Wealth and Income Over the Life-Cycle
Evidence from Swiss Tax Data

Isabel Z. Martínez\textsuperscript{1} Regina Pleninger\textsuperscript{2}

\textsuperscript{1}KOF Swiss Economic Institute, ETH Zurich
\textsuperscript{2}World Bank

Inaugural III/LIS Comparative Economic Inequality Conference
February 24-25, 2023

Disclaimer: The opinions expressed are those of the authors and do not necessarily reflect the views of the World Bank Group or its Board of Executive Directors.
Inequality in Income and Wealth and The Role Of Age

2 stylized facts

1. The marginal distributions of income are strongly correlated, especially at the tails.

2. Income and wealth exhibit pronounced life-cycle patterns, with wealth increasing monotonically as people age.

▶ What are the implications of age for the joint distribution?
▶ What can we say about income and wealth mobility over the life-cycle for different cohorts?
Literature

- **Wealth Inequality**: Kopczuk and Saez (2004), Saez and Zucman (2016), Föllmi and Martínez (2017), Piketty et al. (2019)
- **Joint Distribution**: Jäntti et al. (2015), Jäntti et al. (2008), Sierminska et al. (2007), Gallusser and Krapf (2022), Martínez (2022)
- **Wealth-Income Ratios**: Piketty and Zucman (2014), Piketty (2014), Kumar (2019), Baselgia and Martínez (2023)
- **Wealth Mobility**: Jianakoplos and Menchik (1997), Hochguertel and Ohlsson (2012), Benhabib et al. (2019), Moser (2019)
Income and Wealth Tax Data from Canton of Bern

- 13% of the total population of taxpayers
- Panel over the period 2002 – 2018
- Joint taxation of married couples
- Unit of analysis: the individual
  - **Wealth** of married individuals need to be split equally between spouses
  - **Incomes** of married individuals can be treated in two ways:
    - split equally
    - use individual incomes
      (except for a few sources, where incomes have to be split)
Joint Distribution of Income and Wealth
Mean Wealth Rank by Income Rank (2018)

“Step-function”
- Highly correlated at the tails
- Weak correlation in the middle of the income distribution

Over time,
- corr. ↓ at the bottom
- corr. ↑ for the upper middle class
- top earners moved up wealth distribution (higher avg. wealth percentile)
Mean Wealth Rank by Income Rank Across Age Groups (2018)

“Step-function” mask heterogeneity across age groups

- For a given income percentile, older cohorts are higher up the wealth distribution
- Exception 1: young top-earners (age 16-35) have high wealth
- Exception 2: those with very (!) low income have very low wealth

Policy implication: Retirees tend to be wealthy, even those with low incomes
Wealth-Income Ratios
Wealth-Income Ratios Rising Along the Income Distribution (Median)
Wealth-Income Ratios by Cohort (Median, 2002-2018)

![Graph showing wealth-income ratios by cohort from 1925-1929 to 1990-1994.](image-url)
Income and Wealth Mobility over the Life Cycle
Real Income and Wealth Over The Life-Cycle (Median, 2002-2018)

**Income**

- Real Income (in 1000 CHF) over different birth cohorts.

**Wealth**

- Real Wealth (in 1000 CHF) over different birth cohorts.

**Wealth-Income Ratio**

- Median ratio: 12 / 24.
Average Wealth and Income Rank Mobility (2002-2018)

![Graph showing average wealth and income mobility](image-url)
Income Percentile Rank Mobility Estimates (BE, 2003-2012)

\[ P(\text{Income})_{i,t} = \alpha + \beta \cdot P(\text{Income})_{i,t-9} + \gamma_{\text{age}} + \lambda_t + \varepsilon_{i,t} \]

<table>
<thead>
<tr>
<th></th>
<th>(1) total</th>
<th>(2) female</th>
<th>(3) male</th>
<th>(4) married</th>
<th>(5) single</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P^Y_{t-9})</td>
<td>0.729</td>
<td>0.638</td>
<td>0.757</td>
<td>0.754</td>
<td>0.676</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>14.714</td>
<td>16.923</td>
<td>15.216</td>
<td>12.089</td>
<td>19.311</td>
</tr>
<tr>
<td></td>
<td>(0.05)</td>
<td>(0.07)</td>
<td>(0.09)</td>
<td>(0.07)</td>
<td>(0.09)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.464</td>
<td>0.340</td>
<td>0.501</td>
<td>0.548</td>
<td>0.329</td>
</tr>
<tr>
<td>Obs.</td>
<td>4215677</td>
<td>2068948</td>
<td>2146729</td>
<td>2403134</td>
<td>1812542</td>
</tr>
<tr>
<td>Ind.</td>
<td>677,765</td>
<td>343,417</td>
<td>334,361</td>
<td>407,393</td>
<td>349,595</td>
</tr>
<tr>
<td>HH.</td>
<td>562,508</td>
<td>375,177</td>
<td>380,812</td>
<td>284,083</td>
<td>340,870</td>
</tr>
</tbody>
</table>

Note: All regressions include age and decade fixed effects. Standard errors clustered at individual and household levels (individuals may live in different households due to marriage, divorce, widowhood).
Wealth Percentile Rank Mobility Estimates (BE, 2003-2012)

\[ P(\text{Wealth})_{i,t} = \alpha + \beta \cdot P(\text{Wealth})_{i,t-9} + \gamma_{\text{age}} + \lambda_t + \varepsilon_{i,t} \]

<table>
<thead>
<tr>
<th></th>
<th>(1) total</th>
<th>(2) female</th>
<th>(3) male</th>
<th>(4) married</th>
<th>(5) single</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P^W_{t-9})</td>
<td>0.874</td>
<td>0.878</td>
<td>0.869</td>
<td>0.863</td>
<td>0.877</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>9.437</td>
<td>8.777</td>
<td>10.223</td>
<td>11.091</td>
<td>7.974</td>
</tr>
<tr>
<td></td>
<td>(0.07)</td>
<td>(0.08)</td>
<td>(0.08)</td>
<td>(0.10)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.591</td>
<td>0.596</td>
<td>0.587</td>
<td>0.588</td>
<td>0.544</td>
</tr>
<tr>
<td>Obs.</td>
<td>4130774</td>
<td>2203836</td>
<td>1926938</td>
<td>2441713</td>
<td>1689060</td>
</tr>
<tr>
<td>Ind.</td>
<td>682,416</td>
<td>359,693</td>
<td>322,733</td>
<td>407,483</td>
<td>343,226</td>
</tr>
<tr>
<td>HH.</td>
<td>550,688</td>
<td>394,397</td>
<td>365,771</td>
<td>265,546</td>
<td>338,411</td>
</tr>
</tbody>
</table>

Note: All regressions include age and decade fixed effects. Standard errors clustered at individual and household levels (individuals may live in different households due to marriage, divorce, widowhood).
Income Rank Mobility - Sample Splits

Effect of wealth percentile in t-9 on percentile in t
(larger estimates imply lower mobility)
Wealth Rank Mobility - Sample Splits

Effect of wealth percentile in t-9 on percentile in t
(larger estimates imply lower mobility)

by life-event  by wealth shock
Income Mobility Largest Among Younger Cohorts

\[ P(\text{Income})_{i,t} = \alpha + \beta_0 \cdot P(\text{Income})_{i,t-9} + \beta_{1,c} \cdot (P(\text{Income})_{i,t-9} \times \text{Cohort c}) + \gamma_{age} + \varepsilon_{i,t} \]
Wealth Persistence High Across All Cohorts

\[ P(\text{Wealth})_{i,t} = \alpha + \beta_0 \cdot P(\text{Wealth})_{i,t-9} + \beta_{1,c} \cdot (P(\text{Wealth})_{i,t-9} \times \text{Cohort } c) + \gamma_{\text{age}} + \varepsilon_{i,t} \]
Wealth Ranks Tend To Be More Persistent Than Income Ranks

Effect of percentile in t-9 on percentile in t (larger estimates imply lower mobility)

Decile (in start year)

Wealth
Income
The Top 1%: Persistence After 1 Year

Income

Wealth

Share of top 1% earners, 1 year later

Share of wealthiest top 1%, 1 year later

Still in top 1%
Remained in top 10%
Left the sample
Moved below top 10%
The Top 1%: Persistence After 9 Years

Income

- Still in top 1%
- Remained in top 10%
- Left the sample
- Moved below top 10%

Year in which they belonged to the top 1%

Wealth

- Still in top 1%
- Remained in top 10%
- Left the sample
- Moved below top 10%

Year in which they belonged to the top 1%
Conclusion

- Strong association between income and wealth, especially at the tails
- Non-linearity in joint distribution driven by demographic composition and age-wealth nexus:
  → older people are wealthier throughout the income distribution!
- Climbing wealth distribution harder than income distribution
- Intra-generational wealth mobility (s)low
- Wealth accumulation beyond retirement age
- Retirees hardly dis-save, but rather die rich
- Clear differences between cohorts:
  - Younger cohorts wealthier and have higher incomes
Thank You!
Age Composition Along the Income and Wealth Distributions

**Income (2018)**

- Population share
- Position in the cantonal gross income distribution

**Wealth (2018)**

- Population share
- Position in the cantonal net wealth distribution

Individuals, Bern, 2018
Wealth-Income Ratios Rise With Age (Median, 2018)
Rising Wealth-Income Ratios by Age Group (Mean, 2018)
Financial Wealth-Income Ratios by Cohort (Median, 2002-2018)
Real Estate Wealth-Income Ratios by Cohort (Median, 2002-2018)
Debt-Income Ratios by Cohort (Median, 2002-2018)

![Graph showing Debt-Income Ratios by Cohort](image-url)
Appendix

Income and Wealth Over The Life-Cycle (Mean, 2002-2018)

Income

Wealth

Wealth-Income Ratio
Life Events Associated With Higher Income Mobility

\[ P(\text{Income})_{i,t} = \alpha + \beta \cdot P(\text{Income})_{i,t-9} + \gamma \text{age} + \lambda_t + \varepsilon_{i,t} \]

<table>
<thead>
<tr>
<th></th>
<th>(1) got married</th>
<th>(2) had kids</th>
<th>(3) got divorced</th>
<th>(4) widowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P_{t-9}^Y)</td>
<td>0.638</td>
<td>0.679</td>
<td>0.507</td>
<td>0.513</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>22.154</td>
<td>18.611</td>
<td>36.332</td>
<td>33.348</td>
</tr>
<tr>
<td></td>
<td>(0.26)</td>
<td>(0.22)</td>
<td>(0.26)</td>
<td>(0.20)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.194</td>
<td>0.262</td>
<td>0.295</td>
<td>0.308</td>
</tr>
<tr>
<td>Obs.</td>
<td>388,038</td>
<td>482,852</td>
<td>188,008</td>
<td>163,383</td>
</tr>
<tr>
<td>Ind.</td>
<td>101,502</td>
<td>127,860</td>
<td>49,536</td>
<td>43,183</td>
</tr>
<tr>
<td>HH.</td>
<td>71,021</td>
<td>95,982</td>
<td>52,500</td>
<td>43,375</td>
</tr>
</tbody>
</table>

Note: All regressions include age and decade fixed effects. Standard errors clustered at individual and household levels (individuals may live in different households due to marriage, divorce, widowhood).
Wealth Shocks Only Marginally Affect Income Mobility

\[ P(\text{Income})_{i,t} = \alpha + \beta \cdot P(\text{Income})_{i,t-9} + \gamma_{age} + \lambda_t + \varepsilon_{i,t} \]

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>gift made</td>
<td>gift received</td>
<td>inherited</td>
<td>won lottery</td>
</tr>
<tr>
<td>( P_{t-9} )</td>
<td>0.723 \ (0.00)</td>
<td>0.735 \ (0.00)</td>
<td>0.744 \ (0.00)</td>
<td>0.738 \ (0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>11.355 \ (0.18)</td>
<td>16.609 \ (0.17)</td>
<td>12.345 \ (0.12)</td>
<td>12.629 \ (0.21)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.501</td>
<td>0.414</td>
<td>0.502</td>
<td>0.501</td>
</tr>
<tr>
<td>Obs.</td>
<td>244,095</td>
<td>427,517</td>
<td>635,349</td>
<td>235,897</td>
</tr>
<tr>
<td>Ind.</td>
<td>71,897</td>
<td>121,739</td>
<td>178,707</td>
<td>58,282</td>
</tr>
<tr>
<td>HH.</td>
<td>51,789</td>
<td>90,759</td>
<td>130,616</td>
<td>43,827</td>
</tr>
</tbody>
</table>

\textit{Note:} All regressions include age and decade fixed effects. Standard errors clustered at individual and household levels (individuals may live in different households due to marriage, divorce, widowhood).
Life Events Associated With Higher Wealth Mobility (Except Widowhood)

\[ P(\text{Wealth})_{i,t} = \alpha + \beta \cdot P(\text{Wealth})_{i,t-9} + \gamma_{\text{age}} + \lambda_t + \varepsilon_{i,t} \]

<table>
<thead>
<tr>
<th></th>
<th>(1) got married</th>
<th>(2) had kids</th>
<th>(3) got divorced</th>
<th>(4) widowed</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P^W_{t-9})</td>
<td>0.656</td>
<td>0.787</td>
<td>0.760</td>
<td>0.909</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.01)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>22.299</td>
<td>15.686</td>
<td>8.414</td>
<td>8.098</td>
</tr>
<tr>
<td></td>
<td>(0.22)</td>
<td>(0.19)</td>
<td>(0.30)</td>
<td>(0.28)</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.289</td>
<td>0.405</td>
<td>0.368</td>
<td>0.570</td>
</tr>
<tr>
<td>Obs.</td>
<td>353,671</td>
<td>436,755</td>
<td>166,932</td>
<td>167,495</td>
</tr>
<tr>
<td>Ind.</td>
<td>95,321</td>
<td>120,244</td>
<td>45,588</td>
<td>43,157</td>
</tr>
<tr>
<td>HH.</td>
<td>66,118</td>
<td>86,701</td>
<td>47,804</td>
<td>43,326</td>
</tr>
</tbody>
</table>

Note: All regressions include age and decade fixed effects. Standard errors clustered at individual and household levels (individuals may live in different households due to marriage, divorce, widowhood).
# Wealth Shocks Associated With Higher Wealth Mobility

\[ P(\text{Wealth})_{i,t} = \alpha + \beta \cdot P(\text{Wealth})_{i,t-9} + \gamma \text{age} + \lambda_t + \varepsilon_{i,t} \]

<table>
<thead>
<tr>
<th></th>
<th>(1) gift made</th>
<th>(2) gift received</th>
<th>(3) inherited</th>
<th>(4) won lottery</th>
</tr>
</thead>
<tbody>
<tr>
<td>( P_{t-9} )</td>
<td>0.794</td>
<td>0.691</td>
<td>0.752</td>
<td>0.832</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.00)</td>
</tr>
<tr>
<td>Constant</td>
<td>15.614</td>
<td>26.110</td>
<td>21.455</td>
<td>12.817</td>
</tr>
<tr>
<td></td>
<td>(0.40)</td>
<td>(0.22)</td>
<td>(0.18)</td>
<td>(0.28)</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.487</td>
<td>0.443</td>
<td>0.529</td>
<td>0.541</td>
</tr>
<tr>
<td>Obs.</td>
<td>256,413</td>
<td>442,602</td>
<td>658,343</td>
<td>226,824</td>
</tr>
<tr>
<td>Ind.</td>
<td>73,950</td>
<td>126,856</td>
<td>184,149</td>
<td>57,000</td>
</tr>
<tr>
<td>HH.</td>
<td>50,971</td>
<td>90,236</td>
<td>125,970</td>
<td>40,440</td>
</tr>
</tbody>
</table>

**Note:** All regressions include age and decade fixed effects. Standard errors clustered at individual and household levels (individuals may live in different households due to marriage, divorce, widowhood).