Wealth Taxation and Migration Patterns of the Wealthy

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Do the Rich Move to Avoid Wealth Taxes?

- Debate on desirability of wealth taxes: Saez & Zucman [2019]
  - Literature on “intensive margin” responses (Jakobsen & al [2020], Seim [2017], Avila-Mahecha & Londono-Velez [2021])
  - But international migration responses potentially important

- Looms large in public debate on wealth taxation

*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.*

Bengt Westerberg
(Leader of the Swedish Liberal Party)
What do we know?

- No evidence on *international* migration responses of the very wealthy
  - Evidence on top earners/income taxation (Kleven et al. [2020])

- Enough to understand migration implications of taxing wealth?
  1. Top earners ≠ wealth holders= responsiveness to taxes?
  2. Wealth (stock) ≠ income (flow)= avoidance strategies?
  3. Wealthy entrepreneurs= economic spillovers for the economy?
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  1. Top earners ≠ wealth holders= responsiveness to taxes?
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- Why hard?
  1. Few countries register international migration history
  2. Fewer countries collect information on wealth
  3. Even less countries tax wealth (needed for identification)
  4. Almost no countries link individuals to firms
What do we know?

- No evidence on international migration responses of the very wealthy
  - Evidence on top earners/income taxation (Kleven et al. [2020])

- Enough to understand migration implications of taxing wealth?
  1. Top earners $\neq$ wealth holders $\Rightarrow$ responsiveness to taxes?
  2. Wealth (stock) $\neq$ income (flow) $\Rightarrow$ avoidance strategies?
  3. Wealthy entrepreneurs $\Rightarrow$ economic spillovers for the economy?

- Why hard?
  1. Few countries register international migration history
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→ Work on within-country responses to wealth taxation only: Moretti & Wilson [2023], Bruhlart et al. [2022], Agrawal et al. [2023]
Focus on **Scandinavia**, i.e. Denmark & Sweden
- Exceptional admin data on wealth, migration, closely-held firms
- Credible identifying variation from large tax reforms

1. Document migration patterns at top of wealth distrib.
2. Document real economic effects of wealthy out-migration
3. Identify elasticity of migration to wealth taxation
4. Quantify aggregate economic implications of taxing wealth
1 Introduction

2 Institutional Background & Data

3 Migration: Descriptives

4 What Happens When the Wealthy Migrate?

5 Identifying Migration Elasticities

6 Implications
Wealth Taxation in Scandinavia

- Tax on stock of wealth net of debt
  - Sweden (1910-2007)
  - Denmark (1903-1997)

- Third party reporting and assessments at market values

- Simple structure with 2 brackets:
  - 0% MTR below exemption threshold
  - Top MTR (varied from 1% to 2.2%) above threshold

- Exemption threshold varies over time / across country
  - Denmark threshold ≈ P98 of wealth distrib
  - Sweden threshold ≈ P90-97 of wealth distrib
Various exemptions for specific types of wealth:
- E.g. in Sweden, real estate taxed at 75% of market value, stocks at 80% of market value

Strong exemptions for wealth from closely-held businesses
- E.g. in Sweden, individuals owning more than 25% of firm are fully exempted from wealth tax on value of their stocks

Tax ceiling/floor rules in both countries:
- Total taxes cannot exceed X% of taxable income
- Total taxes cannot be less than wealth tax due on Y% of taxable wealth
Wealth tax applicable to all tax residents
  - Foreigners moving in Sweden only liable to wealth tax after 3 years

Non-residents only liable for wealth held in Sweden/Denmark

In practice, weak enforcement of wealth taxes on non-residents

Special bilateral treaties offer additional grey area

No exit taxes

⇒ Bottom-line: change in country of tax residence enables avoiding wealth tax, without further need to reallocate portfolio
Unique Administrative Data

- **Third-party reported information on wealth**
  - Rich info on **taxable wealth**:
    - Denmark (1980-2016)
    - Sweden (1993-2007)
  - Rich disaggregated info on **total net wealth + transactions**
    - Sweden (1999-2007, with rich info on real estate after 2007)
  - Rich info on **closely-held businesses (CHB)**
    - Link all Swedish unlisted companies to their owners in Sweden

- Population registers with rich demographic & economic info
  - E.g. info on all earnings, capital income, transfers
  - E.g. detailed info on education, occupation, etc.

- Migration registers with precise info on:
  - Dates of entry/exit, duration of stay each year
  - Country of origin/destination
Empirical Roadmap

Today we will mostly focus on Sweden → Denmark used 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 both wealth taxes
   - International migration elasticities with respect to wealth taxes

What are the aggregate economic implications of taxing wealth?
Out-Migration Rates by Wealth Level: 1999-2006
Out-migrants liable to wealth tax ≈ 0.2% of total taxable wealth

- Same numbers in DK

### Top Decile
- Highest Exemption Threshold
- Lowest Exemption Threshold

### Out-migration Rate (in %)
- P0-50
- P50-90
- P90-91
- P91-92
- P92-93
- P93-94
- P94-95
- P95-96
- P96-97
- P97-98
- P98-99
- P99-99.5
- P99.5-99.9
- P99.9-100

### Total Migrations - SCB
Net-Migration Rates by Wealth Level: 1999-2006

Small positive net migration rates → No exodus of the wealthy

<table>
<thead>
<tr>
<th>Top Decile</th>
<th>Lowest Exemption Threshold</th>
<th>Highest Exemption Threshold</th>
</tr>
</thead>
<tbody>
<tr>
<td>P0-50</td>
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<td>P50-90</td>
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<td>P99.5-99.9</td>
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<td>P99.9-100</td>
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<tr>
<td>0</td>
<td>0.05</td>
<td>0.1</td>
<td>0.15</td>
<td>0.2</td>
<td>0.25</td>
<td>0.3</td>
<td>0.35</td>
<td>0.4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Countries of Destination: Wealthy more likely to move to countries with favorable tax regimes.
Selection Into Out-Migration: Sweden

No brain drain, but wealthy entrepreneurs 20% more likely to leave
Introduction

Institutional Background & Data

Migration: Descriptives

What Happens When the Wealthy Migrate?

Identifying Migration Elasticities

Implications
Effects of Out-Migration on Individual-Level Outcomes
Quantifying effects on personal tax payments and portfolio reallocation

- Focus on \textit{all} out-migration events of wealth taxpayers (1999-2006)
- Compare individual-level outcomes before and after out-migration
  - Control group: wealthy subject to the wealth tax staying in Sweden
  - Random allocation of placebo out-migration dates (no matching)
- Dynamic self-selection into out-migration? What happens after?

\begin{equation}
  y_{it} = \alpha + \sum_{j=1}^{\hat{T}} \beta_j \times \text{Emigrant}_i \times 1(t = j) + \sum_{j=1}^{\hat{T}} \delta_j \times 1(t = j) + \varepsilon_{it}
\end{equation}
Average wealth tax payments in year before out-migration = SEK 18,834

Effect of out-migration = -34.16% (13.36)
Average income tax payments in year before out-migration = SEK 39,382

Effect of out-migration = -35.13% (13.12)
Average total tax payments in year before out-migration = SEK 269,395

Effect of out-migration = -39.89% (9.03)
Average probability of selling real estate in year before out-migration = 3.8%

Effect of out-migration = 381.67% (72.04)
Average probability of reporting positive financial assets in year before out-migration = 88%

Effect of out-migration = -20.75% (6.65)
Wealthy Entrepreneurs in Sweden

Top Decile

Business Owners, %


LLC  Non-Active CHB  Active CHB  LLC + Non-Active CHB  LLC + Active CHB
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><strong>Panel A. All Active CHBs</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Nr. of Owners</td>
<td>1.78</td>
<td>1</td>
<td>7.05</td>
<td>589,788</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nr. of Employees</td>
<td>8.03</td>
<td>3</td>
<td>40.49</td>
<td>589,788</td>
<td>13.53%</td>
<td>100%</td>
</tr>
<tr>
<td>Value Added</td>
<td>3,398</td>
<td>1,518</td>
<td>30,859</td>
<td>541,097</td>
<td>21.84%</td>
<td>100%</td>
</tr>
<tr>
<td>Net Turnover</td>
<td>10,610</td>
<td>3,878</td>
<td>61,029</td>
<td>541,097</td>
<td>17.68%</td>
<td>100%</td>
</tr>
<tr>
<td>Tax Payments</td>
<td>138</td>
<td>21</td>
<td>4,708</td>
<td>541,097</td>
<td>27.64%</td>
<td>100%</td>
</tr>
<tr>
<td>Gross Investments</td>
<td>534</td>
<td>55</td>
<td>4,661</td>
<td>541,097</td>
<td>17.88%</td>
<td>100%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
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<th>Std. Dev.</th>
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<th>% of Swedish Aggregates</th>
<th>% of Active CHBs</th>
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</thead>
<tbody>
<tr>
<td><strong>Panel B. Active CHBs with at least one owner in the top 2.5% of net worth</strong></td>
<td></td>
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<tr>
<td>Nr. of Owners</td>
<td>2.38</td>
<td>2</td>
<td>17.04</td>
<td>98,818</td>
<td>3.79%</td>
<td>28.00%</td>
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<tr>
<td>Nr. of Employees</td>
<td>13.51</td>
<td>4</td>
<td>78.44</td>
<td>98,818</td>
<td>7.26%</td>
<td>33.22%</td>
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<tr>
<td>Value Added</td>
<td>6,609</td>
<td>2,179</td>
<td>45,655</td>
<td>91,291</td>
<td>6.45%</td>
<td>36.50%</td>
</tr>
<tr>
<td>Net Turnover</td>
<td>22,035</td>
<td>5,907</td>
<td>102,877</td>
<td>91,291</td>
<td>10.98%</td>
<td>39.72%</td>
</tr>
<tr>
<td>Tax Payments</td>
<td>353</td>
<td>54</td>
<td>2,564</td>
<td>91,291</td>
<td>6.74%</td>
<td>37.72%</td>
</tr>
<tr>
<td>Gross Investments</td>
<td>1,190</td>
<td>100</td>
<td>9,392</td>
<td>91,291</td>
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</table>
Focus on all out-migration events of wealth taxpayers (1999-2006)

Compare firm outcomes before and after out-migration of owners
  - Control group: firms held by wealthy taxpayers staying in Sweden
  - Random allocation of placebo out-migration dates (no matching)

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

\[
y_{f(i)t} = \alpha + \sum_{j=1}^{\tilde{T}} \beta_j \cdot \text{Emig Owner}_{f(i)} \times 1(t = j) + \sum_{j=1}^{\tilde{T}} \delta_j \cdot 1(t = j) + \varepsilon_{i,t}
\]
Effect of out-migration = -28.24% (0.031)
Average number of employees in year before out-migration = **9.1**

Effect of out-migration = **-29.77% (8.5)**
Average value added in year before out-migration = **SEK 5,314,844**

Effect of out-migration = **-32.73% (6.04)**

Intensive Margin?
Summing-up effects on Closely-Held Businesses

- **Upper bounds** for negative spillovers of wealth-tax avoidance
  - Firms could be sold/merged
  - Reallocation in the labor market (next step, unemployment outcomes)
  - Not all migration events are driven by the wealth tax!

- Useful to quantify an upper bound for economic effects
  - One additional move at the top \( \approx -3 \) jobs
  - Aggregate effects of out-migration \( \approx 0.02\% \) of Swedish employment

- What share is causally affected by the wealth tax?
  - Next step: migration responses to wealth tax reforms
1 Introduction

2 Institutional Background & Data

3 Migration: Descriptives

4 What Happens When the Wealthy Migrate?

5 Identifying Migration Elasticities

6 Implications
Large Wealth Tax Reforms
First evidence of international migration responses to wealth taxes

- We exploit three large wealth tax reforms in Scandinavia

- Sweden:
  1. 2007: Abolition of wealth tax
     - Sharp and large decrease in MTR from 1.5% to 0.
     - Followed win of the right wing coalition at the 2006 elections

- Denmark: (not today)
  1. 1988: Large wealth tax decrease
     - Large but gradual decrease in MTR from 2.2% to 1%
  2. 1996: Abolition of wealth tax
Wealth Tax Rates in Sweden

Exposure to the Reform by Distance to the Exemption Threshold

<table>
<thead>
<tr>
<th>Year</th>
<th>Average Tax Rate</th>
<th>Marginal Tax Rate</th>
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<tbody>
<tr>
<td>1999</td>
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</table>

Average Tax Rate
- Top 0.5%
- Top 2%
- Top 10%-20%

Marginal Tax Rate
- Top MTR
A Prediction Model of Current Wealth

- **Two issues**
  - No wealth data after 2008: persistence?
  - Current wealth level = intensive margin = endogeneous

- Build ensemble classification model to **predict wealth**

- Exploit identity of budget constraint → law of motion of wealth

- Predict current wealth group based on rich info on:
  - Past wealth,
  - Parental wealth + demographics
  - Sum of past earnings & capital income

- Train random-forests on 10% random sample of Swedish pop.

- Classify pop in groups of predicted net wealth:
  - E.g. top 2% of distrib., below top 10%, etc.
Effective Wealth Tax Rates
Exposure to the Reform by Predicted Distance to the Exemption Threshold
Out-Migration Rates
Exposure to the Reform by Predicted Distance to the Exemption Threshold

![Out-Migration Rates Graph]

The graph illustrates the out-migration rates by predicted distance to the exemption threshold for different wealth categories over the years 2001 to 2013. The x-axis represents the years, and the y-axis shows the out-migration rate in percent.

Key:
- Top .5% True Wealth (Red dashed line)
- Top .5% Pred. Wealth (Red solid line)
- Top 10-15% True Wealth (Blue dashed line)
- Top 10-15% Pred. Wealth (Blue solid line)
Out-Migration Probability decreased by 0.08pp (-30% relative to pre-reform)


Effect On Out-Migration

Top 0.5% VS 10-15% True Wealth
Top 0.5% VS 10-15% Pred. Wealth
Estimating Semi-Elasticities of Migration

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

\[ Y_{it} = \alpha_0 + \varepsilon \ln(1 - \tau)_{it} \]

\[ \ln(1 - \tau)_{it} = \beta_0 + \beta_1 T + \beta_2 Post + \beta_3 T \cdot Post \]

- \( Y_{it} \): out-, in- or net migration rate of group \( i = \{ T, C \} \) in year \( t \)

- For Denmark, use 3 periods and their interaction with treated grp

- Danish DD Evidence

- Inference: collapse data at year X wealth group level

- Because \( \tau \) small, \( \varepsilon \) has simple interpretation:

  \[ \tau \text{ increases by 1 pct point} \implies \text{migration rate increases by } \varepsilon \text{ pct point} \]
Estimating Semi-Elasticities of Migration

Estimated Semi-elasticities of Out-Migration

**Sweden:**
- Top 2%

**Denmark:**
- Top 1%
- Top .05%
- Top .01%

**Entrepreneurs:**
- Non-Entrepreneurs

**Age Groups:**
- <50 yrs old
- >50 yrs old

Semi-Elasticity

![Graph showing semi-elasticities for different groups in Sweden and Denmark](chart.png)
Interpreting the Magnitude: Stock Elasticity

• Elasticity of steady state population size $N$ w.r.t $1 - \tau$:

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

• Comparison with migration elasticities in the income tax literature?

• 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: $r = .042$, and $\tau \approx .006 \Rightarrow t = 14.3\%$

$$\varepsilon_{N,1-t} = \varepsilon_{N,1-\tau} \cdot \frac{d \ln(1-\tau)}{d \ln(1-t)} \approx .078 \ (0.013)$$
Comparison to Migration Elasticities in the Literature

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

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

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

**Capital Taxation:**
- Intra-National:
  - Moretti and Wilson (2020)
  - Agrawal et al (2020)
  - Bruhlard et al (2019)
Simple optimal taxation model with spillovers

\[ \tau^* = \frac{1 - e \cdot \varepsilon}{1 + \varepsilon} \] (1)

- We have causally estimated \( \varepsilon \)
- \( e \) is the marginal externality effect of out-migration (in gov. revenue terms)

- Prelim results with upper bounds: \( \tau_{Sweden/Denmark} \ll \tau^* \)

- Working on Extension: anticipation effects (empirics+theory)

- Important: externality only matters in uncoordinated settings!
APPENDIX SLIDES
Figure: Evolution of Wealth Tax Threshold - Sweden

[Graph showing the evolution of wealth tax threshold for couples and singles from 1994 to 2006.

- Couples: Red dots, generally increasing trend.
- Singles: Blue dots, fluctuating trend.

X-axis: Year (1994-2006)
Y-axis: Percentile of Taxable Wealth (%)

The graph illustrates how the taxable wealth threshold has changed over time, with a notable increase in the threshold towards the end of the period.]
**Table 1—The Swedish Wealth Tax, 2000–2006**

<table>
<thead>
<tr>
<th>Year</th>
<th>Tax revenue percent</th>
<th>Tax payers percent</th>
<th>Threshold, singles (SEK/USD)</th>
<th>Threshold, couples (SEK/USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>1.0</td>
<td>7.7</td>
<td>900/129</td>
<td>900/129</td>
</tr>
<tr>
<td>2001</td>
<td>0.8</td>
<td>5.3</td>
<td>1,000/143</td>
<td>1,500/214</td>
</tr>
<tr>
<td>2002</td>
<td>0.5</td>
<td>2.3</td>
<td>1,500/214</td>
<td>2,000/286</td>
</tr>
<tr>
<td>2003</td>
<td>0.7</td>
<td>3.5</td>
<td>1,500/214</td>
<td>2,000/286</td>
</tr>
<tr>
<td>2004</td>
<td>0.7</td>
<td>3.6</td>
<td>1,500/214</td>
<td>2,000/286</td>
</tr>
<tr>
<td>2005</td>
<td>0.6</td>
<td>2.5</td>
<td>1,500/214</td>
<td>3,000/429</td>
</tr>
<tr>
<td>2006</td>
<td>0.7</td>
<td>3.0</td>
<td>1,500/214</td>
<td>3,000/429</td>
</tr>
</tbody>
</table>

*Notes:* The table shows aggregate statistics of the wealth tax for the period studied. Tax revenue is presented as a percentage of total tax revenue. Monetary values are presented in 1,000 SEK and 1,000 USD.

*Source:* Statistics Sweden and the Swedish National Financial Management Authority
Figure: Fraction of Total Net Wealth Subject to Wealth Tax - Sweden
Figure: Countries of Destination: Top 2% of Wealth Holders in Sweden
Figure: Countries of Destination: Top 20% to 10% of Wealth Holders in Sweden

- USA
- Denmark
- Finland
- France
- Germany
- Switzerland
- UK
- Spain
- Norway
- Other
Figure: Probability to Spend $> 185$ Days in Sweden From Migration Register
Figure: Median Total Tax Payments, Sweden

- Median Total Tax Payments

Year Relative To Out-Migration

>P97.5, Out-Migrate

>P97.5, Don't Out-Migrate
Figure: Probability Selling Real Estate

The graph shows the probability of selling real estate (%) relative to the year of out-migration. The x-axis represents the year relative to out-migration, ranging from -4 to 4. The y-axis represents the probability of selling real estate, ranging from 0 to 25%. The graph compares two scenarios:

- Red line: >P97.5, Out-Migrate
- Blue line: >P97.5, Don't Out-Migrate
Figure: Probability to Own a LLC

- Probability of owning an LLC, %
- Year relative to out-migration

- >P97.5, Out-Migrate
- >P97.5, Don't Out-Migrate
Figure: Average Number of Employees

Average Number of Workers, Excl. Owners

Year Relative To Out-Migration

> P97.5, Out-Migrate
> P97.5, Don't Out-Migrate
Figure: Total Wage Bill

Avg. Labor Income From LLC Incl. Owners, 100s

Year Relative To Out-Migration

>P97.5, Out-Migrate
>P97.5, Don't Out-Migrate

>5000
>10000
>15000
>20000

>5

>4

>3

>2

>1

>0

>-1

>-2

>-3

>-4

>-5

Back
Average number of employees in year before out-migration = 8.67
Effect of out-migration = -6.19% (9.43)
Prediction Model: Details

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!
What predictors?

1. From IOT: use past wealth construct average taxable wealth X years back using FBESK variable we have this info from 1993 to 2007 take X=7 for instance, this should enable us to predict wealth from 2000 to 2017.

2. Past earnings: LISA: 1990-2017 cumulate past earnings - taxes and transfers over the last X years (use HH disposable income variables to account for all potential sources of income).

3. What about consumption: In LISA: 1990-2017 could use age, family structure, number of children, place of residence, etc, which are proxies for consumption dynamics also what about using car registers for the years we have it?

4. Capturing returns? use cumulated capital income over past X yrs, from LISA 1990-2017 one issue: only realized Kgains (but cumulated over time, reduces variance in realized Kgains, and better captures overall returns, although clearly unrealized Kgains still an issue...could also use structure of wealth / portfolio What about using additional info from wealth register, KURU, Real estate transaction registers.

5. Capturing inheritances: use parental wealth X years ago (and maybe also today)...and age of parents this predicts how much you are likely to have received in inheritances over the past X years... If parents are dead already we have missing values but this should be turned into 0 (it means you can no longer receive additional I from them) Could also use inheritance registry data, etc for the 2 years we have it.
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
Top Wealth ATR - Denmark

Average Wealth Tax Rate

Year


Top 1%

Top 5-2.5%
Danish Reforms: Migration Effects

Top 1%: In Migration Rates

![Chart showing in-migration rates for Top 1% and Top 5-2.5% from 1980 to 2006.](chart.png)
Danish Reforms: Migration Effects

Top 1%: Net Migration Rates

- Net-migration Rate (in %): -0.6, -0.4, -0.2, 0, 0.2, 0.4, 0.6

Graph showing the net-migration rate for top 1% and top 5-2.5% over the years from 1980 to 2006.
Danish Reforms: Migration Effects

Top .05%: Out Migration Rates
Danish Reforms: Migration Effects

Top .05%: In Migration Rates

![Line graph showing in-migration rates from 1980 to 2006 for Top 1% and Top 5-2.5% groups. The graph indicates a general increase in in-migration rates over the years, with slight fluctuations.](image-url)
Danish Reforms: Migration Effects

Top .05%: Net Migration Rates
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 $t = \text{sum of pop. of all ages } k \text{ at } t$

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

$$N_t = \sum_k N_t^k$$

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

$$N_t^1 = B_t$$
$$N_t^2 = (1 - \alpha_t^1)N_{t-1}^1 = (1 - \alpha_t^1)B_{t-1}$$
$$N_t^3 = (1 - \alpha_t^2)N_{t-1}^2 = (1 - \alpha_t^2)(1 - \alpha_{t-1}^1)B_{t-2}, \text{ Etc.}$$

- $B_t$: number of “births”
- $\alpha_t^k$: 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 $\alpha^k_t = \alpha^k_{t-1}$, $\forall t, k$

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

- 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

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

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

$$\Rightarrow \varepsilon_{N,1-\tau} \approx 4.32$$