Income and Wealth Inequality

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Overview

1. Empirics
   a. Functional income distribution
   b. Personal income distribution (incl. differential saving rates)
   c. Wealth distribution (incl. differential rates of return)

2. Post-Keynesian Theory
   a. Overhead costs
   b. Wage-/profit led personal income distribution
   c. Wealth distribution model
Empirics
Personal distribution
Personal income distribution

• Recent surge in interest in mainstream economics
• Long-run inequality: u or wave?
• Income concentration at the top: rising?
• Income composition at the top: are classes still relevant?
Personal income inequality: Historical perspective

Kuznets

Inequality

Time or GDP

Piketty

Inequality

Time or GDP

Milanovic

Inequality

Time or GDP
Personal income inequality (1): Global perspective

Source: Lakner, Milanovic (2016)
Personal income inequality (1): The elephant

Source: Lakner, Milanovic (2016)
Personal income inequality (2): Global perspective

Source: Milanovic (2016)
Personal income inequality (2): The giraffe

Source: Milanovic (2016)
Personal income distribution: Top 1% share in national income (UK, US 1908-2008)

Source: WWID, Alvaredo et al. (2012)
Top 1% share in national income (continental Europe 1891-2006)

Source: WWID, Alvaredo et al. (2012)
What is the economic mainstream doing?

• DINA: Distributional National Accounts (OECD, Eurostat etc.)
• Initiated by Stiglitz-Sen-Fitoussi Commission, propelled by Piketty, Saez, Zucman, and their students
• Link personal-functional distribution in the SNA
• Post-Keynesians involved in projects:
  • Germany (DIW, IfSO Duisburg-Essen)
  • Austria (WIFO, INEQ Economics University Vienna)
Links functional-personal income distribution

- Differential saving rates
- Classes
- Differential rates of return
- Imputations from micro data in SNA
Saving rates

• Differential saving rates (by income): core Post-Keynesian assumption

• Empirically (at least) 3 ways:

  • Savings out of profits are (relatively) higher than savings out of work income

  • Savings of capitalists are (relatively) higher than of workers, if the former receive mainly profit income, and if the latter receive mainly work income

  • Savings from high incomes are (relatively) higher than from low incomes, if high incomes have a larger share of profit income, and if lower incomes have a higher share of work income
Saving rates

- Macrodata with some distributional information (standard calculation):

\[
S_{\text{decile}} = 1 - \frac{\sum_{1}^{n} C_{\text{decile}}}{\sum_{1}^{n} Y_{\text{decile}}}
\]

- Properties:
  - Upward sloping
  - Bottom 40-60% have negative saving rates

- Macroeconomic stability?

- Microdata:

\[
S_{\text{decile}} = \frac{\sum_{1}^{n} 1 - \frac{C_{\text{household}}}{Y_{\text{household}}}}{n}
\]

- Bottom 20% have negative saving rates
Saving rates from macro data (left) and micro data (right)

Net income percentiles

Source: Miriam Rehm; data: Consumption Survey 2009/10

Source: Fessler/Schürz (2018); data: HFCS 2014
Saving rates for Europe

Source: Ederer/Rehm (2019), data: EHBS 2010
Income type by income level (Austria 2010)

Source: Altzinger, Humer, Moser (2016); data: HFCS 2010
Functional income distribution by income level (Austria 2010)

Source: Altzinger, Humer, Moser (2016); data: HFCS 2010
Saving rates

• Differential saving rates (by income): core Post-Keynesian assumption

• Empirically (at least) 3 ways:
  
  • Savings out of profits are (relatively) higher than savings out of work income
  
  • Savings of capitalists are (relatively) higher than of workers,
    if the former receive mainly profit income, and
    if the latter receive mainly work income
  
  • Savings from high incomes are (relatively) higher than from low incomes,
    if high incomes have a larger share of profit income, and
    if lower incomes have a higher share of work income
Wealth distribution
Wealth distribution

• Only recently (somewhat) standardised definition
• Data quality much more problematic compared to income
• Much more unequally distributed than income
• Yet, conceptually critical
Data sources for wealth

- Tax data (e.g. wealth taxes, inheritance taxes)
  - Advantages: Often long time horizons, broad coverage
  - Disadvantages: Tax base and deductibles, tax avoidance and evasion

- Surveys (e.g. SCF for US, HFCS for EU)
  - Advantages: Socioeconomic information
  - Disadvantages: Voluntary participation, underreporting
# Wealth: Definition

<table>
<thead>
<tr>
<th>Non-financial (real) assets</th>
<th>Liabilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owner-occupied housing, other real estate</td>
<td>Mortgages</td>
</tr>
<tr>
<td>Consumer durables</td>
<td>Other investment loans</td>
</tr>
<tr>
<td>Vehicles</td>
<td>Consumer durable loans</td>
</tr>
<tr>
<td>Intellectual property</td>
<td>Education loans</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial assets</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Currency and deposits</td>
<td></td>
</tr>
<tr>
<td>Bonds and other debt securities</td>
<td></td>
</tr>
<tr>
<td>Equity in own unincorporated enterprises</td>
<td></td>
</tr>
<tr>
<td>Shares</td>
<td></td>
</tr>
<tr>
<td>Mutual funds and other investment funds</td>
<td></td>
</tr>
<tr>
<td>Pension funds</td>
<td></td>
</tr>
</tbody>
</table>

Source: OECD (2013)
## Participation in Asset Classes in Europe

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Bottom half &lt; 50%</th>
<th>Affluent 51-95%</th>
<th>Wealthy 96-100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicles</td>
<td>62</td>
<td>85</td>
<td>91</td>
</tr>
<tr>
<td>Main residence</td>
<td>28</td>
<td>92</td>
<td>94</td>
</tr>
<tr>
<td>Other valuables</td>
<td>37</td>
<td>51</td>
<td>62</td>
</tr>
<tr>
<td>Other real estate</td>
<td>8</td>
<td>35</td>
<td>78</td>
</tr>
<tr>
<td>Self-employment business</td>
<td>7</td>
<td>14</td>
<td>50</td>
</tr>
<tr>
<td>Current accounts</td>
<td>92</td>
<td>97</td>
<td>99</td>
</tr>
<tr>
<td>Savings accounts</td>
<td>57</td>
<td>63</td>
<td>67</td>
</tr>
<tr>
<td>Money owed to the household</td>
<td>9</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Bonds</td>
<td>2</td>
<td>8</td>
<td>20</td>
</tr>
<tr>
<td>Shares</td>
<td>4</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td>Mutual funds</td>
<td>6</td>
<td>16</td>
<td>32</td>
</tr>
<tr>
<td>Other financial assets</td>
<td>2</td>
<td>2</td>
<td>8</td>
</tr>
</tbody>
</table>

Source: Miriam Rehm; data: HFCS 2010
Wealth distribution: Inequality in the Euro area

Source: Sierminska and Medgyesi 2013; Holzner, Jestl, Leitner 2015
Differential rates of return

- Workers’ interest rates lower than capitalists’ profit rates:

- Like differential saving rates:
  - Mixed income: capital income of workers (interest) lower than capitalists’ (profit)
  - Explosive feedback in wealth inequality
  - Stability of a growth regime?

- Check empirically: Combine return data from Jordà ea. (2018) with HFCS asset categories
Differential saving rates: Findings

- 3 wealth groups:
  - 30% asset-poor – average saving rate 2.4%
  - 65% middle-class homeowners – average saving rate 5.7%
  - 5% capitalists – average saving rate 7.2%
- Collapse asset-poor and middle-class homeowners into 95% 'workers': avg. saving rate 5.6%
Differential rates of return across wealth vingtiles (continental Europe)

Source: Ederer, Mayerhofer, Rehm (2019), data: HFCS 2014
Theory
Wealth distribution model
Wealth distribution models


• Neo-Kaleckian model of personal income and wealth distribution:
  • Mixed income (profit income for workers, work income for capitalists)
  • Endogenous wealth distribution
  • Calculate parameters from household data
  • Compare model solution with empirical data
The model

• Income is divided between wages and profits (profit share \( \pi \)); wage income is divided between workers and capitalists/managers (\( \alpha \)); differential saving rates (\( s_w, s_r \)) and differential rates of return (\( \gamma_w, \gamma_r \)) (wealth shares held in profit-generating assets)

\[
Y_w = (1 - \alpha)W + \frac{\gamma_w(1 - z)}{\gamma_w(1 - z) + \gamma_r z} R, \quad Y_r = \alpha W + \frac{\gamma_r z}{\gamma_w(1 - z) + \gamma_r z} R
\]

• Workers and capitalists consume and save out of their income

\[
C = (1 - s_w)Y_w + (1 - s_r)Y_r
\]

• The wealth distribution (share of capitalists \( z \)) is \( z = \frac{V_r}{V} \)
Solution (long run)

• Basic version: \( Z^* = \frac{S_r \pi - S_w}{(S_r - S_w)\pi} \)
  (no mixed income, no differential returns)

• Full version: 6 parameters (saving rates \( S_w, S_r \), profit share \( \pi \), share in labour income \( \alpha \), profit generating wealth share \( \gamma_w, \gamma_r \)) define wealth distribution in equilibrium
Full solution

\[ z^{**} = \frac{-D \pm \sqrt{D^2 - 4CE}}{2C} \]

\[ C = -[s_w(1 - \alpha) + s_r\alpha](1 - \pi)(\gamma_r - \gamma_w) - (s_r\gamma_r - s_w\gamma_w)\pi \]

\[ D = s_r\alpha(1 - \pi)(\gamma_r - \gamma_w) + s_r\gamma_r\pi - [s_w(1 - \alpha) + s_r\alpha](1 - \pi)\gamma_w - s_w\gamma_w\pi \]

\[ E = s_r\alpha(1 - \pi)\gamma_w \]
### Transaction flow matrix

<table>
<thead>
<tr>
<th></th>
<th>Households</th>
<th>Firms</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Workers</td>
<td>Capitalists</td>
</tr>
<tr>
<td>Consumption</td>
<td>−C₀</td>
<td>−C₀</td>
</tr>
<tr>
<td>Investment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wages</td>
<td>+W₀</td>
<td>+W₀</td>
</tr>
<tr>
<td>Profits</td>
<td>+R₀</td>
<td>+R₀</td>
</tr>
<tr>
<td>Equity</td>
<td>−γ₀𝑊₀Δ𝑉₀</td>
<td>−γ₀𝑅₀Δ𝑉₀</td>
</tr>
<tr>
<td>Deposits</td>
<td>−(1 − γ₀)Δ𝑉₀</td>
<td>−(1 − γ₀)Δ𝑉₀</td>
</tr>
<tr>
<td>Loans</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Source: Ederer, Rehm (2019)
Data

• Household Finance and Consumption Survey (HFCS)
• Capitalists defined following Rehm, Naqvi, Hofmann (2017):
  • Top 1 percent wealth owners
  • Medium and large business owners (> 5 employees)
  • Capital income higher than average work income
• Workers: employment status
### Empirical values of model parameters

<table>
<thead>
<tr>
<th>Country</th>
<th>$s_w$</th>
<th>$s_r$</th>
<th>$\pi$</th>
<th>$\alpha$</th>
<th>$\gamma_w$</th>
<th>$\gamma_r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>0.05</td>
<td>0.23</td>
<td>0.38</td>
<td>0.07</td>
<td>0.40</td>
<td>0.92</td>
</tr>
<tr>
<td>Belgium</td>
<td>0.10</td>
<td>0.29</td>
<td>0.34</td>
<td>0.02</td>
<td>0.59</td>
<td>0.85</td>
</tr>
<tr>
<td>Cyprus</td>
<td>0.00</td>
<td>0.10</td>
<td>0.37</td>
<td>0.18</td>
<td>0.81</td>
<td>0.96</td>
</tr>
<tr>
<td>Spain</td>
<td>0.00</td>
<td>0.07</td>
<td>0.41</td>
<td>0.10</td>
<td>0.53</td>
<td>0.90</td>
</tr>
<tr>
<td>Finland</td>
<td>0.12</td>
<td>0.39</td>
<td>0.37</td>
<td>0.02</td>
<td>0.55</td>
<td>0.93</td>
</tr>
<tr>
<td>France</td>
<td>0.01</td>
<td>0.29</td>
<td>0.37</td>
<td>0.05</td>
<td>0.57</td>
<td>0.97</td>
</tr>
<tr>
<td>Greece</td>
<td>0.05</td>
<td>0.13</td>
<td>0.34</td>
<td>0.05</td>
<td>0.25</td>
<td>0.90</td>
</tr>
<tr>
<td>Malta</td>
<td>0.00</td>
<td>0.26</td>
<td>0.46</td>
<td>0.03</td>
<td>0.59</td>
<td>0.98</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.13</td>
<td>0.33</td>
<td>0.41</td>
<td>0.04</td>
<td>0.42</td>
<td>0.90</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.18</td>
<td>0.30</td>
<td>0.44</td>
<td>0.05</td>
<td>0.20</td>
<td>0.83</td>
</tr>
</tbody>
</table>

Note: Columns refer to (1) saving rate of workers, (2) saving rate of capitalists, (3) profit share, (4) share of capitalists in the wage bill, (5) share of workers’ wealth held in profit-generating assets, (6) share of capitalists’ wealth held in profit-generating assets

Source: Ederer, Rehm (2019); Data: HFCS 2010, EHBS 2010
Empirical and model share of capitalists in total wealth

Source: Ederer, Rehm (2019), data: HFCS 2010, EHBS 2010
Conclusion

• Post-Keynesians have a headstart on the mainstream in linking the functional and the personal income distribution

• Yet, the personal income distribution is under-researched compared to the functional distribution in Post-Keynesian economics
  • Empirically, both have been becoming more unequal/more unfavourable for workers

• The wealth distribution has received even less attention
  • It is key both theoretically (foundation of classes) and
  • Empirically much more unequal than the income distribution
Thank you!

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Functional distribution
Functional income distribution

• Thoroughly researched by Post-Keynesian economics (e.g. Stockhammer/Onaran 2008, Lavoie 2009, Onaran/Galanis 2012, Hein 2015 …)
• Secular falling trend in many countries, with cyclical elements
• Contradicts Kaldor‘s 1st „remarkable historical consistency“
• Not a focus in much of neoclassical theory
Functional income distribution: Adjusted wage share in continental Europe

Source: European Commission, AMECO-DB
Adjusted wage share in Anglo-Saxon countries

Source: European Commission, AMECO-DB
Classes
Classes

• Does the functional distribution still describe society well?
  • Managers (employees, but like capitalists)
  • Contingent workers (self-employed, but like workers)

• 7 classes:
  • 3 capitalist
  • Self-employed
  • 3 workers
### Income distribution by class
(Darker = higher income share relative to population share)

<table>
<thead>
<tr>
<th>Class</th>
<th>Löhne</th>
<th>Profite</th>
<th>Zinsen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 1%</td>
<td>1.3</td>
<td>9.8</td>
<td>23.5</td>
</tr>
<tr>
<td>Rentiers</td>
<td>0.8</td>
<td>5.4</td>
<td>37.5</td>
</tr>
<tr>
<td>UnternehmerInnen</td>
<td>0.4</td>
<td>10.5</td>
<td>2.2</td>
</tr>
<tr>
<td>Selbständige</td>
<td>0.2</td>
<td>7.1</td>
<td>1.0</td>
</tr>
<tr>
<td>Hochqual. Lohnabh.</td>
<td>1.5</td>
<td>0.4</td>
<td>0.6</td>
</tr>
<tr>
<td>Mittelqual. Lohnabh.</td>
<td>1.0</td>
<td>0.2</td>
<td>0.4</td>
</tr>
<tr>
<td>Geringqual. Lohnabh.</td>
<td>0.7</td>
<td>0.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Source: Rehm, Naqvi, Hofmann (2016); data: HFCS 2010
Wealth distribution by class
(Darker = higher income share relative to population share)

<table>
<thead>
<tr>
<th>Class</th>
<th>Reales Vermögen</th>
<th>Sicheres Finanzverm.</th>
<th>Riskantes Finanzverm.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 1%</td>
<td>19.6</td>
<td>18.0</td>
<td>37.2</td>
</tr>
<tr>
<td>Rentiers</td>
<td>3.8</td>
<td>10.1</td>
<td>13.0</td>
</tr>
<tr>
<td>UnternehmerInnen</td>
<td>4.0</td>
<td>2.6</td>
<td>3.4</td>
</tr>
<tr>
<td>Selbständige</td>
<td>1.6</td>
<td>1.0</td>
<td>0.8</td>
</tr>
<tr>
<td>Hochqual. Lohnabh.</td>
<td>1.0</td>
<td>1.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Mittelqual. Lohnabh.</td>
<td>0.6</td>
<td>0.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Geringqual. Lohnabh.</td>
<td>0.5</td>
<td>0.3</td>
<td>0.2</td>
</tr>
</tbody>
</table>

Source: Rehm, Naqvi, Hofmann (2016); data: HFCS 2010
Debt distribution by class
(Darker = higher income share relative to population share)

<table>
<thead>
<tr>
<th>Category</th>
<th>Hypotheken</th>
<th>Unbesicherte Schulden</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top 1%</td>
<td>4.8</td>
<td>4.6</td>
</tr>
<tr>
<td>Rentiers</td>
<td>3.4</td>
<td>1.6</td>
</tr>
<tr>
<td>UnternehmerInnen</td>
<td>1.5</td>
<td>2.9</td>
</tr>
<tr>
<td>Selbständige</td>
<td>1.4</td>
<td>1.7</td>
</tr>
<tr>
<td>Hochqual. Lohnabh.</td>
<td>1.5</td>
<td>1.3</td>
</tr>
<tr>
<td>Mittelqual. Lohnabh.</td>
<td>0.8</td>
<td>0.8</td>
</tr>
<tr>
<td>Geringqual. Lohnabh.</td>
<td>0.5</td>
<td>0.6</td>
</tr>
</tbody>
</table>

Source: Rehm, Naqvi, Hofmann (2016); data: HFCS 2010
Manager pay & overhead costs
Manager pay & overhead costs

- Managers’ salaries are wages by accounting standards
- Conceptually, are they profit/capital income?
- Important for the definition of costs: variable or fixed?
Overhead labour (Palley 2005, Lavoie 2009)

- Wages and salaries: split between workers (variable costs) and managers (overhead costs)
- Ratio of wages depends endogenously on the capacity utilization (Lavoie 2009)
- Increase in overhead costs:
  - Target return pricing: firms have a target profit rate (based on total unit costs), and will thus raise prices when costs rise
  - Wage share of workers will fall, wage share of managers will rise
  - Profit share depends on capacity utilization and autonomous investment
Wage-/profit-led personal income distribution
Neo-Goodwinian Model (profit-led)

• Long-run effective demand:
  Demand curve $\dot{u} = f(u, \delta)$
  
  $\dot{u} = 0 \begin{cases} 
  \text{positive slope: profit-led} \\
  \text{negative slope: wage-led} 
  \end{cases}$

• Long-run wage share:
  Distribution curve $\dot{\delta} = g(u, \delta)$
  
  $\dot{\delta} = 0 \begin{cases} 
  \text{positive slope: profit squeeze} \\
  \text{negative slope: forced saving} 
  \end{cases}$
Phase diagrams (profit-led)

(a) wage-led/wage-squeeze
(b) profit-led/profit-squeeze

Source: Kiefer, Rada (2015)
Wage-/profit-led personal income distribution

- Carvalho, Rezai (2016): What if inequality of wage income falls?
- Direct effect: Lower saving out of wages
  => higher differential between saving out of wages and profits
  => more wage-led/less profit-led
- Indirect effect: higher capacity utilisation (due to higher consumption) and additionally
  - Wage-led and weakly profit-led => more wage-led
  - Strongly profit-led => more profit-led
Wage/profit-led: Personelle Einkommensverteilung

Source: Carvalho und Rezai (2016)
Political debates

• Political debates:
  • Wealth tax (Elizabeth Warren)
  • Top income tax (Alexandria Ocasio-Cortez)
  • MMT (Stephanie Kelton, Warren Mosler, Randall Wray, Pavlina Tcherneva)