Accounting for Wealth Inequality Dynamics: Methods, Estimates and Simulations for France (1800-2014)

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Motivation

• Large disconnect between the study of inequality and macro
  • Macro: national accounts with no distribution information
  • Inequality: surveys and tax data data inconsistent with national aggregates

• Multi-country project: Distributional National Accounts (DINA)
  • Provide long-term series on distribution of income and wealth
    • Homogeneous across countries and over time
    • Consistent with National Income and Wealth Accounts
    • Covering all the distribution from bottom to top

• For France: two papers
  • Today: Wealth
  • Income Inequality
WID Website

WORLD VIEW

Compare inequality between countries on an interactive world map

COUNTRY GRAPHS

Follow the evolution of inequality within countries with user-friendly graphs

DATA TABLES

Download our open-access datasets
Measuring the wealth distribution

• Concept of wealth:
  • Net marketable wealth:
    Non-financial assets + Financial assets - Liabilities

• Five different sources of wealth data and methods
  1 Capitalization method using income tax data
  2 Estate multiplier method using inheritance tax data (available over longer period of time)
  3 Household wealth surveys based upon self-reported information
  4 Annual wealth tax data (usually not available, many tax exempt assets)
  5 Billionaire lists (very uncertain methodology)

• All sources have advantages and drawbacks: they need to be combined
Literature

• Huge literature on historical evolution of wealth distribution:
  • Mainly based on inheritance tax data to recover wealth inequality (mortality multiplier method)
  • Cover France, US, UK and Sweden since 19th century

• Saez-Zucman (2016) used capitalization method to recover wealth inequality in the US
  • Huge difference with Kopczuk-Saez (2004) on recent evolution => Rising debate on validity of capitalization method vs estate multiplier method (Kopczuk (2015), Lundberg and Waldenström (2016))
Literature cont.

• Literature on Calibrated Models of Wealth Distributions

• Reproduce the level of wealth inequality at a point in time by introducing:
  
  • Uninsured idiosyncratic shocks to labor earnings and/or asset returns, tastes for savings and bequests, entrepreneurship, preference heterogeneity
  
  • See among others Castaneda, Diaz-Gimenez and Rios-Rull (2003), De Nardi (2004), Cagetti and De Nardi (2006), Aoki and Nirei (2016), Benhabib, Bisin, and Zhu (2015)

• Which ingredients matter? Historical evolution and transitional dynamics?
Research question

What are the evolution and the determinants of wealth inequality in France?

1 Methodological issue:
   • Reconciliation between different wealth data and national accounts

2 Empirical issue:
   • Long-term evolution of wealth
   • Determinants of wealth inequality dynamic
This paper: Methodological contributions

1. Reconciliation of the different data sources and methods
   - 1970-2014: Mixture of capitalization method and wealth surveys
   - 1800-1970: Estate multiplier Approach

2. For recent periods (1970-2014):
   - Wealth series broken down by age, gender and asset categories
   - Determinants of wealth inequality dynamics
     - inequality of rates of return, saving rates, rates of capital gains and labor income

3. Inheritance data and estate multiplier approach may have become less reliable over time
   - Deterioration of data quality and access
   - Death is increasingly concentrated at high ages (terminal illness spendings, tax planning)
     ⇒ It becomes more difficult to recover wealth of the living.
This paper: Main findings

1. We confirm previous findings on decline of wealth inequality following WWI and WWII
   - Significant decline in the top 10% wealth share from the 1910s to the 1980s
   - Rise of the middle 40% wealth share from the 1910s to the 1980s

2. We are able to better analyse the moderate rise in wealth concentration since early 1980s
   - Moderate rise of wealth concentration since early 1980s with large fluctuations due to asset price movements

3. Steady-state formulas for wealth inequality
   - Key forces:
     unequal labor incomes, unequal rates of return, unequal saving rates
   - Large multiplicative effects in the long run
   - Long run trend might involve steeply rising top wealth shares in the future
Outline

Long-run unified series for 1800-2014

Detailed results for 1970-2014

Analysing the determinants of steady-state wealth inequality

Conclusion
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Wealth concentration in France, 1800-2014 (wealth shares, % total wealth)

- Top 10% (“Upper Class”)
- Middle 40% (“Middle Class”)
- Bottom 50% (“Lower Class”)

1914-1984: the Fall of the Upper Class, the Rise of the Middle Class

Average net wealth per adult (2014): 197,000 €

1,075,000 €

189,000 €

25,000 €

Average net wealth per adult (2014): 197,000 €
Top wealth shares in France, 1800-2014 (% total wealth)

Average net wealth per adult (2014): 197,000 €

- Top 1%
- Top 10-1%

1800 1820 1840 1860 1880 1900 1920 1940 1960 1980 2000
Interpreting the long-run evolution

• No inequality decline before WWI

• Large decline following WWI, WWII and in post-war period

• Main mechanism: Big fall in top capital incomes due to war shocks
  • destruction, depression, inflation, taxation, regulation: rent control and nationalization
  ⇒ Fall in top saving rates
  ⇒ long-run multiplicative effect on wealth concentration
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Composition of aggregate personal wealth, France 1970-2014

- Deposits
- Financial assets (excl. deposits)
- Business assets
- Housing (net of debt)
Level and composition of personal wealth, France 1970-2014
(% national income)

Ratio 2014 = 571%
Personal wealth per adult: 197 400 €
National income per adult: 34 600 €
Capitalization method

• Data sources
  • Microfiles of income tax returns since 1970

• Methodology
  • Start from each capital income component reported on individual tax returns
  • Compute aggregate rate of return for each asset class $i$
  • Divide observed individual income $y_j^i$ by $r^i$

• Limit
  • Key assumption: Uniform rate of return within asset class
  • The more detailed the asset categories, the more reliable the results
How we deal with non-taxable capital income

- Need to impute owner-occupied housing, life insurance, deposits

- Data used
  - Housing surveys 1970-2010

- Imputation methodology
  - Define groups by age/taxable capital income/taxable labor income
  - For each group, compute in the wealth surveys:
    - the proportion of individuals holding the considered asset
    - the share of total asset owned by the group

Example
Wealth concentration in France, 1970-2014

Top 10% (Upper Class)
Middle 40% (Middle Class)
Bottom 50% (Lower Class)
Age-wealth profiles in France, 1970-2012

Average wealth age (% average wealth 20+)

Age profiles in France, 1970-2012

- 2010
- 1995
- 1970

{Graph showing age-wealth profiles in France from 1970 to 2012 with lines representing different years.}
Wealth concentration by age group, France 1970-2012

- Top 10% (all ages)
- Middle 40% (all ages)
- Bottom 50% (all ages)
- Top 10% (20-39-yr)
- Middle 40% (20-39-yr)
- Bottom 50% (20-39-yr)
Wealth concentration by age group, France 1970-2012

- Top 10% (all ages)
- Middle 40% (all ages)
- Bottom 50% (all ages)
- Top 10% (20-39-yr)
- Middle 40% (20-39-yr)
- Bottom 50% (20-39-yr)
- Top 10% (40-59-yr)
- Middle 40% (40-59-yr)
- Bottom 50% (40-59-yr)
Wealth concentration in France, 1970-2014

Top 10% (Upper Class)
Middle 40% (Middle Class)
Bottom 50% (Lower Class)
Top wealth shares in France, 1970-2014 (wealth shares, % total wealth)

- Top 10-1%
- Top 1%

Average net wealth per adult (2014): 197,500 €

700,000 €

4,615,000 €
Decomposition of top 1% wealth share (% aggregate wealth)

Top 1% personal wealth per adult: 4,614,000€ (2014)
Decomposition of top 10-1% wealth share (% aggregate wealth)

Top 10-1% personal wealth per adult: €683,000 (2014)

- Deposits
- Financial assets (excl. deposits)
- Business assets
- Housing (net of debt)
Decomposition of middle 40% wealth share (% aggregate wealth)

Middle 40% personal wealth per adult: 189,000 € (2014)
Decomposition of bottom 50% wealth share (% aggregate wealth)

Bottom 50% personal wealth per adult: 25 000 € (2014)
Asset composition by wealth level, France 1970

- **Housing (net of debt)**
- **Business assets**
- **Financial assets (excl. deposits)**
- **Deposits**

The chart shows the distribution of asset composition across different wealth levels in France for the year 1970.
Asset composition by wealth level, France 2000

- **Housing (net of debt)**
- **Business assets**
- **Financial assets (excl. deposits)**
- **Deposits**
Asset composition by wealth level, France 2012

- **Deposits**
- **Financial assets (excl. deposits)**
- **Business assets**
- **Housing (net of debt)**

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<th>Wealth Level</th>
<th>Housing (net of debt)</th>
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<th>Financial assets (excl. deposits)</th>
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Main results for 1970-2014

Moderate rise of wealth concentration since early 1980s with large fluctuations due to asset price movements:

- Inequality boom around 2000 due to stock market boom
- Equalizing impact of housing boom during 2000s (at least for the middle class vs the rich)
- In the absence of this housing price effect, rising top wealth shares in the future
Simulation of top 1% wealth share

- Question: With constant capital gains over the period, what would have been the evolution of wealth inequality?
- Answer: There would have been a gradual increase of wealth inequality.
  - Rising wealth concentration due to large inequality of saving rates and rates of return
Simulation of top 1% wealth share cont.

- Accumulation equation of asset $A$ from wealth group $i$ at time $t + 1$:
  - $s$: saving rate (in % of wealth), $p$: inflation rate, $q$: real rate of capital gain
  
  $$A_{t+1}^i = (1 + p_t)(1 + q_{t,A})(1 + s_{t,A}^i)A_t^i$$

  $$\Rightarrow A_T^i = \prod_{t=t0+1}^{t=T} (1 + p_t)(1 + q_{t,A})(1 + s_{t,A}^i)A_{t0}^i$$

- Fixed real capital gains by asset class:
  
  $$A_T^i = \prod_{t=t0+1}^{t=T} (1 + p_t)(1 + \bar{q}_A)(1 + s_{t,A}^i)A_{t0}^i$$

- Fixed real capital gains by asset class + Fixed saving rate by wealth group:
  
  $$A_T^i = \prod_{t=t0+1}^{t=T} (1 + p_t)(1 + \bar{q}_A)(1 + \bar{s}_A)\frac{(1 + s_{t,A}^i)}{(1 + s_{t,A})}A_{t0}^i$$
Simulating the evolution of top 1% wealth share (1)

- Observed
- Fixed real rate of capital gains by asset class 1970-2014
- Fixed real capital gains by asset class + Fixed savings rate by fractile 1970-2014
Simulating the evolution of top 1% wealth share (2)

- Observed
- Fixed real rate of capital gains by asset class 1970-2000
- Fixed real capital gains by asset class + Fixed savings rate by fractile 1970-2000
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Top 10% share: income vs wealth

Distribution of total income, labor income, capital income and net wealth among adults. Equal-split-adults series (income and wealth of married couples divided by two).
Equation of wealth accumulation:*

Equation of wealth accumulation at time $t + 1$ for the wealth group $p$ (for instance $p =$ top 10% wealth group):

$$W_{t+1}^p = (1 + q_t^p)[W_t^p + s_t^p(Y_{Lt}^p + r_t^p W_t^p)]$$

- $W^p$ is the aggregate wealth for the wealth group $p$, $Y_L^p$ labor income
- $q^p$ is the real rate of capital gain
- $s^p$ is the saving rate, $r^p$ is the after-tax rate of return (for group $p$)
- We infer group-level synthetic saving rates $s_t^p$ from the observation of $W_{t+1}^p, W_t^p, Y_{Lt}^p, r_t^p, q_t^p$
Steady-state formulas for top wealth shares

From the equation of wealth accumulation, with the same notations as above:

\[ W_{t+1}^p = (1 + q_t^p)[W_t^p + s_t^p(Y_t^p + r_t^p W_t^p)] \]

and assuming \( q_t \) has to be equal to 0 at steady state, we directly derive:

\[ sh_W^p = (1 + \frac{s^p r^p - s r}{g - s^p r^p}) \frac{s^p}{s} sh_{Y_L}^p \]

- If \( s^p = s \) and \( r^p = r \), then \( sh_W^p = sh_{Y_L}^p \): wealth inequality = labor income inequality
- but if \( s^p > s \) and \( r^p > r \), then this can generate large multiplicative effects, and lead to very high steady-state wealth concentration
Synthetic saving rates by wealth group
Flow returns by wealth group (before all taxes)

- Top 1%
- Top 10-1%
- Middle 40%
Determinants of steady-state wealth inequality

- Three key forces:
  - unequal labor incomes, unequal rates of return, unequal saving rates
- Inequality in rates of return is persistently high (approximately stable over time)
- Inequality in saving rates increased over the 1970-2014 period
- Large multiplicative effects, especially with long horizon and inheritance
Steady-state top 10% wealth share, 1800-2150 (% total wealth)

Steady-state with 1984-2014 saving rates: 24.5% for top 10%, 2.5% for bottom 90%

Steady-state with 1970-1984 saving rates: 22% for top 10%, 9.5% for bottom 90%
Wealth concentration: France, US, UK 1900-2014 (wealth shares, %)

- Top 10% (France)
- Top 1% (France)
- Top 10% (US)
- Top 1% (US)
- Top 10% (UK)
- Top 1% (UK)
International comparisons

- French inequality dynamic is representative of a more general form of European pattern
- France and UK vs US:
  - Wealth inequality larger in France and the U.K. than in the U.S. in the early 20th century
  - Wealth inequality larger in the U.S. in recent decades
  - New world effect: population was still growing very fast in the U.S. \(\Rightarrow\) very far from its steady-state level
  - Higher labor income inequality \(\Rightarrow\) higher inequality in saving rates \(\Rightarrow\) higher steady-state wealth inequality
- Need to apply our steady-state formula to several countries using homogenous series on income shares, wealth shares and synthetic saving rates to better understand wealth inequality dynamic
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• Reconciliation of data sources to build consistent wealth inequality series.
  • 100% consistent with National Accounts
  • Covering all the wealth distribution

• Main findings:
  • Decline of wealth inequality after WWI and WWII
  • Moderate rise in wealth concentration since early 1980s
  • Determinants of steady-state wealth inequality
    • Key forces: unequal labor incomes, unequal rates of return, unequal saving rates
    • Large multiplicative effects in the long run
BACK UP SLIDES
Estate multiplier vs capitalization method: France 1970-2012 (1)
Appendix

Estate multiplier vs capitalization method: France 1970-2012 (2)

- Top 1% Capitalization
- Top 1% Estate Multiplier
Imputation

• Groups for imputation of owner-occupied housing asset
  • Age split into 10 categories: < 25; 25-30; 31-39, 40-49; 50-54; 55-60; 61-65; 66-70; 71-80; >80
  • For each age group, decomposition by taxable capital income: P0-50, P50-90, P90-95, P95-99, P99-100
  • For each age*capital income group, decomposition by taxable labor and replacement income: P0-25, P25-50, P50-75, P75-90,