Capital in the 21st century

Thomas Piketty
Paris School of Economics
Helsinki, June 12 2014

- This presentation is based upon ***Capital in the 21st century*** (Harvard University Press, March 2014)
- This book studies the global dynamics of income and wealth distribution since 18c in 20+ countries; I use historical data collected over the past 15 years together with Atkinson, Saez, Postel-Vinay, Rosenthal, Alvaredo, Zucman, and 30+ others.

- The book includes four parts:

Part 1. Income and capital

Part 2. The dynamics of the capital/income ratio

Part 3. The structure of inequalities

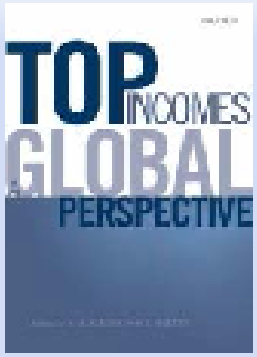
Part 4. Regulating capital in the 21st century

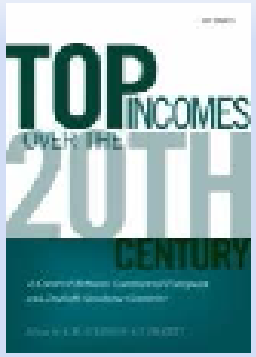
- In this presentation I will present some results from Parts 2 & 3, focusing upon the long-run evolution of capital/income ratios and wealth concentration

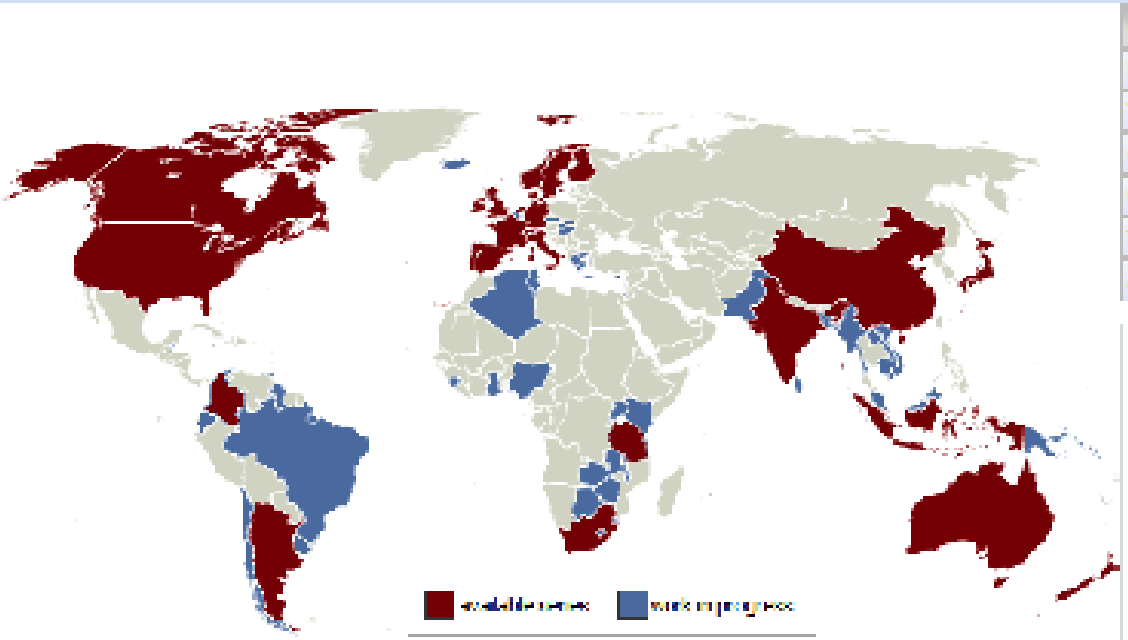
(all graphs and series are available on line:

see http://piketty.pse.ens.fr/capital21c)

The World Top Incomes Database





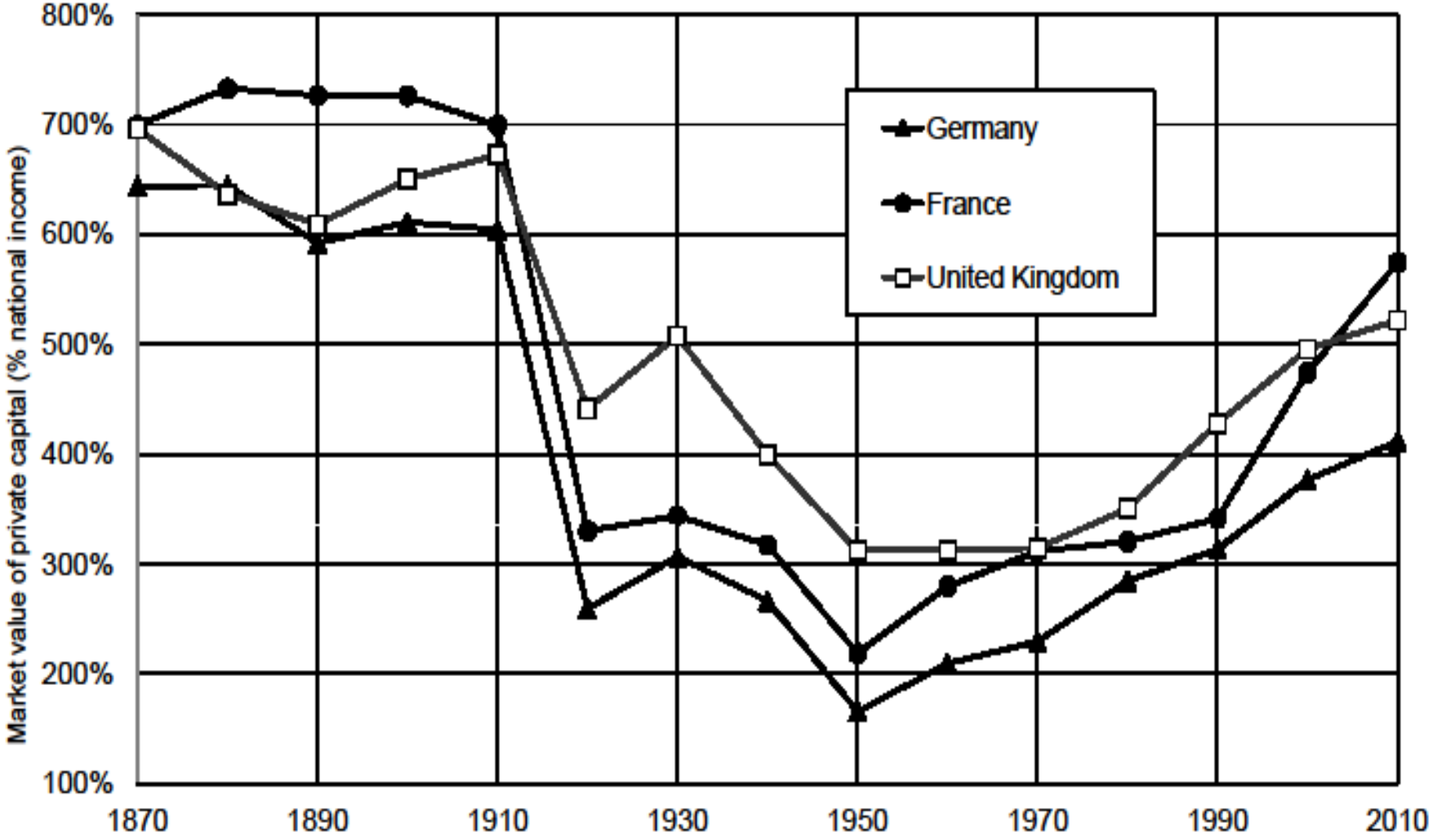


Institute for New Economic Thinking

Figure I.1. Income inequality in the United States, 1910-2010

The top decile share in U.S. national income dropped from 45-50% in the 1910s-1920s to less than 35% in the 1950s (this is the fall documented by Kuznets); it then rose from less than 35% in the 1970s to 45-50% in the 2000s-2010s. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure I.2. The capital/income ratio in Europe, 1870-2010



Aggregate private wealth was worth about 6-7 years of national income in Europe in 1910, between 2 and 3 years in 1950, and between 4 and 6 years in 2010. Sources and series: see piketty.pse.ens.fr/capital21c.

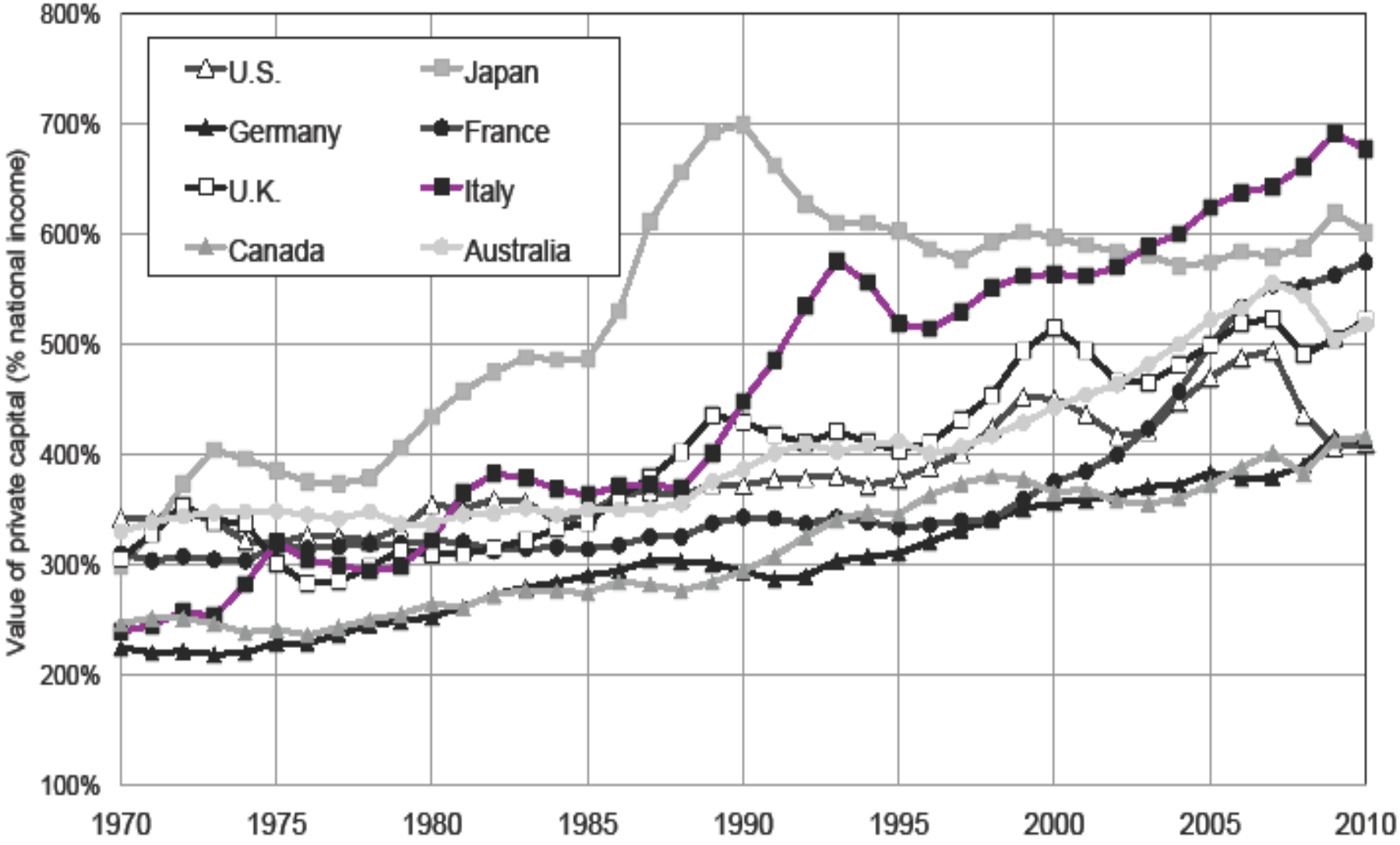
This presentation: three points

- **1. The return of a patrimonial (or wealth-based) society** in the Old World (Europe, Japan). Wealth-income ratios seem to be returning to very high levels in low growth countries. Intuition: in a slow-growth society, wealth accumulated in the past can naturally become very important. In the very long run, this can be relevant for the entire world.

- **2. The future of wealth concentration**: with high r - g during 21^{c} (r = net-of-tax rate of return, g = growth rate), then wealth inequality might reach or surpass 19^{c} oligarchic levels; conversely, suitable institutions can allow to democratize wealth.

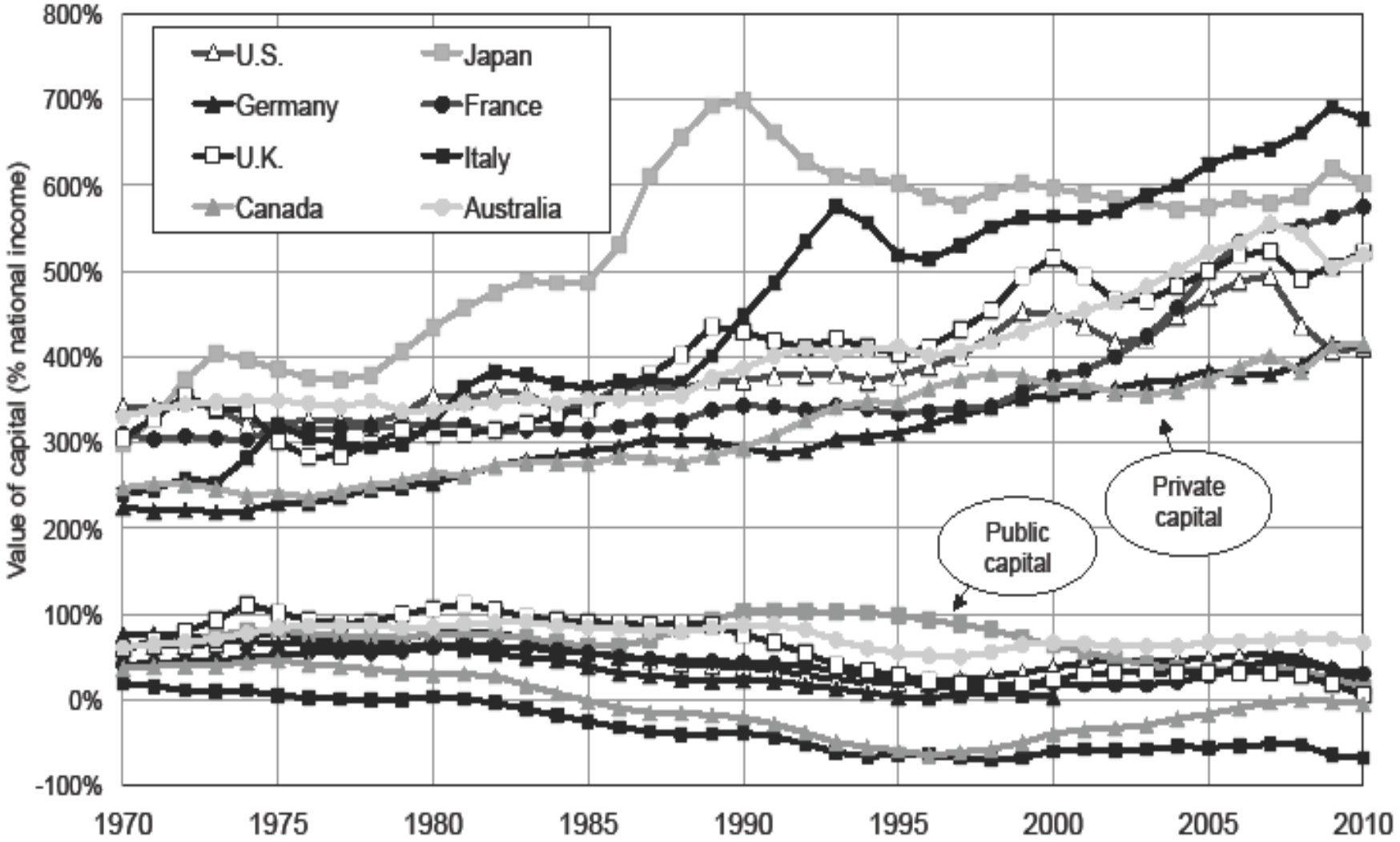
- **3. Inequality in America**: is the New World developing a new inequality model that is based upon extreme labor income inequality more than upon wealth inequality? Is it more merit-based, or can it become the worst of all worlds?

Figure 5.3. Private capital in rich countries, 1970-2010



Private capital is worth between 2 and 3.5 years of national income in rich countries in 1970, and between 4 and 7 years of national income in 2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 5.5. Private and public capital in rich countries, 1970-2010



In Italy, private capital rose from 240% to 680% of national income between 1970 and 2010, while public capital dropped from 20% to -70%. Sources and series: see piketty.pse.ens.fr/capital21c.

Table 12.1. The growth rate of top global wealth, 1987-2013

Average real growth rate per year *(after deduction of inflation)*	1987-2013
The top 1/(100 million) highest wealth holders (about 30 adults out of 3 billions in 1980s, and 45 adults out of 4,5 billions in 2010s)	6,8%
The top 1/(20 million) highest wealth holders (about 150 adults out of 3 billions in 1980s, and 225 adults out of 4,5 billions in 2010s)	6,4%
Average world wealth per adult	2,1%
Average world income per adult	1,4%
World adult population	1,9%
World GDP	3,3%

Between 1987 and 2013, the highest global wealth fractiles have grown at 6%-7% per year, vs. 2,1% for average world wealth and 1,4% for average world income. All growth rates are net of inflation (2,3% per year between 1987 and 2013). Sources: see piketty.pse.ens.fr/capital21c.

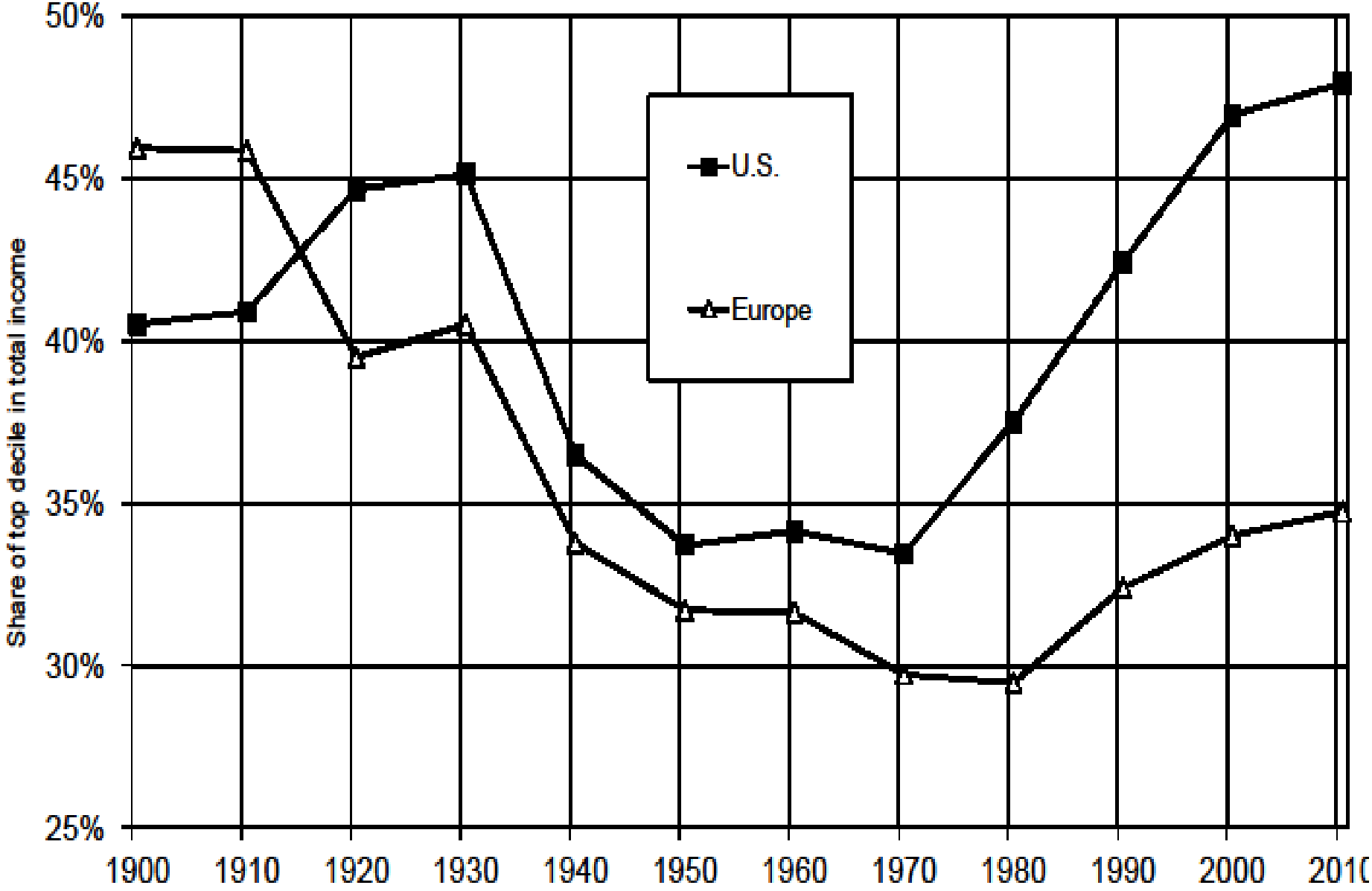
Table 12.2. The return on the capital endowments of U.S. universities, 1980-2010

Average real annual rate of return *(after deduction of inflation and all administrative costs and financial fees)*	Période 1980-2010
All universities (850)	8.2%
incl.: Harvard-Yale-Princeton	10.2%
incl.: Endowments higher than 1 billion $ (60)	8.8%
incl. Endowments between 500 millions and 1 billion $ (66)	7.8%
incl. Endowments between 100 and 500 million $ (226)	7.1%
dont: Endowments less than 100 million $ (498)	6.2%

Between 1980 and 2010, U.S. universities earned an average real return of 8.2% on their capital endowments, and all the more so for higher endowments. All returns reported here are net of inflation (2.4% per year between 1980 and 2010) and of all administrative costs and financial fees.

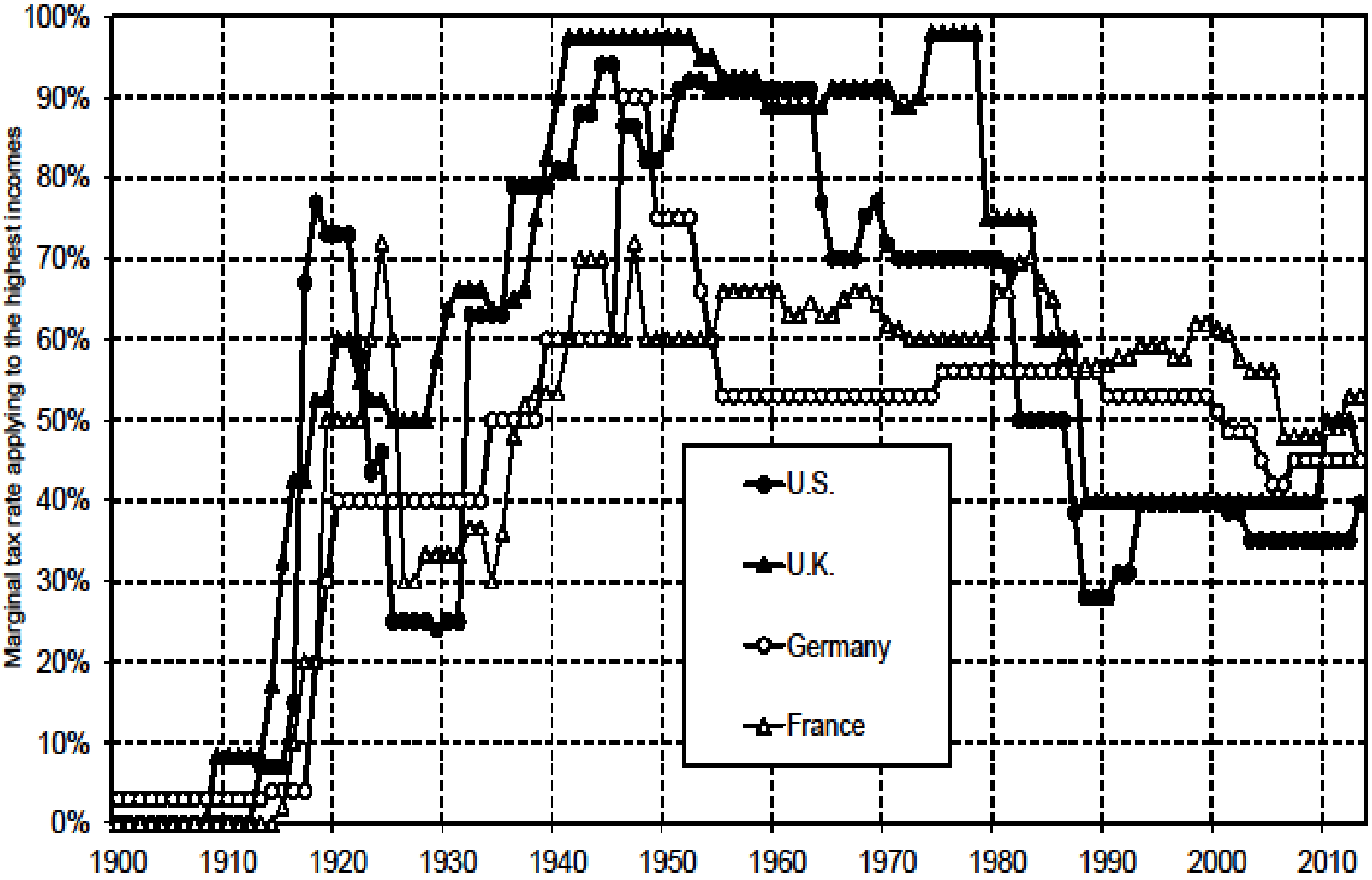
Sources: see piketty.pse.ens.fr/capital21c.

Figure 9.8. Income inequality: Europe vs. the United States, 1900-2010



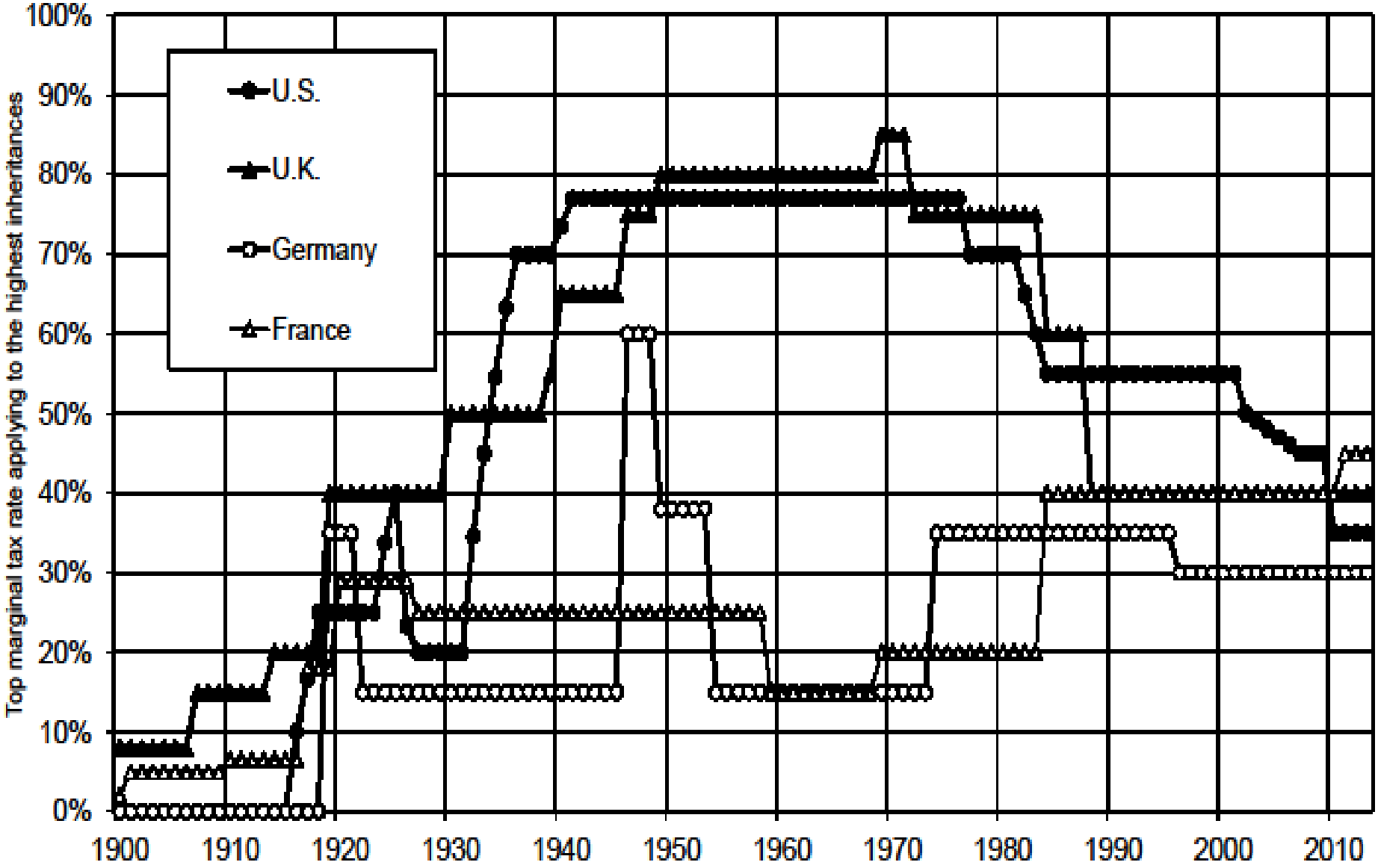
The top decile income share was higher in Europe than in the U.S. in 1900-1910; it is a lot higher in the U.S. in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 14.1. Top income tax rates, 1900-2013



The top marginal tax rate of the income tax (applying to the highest incomes) in the U.S. dropped from 70% in 1980 to 28% in 1988. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 14.2. Top inheritance tax rates, 1900-2013



The top marginal tax rate of the inheritance tax (applying to the highest inheritances) in the U.S. dropped from 70% in 1980 to 35% in 2013. Sources and series: see piketty.pse.ens.fr/capital21c.

Conclusions

- **The history of income and wealth inequality is always political, chaotic and unpredictable; it involves national identities and sharp reversals; nobody can predict the reversals of the future**
- Marx: with $g=0$, $\beta \uparrow \infty$, $r \to 0$: revolution, war
- My conclusions are less apocalyptic: with $g>0$, at least we have a steady-state $\beta=s/g$
- But with $g>0$ & small, this steady-state can be rather gloomy: it can involve a very large capital-income ratio β and capital share α, as well as extreme wealth concentration due to high r-g
- This has nothing to do with a market imperfection: the more perfect the capital market, the higher r-g
- The ideal solution: progressive wealth tax at the global scale, based upon automatic exchange of bank information
- Other solutions involve authoritarian political & capital controls (China, Russia..), or perpetual population growth (US), or inflation, or some mixture of all

1. The return of a wealth-based society

- Wealth = capital K = everything we own and that can be sold on a market (net of all debts) (excludes human K, except in slave societies)
- In textbooks, wealth-income & capital-ouput ratios are supposed to be constant. But the so-called « Kaldor facts » actually rely on little historical evidence.

- In fact, we observe in Europe & Japan a large recovery of β=K/Y in recent decades:

  β=200-300% in 1950-60s → β=500-600% in 2000-10s

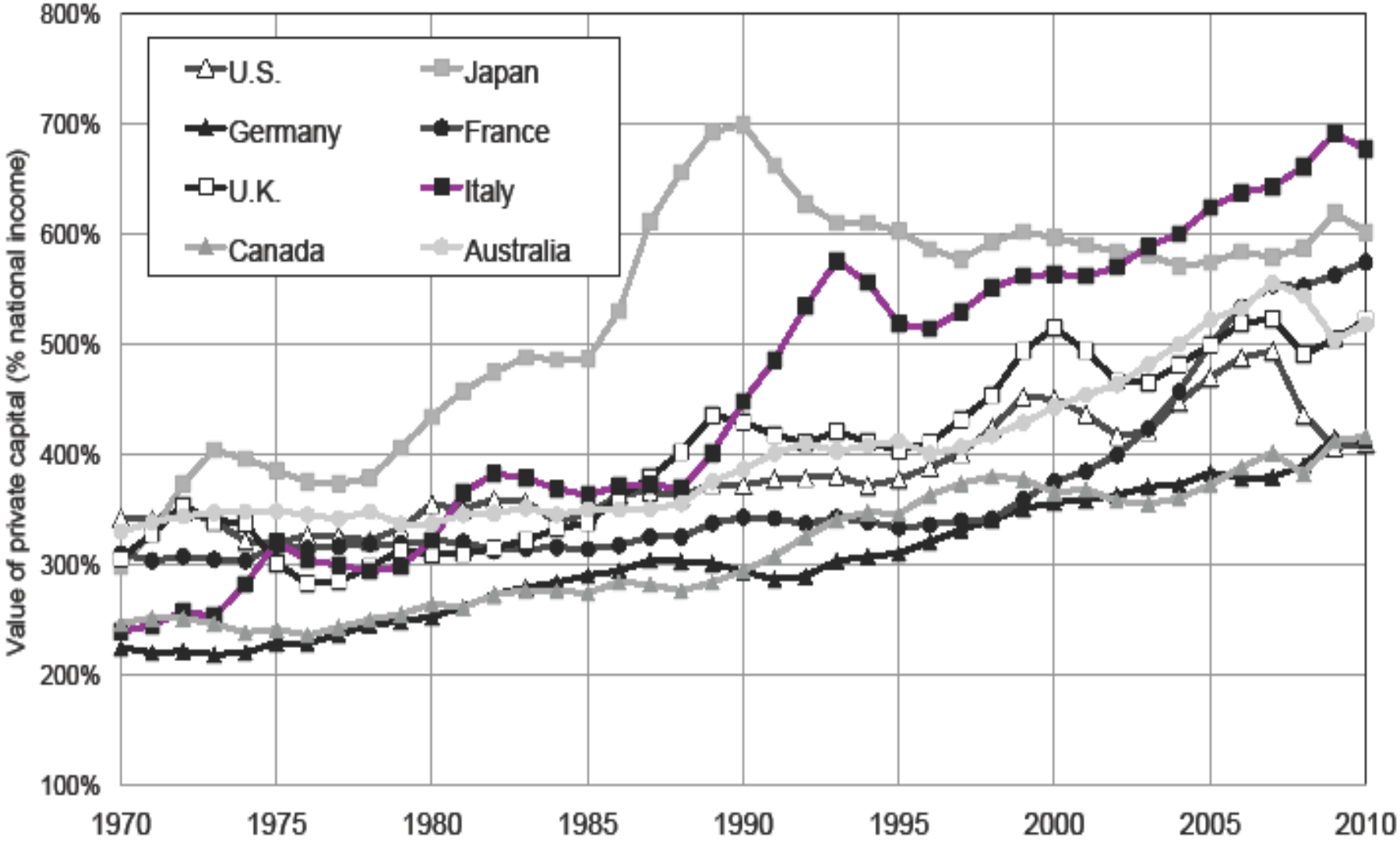
  (i.e. average wealth K was about 2-3 years of average income Y around 1950-1960; it is about 5-6 years in 2000-2010)

  (with β≈600%, if Y≈30 000€ per capita, then K≈180 000€ per capita)

  (currently, K ≈ half real estate, half financial assets)

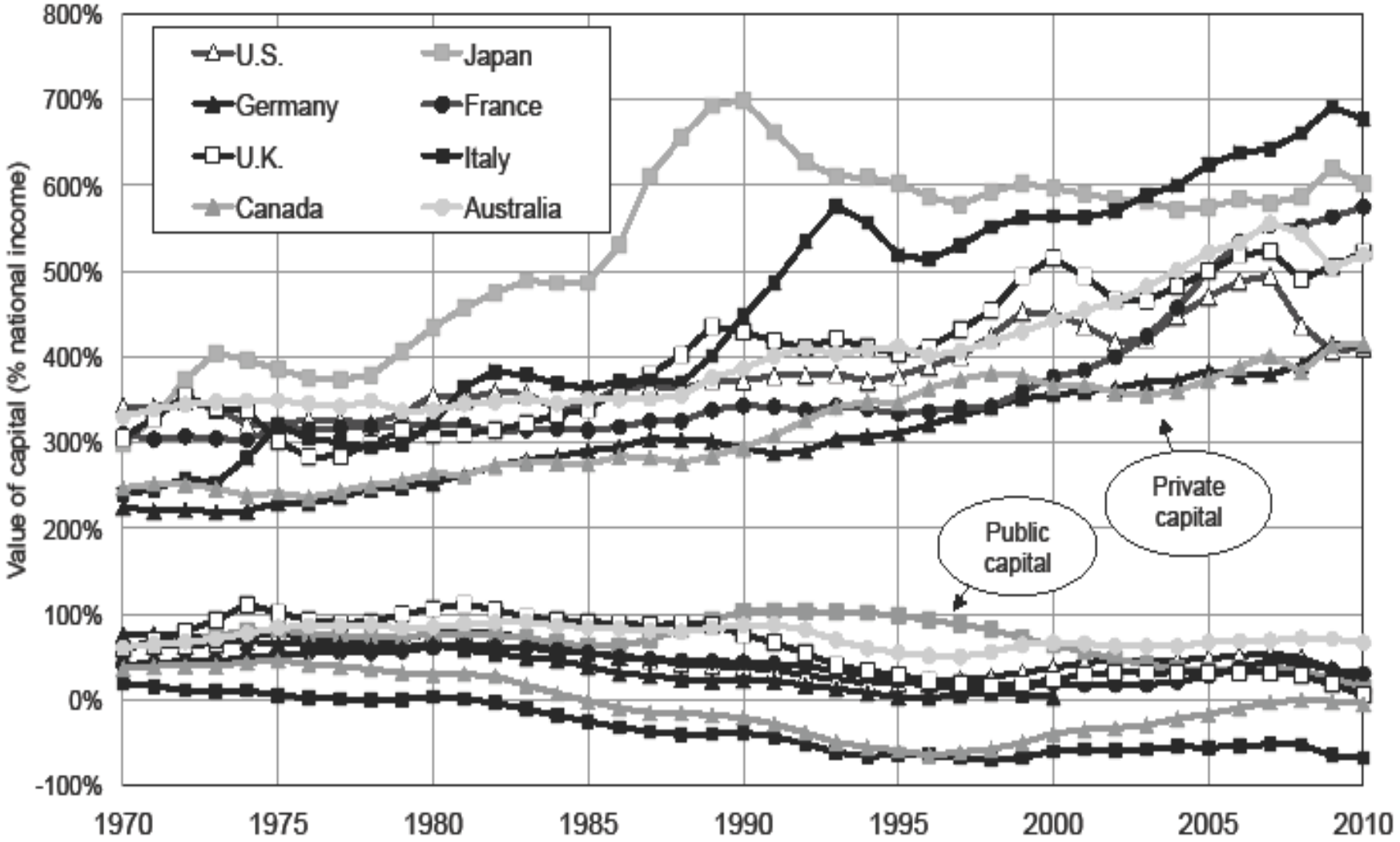
Are we heading back to the β=600-700% observed in the wealth-based societies of 18^{c}-19^{c} ? Or even more?

Figure 5.3. Private capital in rich countries, 1970-2010



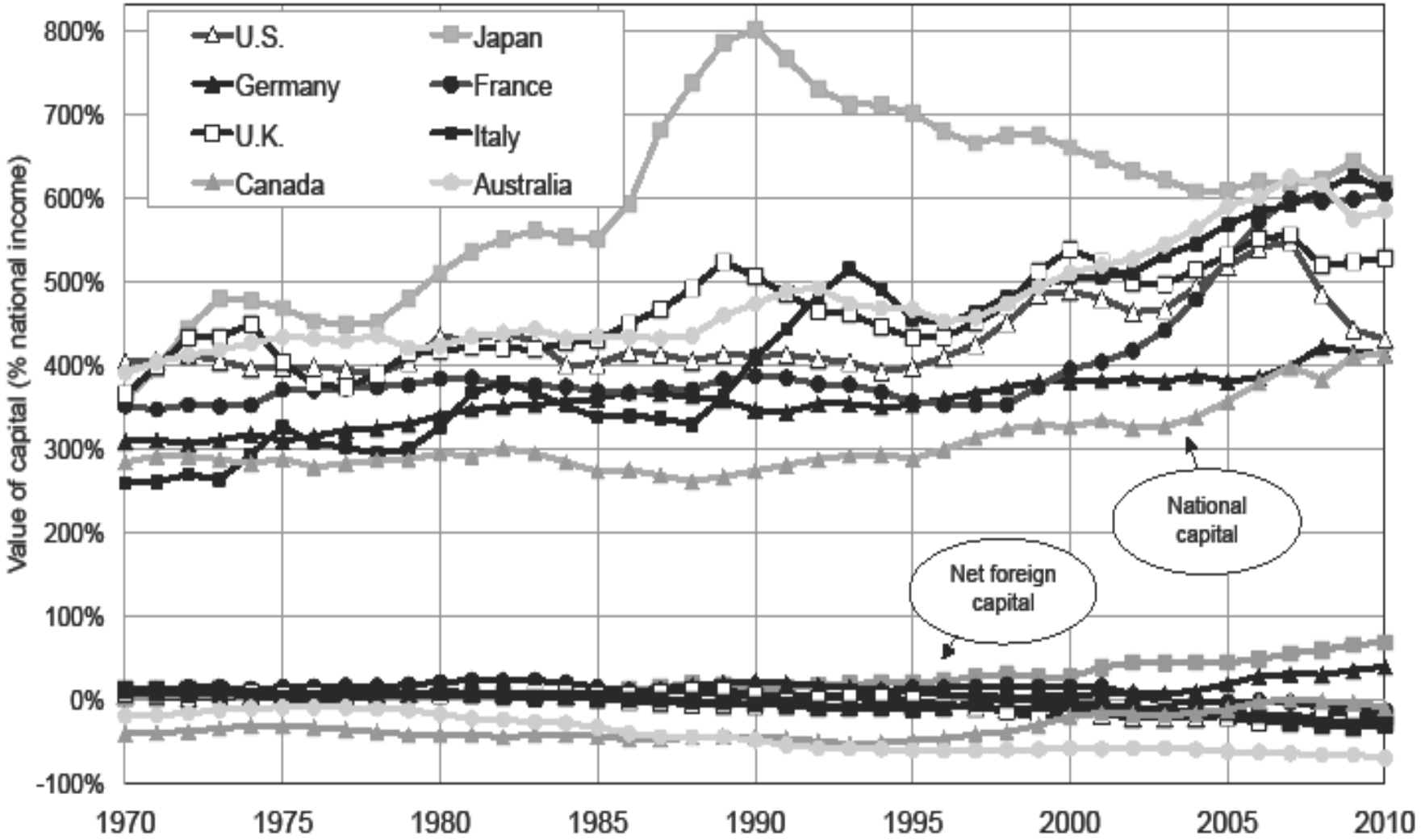
Private capital is worth between 2 and 3.5 years of national income in rich countries in 1970, and between 4 and 7 years of national income in 2010. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 5.5. Private and public capital in rich countries, 1970-2010



In Italy, private capital rose from 240% to 680% of national income between 1970 and 2010, while public capital dropped from 20% to -70%. Sources and series: see piketty.pse.ens.fr/capital21c.

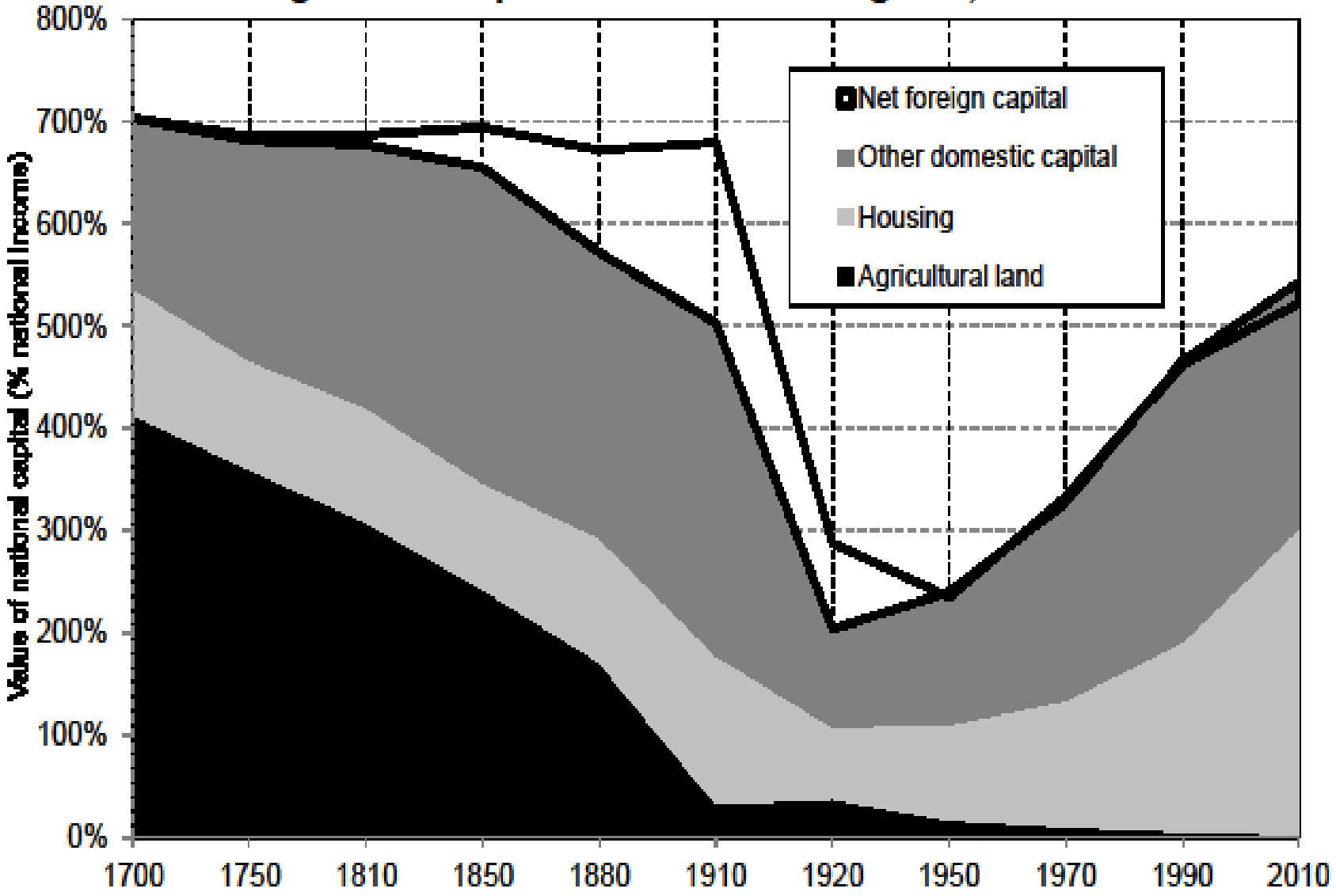
Figure 5.7. National capital in rich countries, 1970-2010



Net foreign assets held by Japan and Germany are worth between 0.5 and 1 year of national income in 2010.

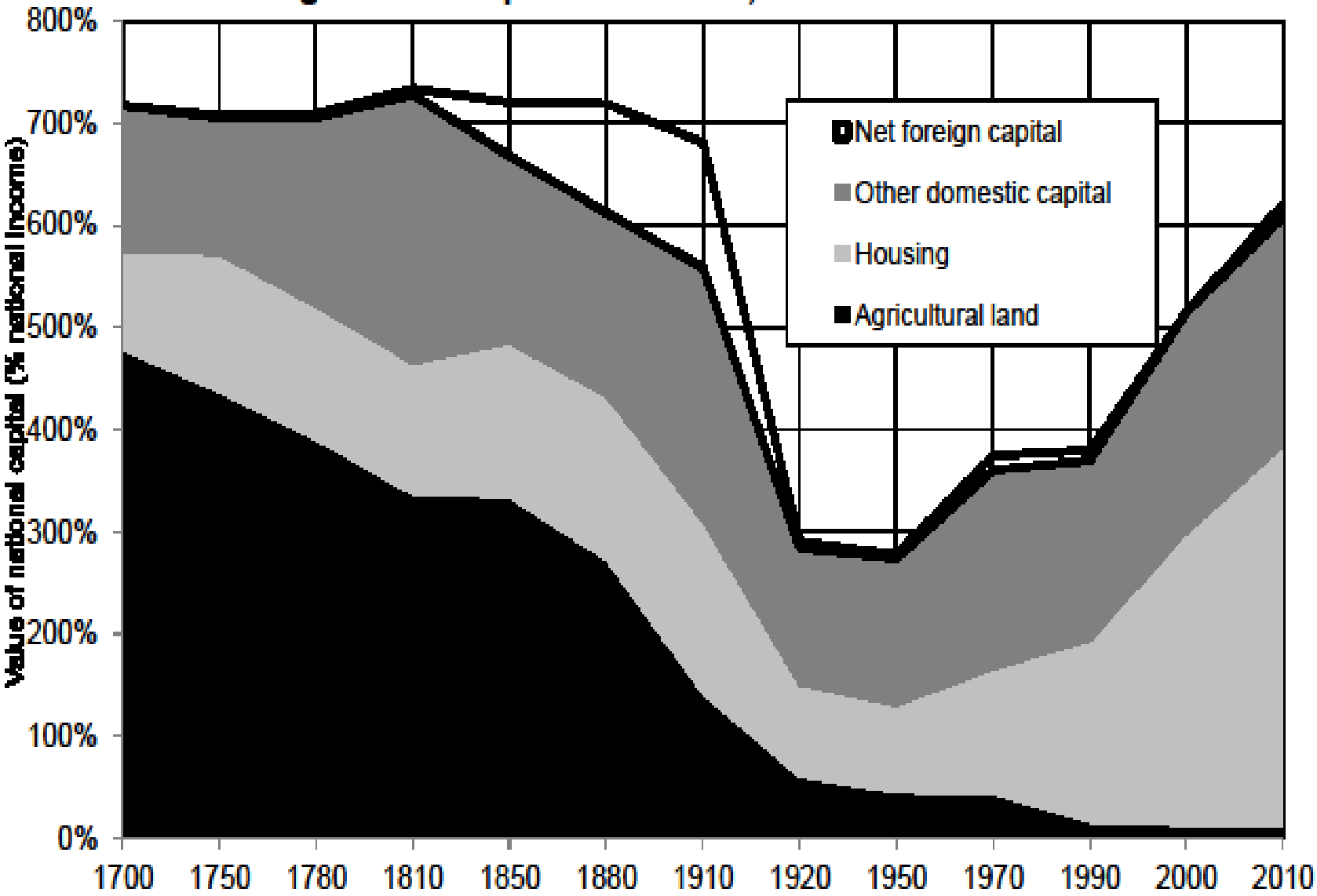
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 3.1. Capital in the United Kingdom, 1700-2010



National capital is worth about 7 years of national income in the United Kingdom in 1700 (including 4 in agricultural land). Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 3.2. Capital in France, 1700-2010



National capital is worth almost 7 years of national income in France in 1910 (including 1 invested abroad).

Sources and series: see piketty.pse.ens.fr/capital21c.

- The simplest way to think about this is the following: in the long-run, **$\beta = s/g$** with s = (net-of-depreciation) saving rate
  and g = economy's growth rate (population + productivity)

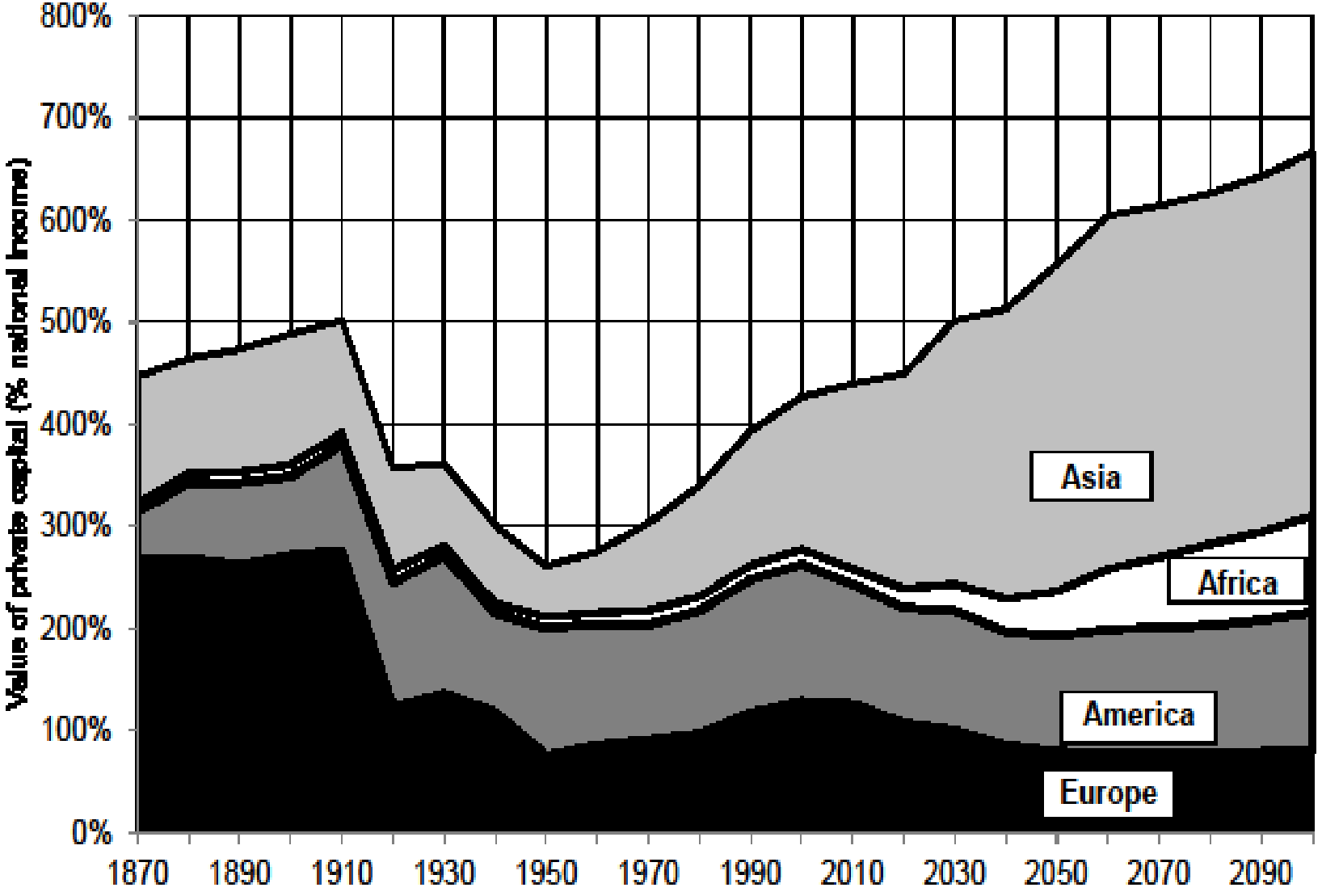
With s=10%, g=3%, β≈300%; but if s=10%, g=1,5%, β≈600%

= in slow-growth societies, the total stock of wealth accumulated in the past can naturally be very important

→ capital is back because low growth is back
(in particular because population growth↓0)
→ in the long run, this can be relevant for the entire planet

Note: β=s/g = pure stock-flow accounting identity; it is true whatever the combination of saving motives

Figure 12.5. The distribution of world capital 1870-2100



According to the central scenatio, Asian countries should own about half of world capital by the end of the 21st century. Sources and series: see piketty.pse.ens.fr/capital21c.

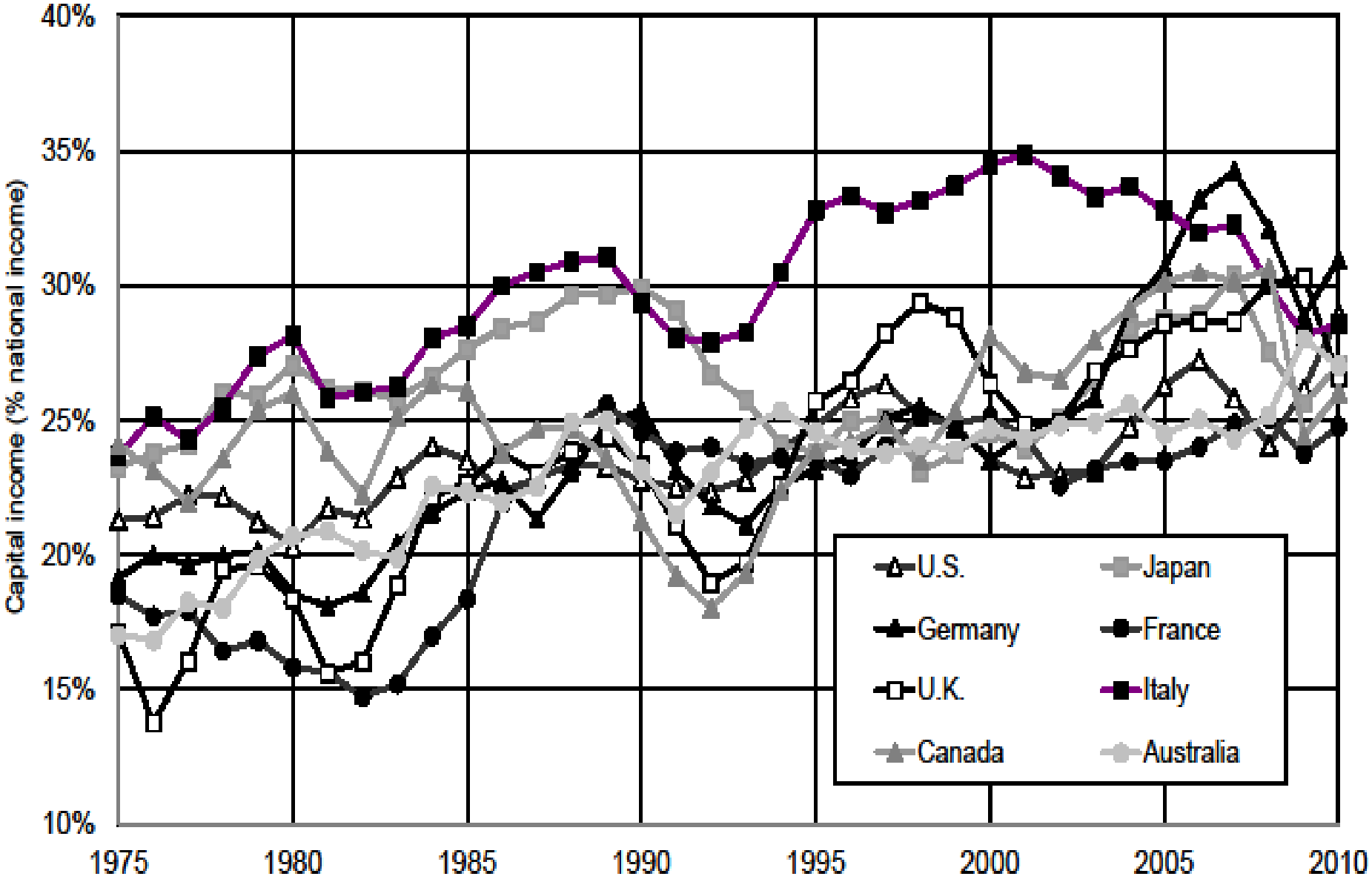
- **Will the rise of capital income-ratio β also lead to a rise of the capital share α in national income?**
- If the capital stock equals **β=6** years of income and the average return to capital is equal **r=5%** per year, then the share of capital income (rent, dividends, interest, profits, etc.) in national income equals **α = r x β = 30%**

- Technically, whether a rise in β also leads to a rise in capital share α = r β depends on the elasticity of substitution σ between capital K and labor L in the production function Y=F(K,L)
- Intuition: σ measures the extent to which workers can be replaced by machines (e.g. Amazon's drones)

- Standard assumption: Cobb-Douglas production function (σ=1) = as the stock β↑, the return r↓ exactly in the same proportions, so that α = r x β remains unchanged, like by magic = a stable world where the capital-labor split is entirely set by technology

- But if σ>1, then the return to capital r↓ falls less than the volume of capital β↑, so that the product α = r x β ↑
- **Exactly what happened since the 1970s-80s: both the ratio β and the capital share α have increased**

Figure 6.5. The capital share in rich countries, 1975-2010



Capital income absorbs between 15% and 25% of national income in rich countries in 1970, and between 25% and 30% in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c

- With a large rise in β, one can get large rise in α with a production function F(K,L) that is just a little bit more substituable than in the standard Cobb-Douglas model (say if σ=1,5 instead of 1)

- Maybe it is natural to expect σ↑over the course of history: more and more diversified uses for capital;
  extreme case: pure robot-economy (σ=infinity)

- Less extreme case: there are many possible uses for capital (machines can replace cashiers, drones can replace Amazon's delivery workers, etc.), so that the capital share α↑ continuously; there's no natural corrective mechanism for this

- The rise of β and α can be a good thing (we could all devote more time to culture, education, health…, rather than to our own subsistance), assuming one can answer the following question: **who owns the robots?**

2. The future of wealth concentration

- In all European countries (UK, France, Sweden…), wealth concentration was extremely high in 18^{c}-19^{c} & until WW1:

  about 90% of aggregate wealth for top 10% wealth holders

  about 60% of aggregate wealth for top 1% wealth-holders

  = the classic patrimonial (wealth-based) society: a minority lives off its wealth, while the rest of the populaton works (Austen, Balzac)

- Today wealth concentration is still very high, but less extreme:

  about 60-70% for top 10%; about 20-30% for top 1%

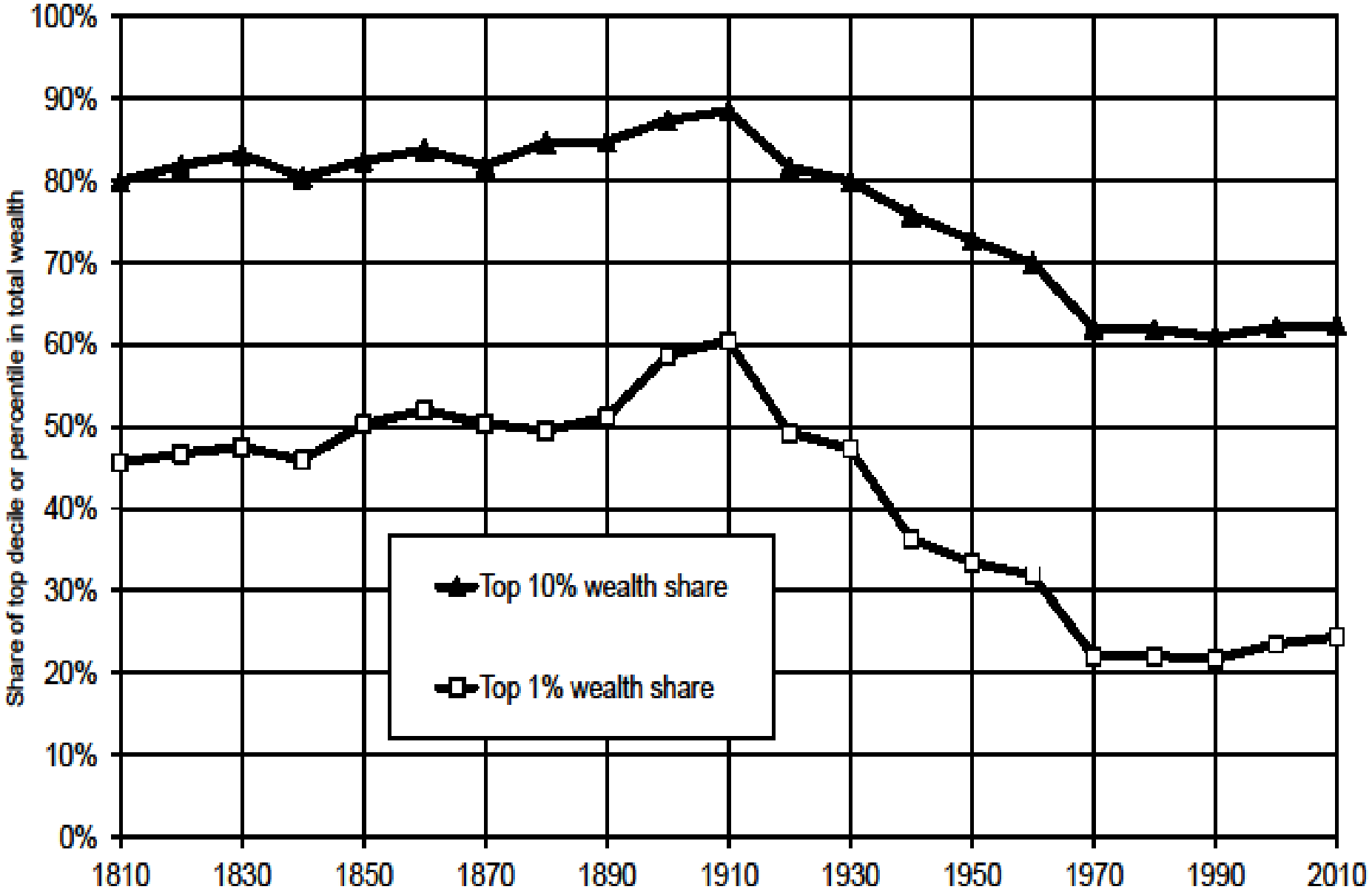
  the bottom 50% still owns almost nothing (<5%)

  but the middle 40% now owns 20-30% of aggregate wealth

  = the rise of a patrimonial middle class

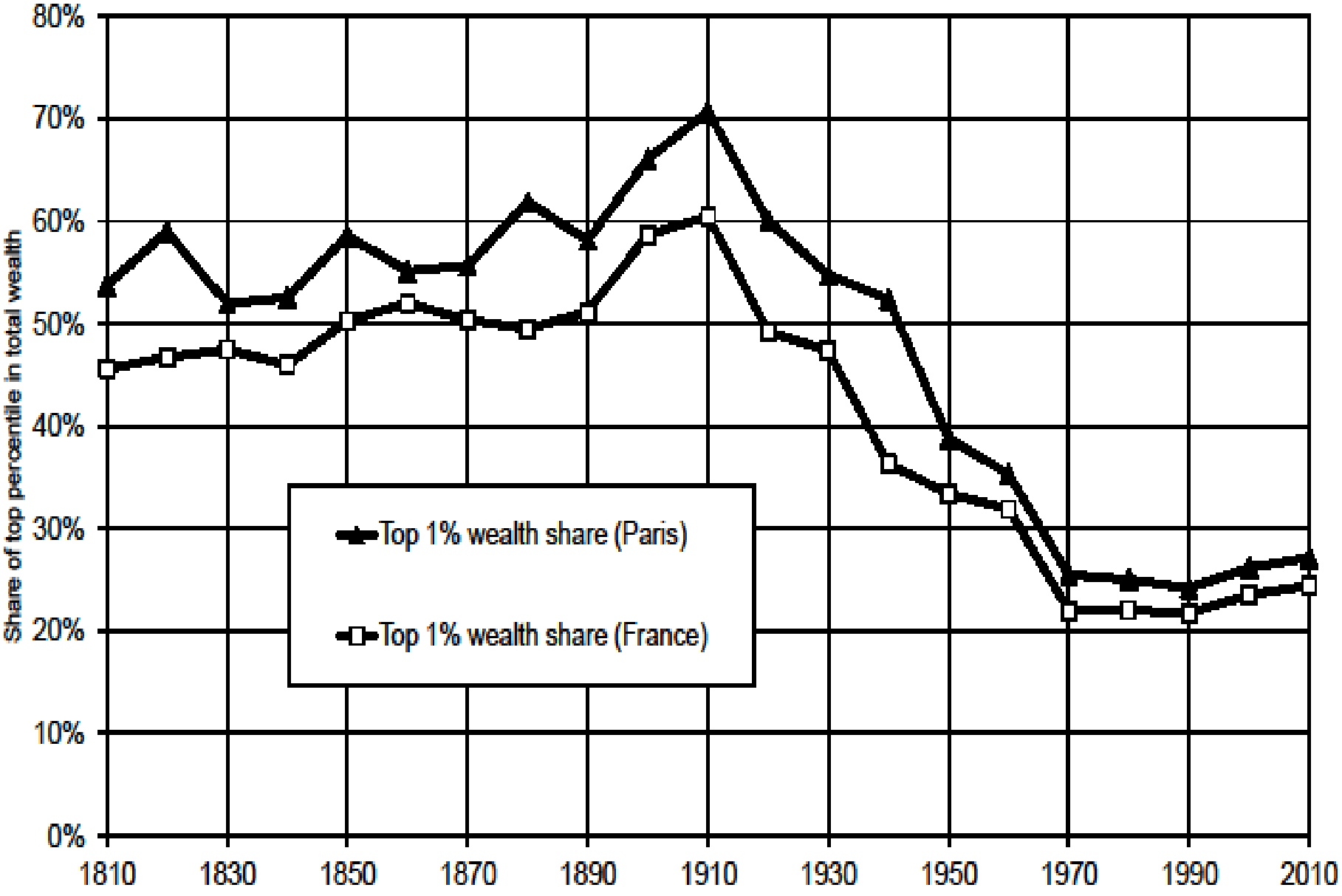
- How did it happen, and will it last? **Will the patrimonial middle class expend, or will it shrink?**

Figure 10.1. Wealth inequality in France, 1810-2010



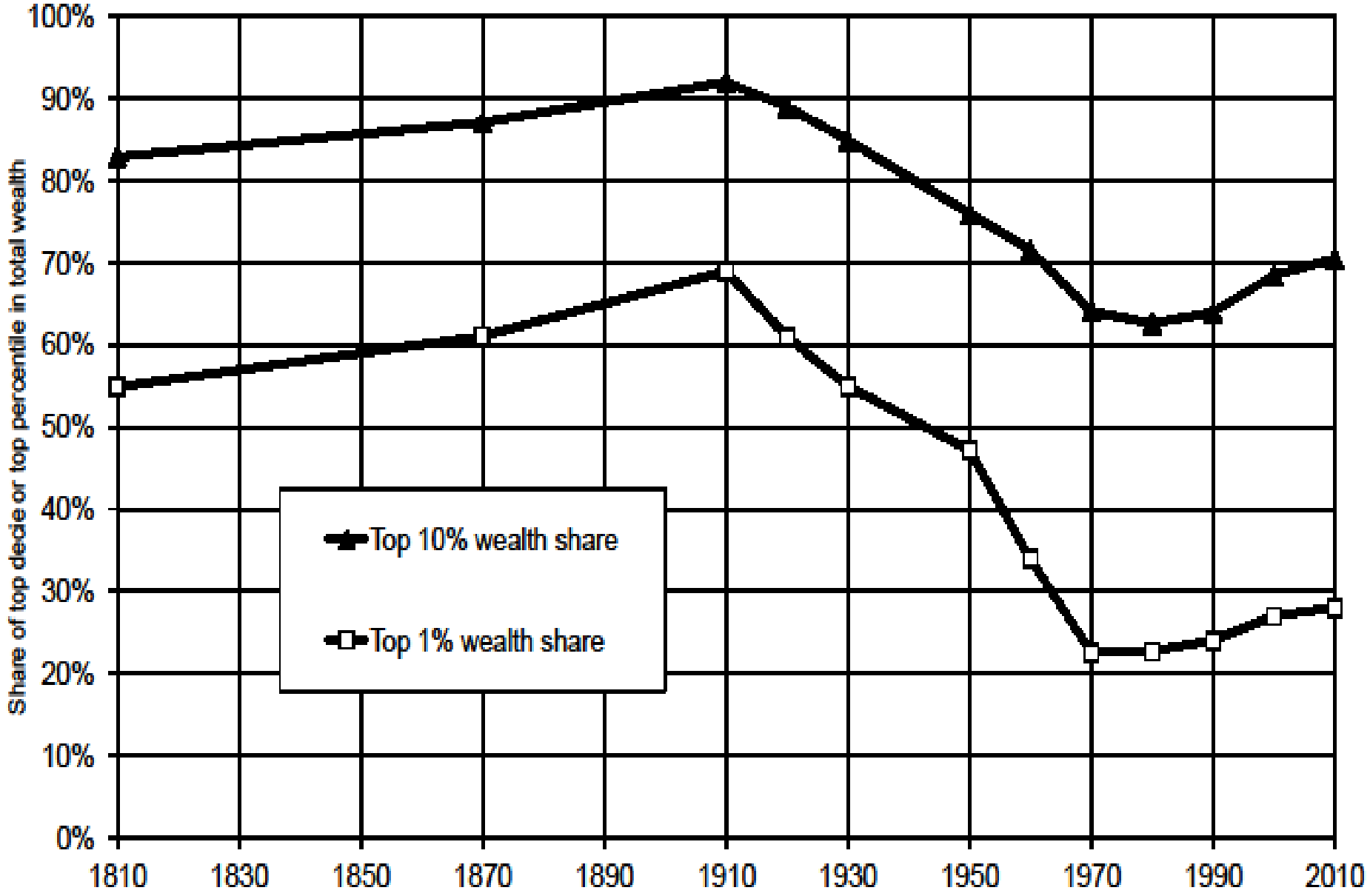
The top decile (the top 10% highest wealth holders) owns 80-90% of total wealth in 1810-1910, and 60-65% today.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 10.2. Wealth inequality : Paris vs. France, 1810-2010



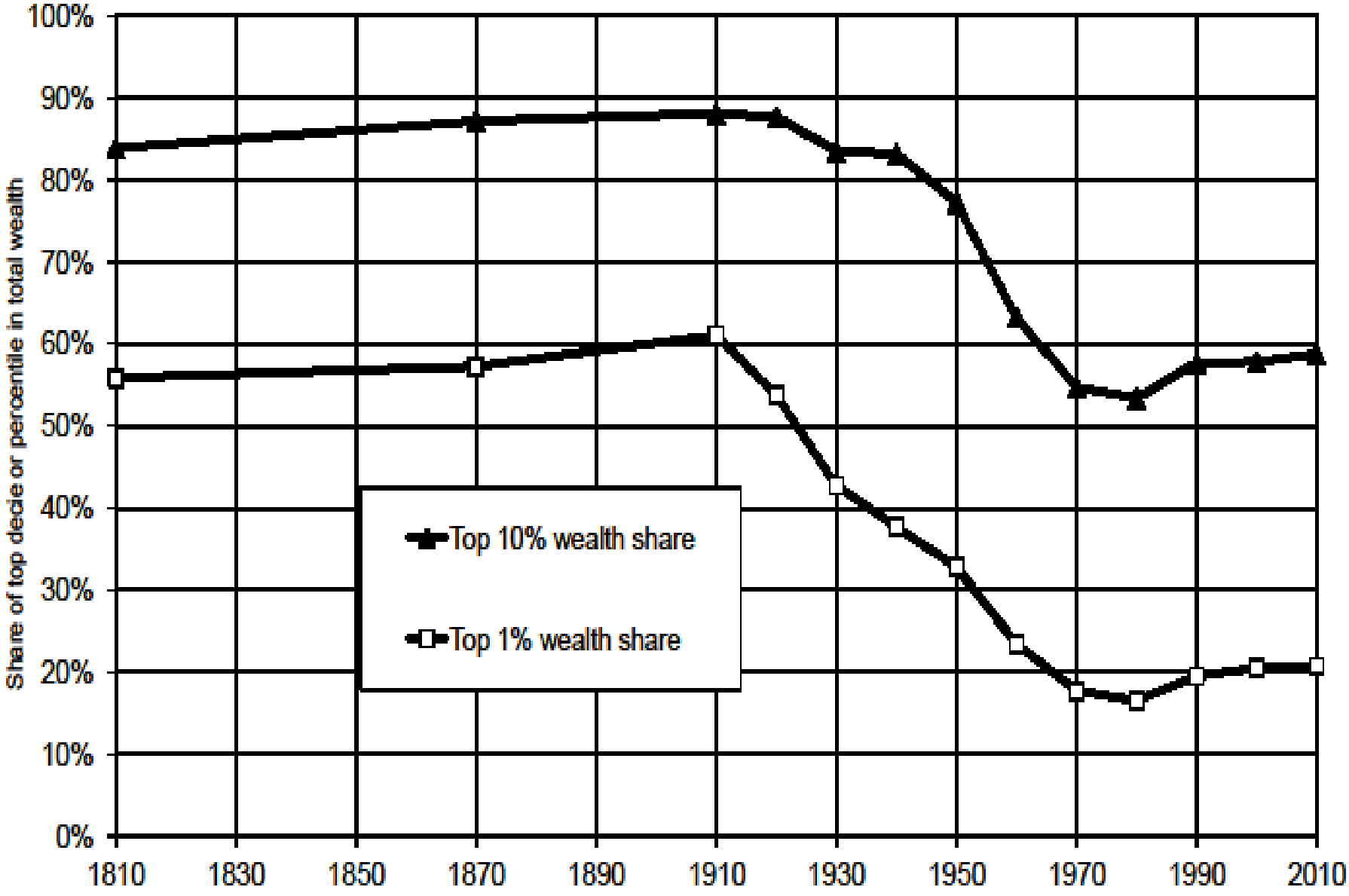
The top percentile (the top 1% wealth holders) owns 70% of aggregate wealth in Paris at the eve of World War I.
Sources and series: see piketty.pse.ens.fr/capital21c

Figure 10.3. Wealth inequality in the United Kingom, 1810-2010



The top decile owns 80-90% of total wealth in 1810-1910, and 70% today.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 10.4. Wealth inequality in Sweden, 1810-2010

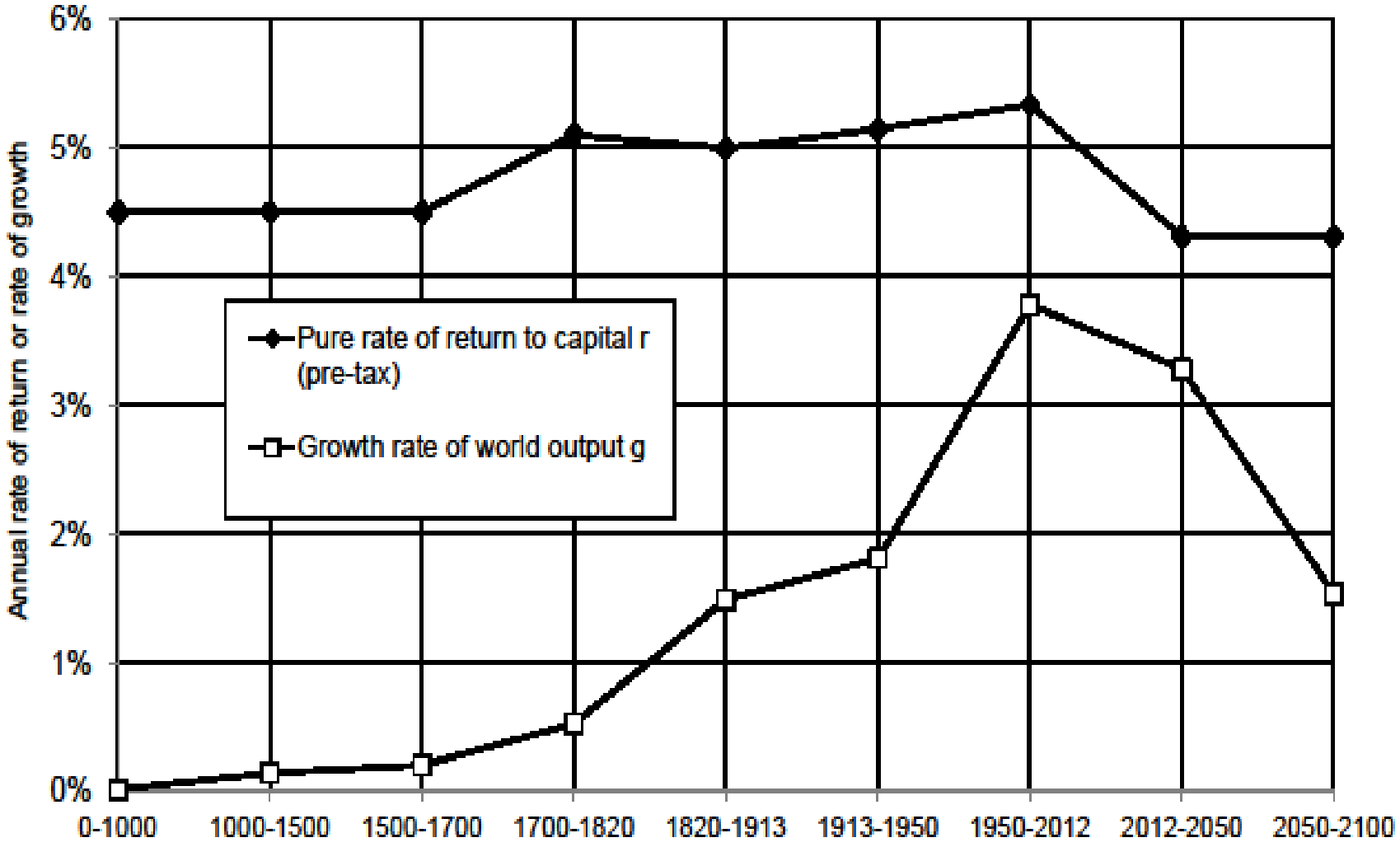


The top 10% holds 80-90% of total wealth in 1810-1910, and 55-60% today.
Sources and series: see piketty.pse.ens.fr/capital21c.

- Key finding: there was no decline in wealth concentration prior to World War shocks; was it just due to shocks?
- Q.: Apart from shocks, what forces determine the long-run level of wealth concentration?
- A.: In any dynamic, multiplicative wealth accumulation model with random individual shocks (tastes, demographic,returns, wages,..), the steady-state level of wealth concentration is an increasing function of **r - g**

  (with r = net-of-tax rate of return and g = growth rate)
- With growth slowdown and rising tax competition to attract capital, r - g might well rise in the 21^c → back to 19^c levels
- Future values of r also depend on technology ($\sigma>1$?)
- Under plausible assumptions, wealth concentration might reach or surpass 19^c record levels: see global wealth rankings

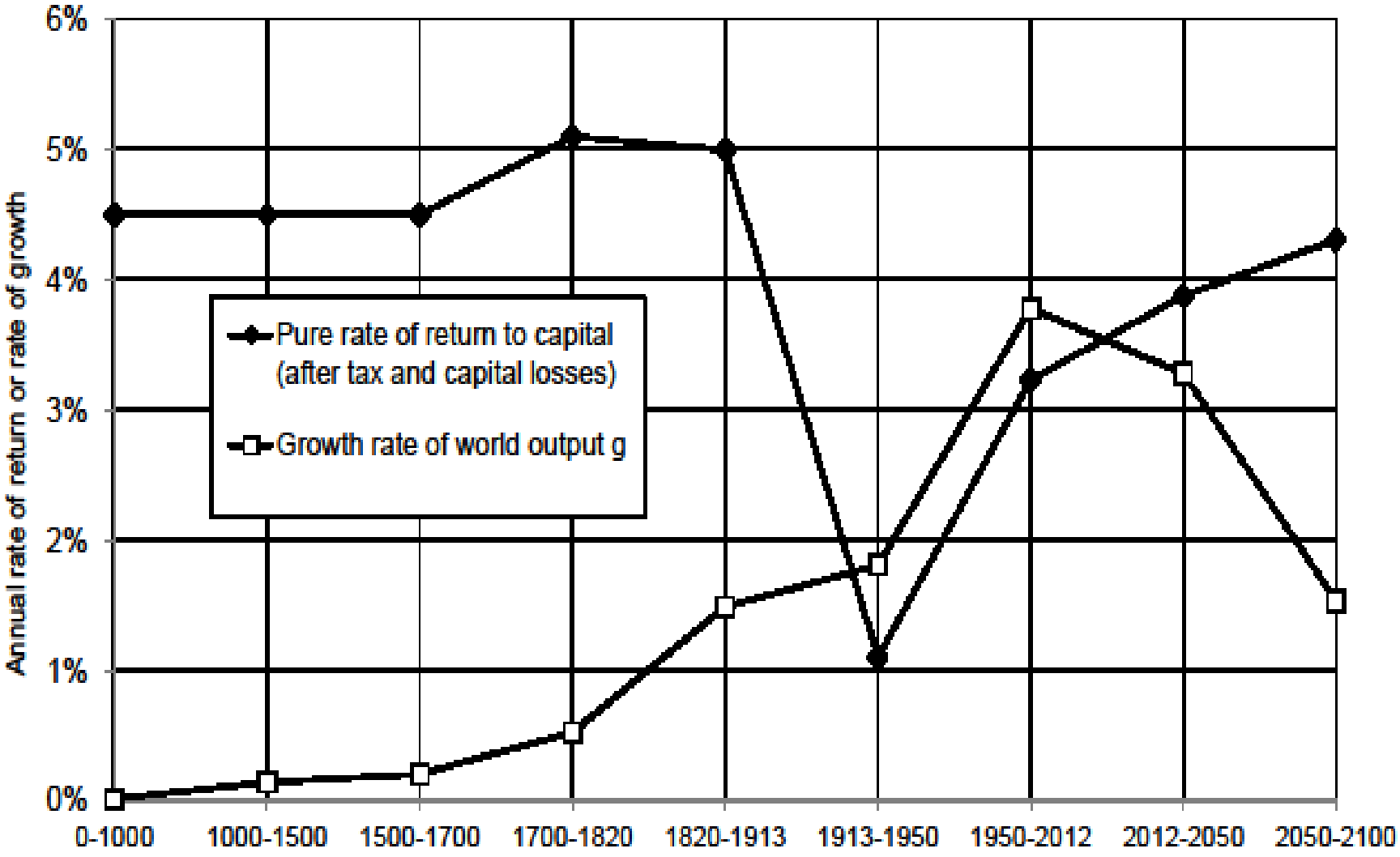
Figure 10.9. Rate of return vs. growth rate at the world level, from Antiquity until 2100



The rate of return to capital (pre-tax) has always been higher than the world growth rate, but the gap was reduced during the 20th century, and might widen again in the 21st century.

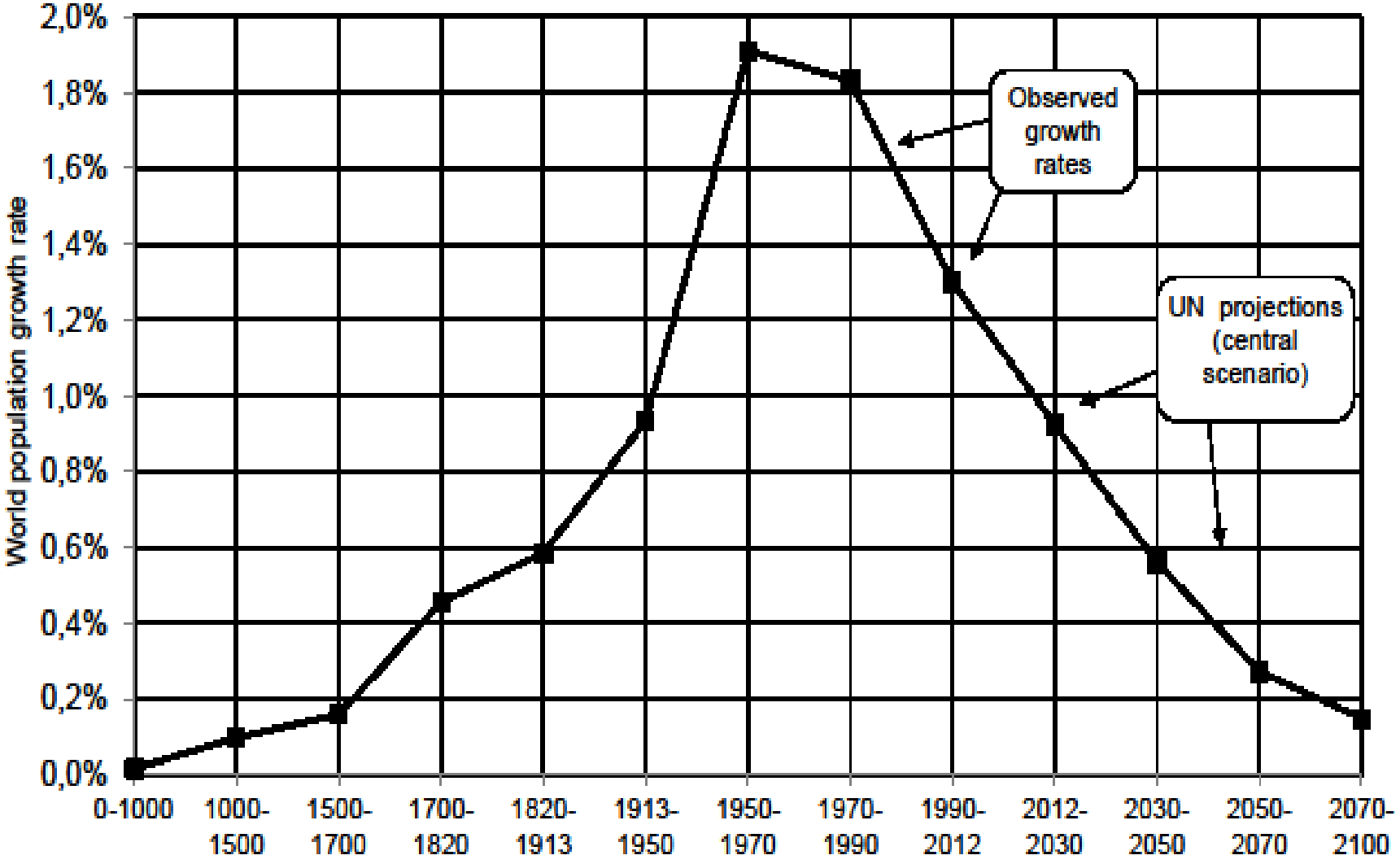
Sources and series: see piketty.pse.ens.fr/capital21c

Figure 10.10. After tax rate of return vs. growth rate at the world level, from Antiquity until 2100



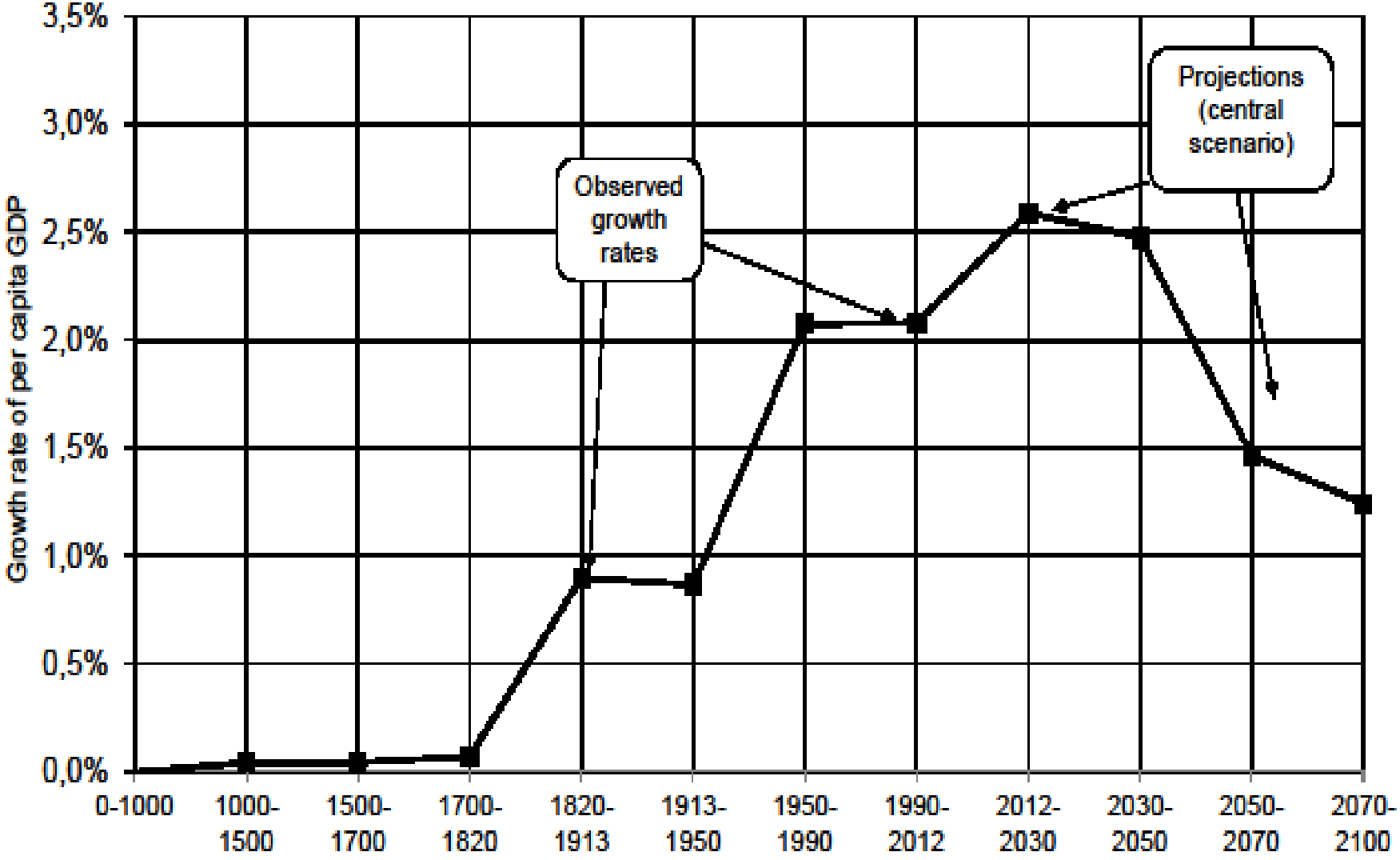
The rate of return to capital (after tax and capital losses) fell below the growth rate during the 20th century, and may again surpass it in the 21st century. Sources and series : see piketty.pse.ens.fr/capital21c

Figure 2.2. The growth rate of world population from Antiquity to 2100



The growth rate of world population was above 1% per year from 1950 to 2012 and should return toward 0% by the end of the 21st century. Sources and series: see piketty.pse.ens.fr/capital21c.

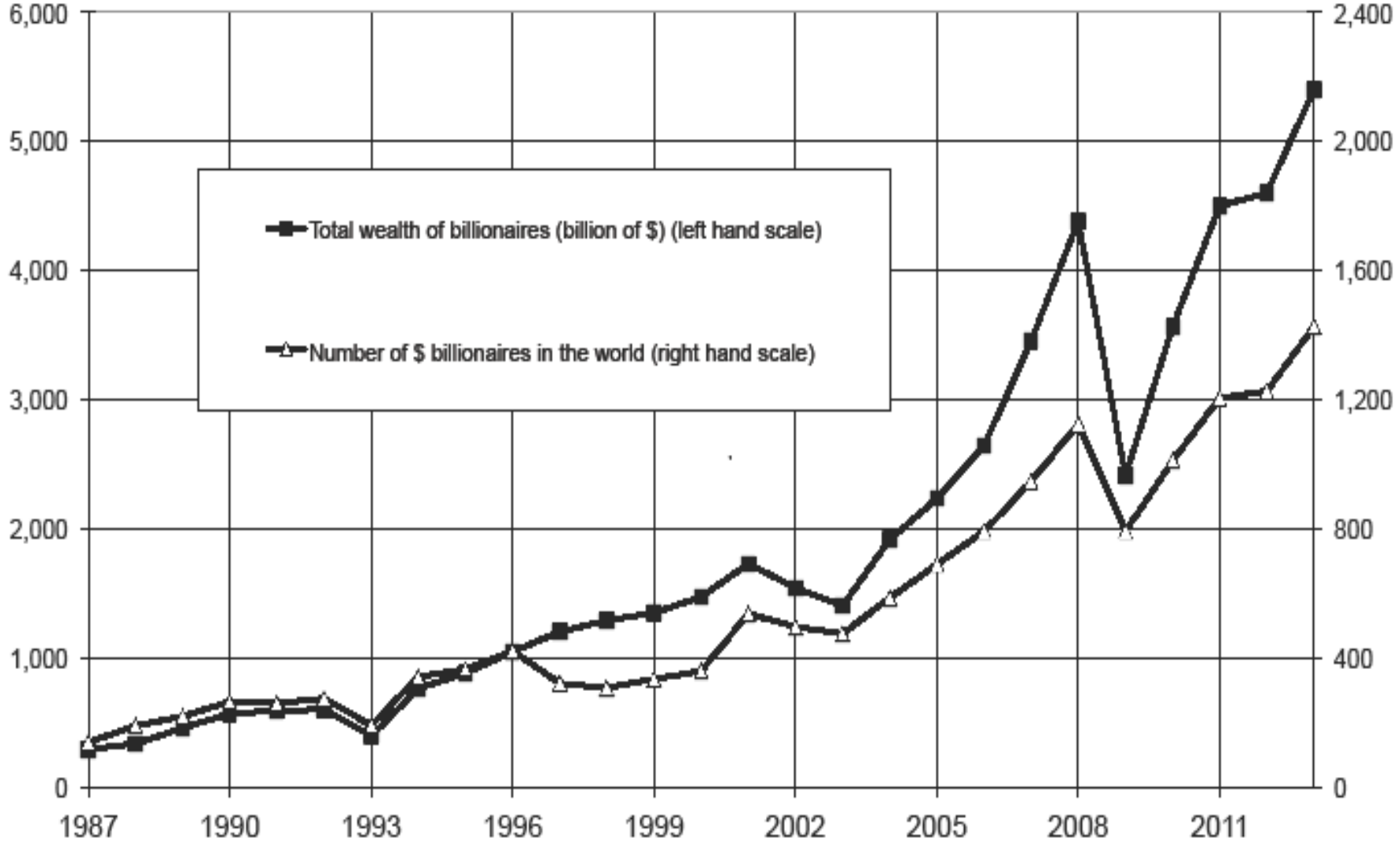
Figure 2.4. The growth rate of world per capita output since Antiquity until 2100



The growth rate of per capita output surpassed 2% from 1950 to 2012. If the convergence process goes on, it will surpass 2,5% from 2012 to 2050, and then will drop below 1,5%.

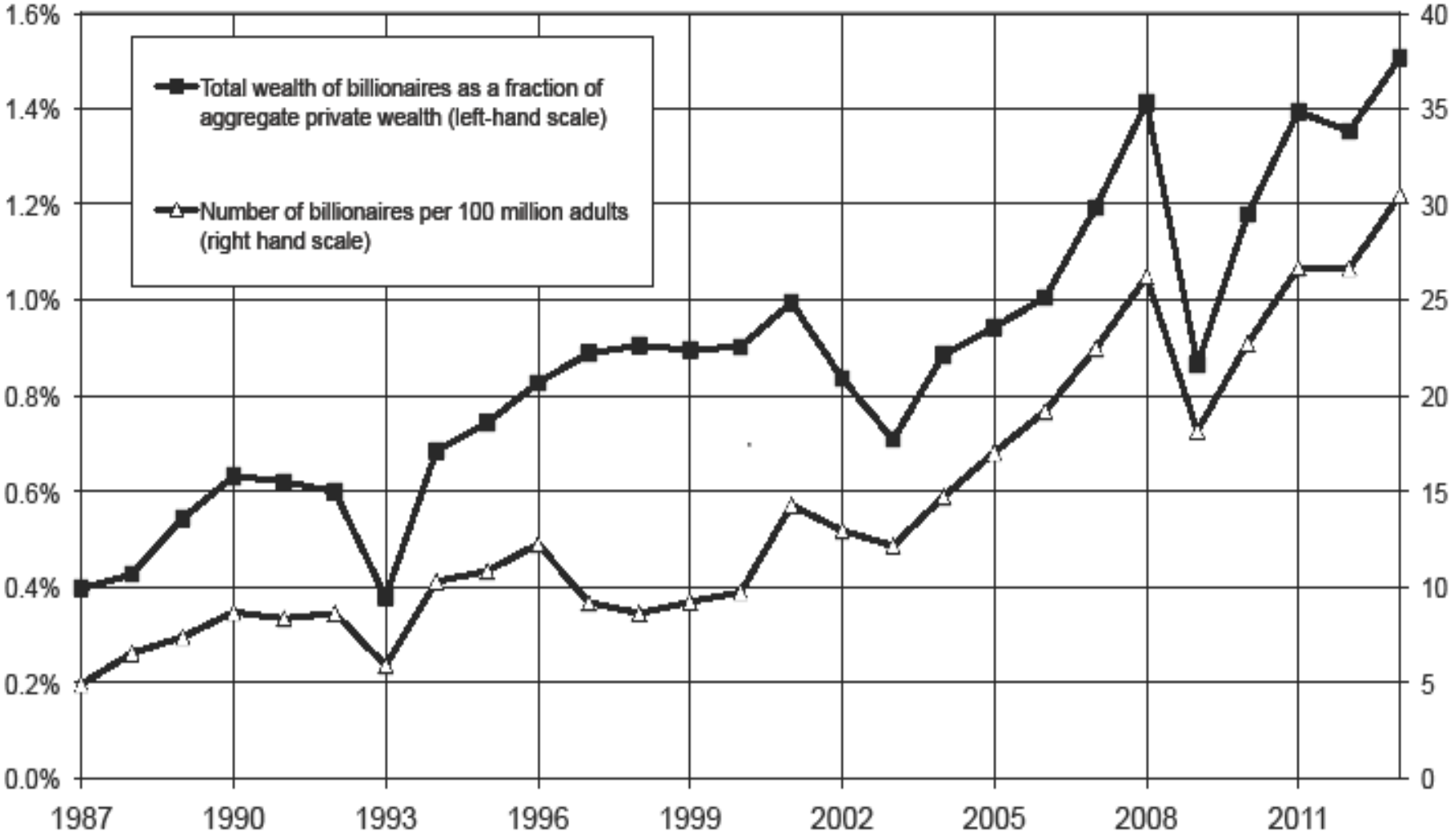
Sources and series : see piketty.pse.ens.fr/capital21c.

Figure 12.1. The world billionaires according to Forbes, 1987-2013



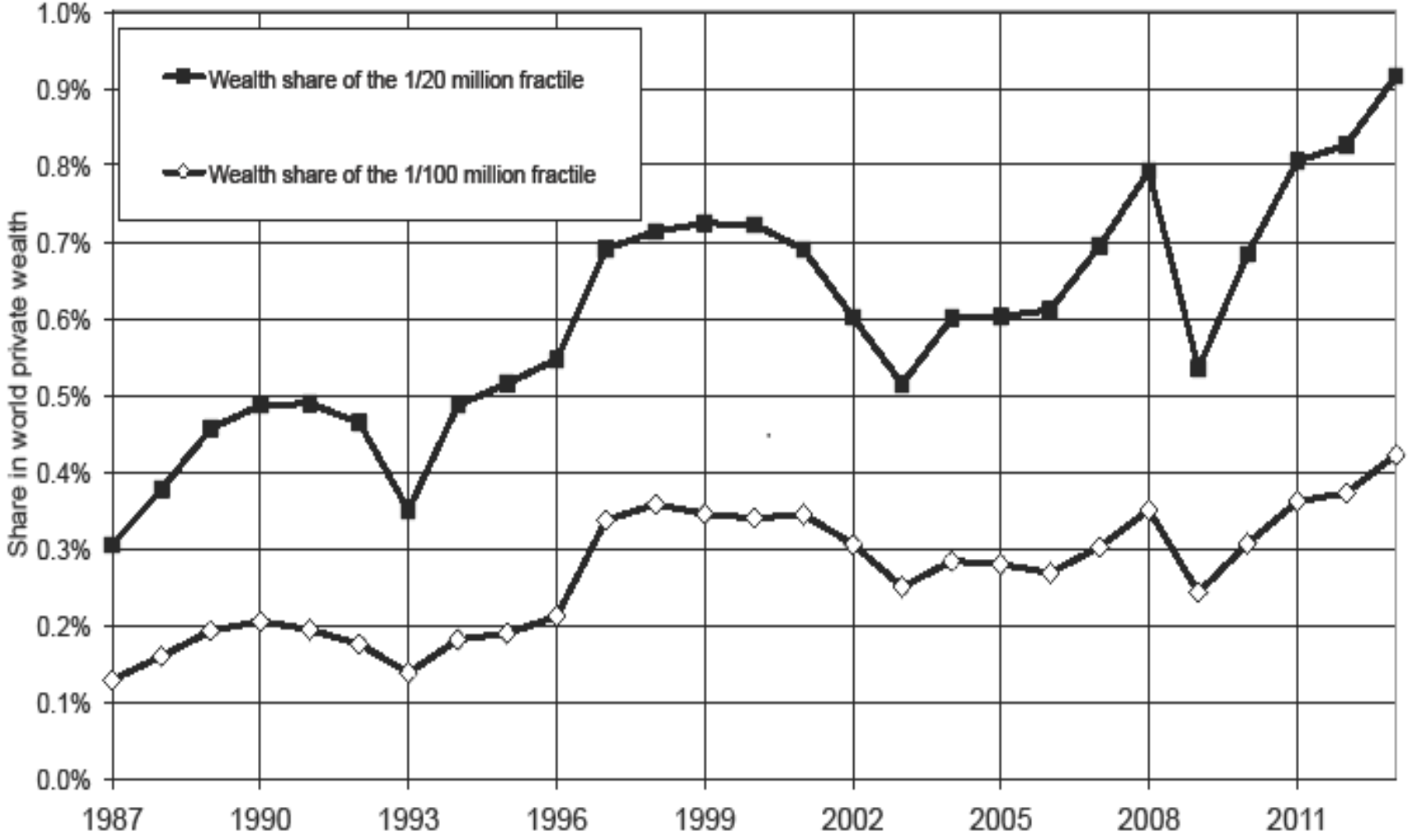
Between 1987 and 2013, the number of $ billionaires rose according to Forbes from 140 to 1400, and their total wealth rose from 300 to 5 400 billion dollars. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 12.2. Billionaires as a fraction of global population and wealth 1987-2013



Between 1987 and 2013, the number of billionaires per 100 million adults rose from 5 to 30, and their share in aggregate private wealth rose from 0.4% to 1.5%. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 12.3. The share of top wealth fractiles in world wealth, 1987-2013



Between 1987 and 2013, the share of the top 1/20 million fractile rose from 0.3% to 0.9% of world wealth, and the share of the top 1/100 million fractile rose from 0.1% to 0.4%. Sources and series: see piketty.pse.ens.fr/capital21c.

Table 12.1. The growth rate of top global wealth, 1987-2013

Average real growth rate per year *(after deduction of inflation)*	1987-2013
The top 1/(100 million) highest wealth holders (about 30 adults out of 3 billions in 1980s, and 45 adults out of 4,5 billions in 2010s)	6,8%
The top 1/(20 million) highest wealth holders (about 150 adults out of 3 billions in 1980s, and 225 adults out of 4,5 billions in 2010s)	6,4%
Average world wealth per adult	2,1%
Average world income per adult	1,4%
World adult population	1,9%
World GDP	3,3%

Between 1987 and 2013, the highest global wealth fractiles have grown at 6%-7% per year, vs. 2,1% for average world wealth and 1,4% for average world income. All growth rates are net of inflation (2,3% per year between 1987 and 2013). Sources: see piketty.pse.ens.fr/capital21c.

Table 12.2. The return on the capital endowments of U.S. universities, 1980-2010

Average real annual rate of return *(after deduction of inflation and all administrative costs and financial fees)*	Période 1980-2010
All universities (850)	8.2%
incl.: Harvard-Yale-Princeton	10.2%
incl.: Endowments higher than 1 billion $ (60)	8.8%
incl. Endowments between 500 millions and 1 billion $ (66)	7.8%
incl. Endowments between 100 and 500 million $ (226)	7.1%
dont: Endowments less than 100 million $ (498)	6.2%

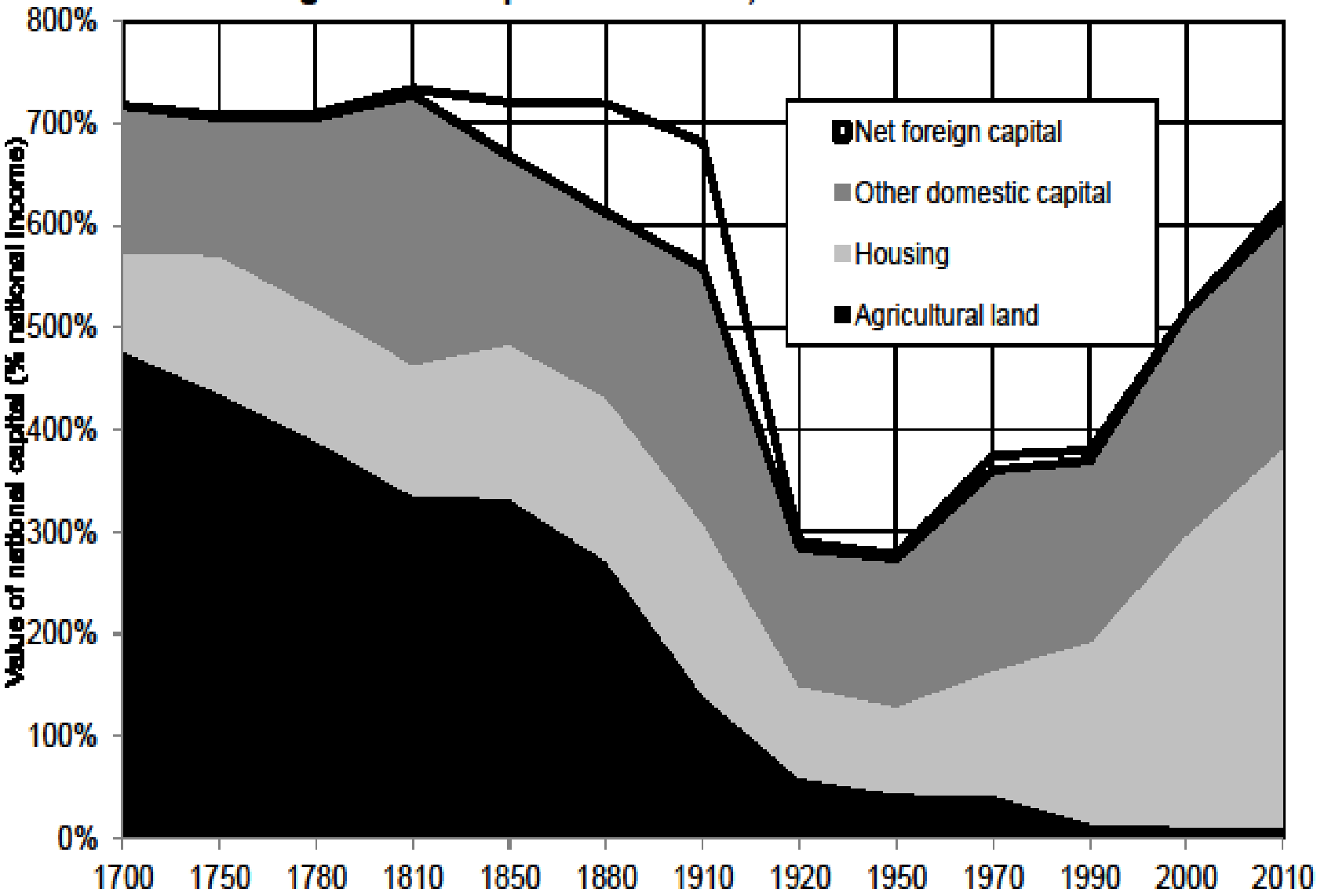
Between 1980 and 2010, U.S. universities earned an average real return of 8.2% on their capital endowments, and all the more so for higher endowments. All returns reported here are net of inflation (2.4% per year between 1980 and 2010) and of all administrative costs and financial fees.

Sources: see piketty.pse.ens.fr/capital21c.

3. Inequality in America

- Inequality in America = a different structure as in Europe: more egalitarian in some ways, more inegalitarian in some other dimensions
- The New World in the 19th century: the land of opportunity (capital accumulated in the past mattered much less than in Europe; perpetual demographic growth as a way to reduce the level of inherited wealth and wealth concentration)… and also the land of slavery
- Northern US were in many ways more egalitarian than Old Europe; but Southern US were more inegalitarian
- We still have the same ambiguous relationship of America with inequality today: in some ways more merit-based; in other ways more violent (prisons)

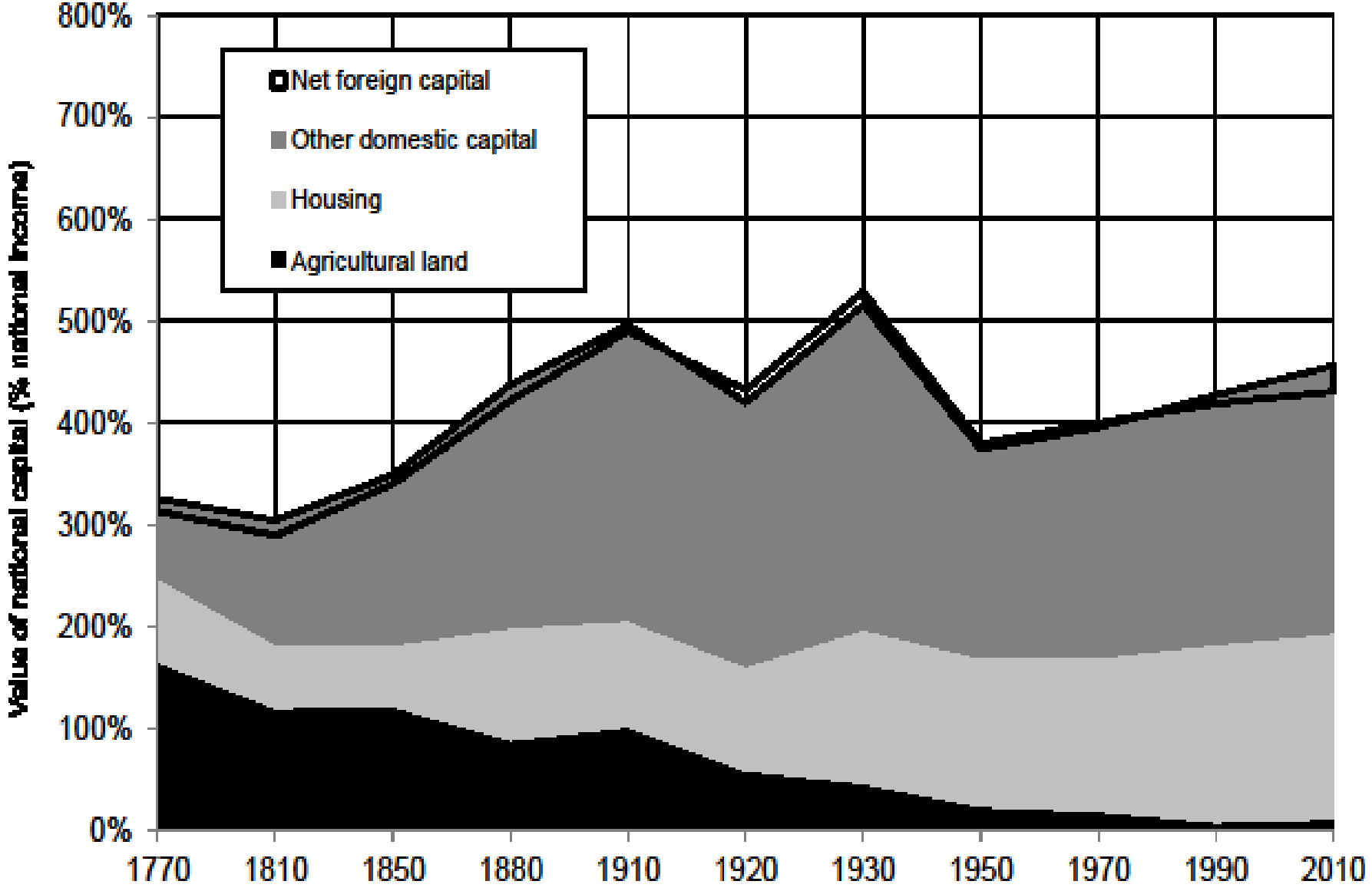
Figure 3.2. Capital in France, 1700-2010



National capital is worth almost 7 years of national income in France in 1910 (including 1 invested abroad).

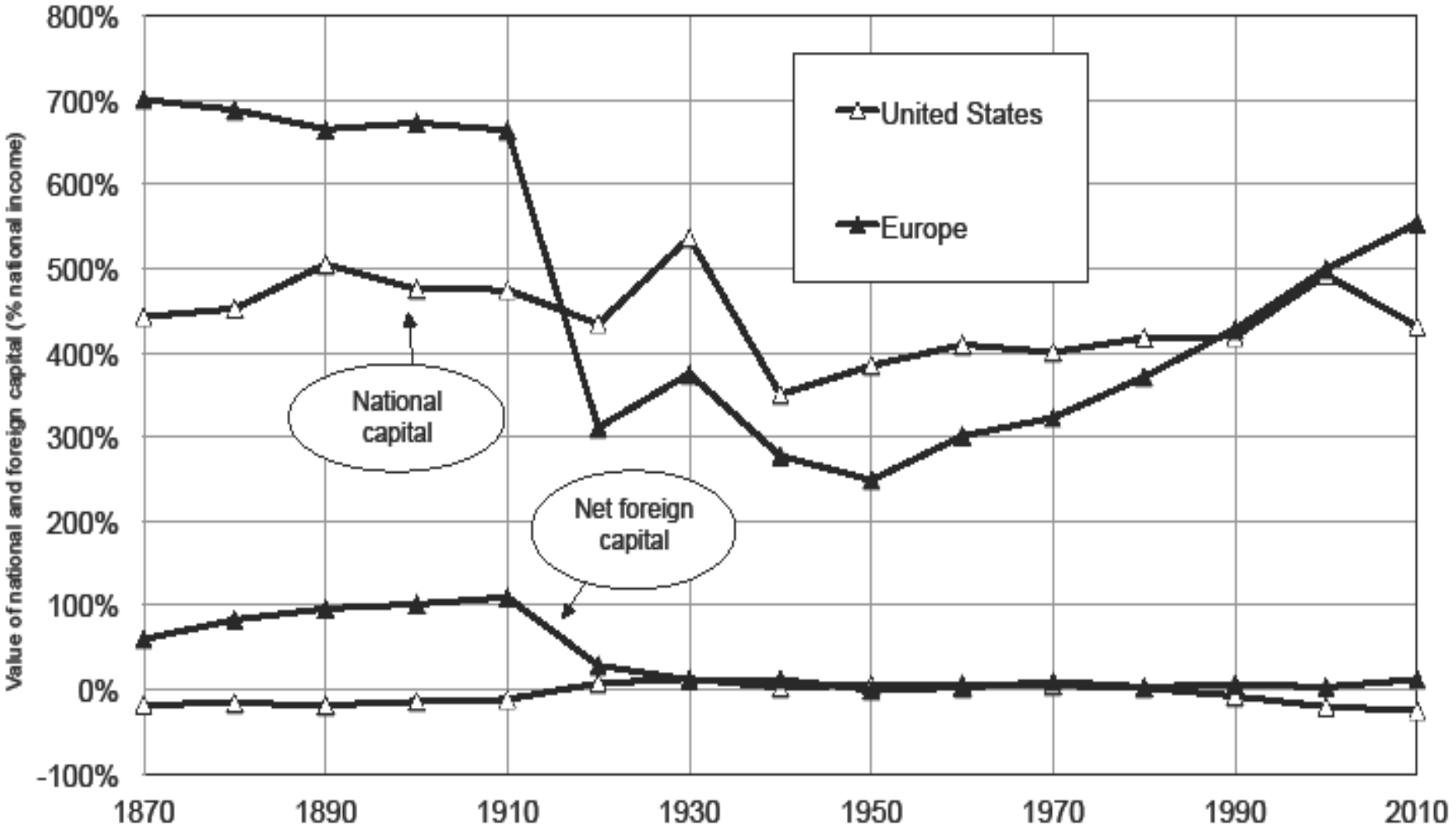
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 4.6. Capital in the United States, 1770-2010



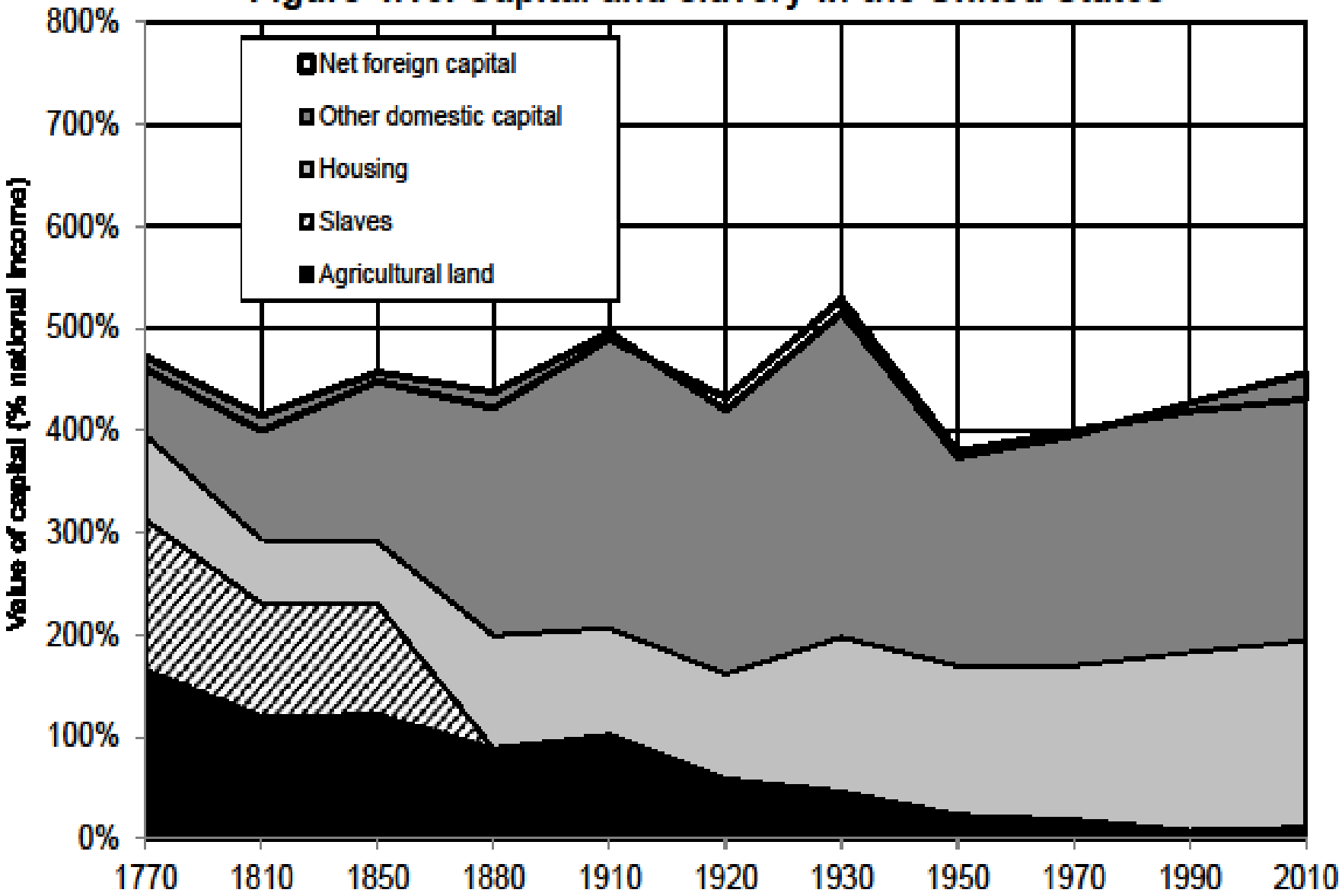
National capital is worth 3 years of national income in the United States in 1770 (incl. 1,5 years in agricultural land). Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 5.2. National capital in Europe and America, 1870-2010



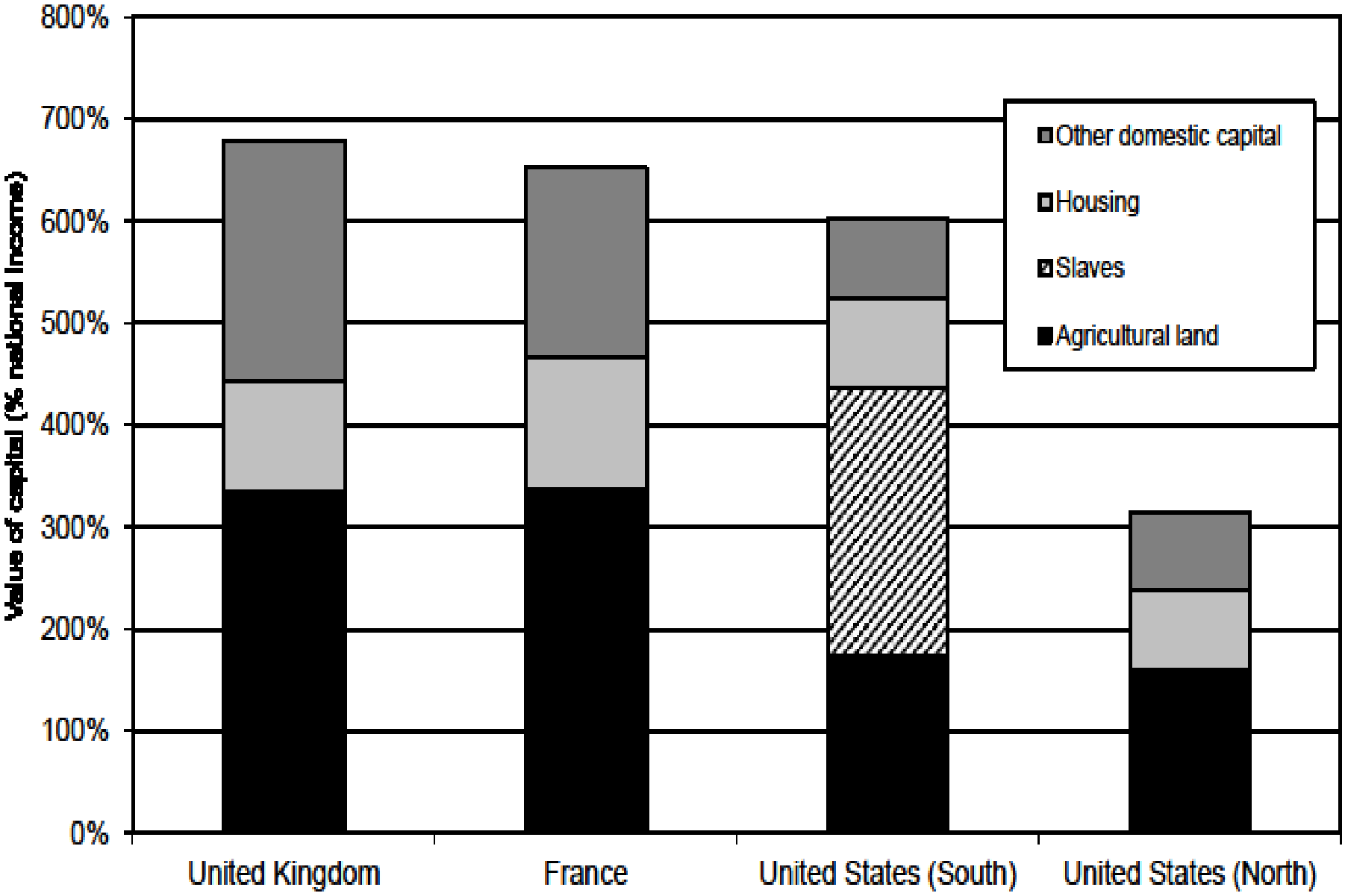
National capital (public and private) is worth 6.5 years of national income in Europe in 1910, vs. 4.5 years in America.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 4.10. Capital and slavery in the United States



The market value of slaves was about 1,5 years of U.S. national income around 1770 (as mush as land).
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 4.11. Capital around 1770-1810: Old an New World

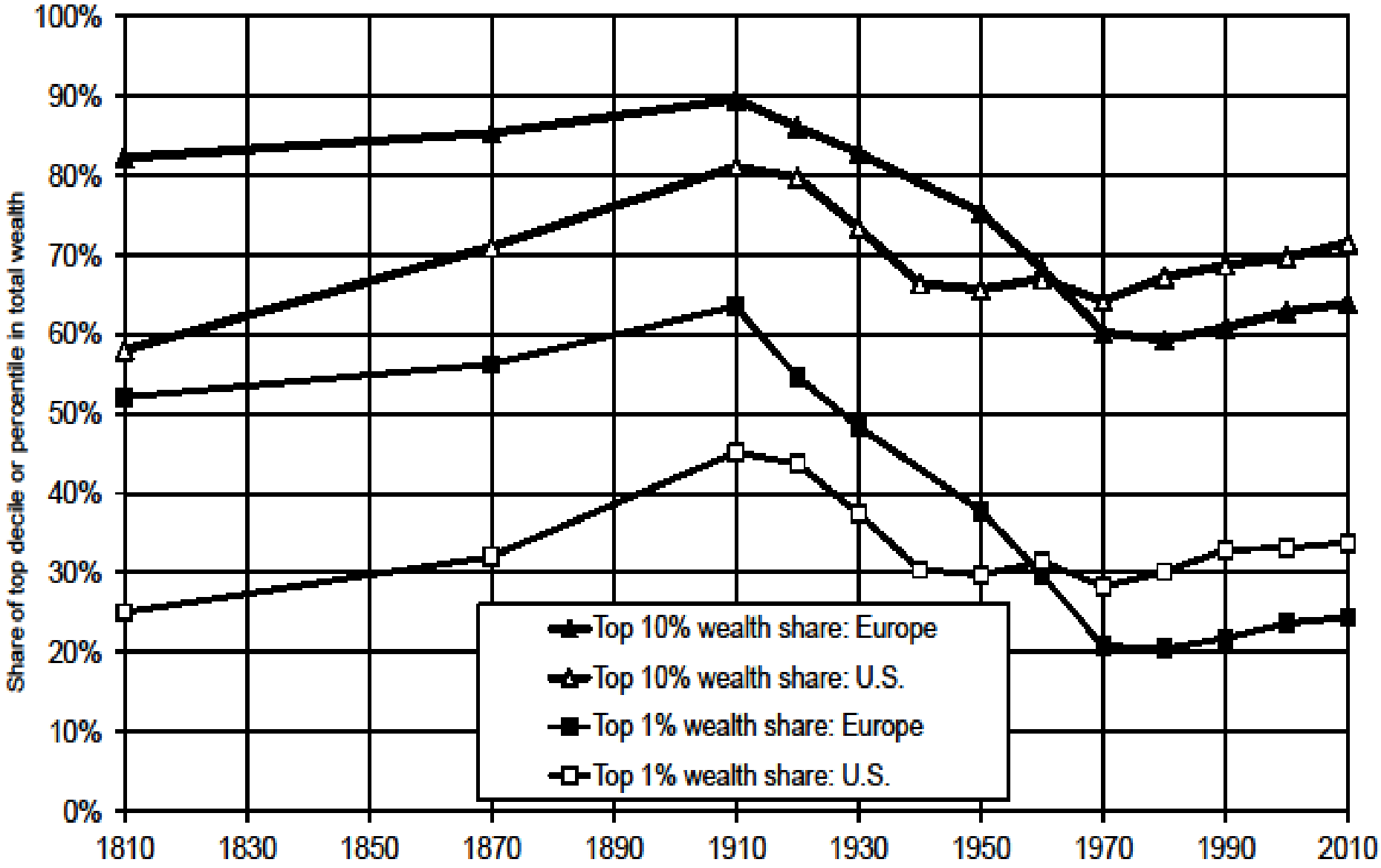


The combined value of agricultural land and slaves in Southern United States surpassed 4 years of national income around 1770-1810. Sources and series: see piketty.pse.ens.fr/capital21c.

- The US distribution of income has become more unequal than in Europe over the course of the 20th century; it is now as unequal as pre-WW1 Europe

- But the structure of inequality is different: US 2013 has less wealth inequality than Europe 1913, but higher inequality of labor income

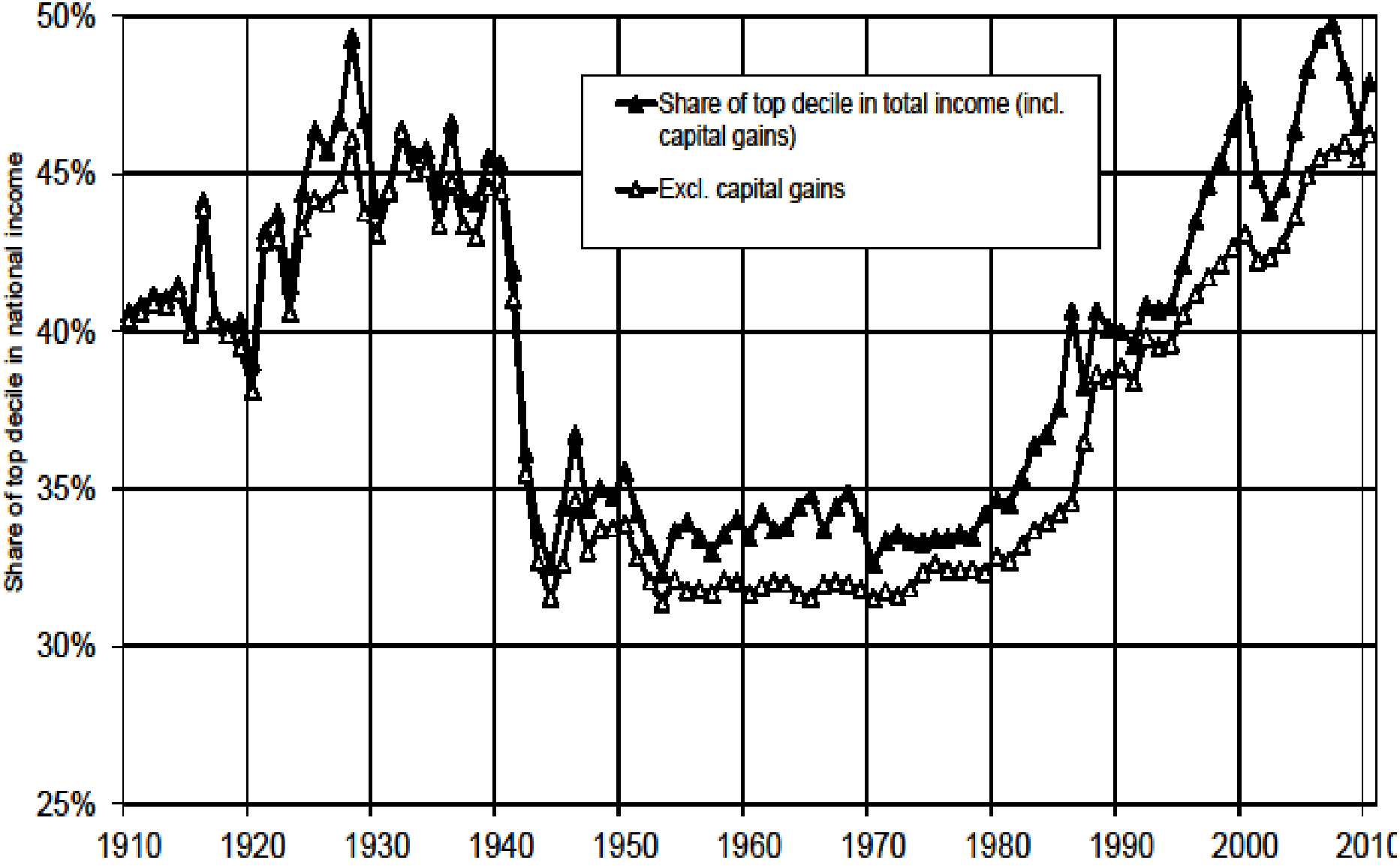
Figure 10.6. Wealth inequality: Europe and the U.S., 1810-2010



Until the mid 20th century, wealth inequality was higher in Europe than in the United States.

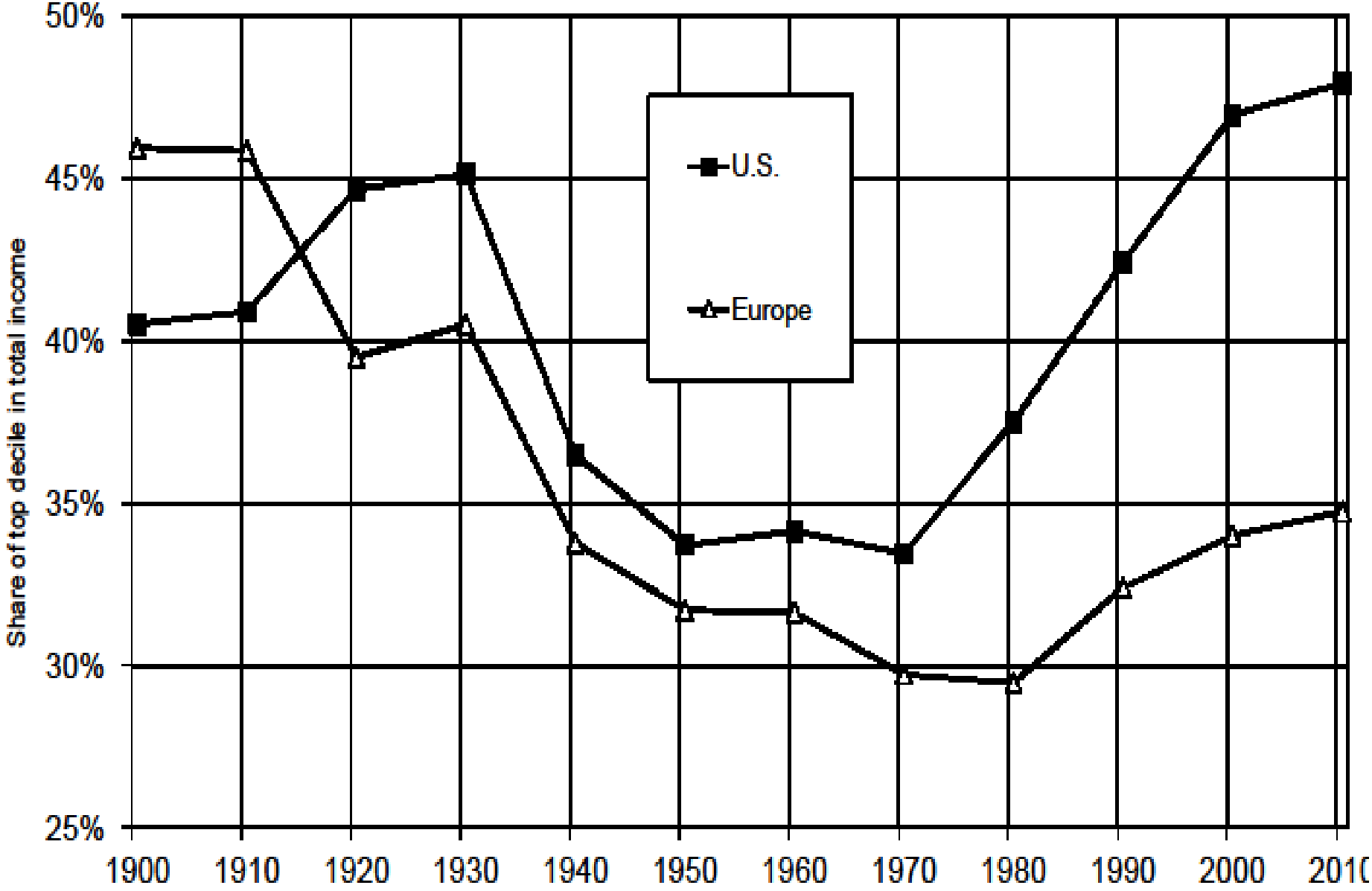
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.5. Income inequality in the United States, 1910-2010



The top decile income share rose from less than 35% of total income in the 1970s to almost 50% in the 2000s-2010s. Sources and series: see piketty.pse.ens.fr/capital21c.

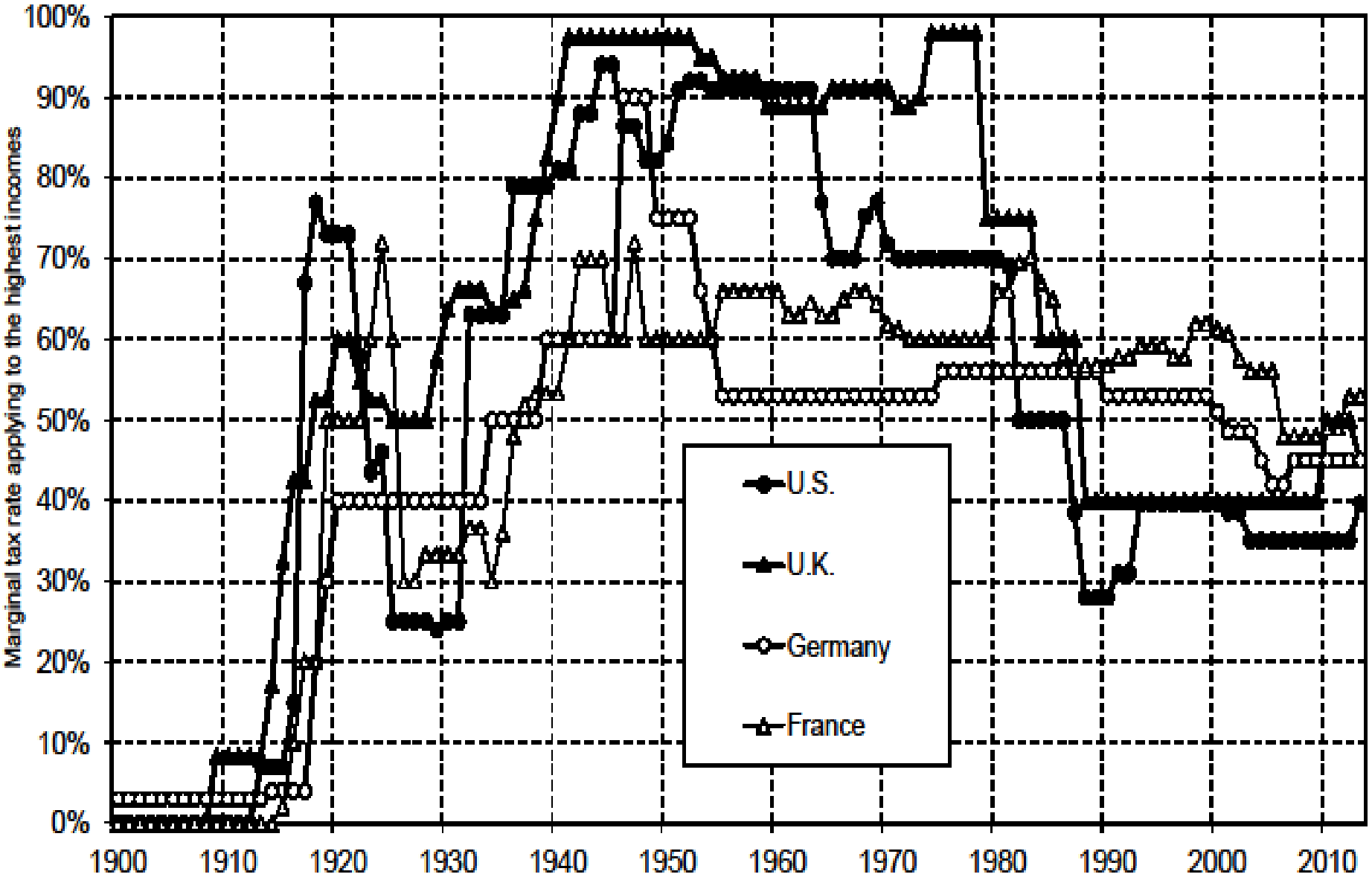
Figure 9.8. Income inequality: Europe vs. the United States, 1900-2010



The top decile income share was higher in Europe than in the U.S. in 1900-1910; it is a lot higher in the U.S. in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

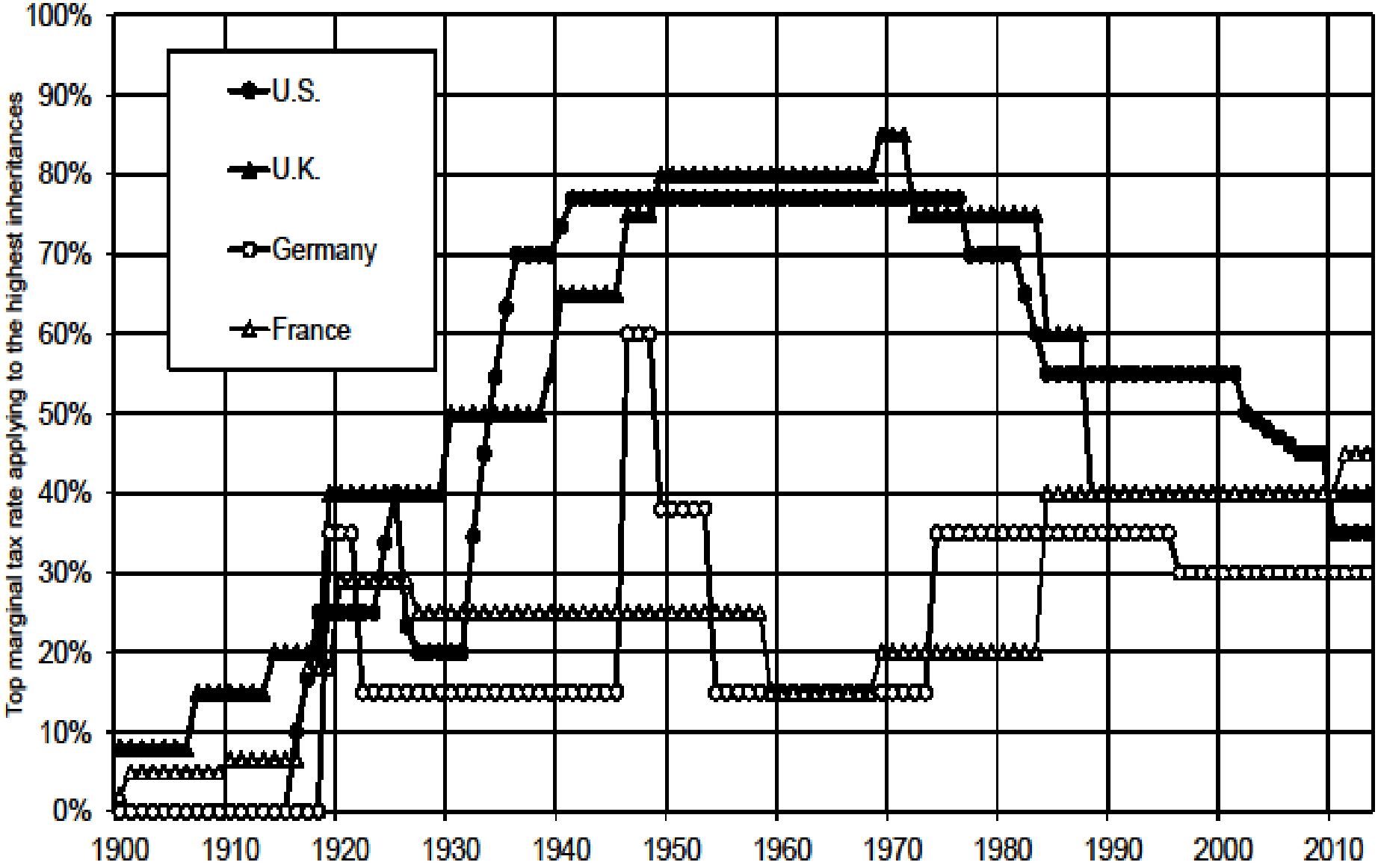
- Higher inequality of labor income in the US could reflect higher inequality in education investment; but it also reflects a huge rise of top executive compensation that it very hard to explain with education and productivity reasonning alone
- In the US, this is sometime described as more merit-based: the rise of top labor incomes makes it possible to become rich with no inheritance (≈Napoleonic *prefets*)
- Pb = this can be the worst of all worlds for those who are neither top income earners nor top successors: they are poor, and they are depicted as dump & undeserving (at least, nobody was trying to depict Ancien Regime inequality as fair)
- It is unclear whether rise of top incomes has a lot to do with merit or productivity: sharp decline in top tax rates & rise of CEO bargaining power are more convincing explanations; chaotic US history of social norms regarding inequality

Figure 14.1. Top income tax rates, 1900-2013



The top marginal tax rate of the income tax (applying to the highest incomes) in the U.S. dropped from 70% in 1980 to 28% in 1988. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 14.2. Top inheritance tax rates, 1900-2013



The top marginal tax rate of the inheritance tax (applying to the highest inheritances) in the U.S. dropped from 70% in 1980 to 35% in 2013. Sources and series: see piketty.pse.ens.fr/capital21c.

Conclusions

- **The history of income and wealth inequality is always political, chaotic and unpredictable; it involves national identities and sharp reversals; nobody can predict the reversals of the future**
- Marx: with $g=0$, $\beta \uparrow \infty$, $r \to 0$: revolution, war
- My conclusions are less apocalyptic: with $g>0$, at least we have a steady-state $\beta=s/g$
- But with $g>0$ & small, this steady-state can be rather gloomy: it can involve a very large capital-income ratio β and capital share α, as well as extreme wealth concentration due to high r-g
- This has nothing to do with a market imperfection: the more perfect the capital market, the higher r-g
- The ideal solution: progressive wealth tax at the global scale, based upon automatic exchange of bank information
- Other solutions involve authoritarian political & capital controls (China, Russia..), or perpetual population growth (US), or inflation, or some mixture of all