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


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BY COUNTRY
DATA
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WEALTH & INCOME
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METHODOLOGY
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WORLD VIEW
Compare inequality between countries on an interactive world map
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Follow the evolution of inequality within countries with user-friendly graphs
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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:
  - Lampman (1962), Atkinson and Harrisson (1978), Kopczuk and Saez (2004), Piketty, Postel-Vinay and Rosenthal (2006), Bourdieu, Kesztenbaum and Postel-Vinay (2009), Roine and Waldenström (2009)
  - Mainly based on inheritance tax data to recover wealth inequality (mortality multiplier method)
  - Cover France, US, UK and Sweden since 19^{th} 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)
     $\Rightarrow$ 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

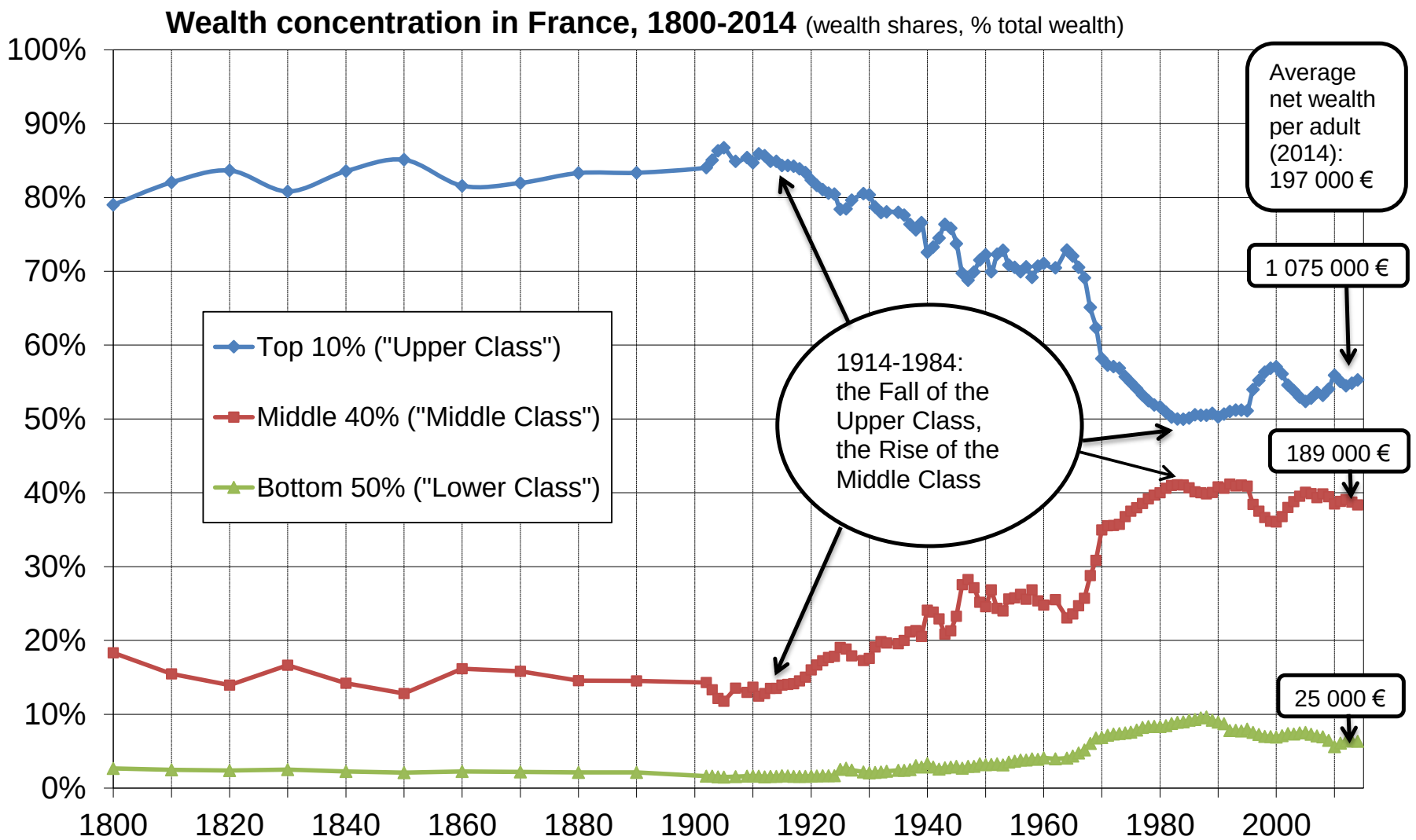
Long-run unified series for 1800-2014

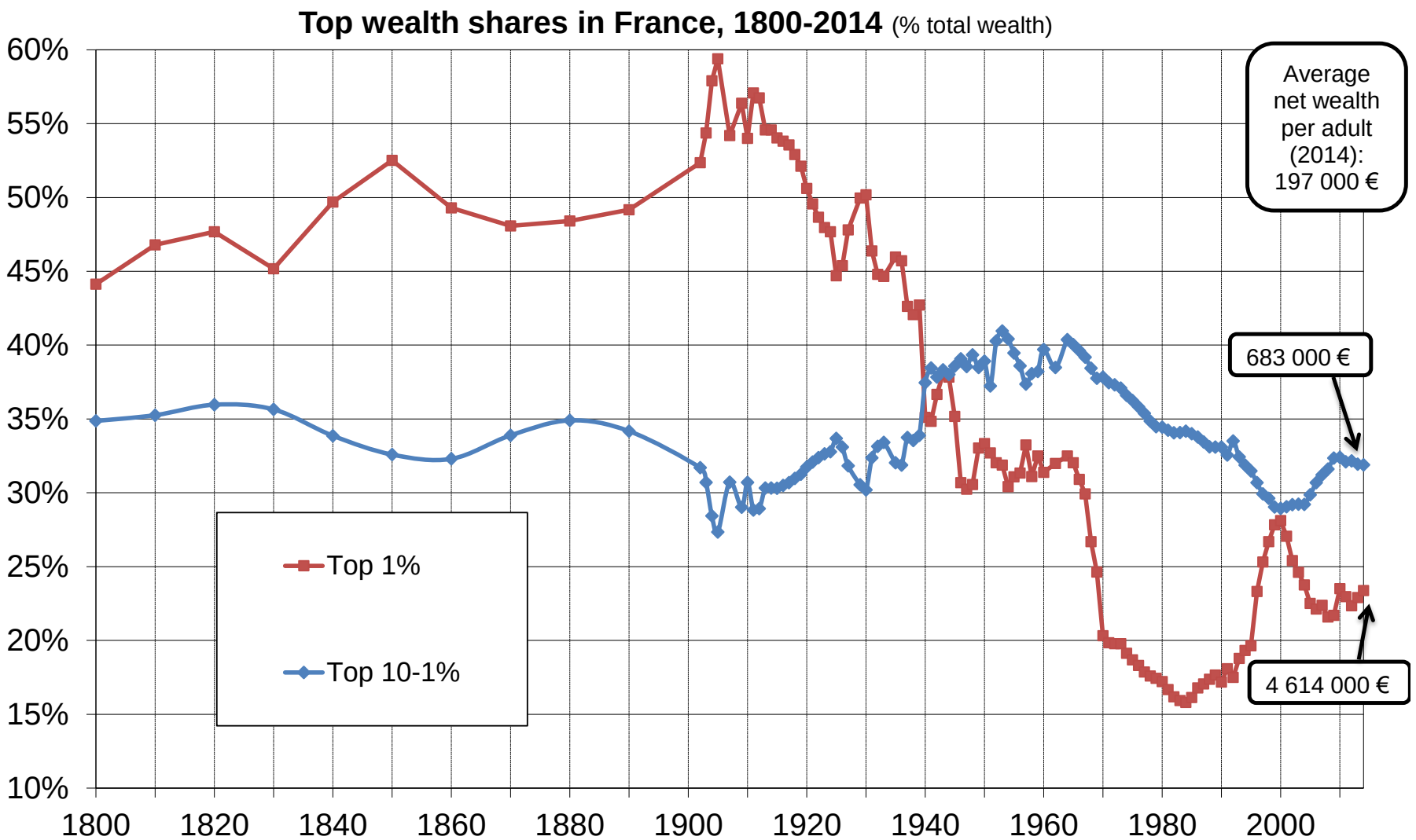
Detailed results for 1970-2014

Analysing the determinants of steady-state wealth inequality

Conclusion

Outline

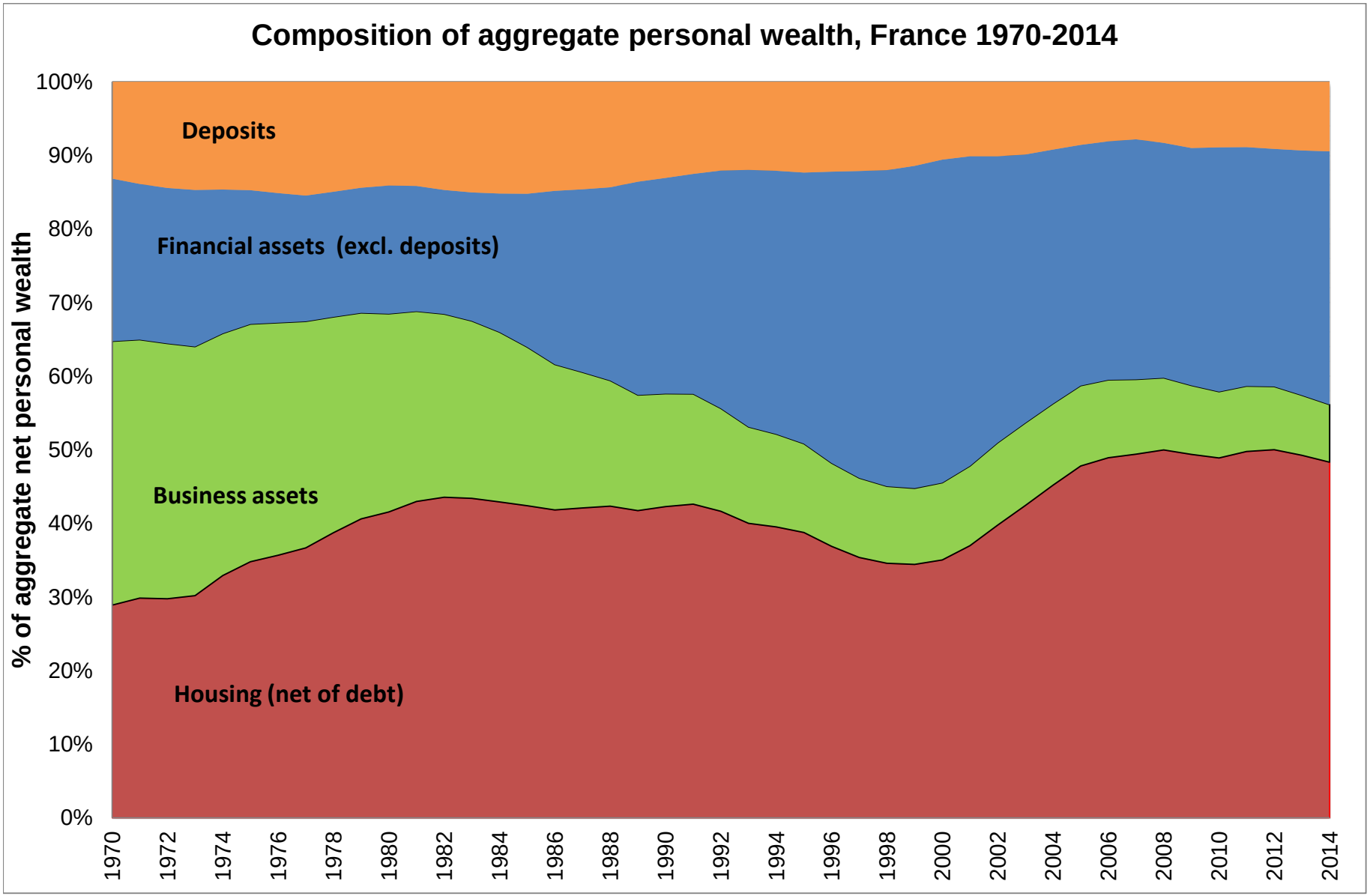

Wealth concentration in France, 1800-2014 (wealth shares, % total wealth)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
Top 10% ("Upper Class")
Middle 40% ("Middle Class")
Bottom 50% ("Lower Class")
1914-1984: the Fall of the Upper Class, the Rise of the Middle Class
Average net wealth per adult (2014): 197 000 €
1 075 000 €
189 000 €
25 000 €

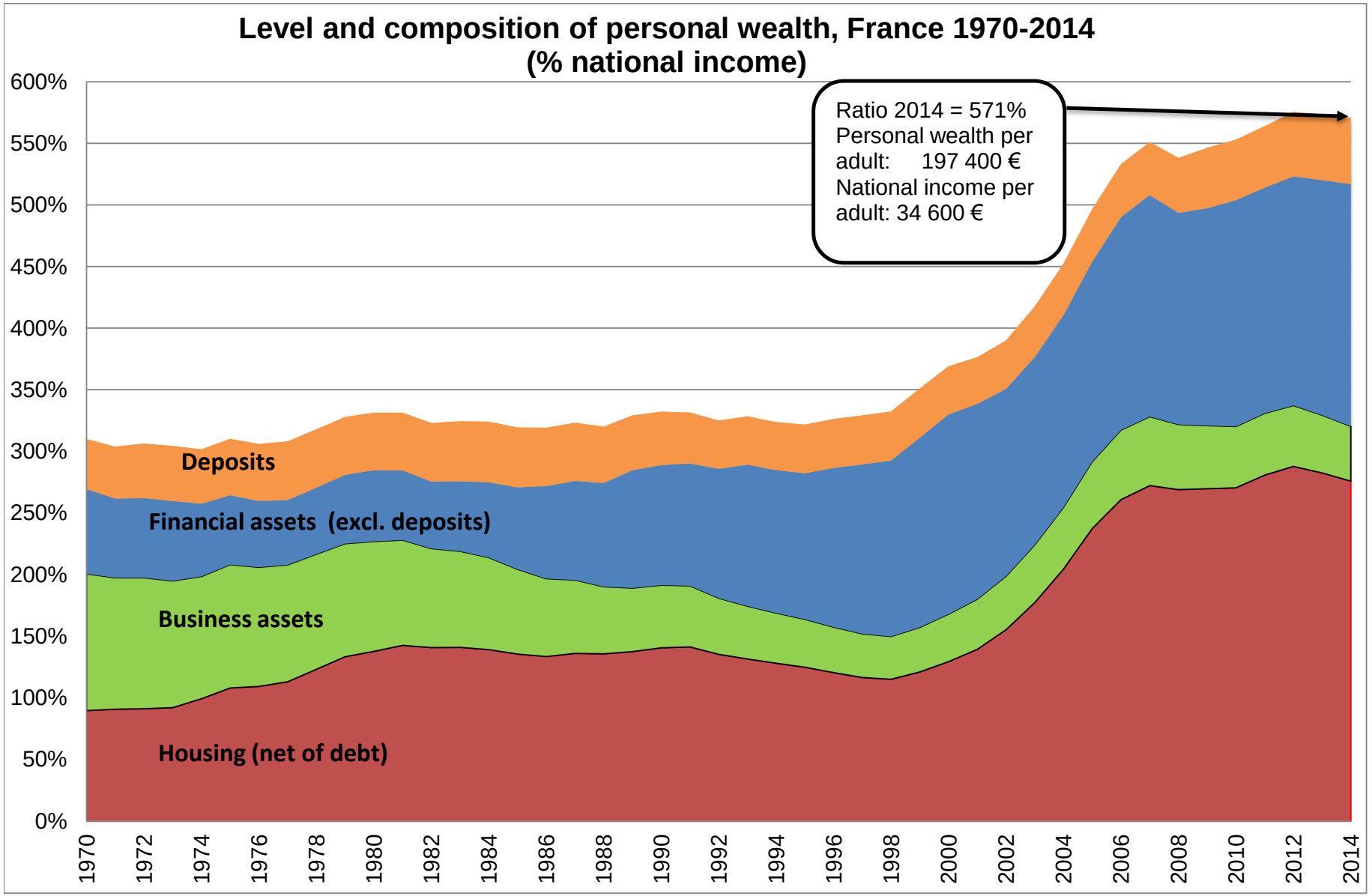

Top wealth shares in France, 1800-2014 (% total wealth)
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
1800
1820
1840
1860
1880
1900
1920
1940
1960
1980
2000
Top 1%
Top 10-1%
Average net wealth per adult (2014): 197 000 €
683 000 €
4 614 000 €

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
    $\Rightarrow$ Fall in top saving rates
    $\Rightarrow$ long-run multiplicative effect on wealth concentration

Outline


Composition of aggregate personal wealth, France 1970-2014
% of aggregate net personal wealth
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014


Level and composition of personal wealth, France 1970-2014
(% national income)
600%
550%
500%
450%
400%
350%
300%
250%
200%
150%
100%
50%
0%
Ratio 2014 = 571%
Personal wealth per adult: 197 400 €
National income per adult: 34 600 €
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
1970
1972
1974
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014

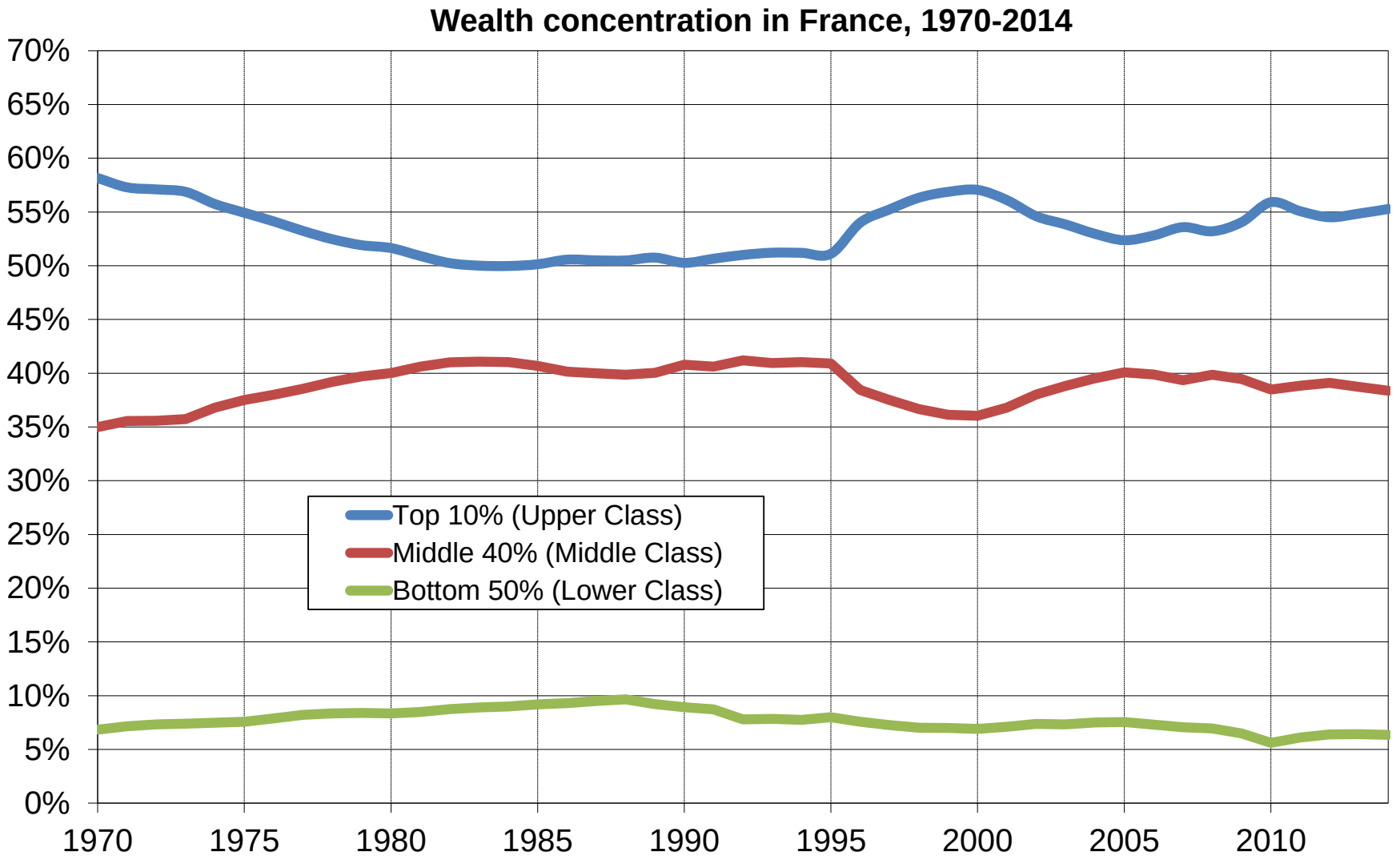
Capitalization method

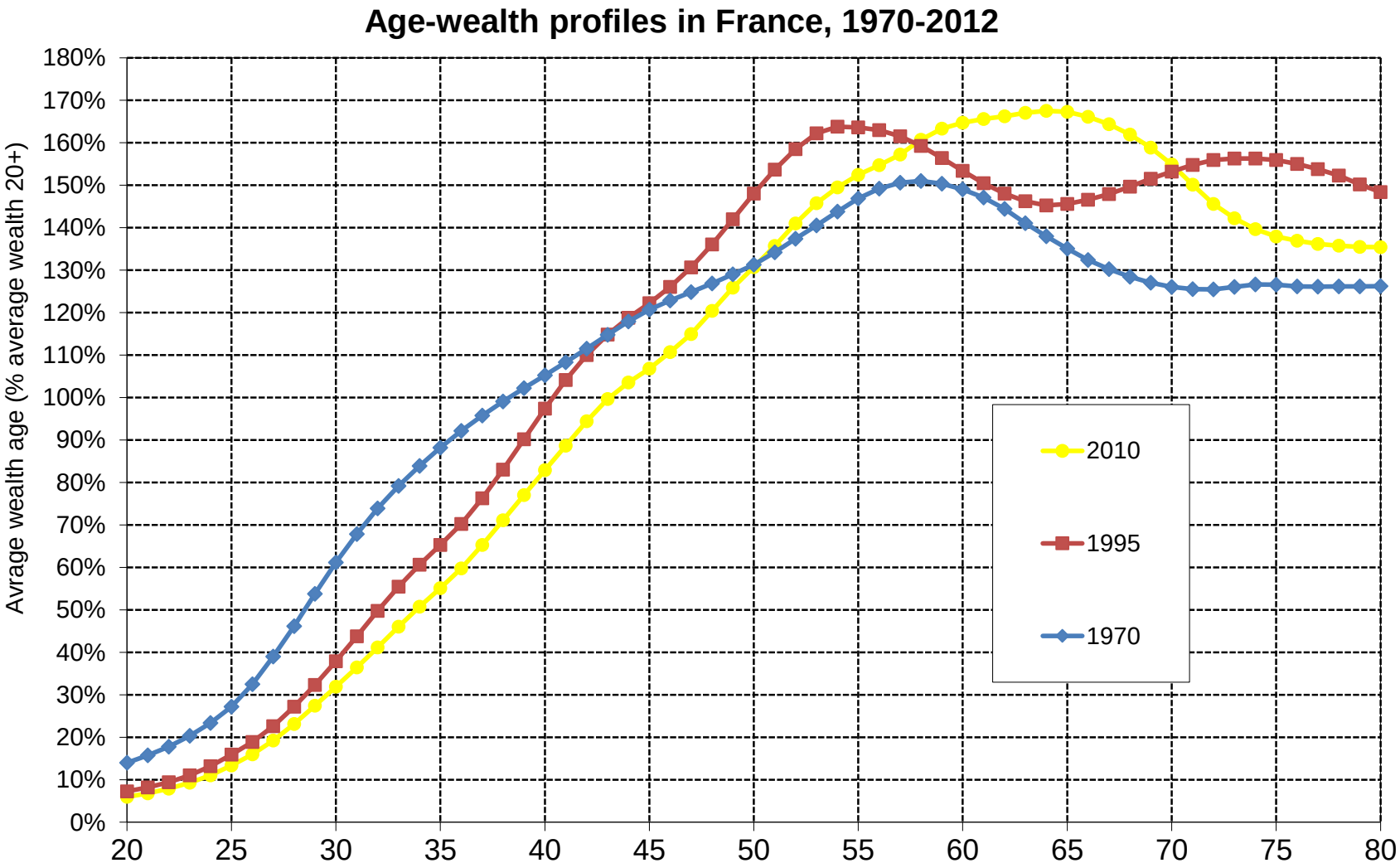
- Data sources
  - Microfiles of income tax returns since 1970
- Methodology
  - Start from each capital income component reported on individual tax returns
  - Compute aggregate rate of return for each asset class i
  - Divide observed individual income y_j^i by r^i
- Limit
  - Key assumption: Uniform 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
  - Wealth surveys 1986, 1992, 1998, 2004 and 2010
  - 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
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
Top 10% (Upper Class)
Middle 40% (Middle Class)
Bottom 50% (Lower Class)


Age-wealth profiles in France, 1970-2012
Avrage wealth age (% average wealth 20+)
180%
170%
160%
150%
140%
130%
120%
110%
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
20
25
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35
40
45
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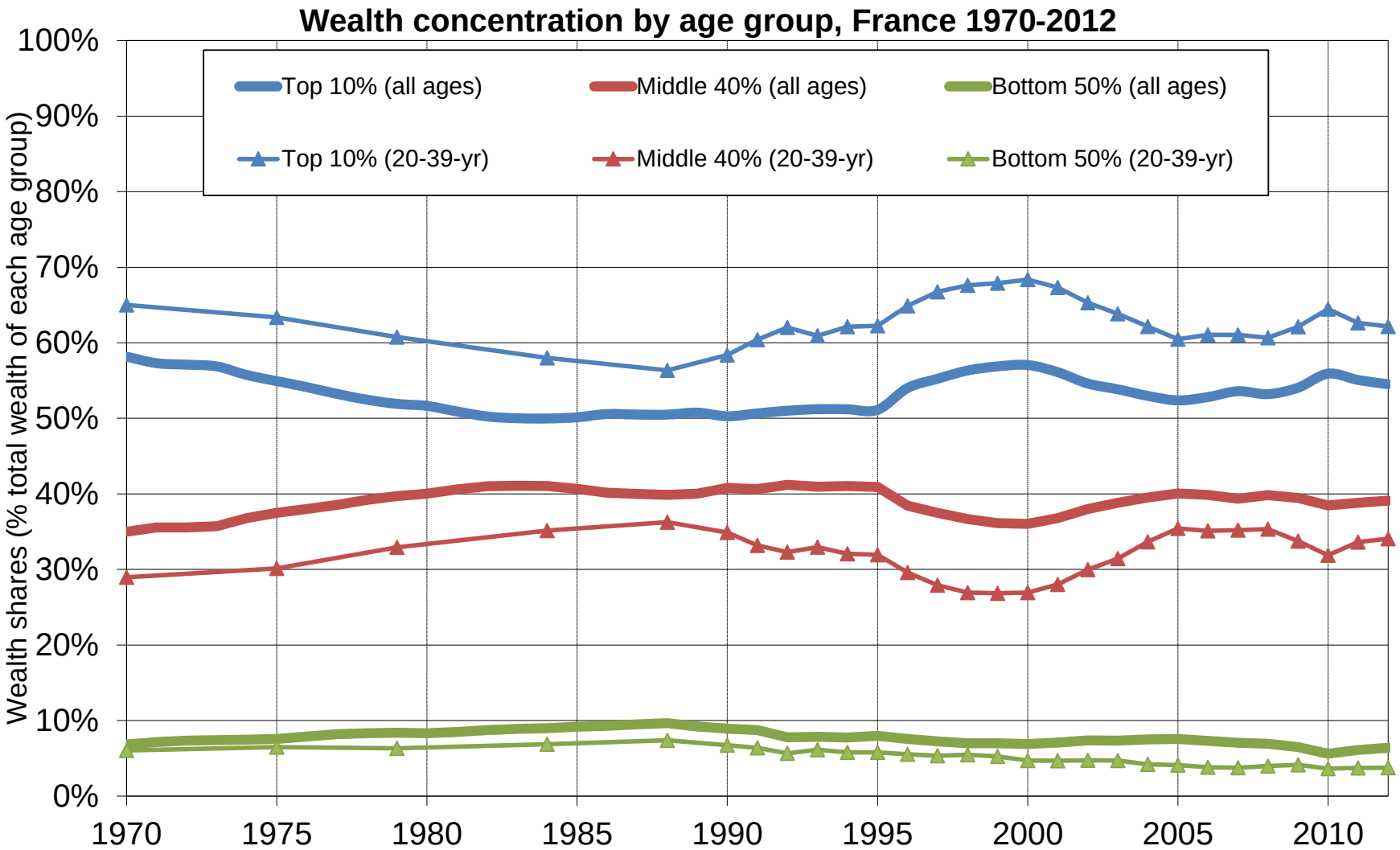
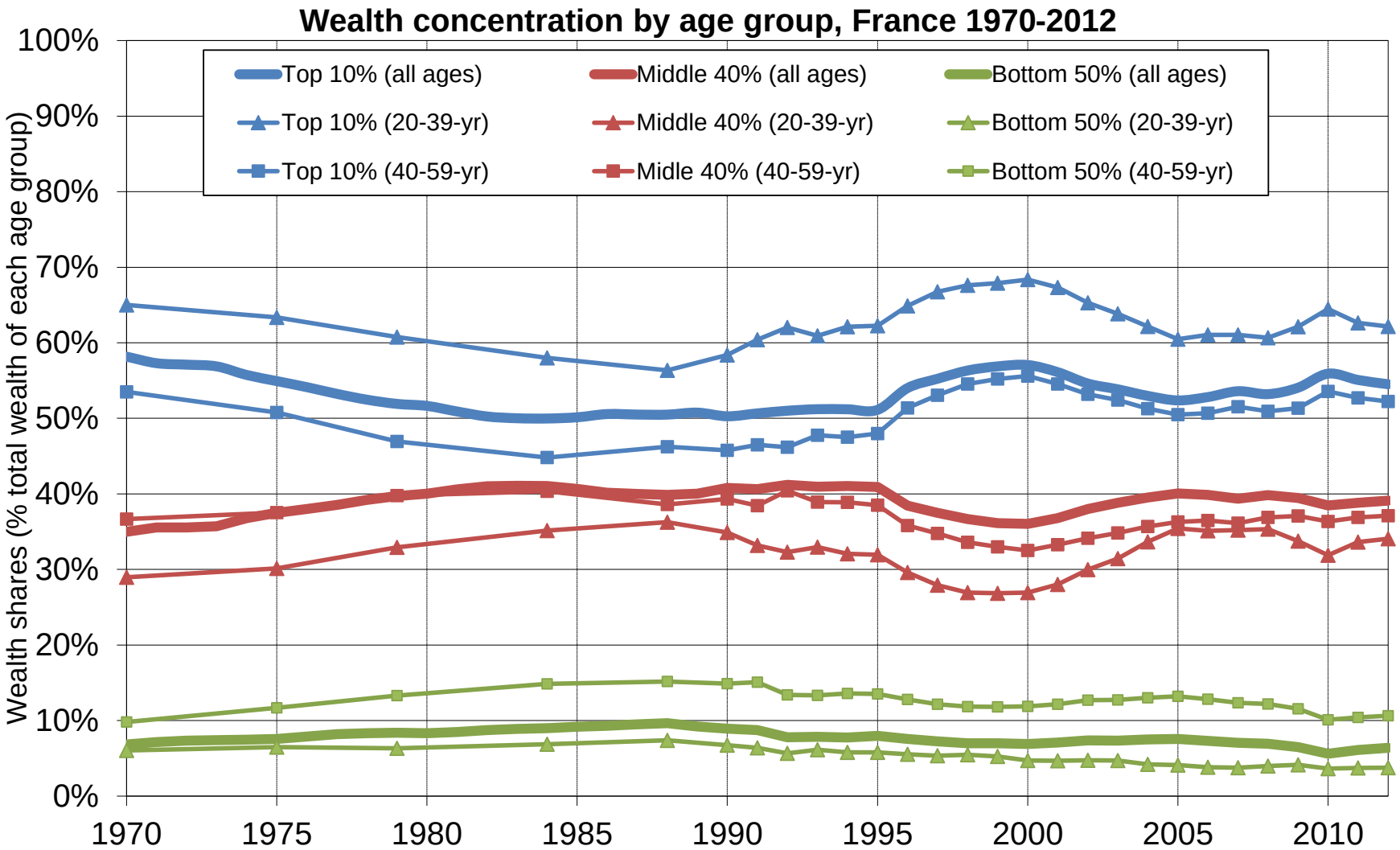
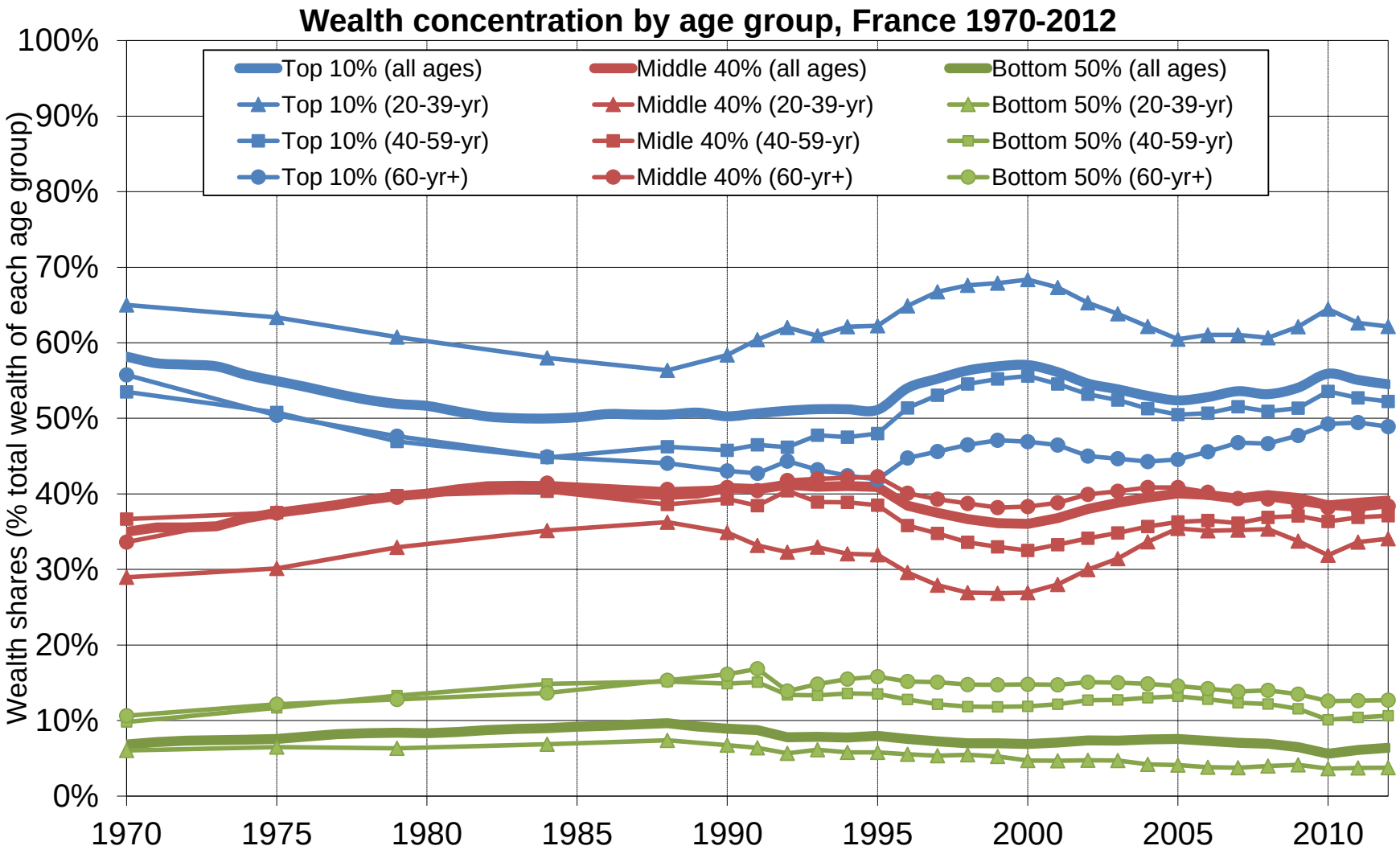
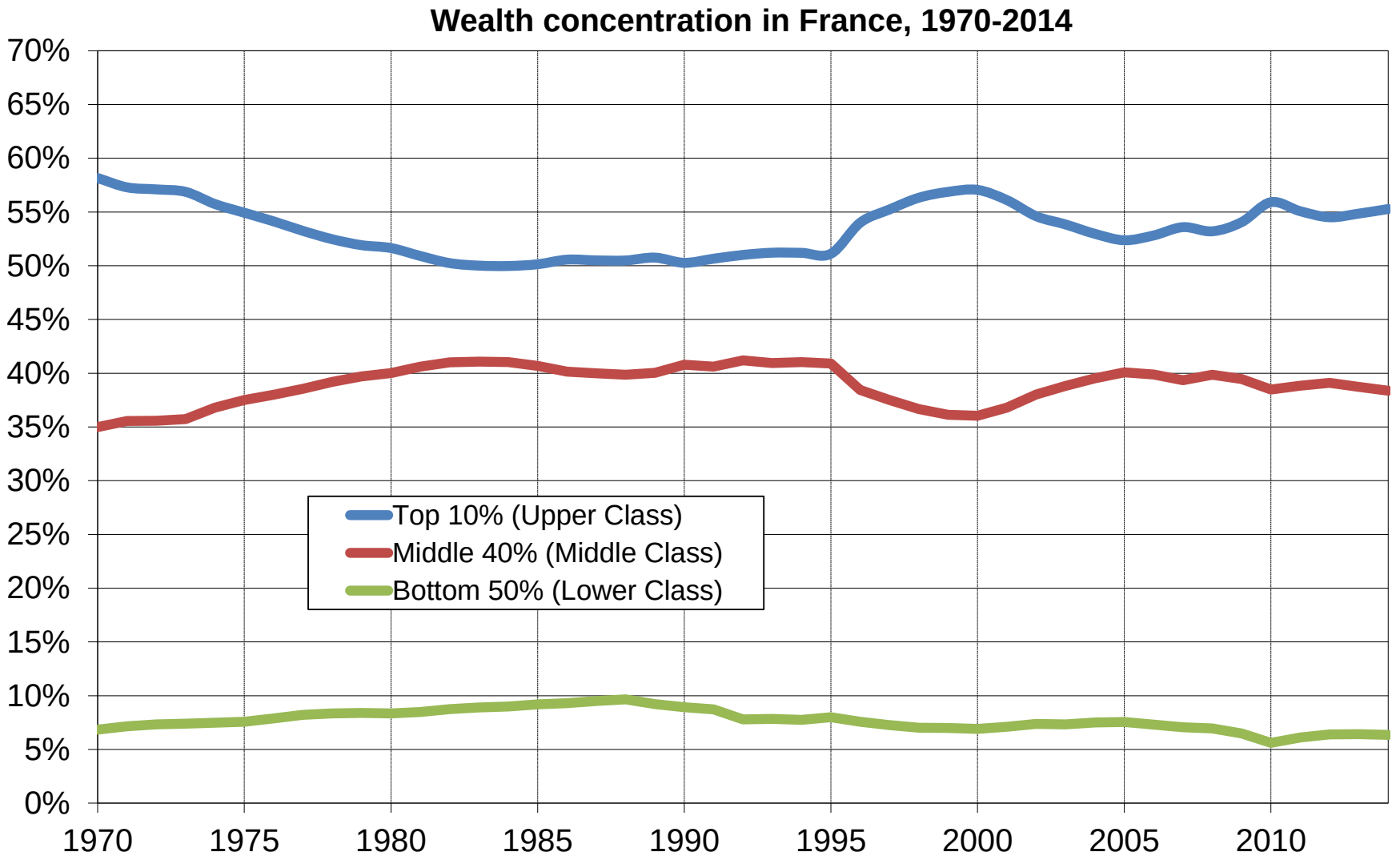
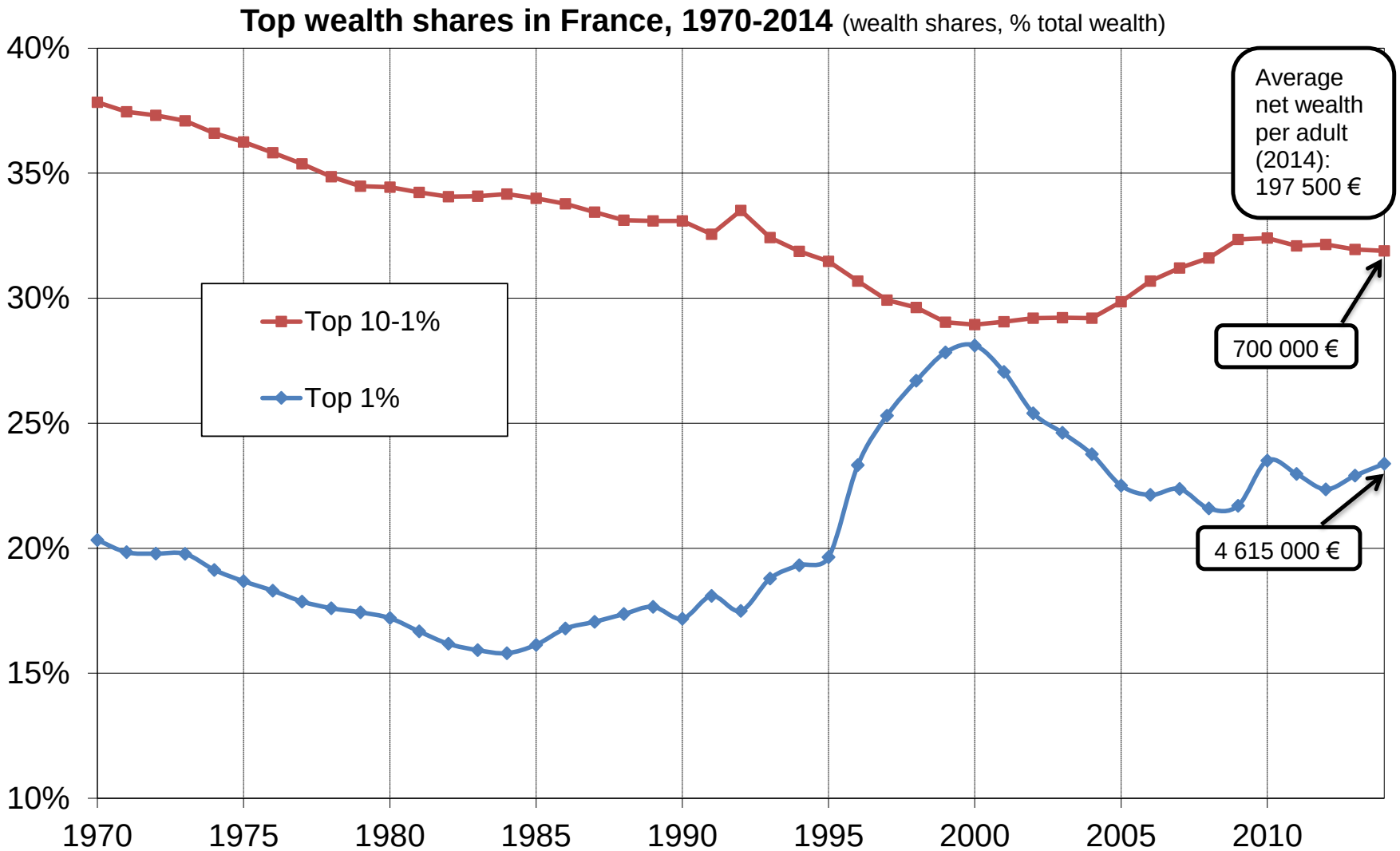
55
60
65
70
75
80
2010
1995
1970

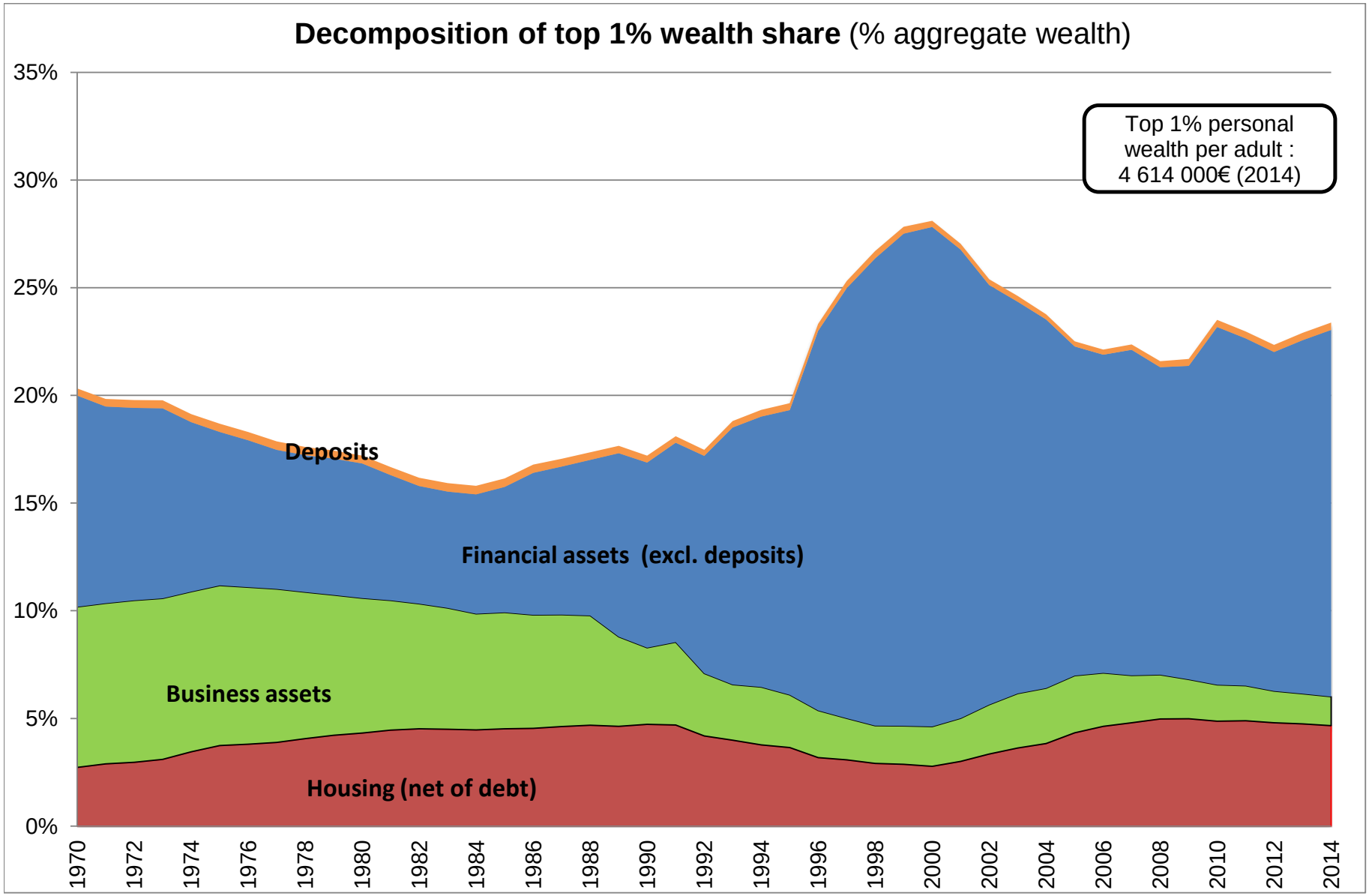

Wealth concentration by age group, France 1970-2012
Top 10% (all ages)
Middle 40% (all ages)
Bottom 50% (all ages)
Top 10% (20-39-yr)
Middle 40% (20-39-yr)
Bottom 50% (20-39-yr)
Wealth shares (% total wealth of each age group)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010


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)
Midle 40% (40-59-yr)
Bottom 50% (40-59-yr)
Wealth shares (% total wealth of each age group)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010


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)
Midle 40% (40-59-yr)
Bottom 50% (40-59-yr)
Top 10% (60-yr+)
Middle 40% (60-yr+)
Bottom 50% (60-yr+)
Wealth shares (% total wealth of each age group)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010


Wealth concentration in France, 1970-2014
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
Top 10% (Upper Class)
Middle 40% (Middle Class)
Bottom 50% (Lower Class)


Top wealth shares in France, 1970-2014 (wealth shares, % total wealth)
40%
35%
30%
25%
20%
15%
10%
1970
1975
1980
1985
1990
1995
2000
2005
2010
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)
35%
30%
25%
20%
15%
10%
5%
0%
Top 1% personal wealth per adult : 4 614 000€ (2014)
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
1970
1972
1974
1976
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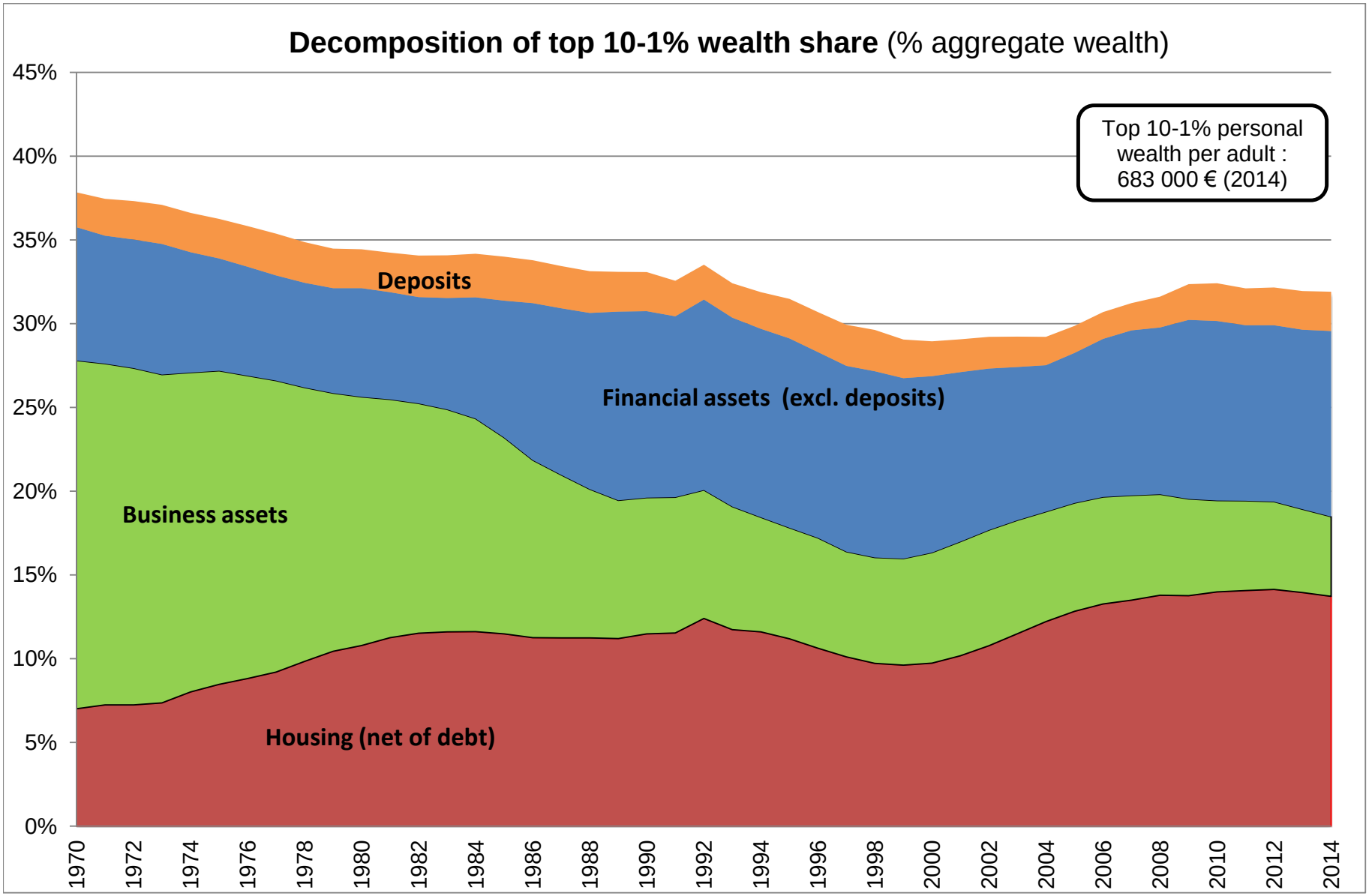
2008
2010
2012
2014


Decomposition of top 10-1% wealth share (% aggregate wealth)
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
Top 10-1% personal wealth per adult : 683 000 € (2014)
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
1970
1972
1974
1976
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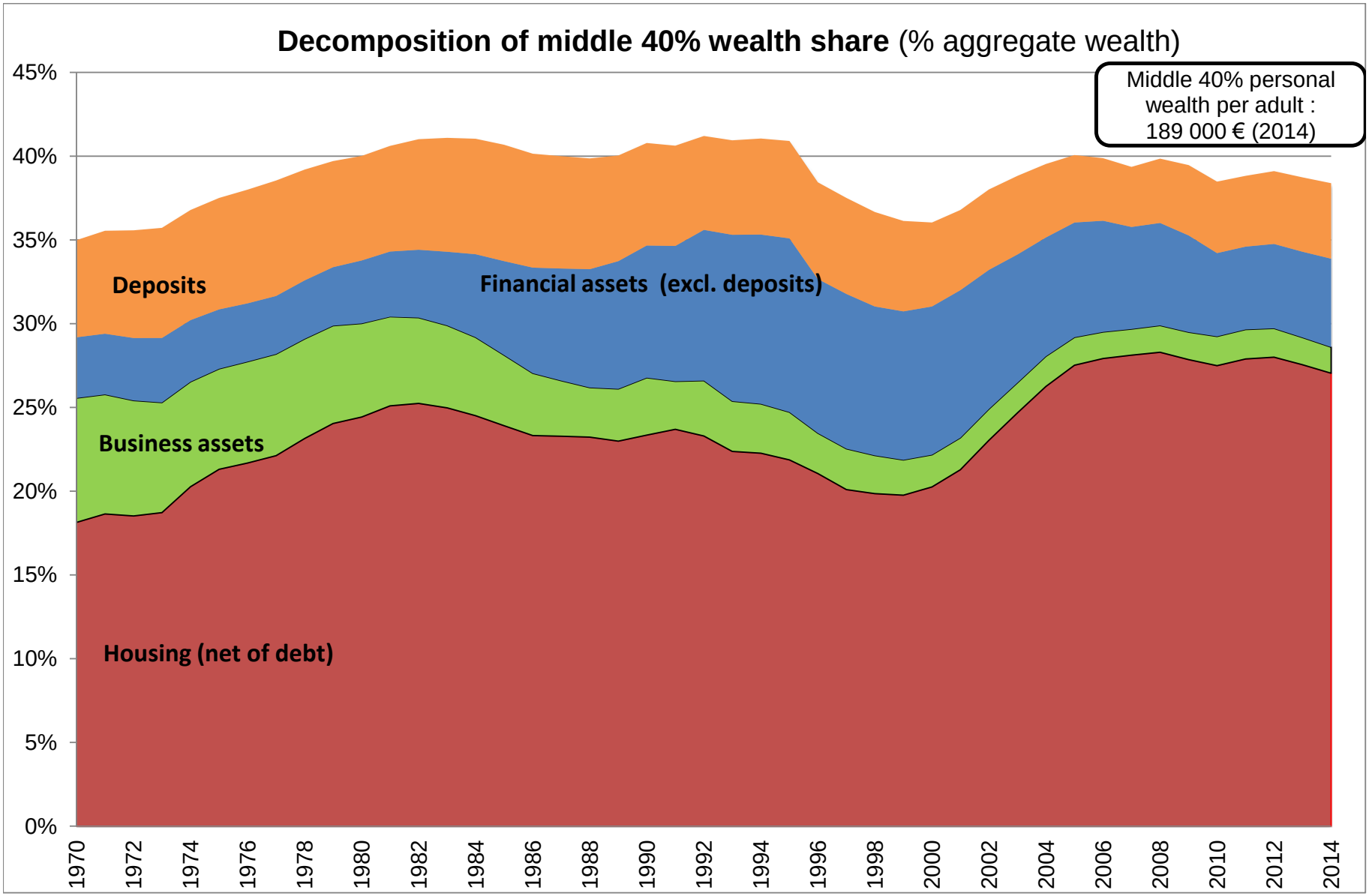
2012
2014


Decomposition of middle 40% wealth share (% aggregate wealth)
Middle 40% personal wealth per adult : 189 000 € (2014)
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1970
1972
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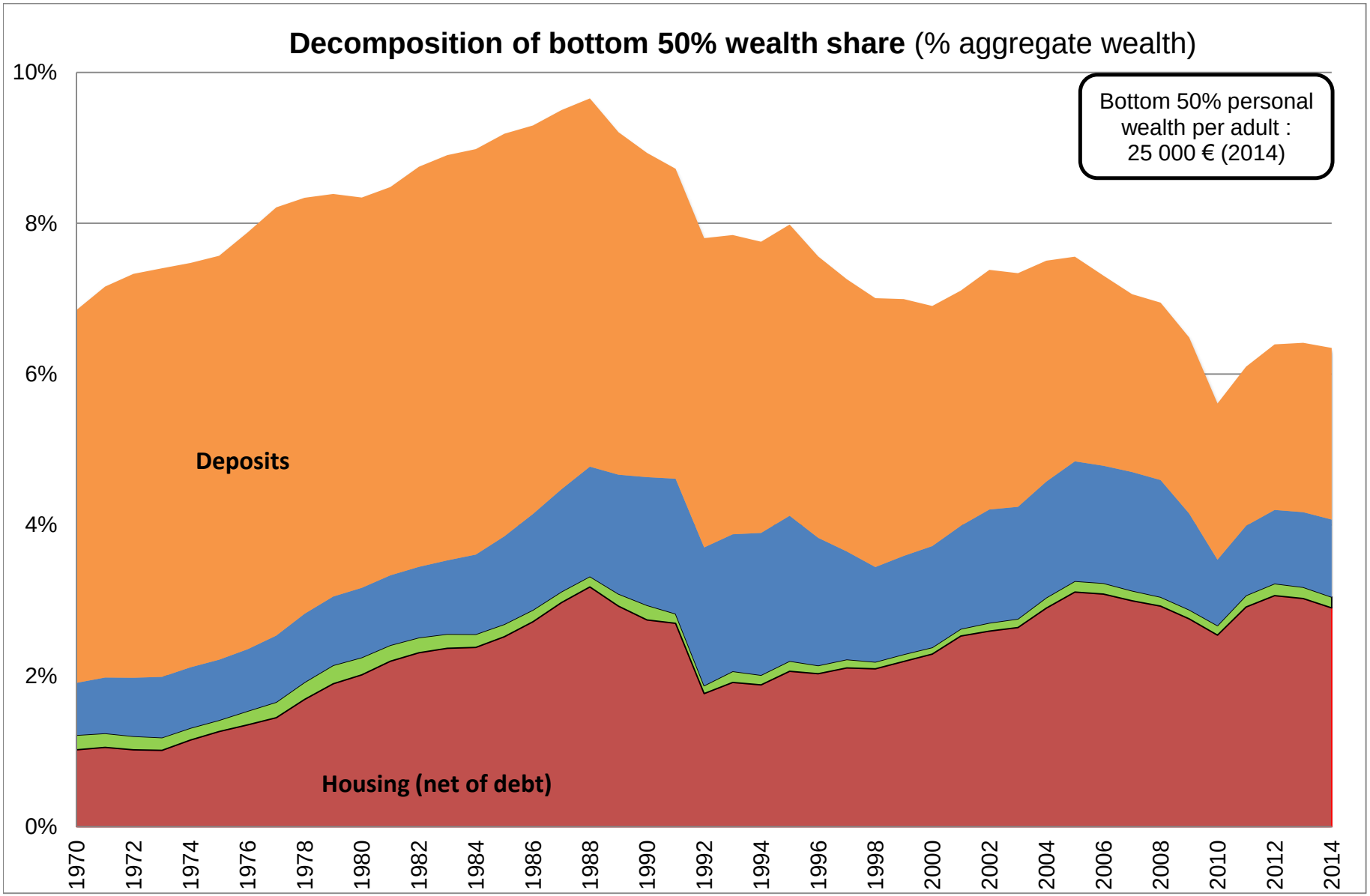
Decomposition of bottom 50% wealth share (% aggregate wealth)
Bottom 50% personal wealth per adult : 25 000 € (2014)
Deposits
Housing (net of debt)
10%
8%
6%
4%
2%
0%
1970
1972
1974
1976
1978
1980
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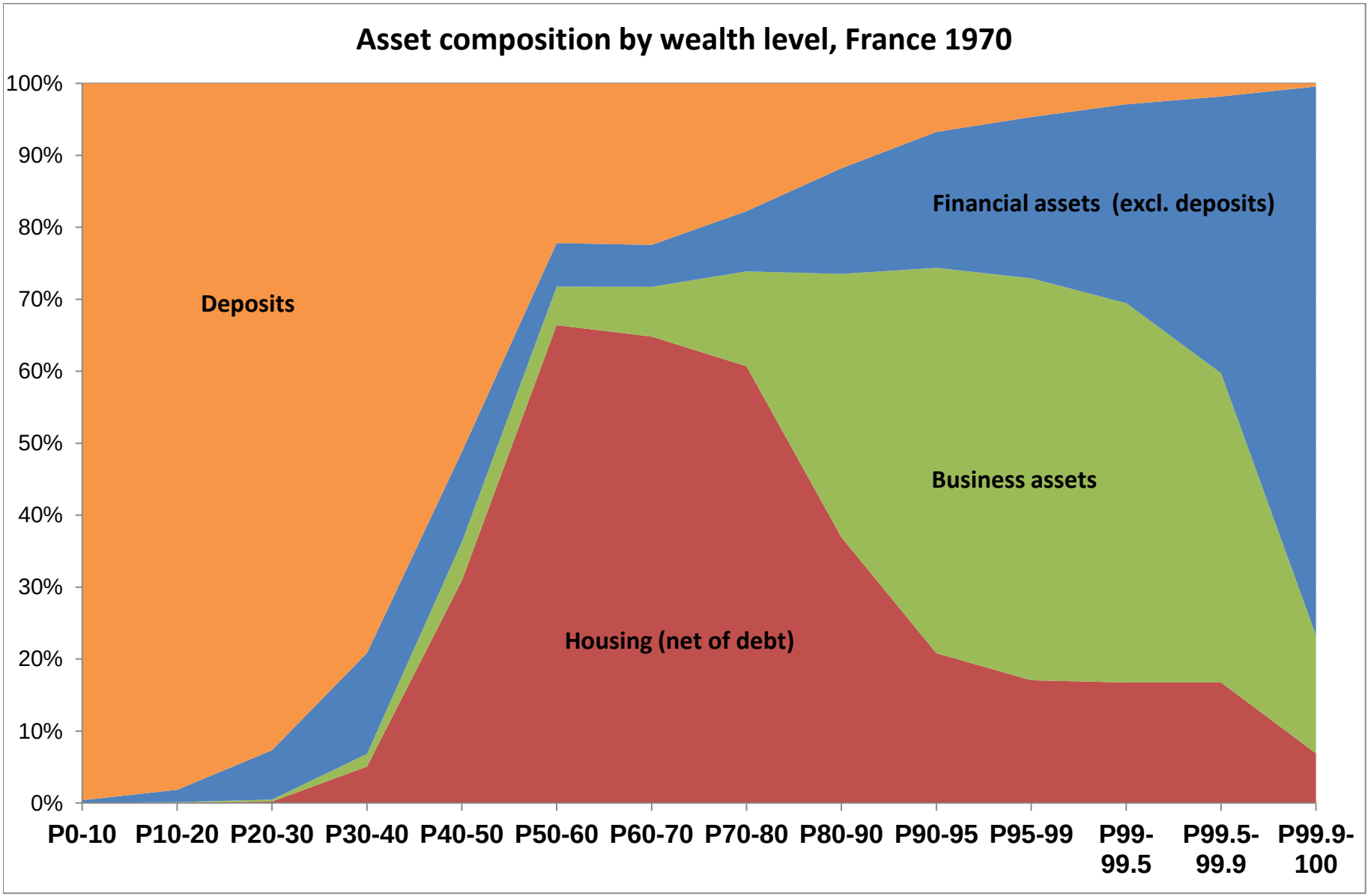
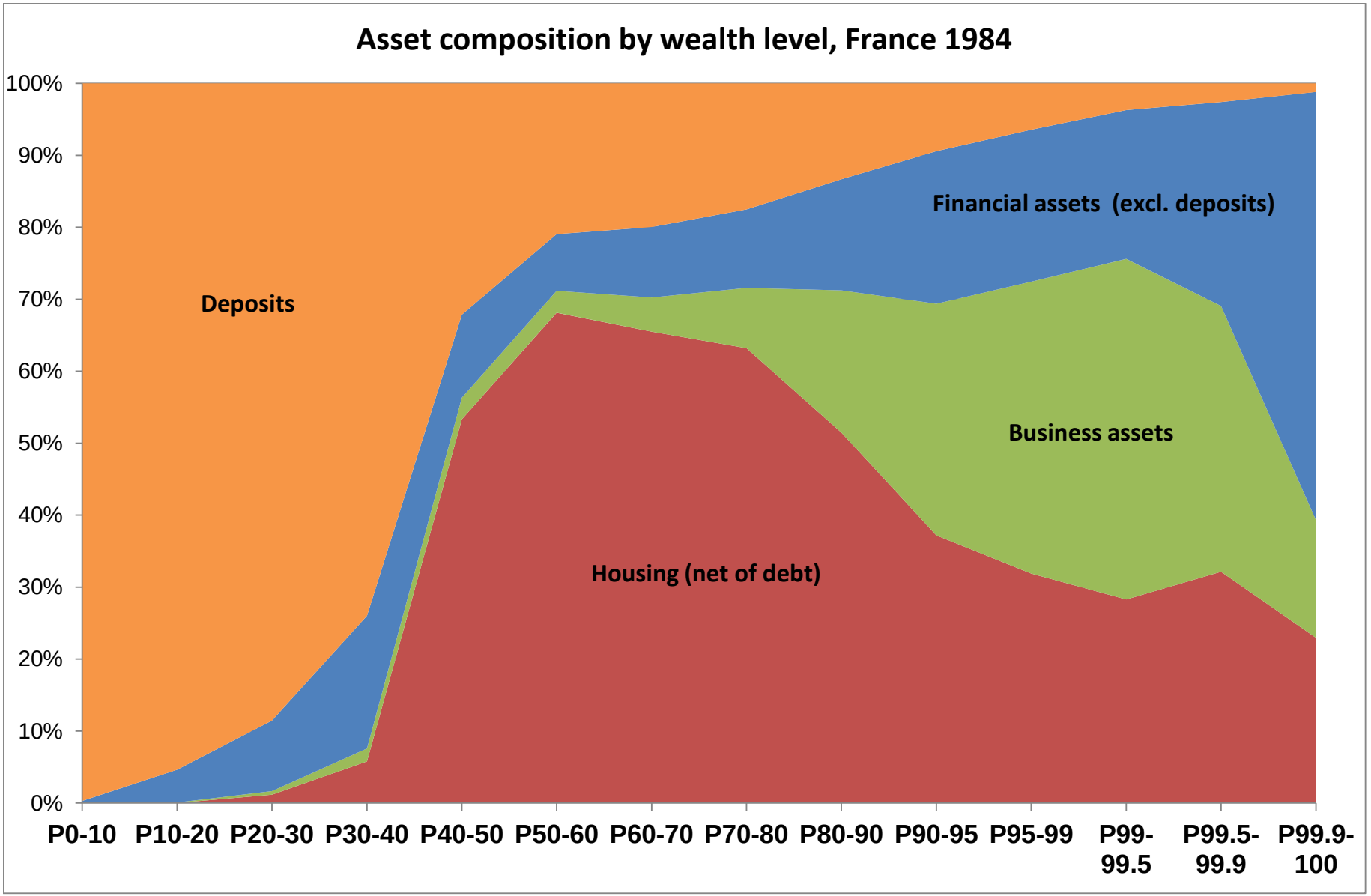
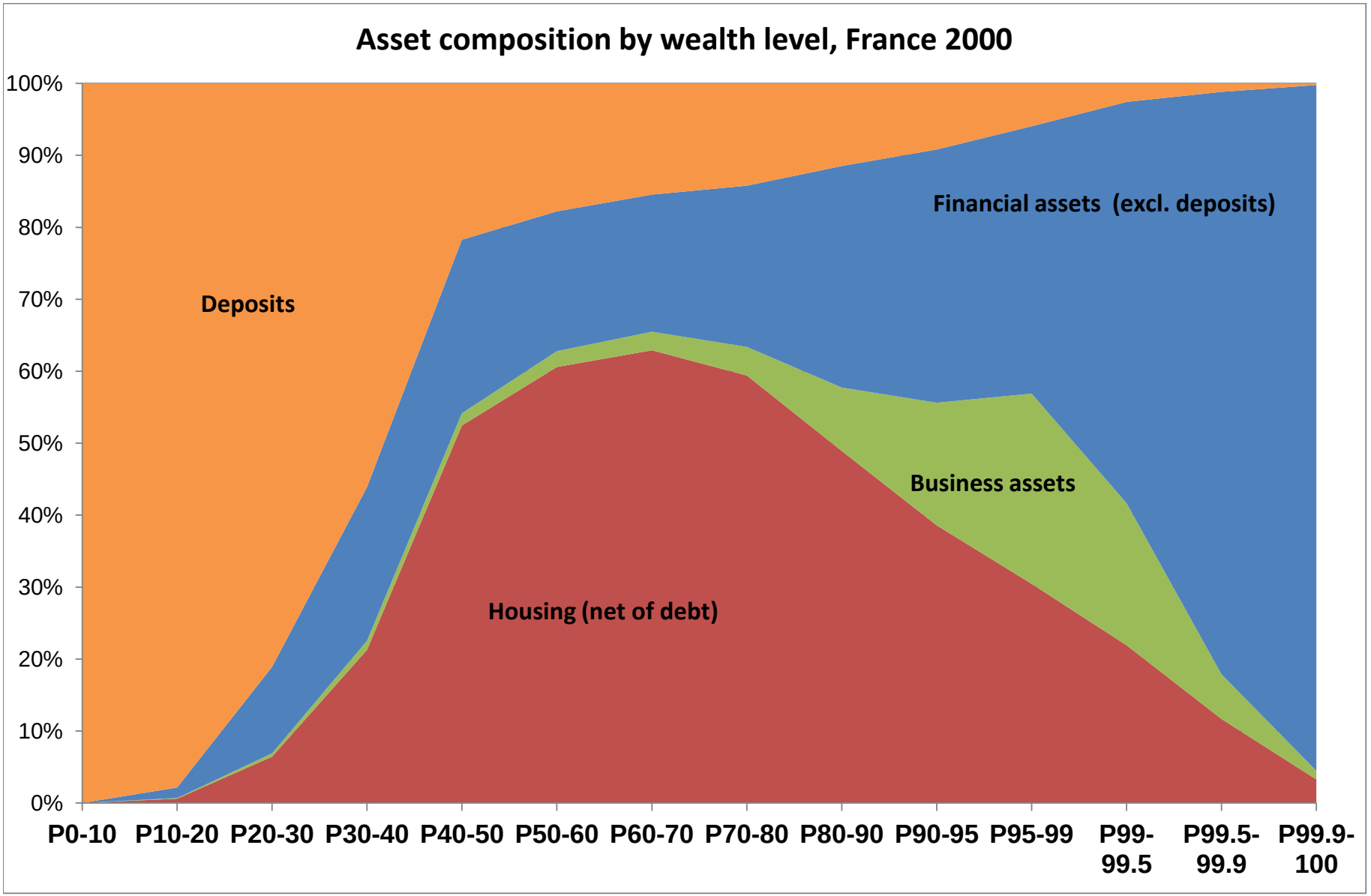
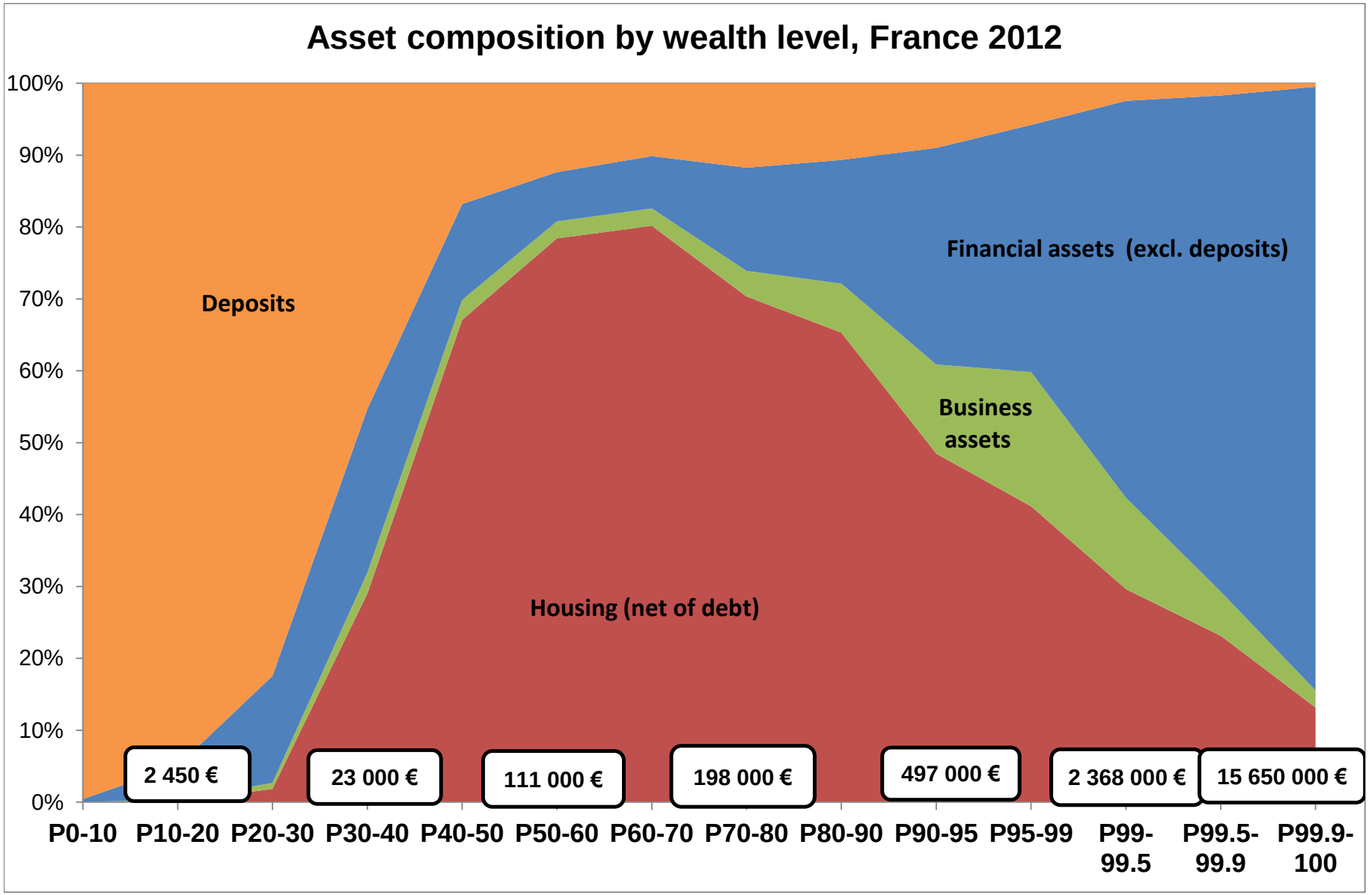
2012
2014


Asset composition by wealth level, France 1970
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.5
P99.5-99.9
P99.9-100


Asset composition by wealth level, France 1984
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.5
P99.5-99.9
P99.9-100


Asset composition by wealth level, France 2000
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.5
P99.5-99.9
P99.9-100


Asset composition by wealth level, France 2012
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Deposits
Financial assets (excl. deposits)
Business assets
Housing (net of debt)
2 450 €
23 000 €
111 000 €
198 000 €
497 000 €
2 368 000 €
15 650 000 €
P0-10
P10-20
P20-30
P30-40
P40-50
P50-60
P60-70
P70-80
P80-90
P90-95
P95-99
P99-99.5
P99.5-99.9
P99.9-100

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

$$A^i_{t+1} = (1 + p_t)(1 + q_{t,A})(1 + s^i_{t,A})A^i_t$$

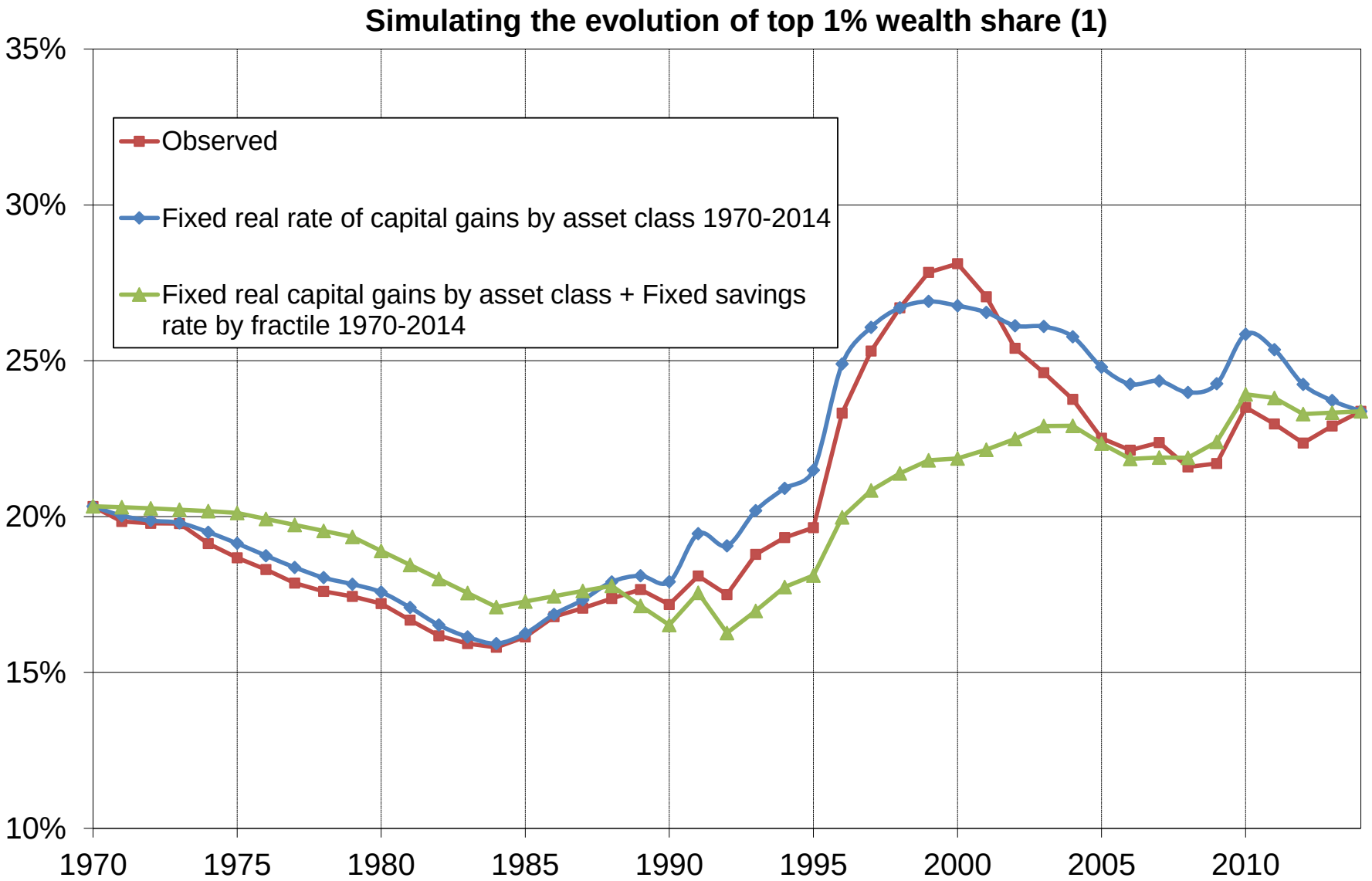
$$\Rightarrow A^i_T = \prod_{t=t0+1}^{t=T} (1 + p_t)(1 + q_{t,A})(1 + s^i_t)A^i_{t0}$$

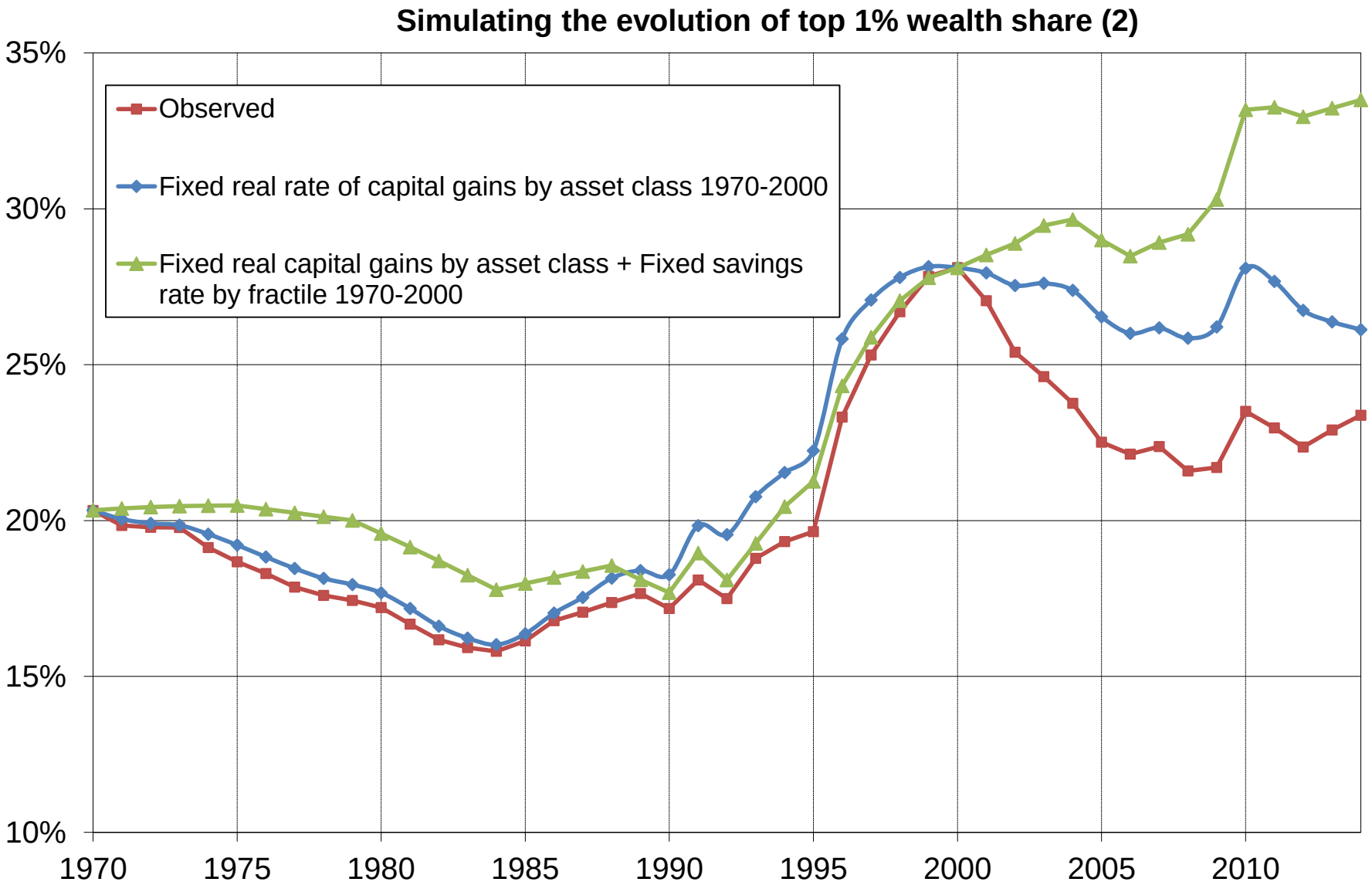
- Fixed real capital gains by asset class:

$$A^i_T = \prod_{t=t0+1}^{t=T} (1 + p_t)(1 + \bar{q}_A)(1 + s^i_{t,A})A^i_{t0}$$

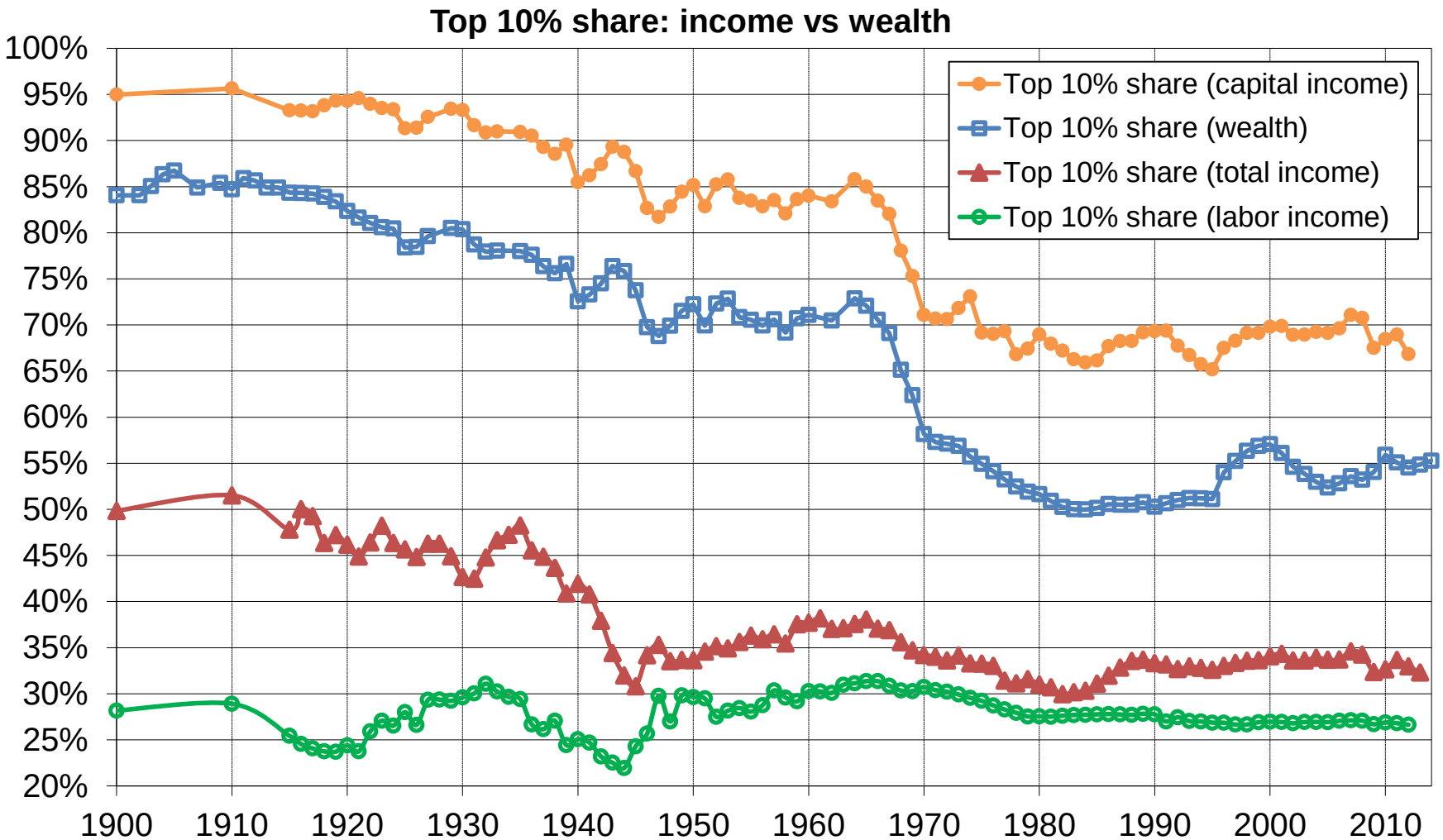
- Fixed real capital gains by asset class + Fixed saving rate by wealth group:

$$A^i_T = \prod_{t=t0+1}^{t=T} (1 + p_t)(1 + \bar{q}_A)(1 + \bar{s}_A)\frac{(1 + s^i_{t,A})}{(1 + s_{t,A})}A^i_{t0}$$


Simulating the evolution of top 1% wealth share (1)
35%
30%
25%
20%
15%
10%
1970
1975
1980
1985
1990
1995
2000
2005
2010
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)
35%
30%
25%
20%
15%
10%
1970
1975
1980
1985
1990
1995
2000
2005
2010
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

Outline



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):

$$W^p_{t+1} = (1 + q^p_t)[W^p_t + s^p_t(Y^p_{Lt} + r^p_t W^p_t)]$$

- W^p is the aggregate wealth for the wealth group p, Y^p_L 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^p_t from the observation of W^{p+1}_t, W^p_t, Y^p_{Lt}, r^p_t, q^p_t**

Steady-state formulas for top wealth shares

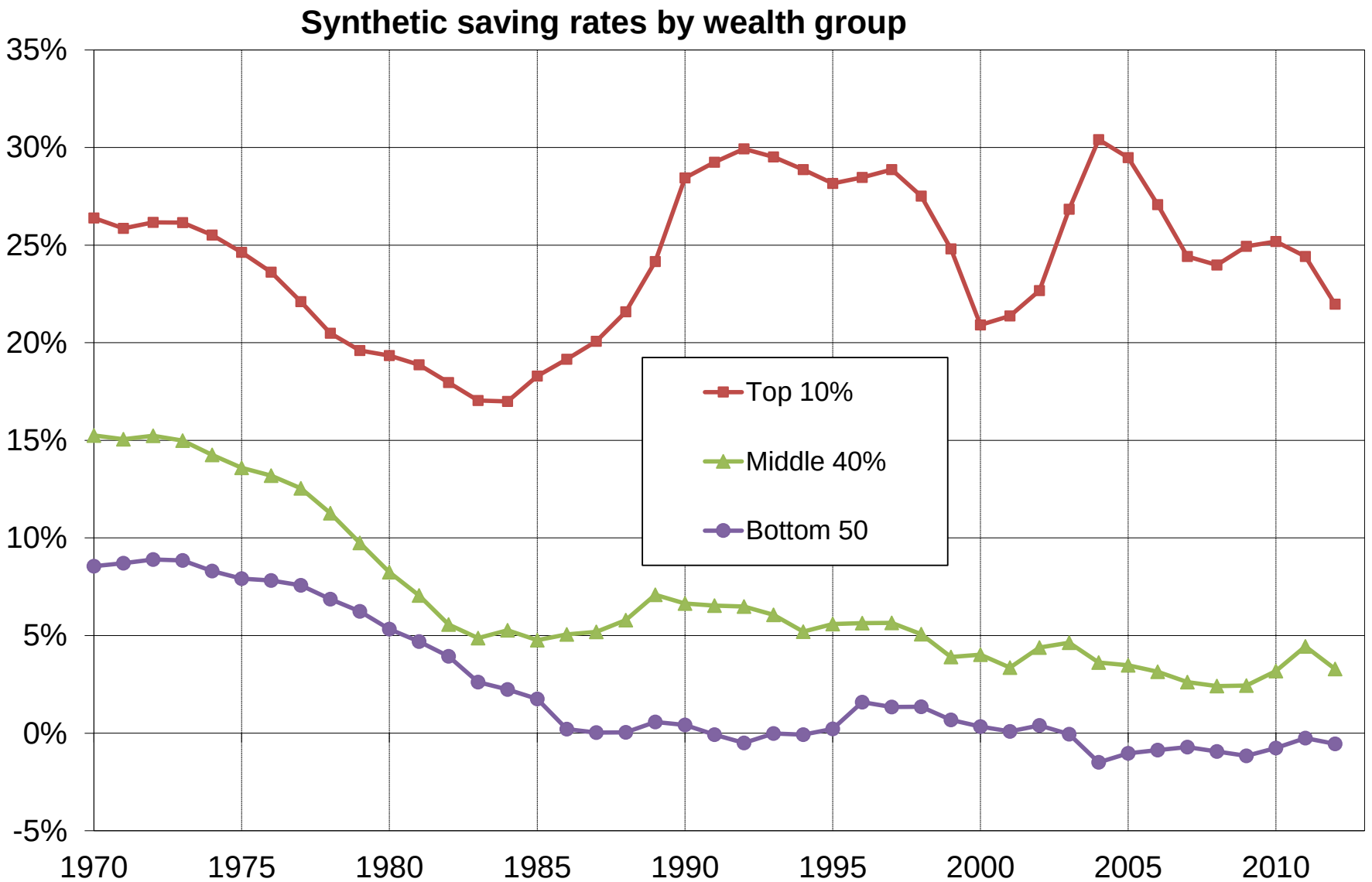
From the equation of wealth accumulation, with the same notations as above:

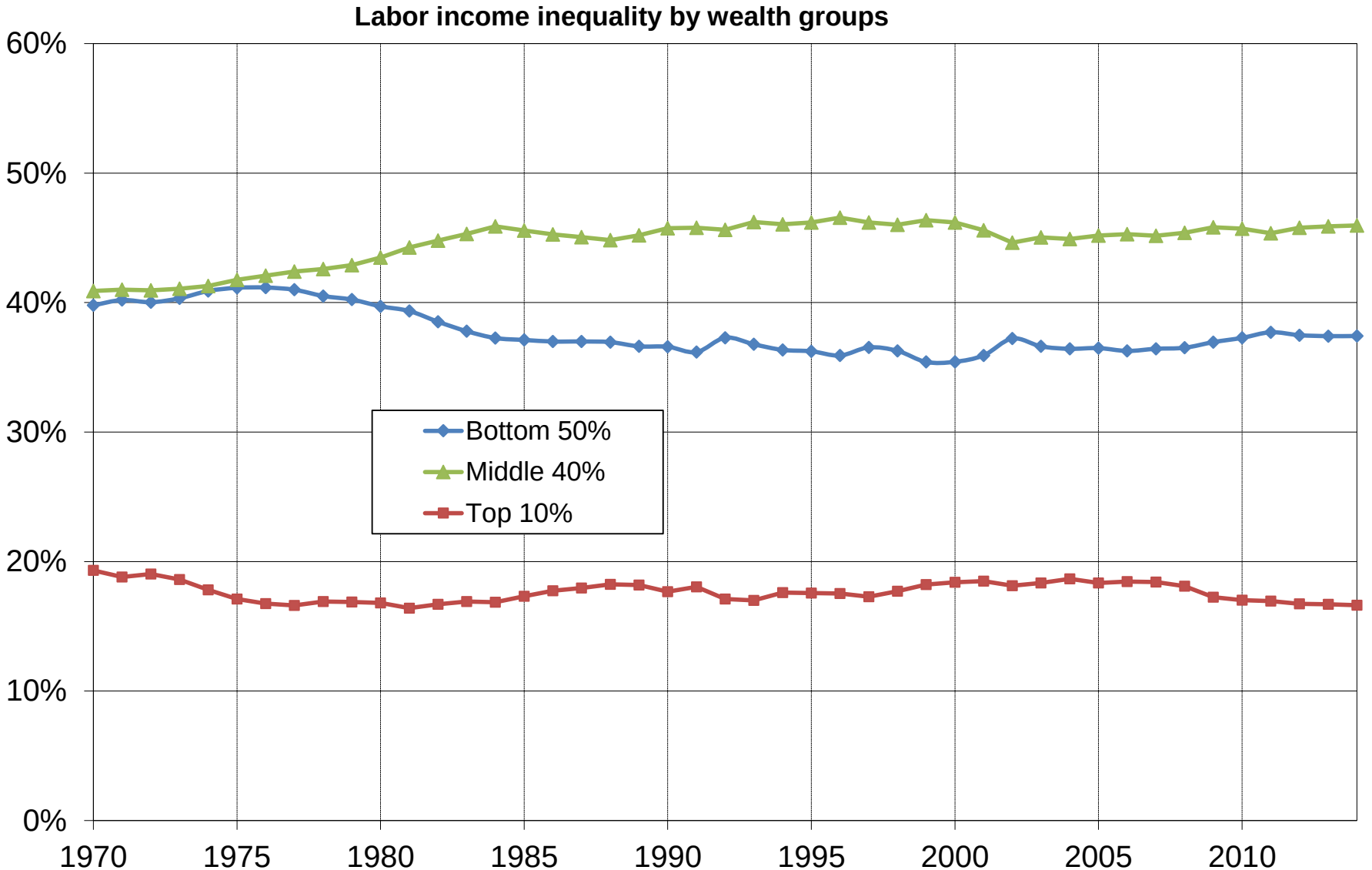
$$W^p_{t+1} = (1 + q^p_t)[W^p_t + s^p_t(Y^p_{Lt} + r^p_t W^p_t)]$$

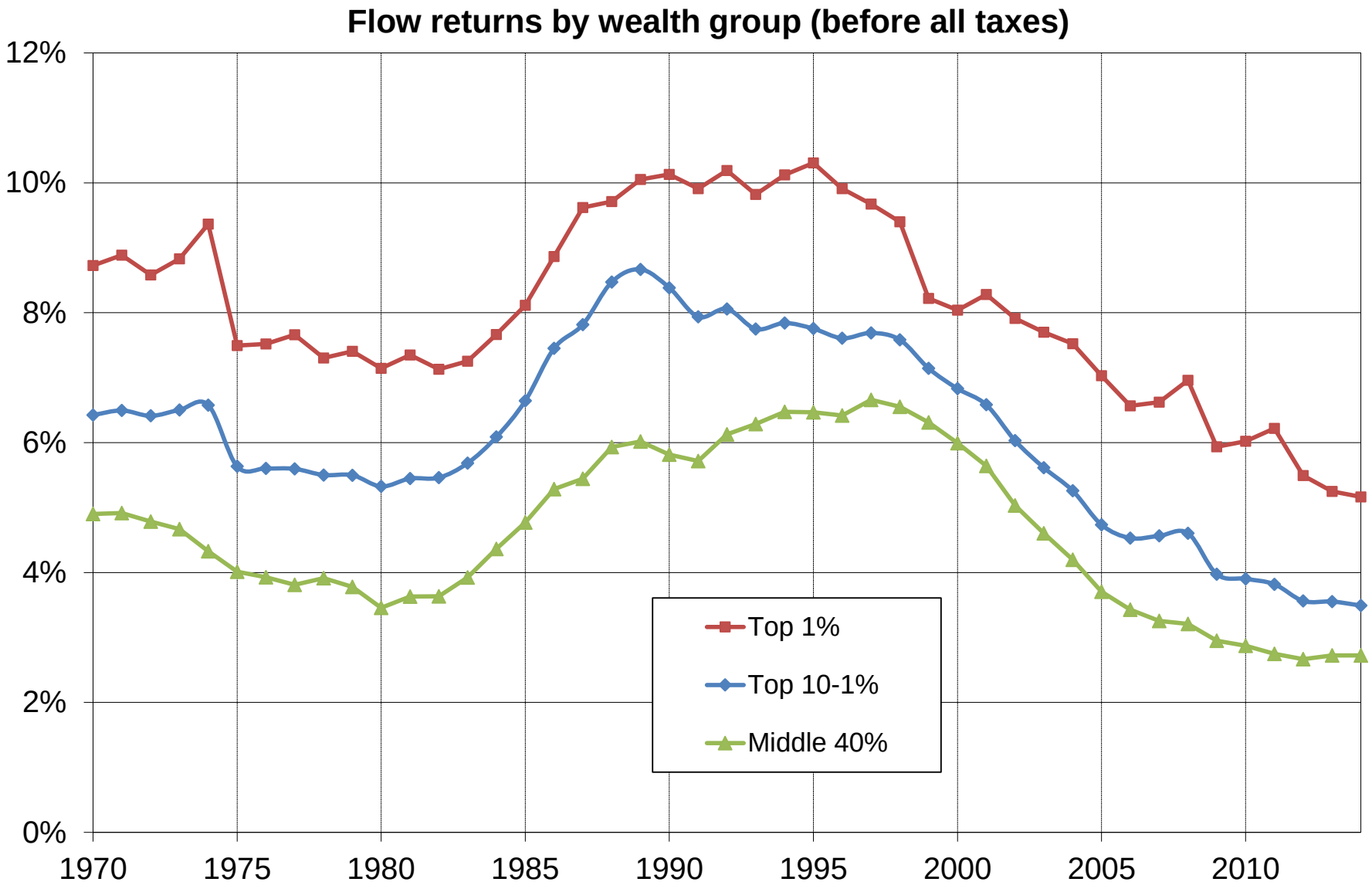
and assuming q_t has to be equal to 0 at steady state, we directly derive:

$$sh^p_W = (1 + \frac{s^p r^p - sr}{g - s^p r^p})\frac{s^p}{s} sh^p_{Y_L}$$

- If $s^p = s$ and $r^p = r$, then $sh^p_W = sh^p_{Y_L}$: **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**

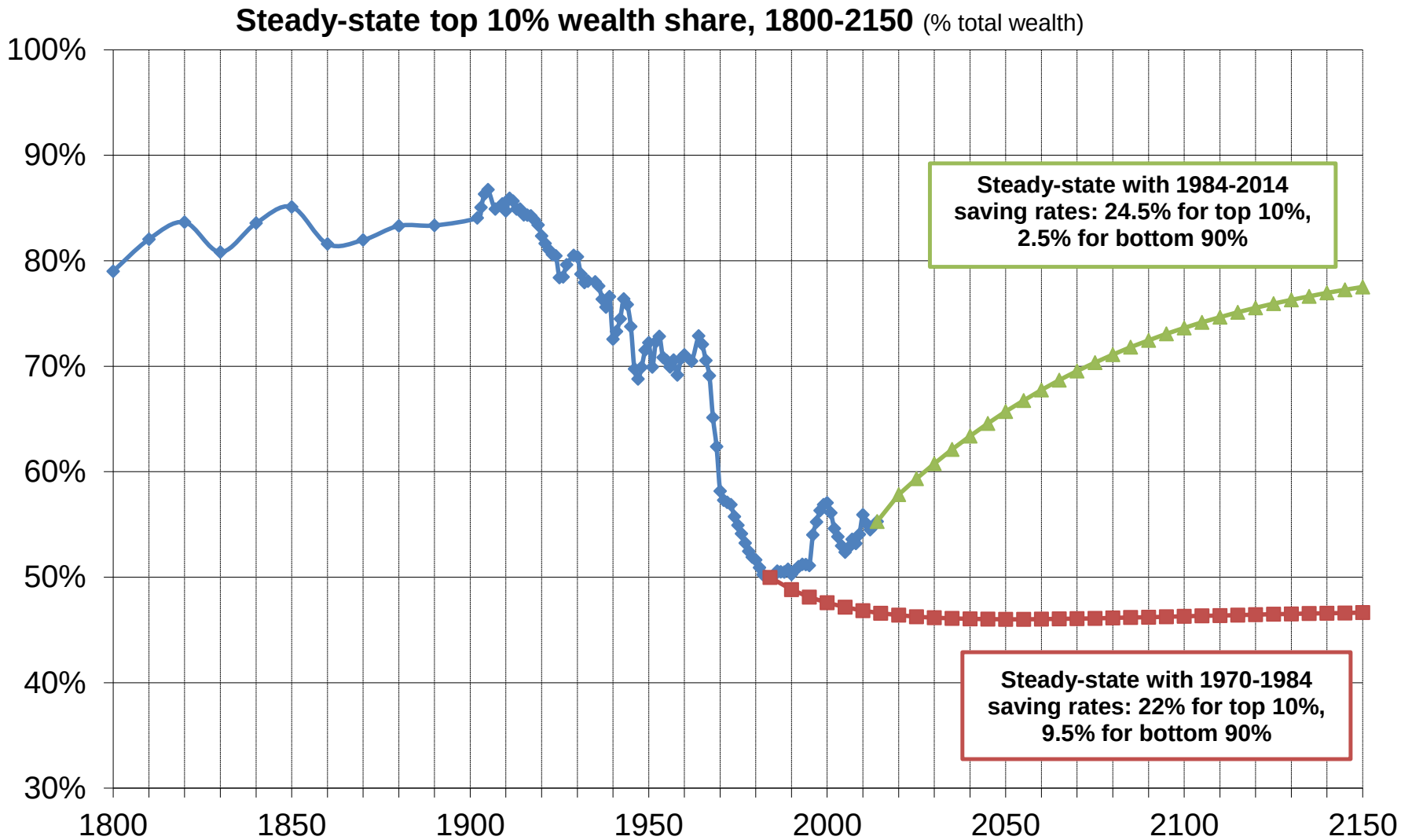

Synthetic saving rates by wealth group
35%
30%
25%
20%
15%
10%
5%
0%
-5%
1970
1975
1980
1985
1990
1995
2000
2005
2010
Top 10%
Middle 40%
Bottom 50

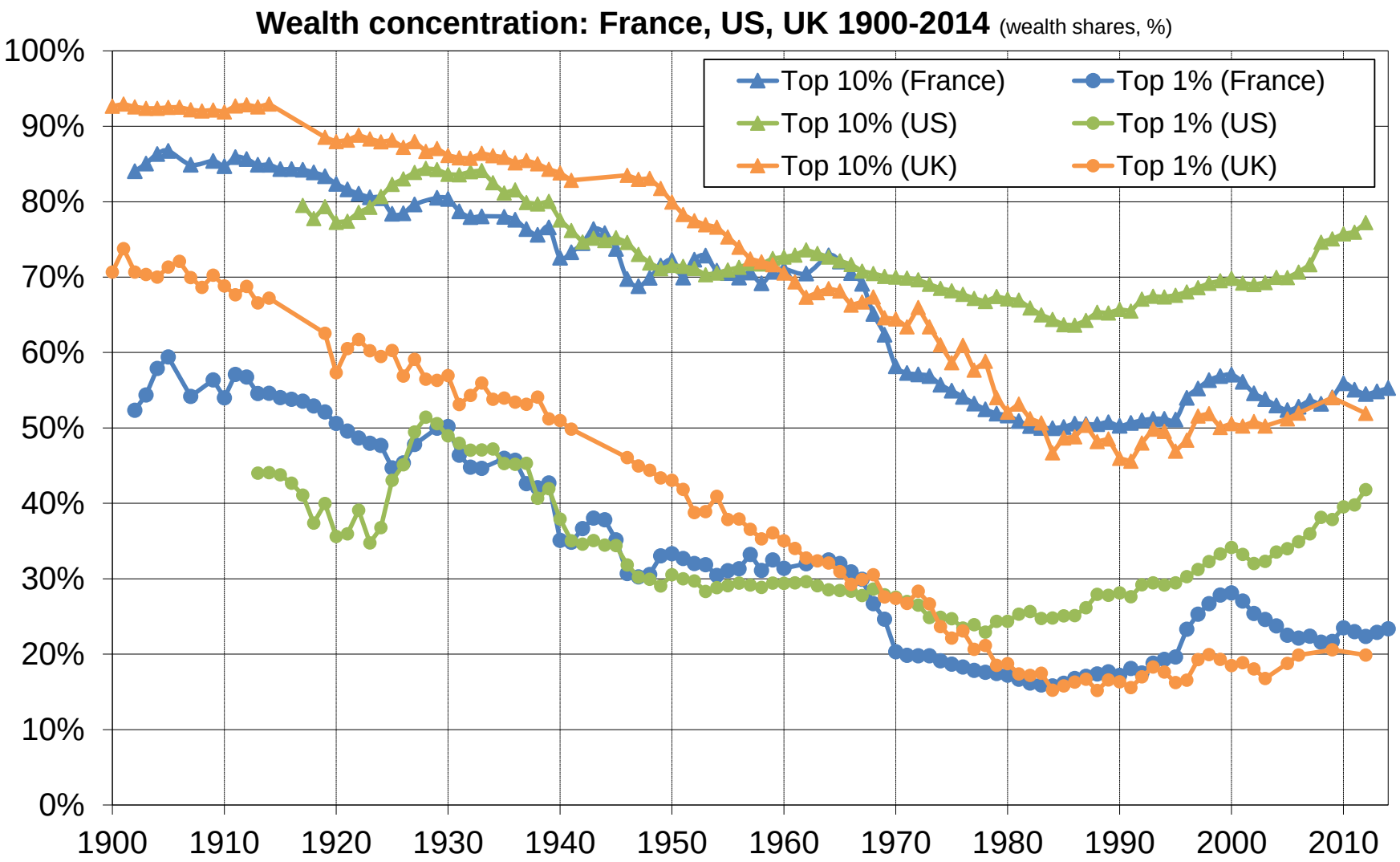

Labor income inequality by wealth groups
60%
50%
40%
30%
20%
10%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
Bottom 50%
Middle 40%
Top 10%


Flow returns by wealth group (before all taxes)
12%
10%
8%
6%
4%
2%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
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)
100%
90%
80%
70%
60%
50%
40%
30%
1800
1850
1900
1950
2000
2050
2100
2150
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)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010

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

Outline

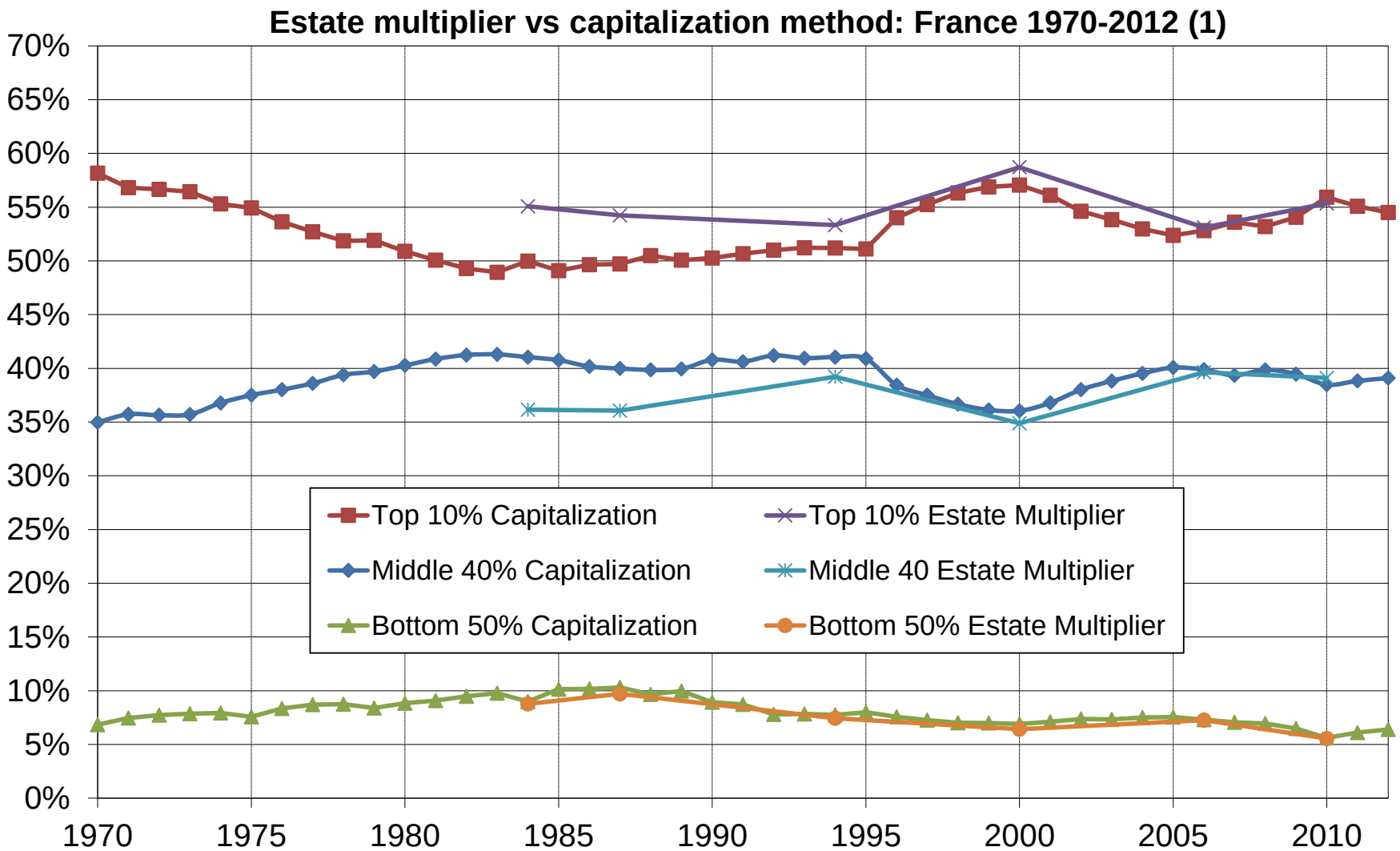
Conclusion

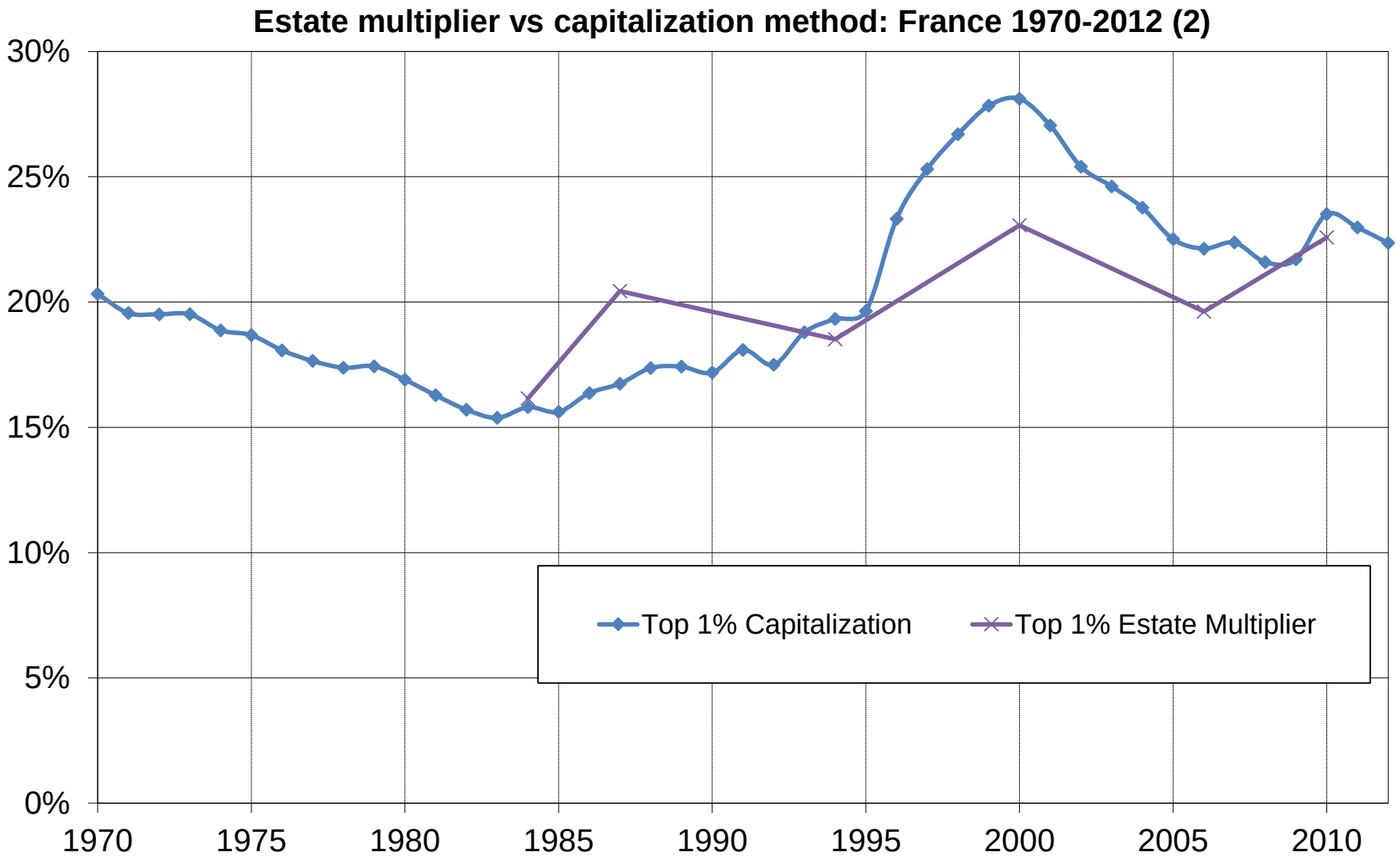
- Reconciliation of data sources to build consistent wealth inequality series.
  - 100% consistent with National Accounts
  - Covering all the wealth distribution
- Main findings:
  - Decline of wealth inequality after WWI and WWII
  - Moderate rise in wealth concentration since early 1980s
  - Determinants of steady-state wealth inequality
    - Key forces: unequal labor incomes, unequal rates of return, unequal saving rates
    - Large multiplicative effects in the long run

Outline

Appendix

BACK UP SLIDES


Estate multiplier vs capitalization method: France 1970-2012 (1)
70%
65%
60%
55%
50%
45%
40%
35%
30%
25%
20%
15%
10%
5%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
Top 10% Capitalization
Top 10% Estate Multiplier
Middle 40% Capitalization
Middle 40 Estate Multiplier
Bottom 50% Capitalization
Bottom 50% Estate Multiplier


Estate multiplier vs capitalization method: France 1970-2012 (2)
30%
25%
20%
15%
10%
5%
0%
1970
1975
1980
1985
1990
1995
2000
2005
2010
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,

Back