{d \ln(1 - t)} \approx 0.078 (0.013)$$
Two models to study selection into out-migration ($Y$) from Sweden

- **Model 1** - All individuals:

  $$P\{Y = 1\} = \beta'X_0$$

- **Model 2** - Individuals in the top 2% of net wealth:

  $$P\{Y = 1\} = 1\{W < P_W\} \cdot \beta'X_0 + 1\{W \geq P_W\} \cdot \beta_w'X_0$$

- $X_0$ is a vector of individual characteristics
- $P_W$ is the 98th percentile of the net wealth distribution
Effect on Employment Before vs After Wealth Tax Repeal

a. Before

Average number of employees in year before out-migration = 9.19
Effect of out-migration = -36.98% (8.77)

b. After

Average number of employees in year before out-migration = 8.09
Effect of out-migration = -27.47% (9.43)
### Effects Before vs After Wealth Tax Repeal

#### Sample of CHBs with owner in the top 2% of net worth

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Out-Migration Years:</th>
<th>T-Stat</th>
<th>Percentage Effects</th>
<th>T-Stat</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( t_{pre} = +5 )</td>
<td>( t_{post} = +5 )</td>
<td>( t_{pre} = t_{post} )</td>
<td>( t_{pre} = t_{post} )</td>
</tr>
<tr>
<td>Prob. Firm Is Alive (pp)</td>
<td>-28</td>
<td>-24.47</td>
<td>-0.86</td>
<td>-28%</td>
</tr>
<tr>
<td></td>
<td>(3.43)</td>
<td>(3.76)</td>
<td></td>
<td>(3.43)</td>
</tr>
<tr>
<td>Number of Employees</td>
<td>-3.40</td>
<td>-2.22</td>
<td>-1</td>
<td>-36%</td>
</tr>
<tr>
<td></td>
<td>(0.81)</td>
<td>(0.76)</td>
<td></td>
<td>(8.77)</td>
</tr>
<tr>
<td>Value Added (SEK1,000)</td>
<td>-2,917</td>
<td>-875</td>
<td>-2</td>
<td>-42%</td>
</tr>
<tr>
<td></td>
<td>(624)</td>
<td>(598)</td>
<td></td>
<td>(9.09)</td>
</tr>
<tr>
<td>Net Turnover (SEK1,000)</td>
<td>-9,272</td>
<td>-2,752</td>
<td>-2.41</td>
<td>-39%</td>
</tr>
<tr>
<td></td>
<td>(2,056)</td>
<td>(1,759)</td>
<td></td>
<td>(8.73)</td>
</tr>
<tr>
<td>Tax Payments (SEK1,000)</td>
<td>-202</td>
<td>-85</td>
<td>-2.04</td>
<td>-50%</td>
</tr>
<tr>
<td></td>
<td>(45)</td>
<td>(34)</td>
<td></td>
<td>(11)</td>
</tr>
<tr>
<td>Gross Investments (SEK1,000)</td>
<td>-196</td>
<td>-75</td>
<td>-1.27</td>
<td>-30%</td>
</tr>
<tr>
<td></td>
<td>(78)</td>
<td>(55)</td>
<td></td>
<td>(12)</td>
</tr>
</tbody>
</table>