Economic History

(Master APE & PPD, Paris School of Economics)

Thomas Piketty

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Lecture 4: Inequality in the long run: labor income vs capital ownership

(check on line for updated versions)

Roadmap of lecture 4

- The measurement of inequality
- Basic orders of magnitudes about inequality
- Basic facts about the evolution of inequality
- Inequality of labor income in the long run
- Inequality of capital ownership in the long run
- r-g and the long-run concentration of wealth
- Inheritance vs work
- The world dynamics of the wealth distribution
- What do we know about preindustrial inequality?

The measurement of inequality

- S. Kuznets, *Shares of upper income groups in income and savings*, 1953; « Economic growth and income inequality », AER 1955 : first major historical-statistical study on income distribution… but interest in inequality started much before
- Some exemples of pre-statistical work on inequality:
- T. Malthus 1798, *Essay on principle of population*: main danger is over-population → falling wages, political chaos: inspired by A. Young, Travel Diaries in France 1787-1789 and by fear of French revolution (not much statistics, but inspiring)
- D. Ricardo 1817, *Principles of political economy and taxation*: main danger is ever-rising land prices (rising rent in France 18c)
- K. Marx 1867, *Capital*: stagnating wages & rising profits and k accumulation will lead to revolution (wage stagnation 19^{c})
- P. Leroy-Beaulieu 1881, *Essai sur la répartition des richesses et sur la tendance à une moindre inégalité des conditions* : much more optimistic view of the future… but no data

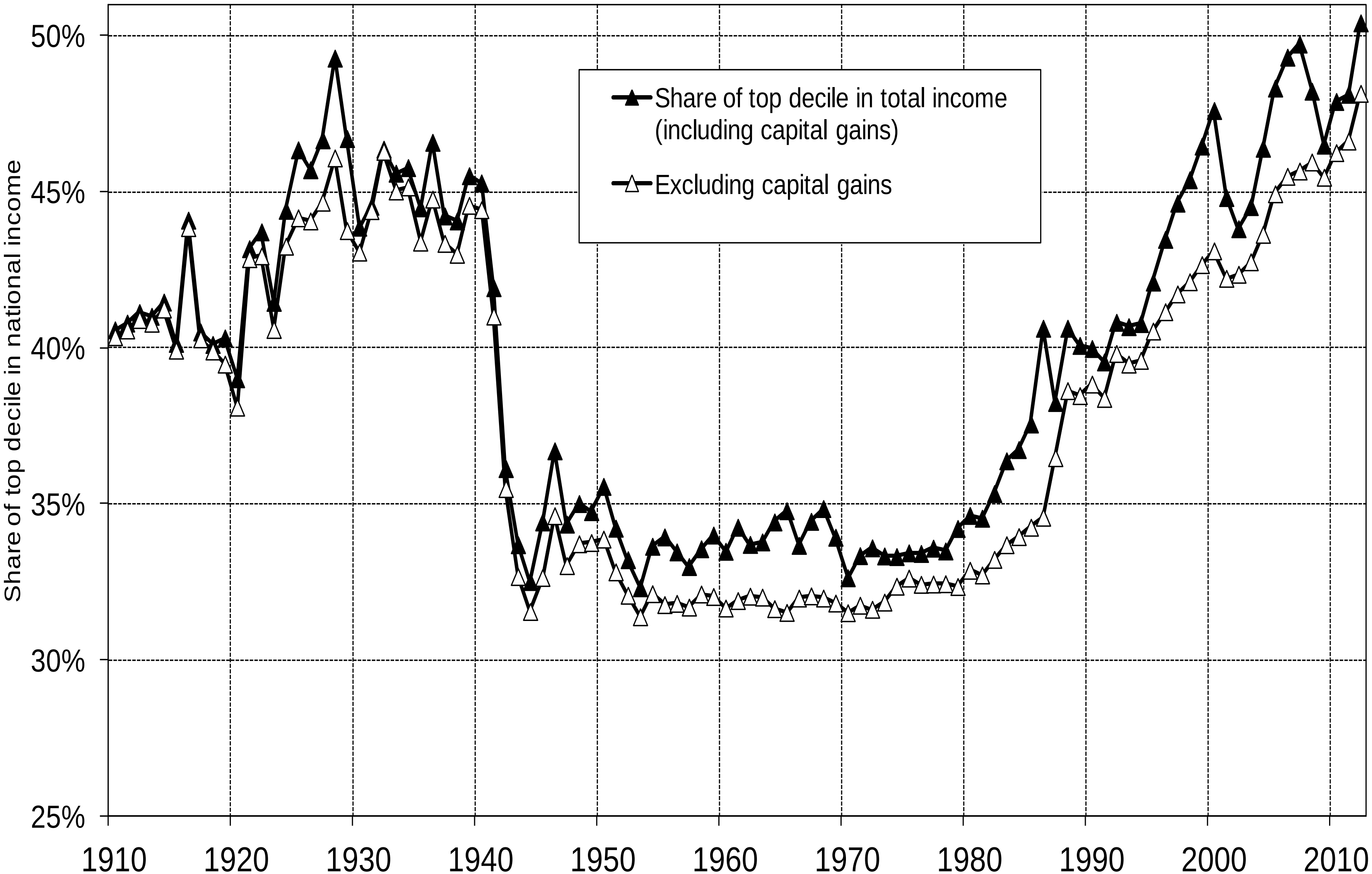
- Late 19c – early 20c: more and more historical work on national income and wealth (see lectures 1-2, e.g. Giffen 1889) and on long-run series on prices and wages = an indirect way to study capital shares and inequality
- E. Labrousse 1933, *Esquisse du mouvement des prix et des revenus en France au 18e siècle*: France 1726-1789: grain prices ↑50-60%, land rent ↑80%, wages ↑20-30% → inequality ↑, social unrest, revolution
- F. Simiand, *Le salaire, l'évolution sociale et la monnaie*, Alcan, 1932: wages↑ more than prices 1789-1815, a bit less than prices 1815-1850 (stagnation), more than prices 1860-1914
- See also Bouvier-Furet-Gillet, *Le mouvement du profit en France au 19e siècle*, 1965; Daumard, *Les fortunes françaises au 19e siècle*, 1973
- See lectures 5-6 for more references on long-run series on wages, prices and population (e.g. Allen on Engel's pause: long wage stagnation 1815-1850)

- Kuznets' 1953 key novelty: combines macro data (national accounts for US 1913-1948: total income denominator) with micro data (income tax data: top income numerator) in order to compute shares of top incomes (top 10%, top 1%, etc.)

- Atkinson-Harrison 1978: computations of top wealth shares using inheritance tax data (estate multiplier method) and income tax data (income capitalization method)

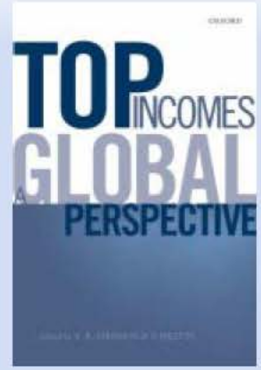
- Atkinson-Piketty, *Top Incomes Over the 20th Century*, OUP 2007; *Top Incomes: A Global Pespective*, OUP 2010 = extension of Kuznets' methods to more countries & years
- See survey articles by Alvaredo-Atkinson-Piketty-Saez:
  « Top Incomes in the Long Run of History», JEL 2011;
  "The Top 1% in International & Historical Perspective", JEP 2013 *;*
  "Inequality in the long run", Science 2014
- Updated series: see World Top Incomes Database, currently being extended into the World Wealth and Income Database (WID)

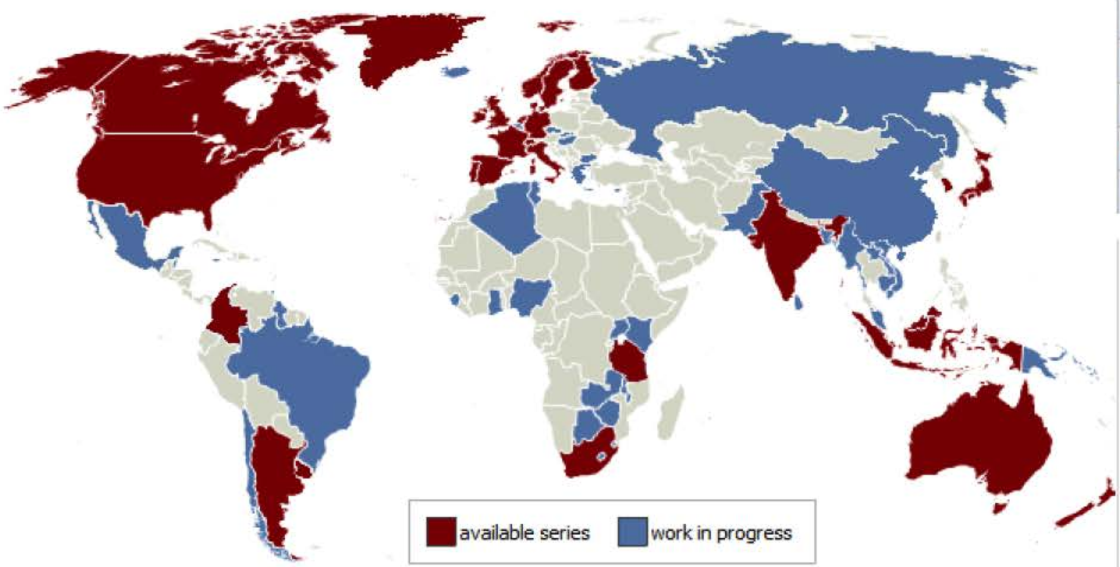
Figure I.1. Income inequality in the United States, 1910-2012



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

The World Wealth and Income Database





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- Current extension of WID: Distributional National Accounts (DINA) = coverage of total national income, including tax-exempt capital income, transfers, etc., and not only fiscal income
- See Piketty-Saez-Zucman, «Distributional National Accounts: Methods and Estimates for the U.S. since 1913 », 2016
- Garbinti-Goupille-Piketty, « Wealth Concentration in France 1800-2014: Methods, Estimates and Simulations », 2016a; « Inequality Dynamics in France, 1900-2014: Evidence from Distributional National Accounts », 2016b

Notes on historical inequality data sources & Pareto interpolation methods

- In this course, I focus upon the interpretation of the results and I say relatively little about methodological and data issues; for more details on these issues, see for instance my book's technical appendix or the WID web site
- In order to have a sense of how raw data sources look like, see for instance income tax tabulations for France 1919
- Of course, it is always better to have micro files rather than tabulations; but tax administrations did not start producing micro files before the 1970s-80s (1990s-2000s in some countries); for earlier periods, and sometime also for the present, we only have tabulations; the point is that we can actually infer the entire distribution from tabulations, using Pareto extrapolation techniques

- Reminder: Pareto distributions have a density function $f(y)=ac^a/y^{(1+a)}$ and a distribution function $1-F(y) = (c/y)^a$ (=population fraction above y) with c = constant and a = Pareto coefficient
- Intuition: higher coefficient a = faster convergence toward 0 = less fat upper tail = less income concentration at the top
- **Key property of Pareto distributions: ratio average/threshold = constant**
- Note $y^*(y)$ the average income of the population above threshold y. Then $y^*(y)$ can be expressed as follows : $y^*(y) = [\int_{z>y} z\, f(z)dz\ ] / [\int_{z>y} f(z)dz\ ]$

  i.e. $y^*(y) = [\int_{z>y} dz/z^a\ ] / [\int_{z>y} dz/z^{(1+a)}\ ] = ay/(a-1)$
- I.e. $y^*(y)/y = b = a/(a-1)$
- If b=2: average income above 100 000€ = 200 000€, average income above 1 million € = 2 million €, etc.
- France 2010s,US 1970s: b = 1.5-1.8; France 1910s, US 2010s:b = 2.3-2.8
- For wealth distributions, b can be larger than 3: b = index of concentration
- Pareto coefficients are easy to estimate using tabulations: see for instance Atkinson-Piketty-Saez 2011 for graphs on b over time & across countries

Basic orders of magnitude about inequality

- Inequality of labor income is always much less than inequality of capital ownership
- Top 10% share: 20-30% for labor income, 50-90% for wealth & capital income; 30-60% for total income
- Bottom 50% share: 20-30% for labor inc.; <5-10% for wealth
- Gini coefficients: 0,2-0,4 for labor income; 0,6-0,8 for wealth
- Gini coefficient = synthetic index going from 0 (perfect equality) to 1 (complete inequality)
- Pb: Gini coeff is so synthetic (it aggregates info from top decile shares, bottom decile shares, middle decile shares) that it is sometime difficult to understand where it comes from and to pinpoint data inconsistencies

  → it is better to use data on decile and percentile shares

Table 7.1. Inequality of labor income across time and space

Share of different groups in total labor income	Low inequality (≈ Scandinavia, 1970s-80s)	Medium inequality (≈ Europe 2010)	High inequality (≈ U.S. 2010)	Very high inequality (≈ U.S. 2030 ?)
The top 10% "Upper class"	**20%**	**25%**	**35%**	**45%**
including: the top 1% ("dominant class")	*5%*	*7%*	*12%*	*17%*
including: the next 9% ("well-to-do class")	*15%*	*18%*	*23%*	*28%*
The middle 40% "Middle class"	**45%**	**45%**	**40%**	**35%**
The bottom 50% "Lower class"	**35%**	**30%**	**25%**	**20%**
Corresponding Gini coefficient (synthetic inequality index)	0,19	0,26	0,36	0,46

In societies where labor income inequality is relatively low (such as in Scandinavian countries in the 1970s-1980s), the top 10% most well paid receive about 20% of total labor income, the bottom 50% least well paid about 35%, the middle 40% about 45%. The corresponding Gini index (a synthetic inequality index going from 0 to 1) is equal to 0,19. See technical appendix.

Table 7.2. Inequality of capital ownership across time and space

Share of different groups in total capital	**Low inequality** (never observed; ideal society?)	**Medium inequality** (≈ Scandinavia, 1970s-1980s)	**Medium-high inequality** (≈ Europe 2010)	**High inequality** (≈ U.S. 2010)	**Very high inequality** (≈ Europe 1910)
The top 10% "Upper class"	**30%**	**50%**	**60%**	**70%**	**90%**
including: the top 1% ("dominant class")	*10%*	*20%*	*25%*	*35%*	*50%*
including: the next 9% ("well-to-do class")	*20%*	*30%*	*35%*	*35%*	*40%*
The middle 40% "Middle class"	**45%**	**40%**	**35%**	**25%**	**5%**
The bottom 50% "Lower class"	**25%**	**10%**	**5%**	**5%**	**5%**
Corresponding Gini coefficient (synthetic inequality index)	0,33	0,58	0,67	0,73	0,85

In societies with "medium" inequality of capital ownership (such as Scandinavian countries in the 1970s-1980s), the top 10% richest in wealth own about 50% of aggregate wealth, the bottom 50% poorest about 10%, and the middle 40% about 40%. The corresponding Gini coefficient is equal to 0,58. See technical appendix.

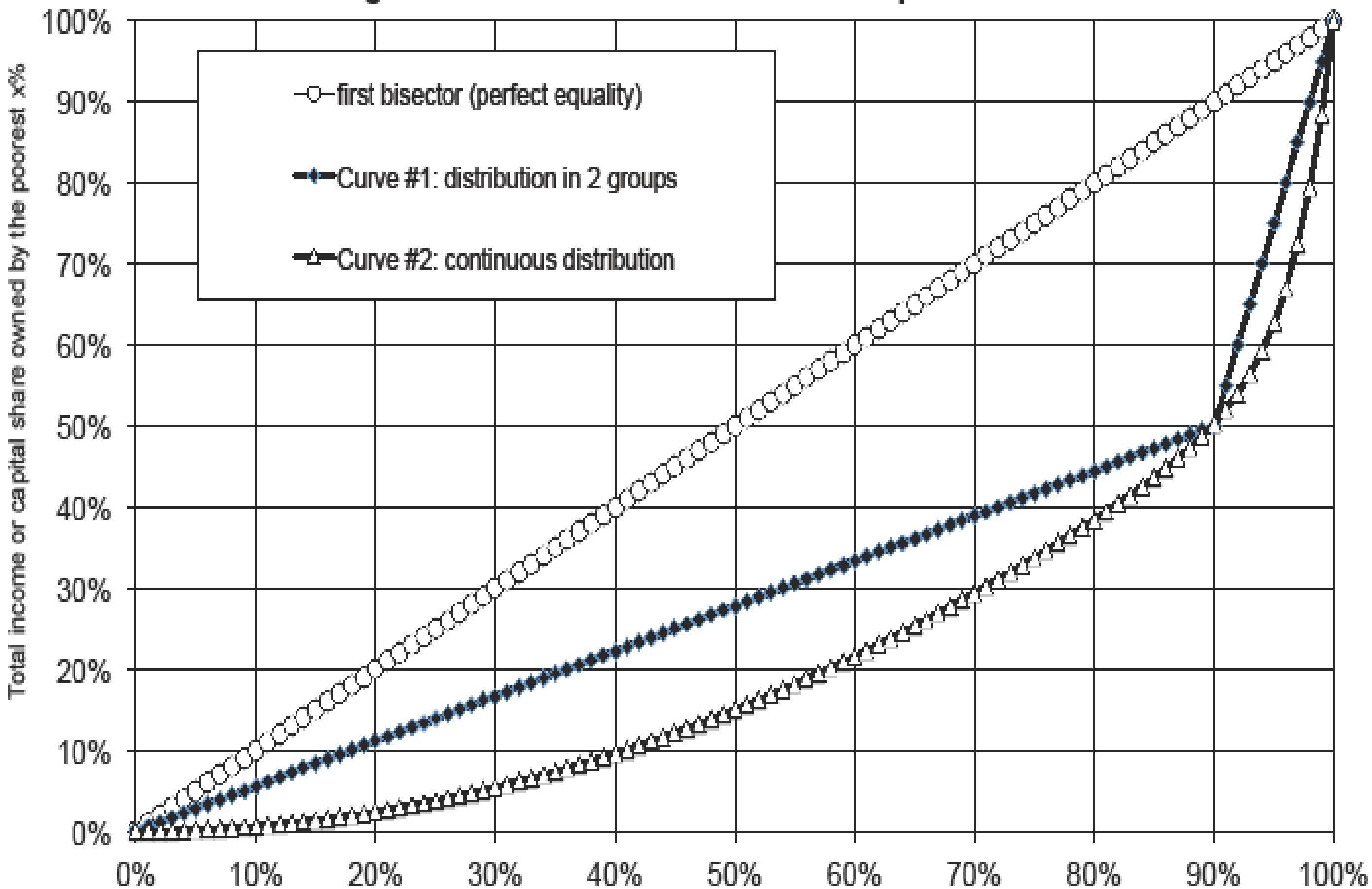
Table 7.3. Inequality of total income (labor and capital) across time and space

Share of different groups in total income (labor + capital)	**Low inequality** (≈ Scandinavia, 1970s-80s)	**Medium inequality** (≈ Europe 2010)	**High inequality** (≈ U.S. 2010, Europe 1910)	**Very high inequality** (≈ U.S. 2030 ?)
The top 10% "Upper class"	**25%**	**35%**	**50%**	**60%**
including: the top 1% ("dominant class")	*7%*	*10%*	*20%*	*25%*
including: the next 9% ("well-to-do class")	*18%*	*25%*	*30%*	*35%*
The middle 40% "Middle class"	**45%**	**40%**	**30%**	**25%**
The bottom 50% "Lower class"	**30%**	**25%**	**20%**	**15%**
Corresponding Gini coefficient (synthetic inequality index)	0,26	0,36	0,49	0,58

In societies where the inequality of total income is relatively low (such as Scandinavian countries during the 1970s-1980s), the 10% highest incomes receive about 20% of total income, the 50% lowest income receive about 30%. The corresponding Gini coefficient is equal to 0,26. See technical appendix.

- Reminder about Gini coefficients
- G = 2 x area between first diagonal and Lorenz curve (see graph)
- Exemple with finite number of income or wealth groups (in practice, distributions are better approximated as continuous distributions):
- $p_1,\ldots, p_n$ = percentiles
- $s_0,s_1,\ldots, s_n$ = corresponding shares in total income or wealth
- I.e. s_0 = share owned by individuals below percentile p_1, s_1 = share owned by individuals between percentiles p_1 and p_2, ..., s_n = share owned by individuals above percentile p_n.
- By definition, $\Sigma_{0\leq i\leq n}\, s_i = 1$.
- *Exemple 1*. Assume n=1, p_1=0,9, s_0=0,5, s_1=0,5. I.e. the bottom 90% and the top 10% both own 50% of total income (or wealth), and both groups are supposed to be homogenous.
- *Exemple 2*. Assume n=2, p_1=0,5, p_2=0,9, s_0=0,2, s_1=0,3, s_2=0,5. I.e. the bottom 50% owns 20% of total, the next 40% own 30%, and the top 10% own 50%.

Figure S7.1. Gini-Lorenz curves examples



Curve 1 assumes that the poorest 90% and the richest 10% own 50% of total income or capital each, and that both groups are homogenous (hence a linear curve); curve 2 assumes a continuous distribution

- With two groups, one can show that $\mathbf{G = s_1 + p_1 - 1}$

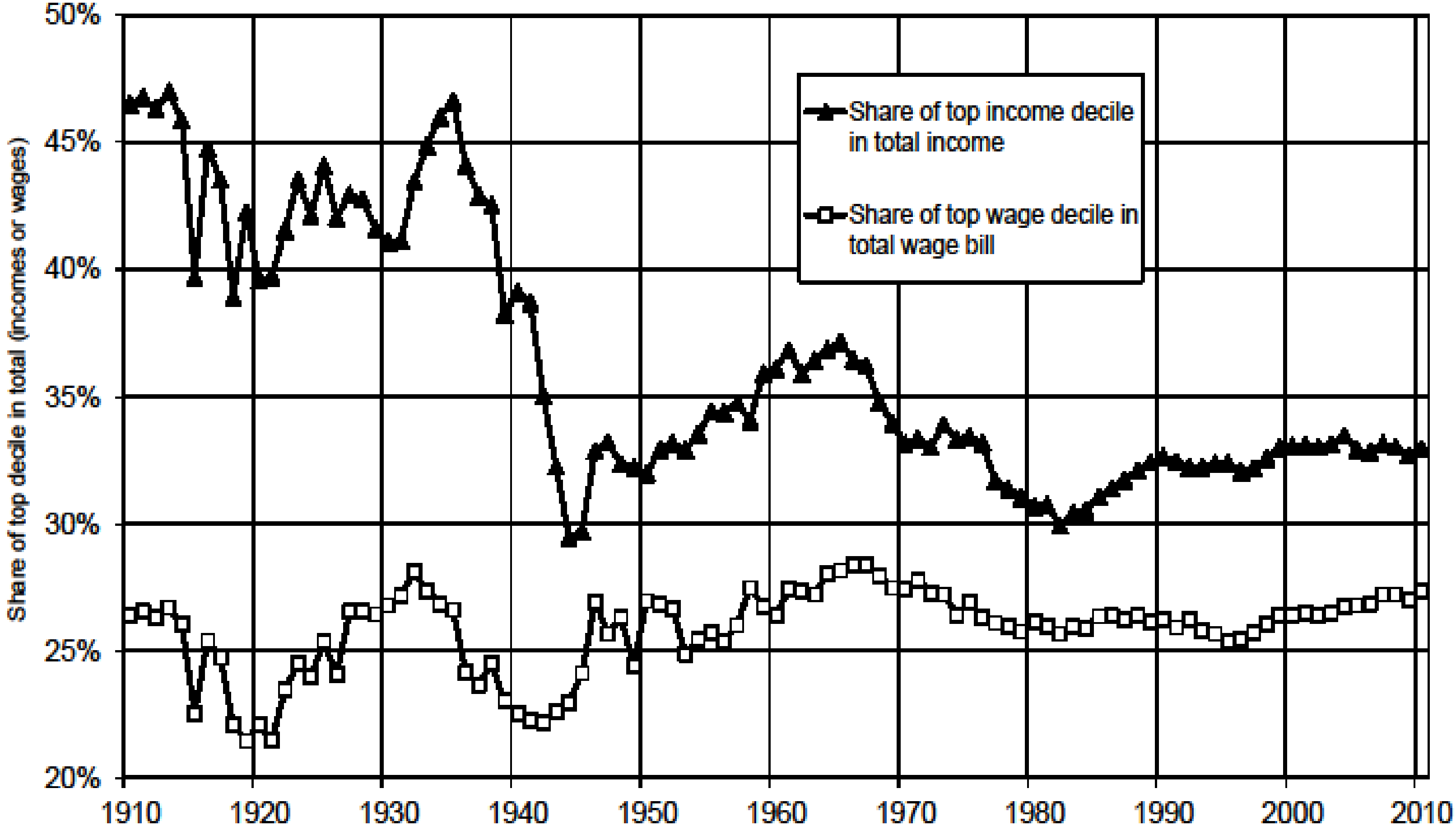
  (simple triangle area computation)
- I.e. if the top 10% owns 20% of the total, then G=0,2+0,9-1=0,1.
- If the top 10% owns 50% of the total, then G=0,5+0,9-1=0,4.
- If the top 10% owns 90% of the total, then G=0,9+0,9-1=0,8.
- If $s_1 = 1 - p_1$ (the top group owns exactly as much as its share in population), then by definition we have complete equality: G = 0.
- If $p_1 \to 1$ and $s_1 \to 1$ (the top group is infinitely small and owns almost everything), then $G \to 1$.
- With n+1 groups, one can show that: $G = 1 - p_1 s_0 - [\ \Sigma_{1\leq i\leq n-1} (p_{i+1}-p_i)(2s_0 + 2s_1 +...+2s_{i-1}+s_i)\ ] - (1-p_n)(1+s_0+...+s_{n-1})$

  (see this excel file for exemples of computations of Gini coeff.)
- With imperfect survey data at the top, one can also use the following formula: G = G* (1-S) + S with S = share owned by very top group and G* = Gini coefficient for the rest of the population
- SeeAlvareto, A note on the relationship btw top income shares and Gini coefficients, Economics letters 2011

Basic facts about the historical evolution of income inequality

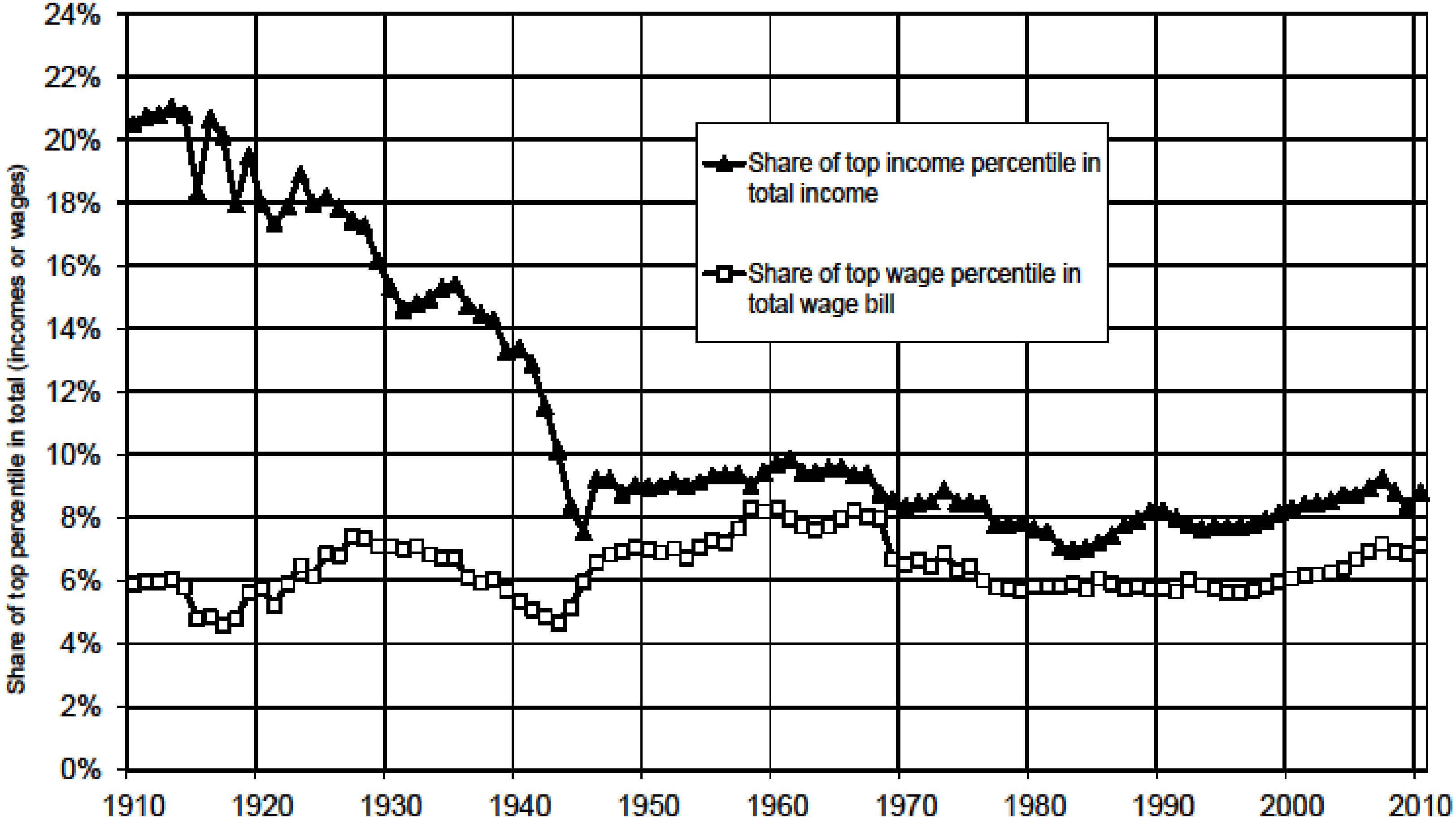
- France (& Europe, Japan): inequality of labor income has been relatively flat in the long-run; 20^c decline in total inequality comes mostly from compression of inequality in capital ownership
- US: inequality in capital ownerwhip has never been as large as in 19^c Europe; but inequality of labor income has grown to unprecedented levels in recent decades; **why?**

Figure 8.1. Income inequality in France, 1910-2010



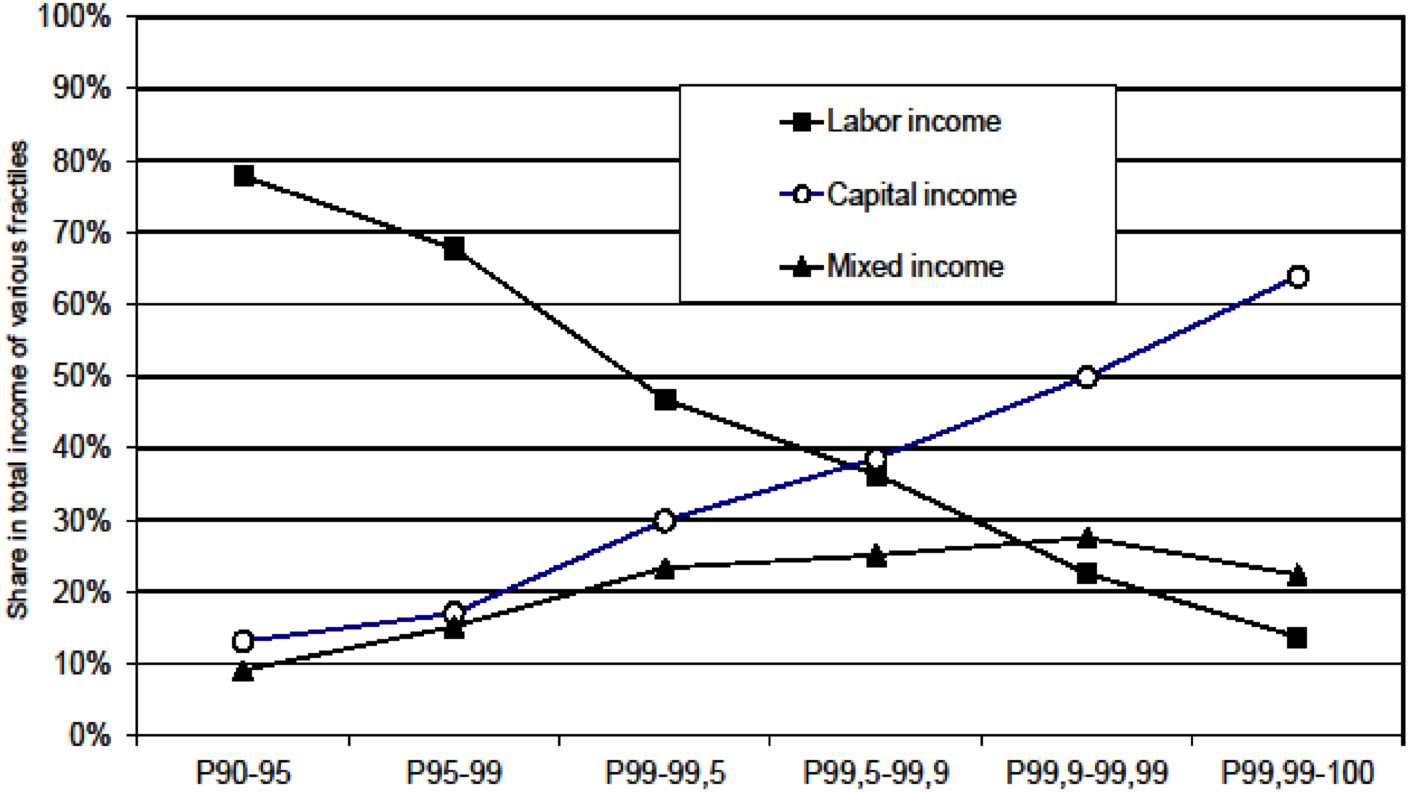
Inequality of total income (labor and capital) has dropped in France during the 20th century, while wage inequality has remained the same. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.2. The fall of rentiers in France, 1910-2010



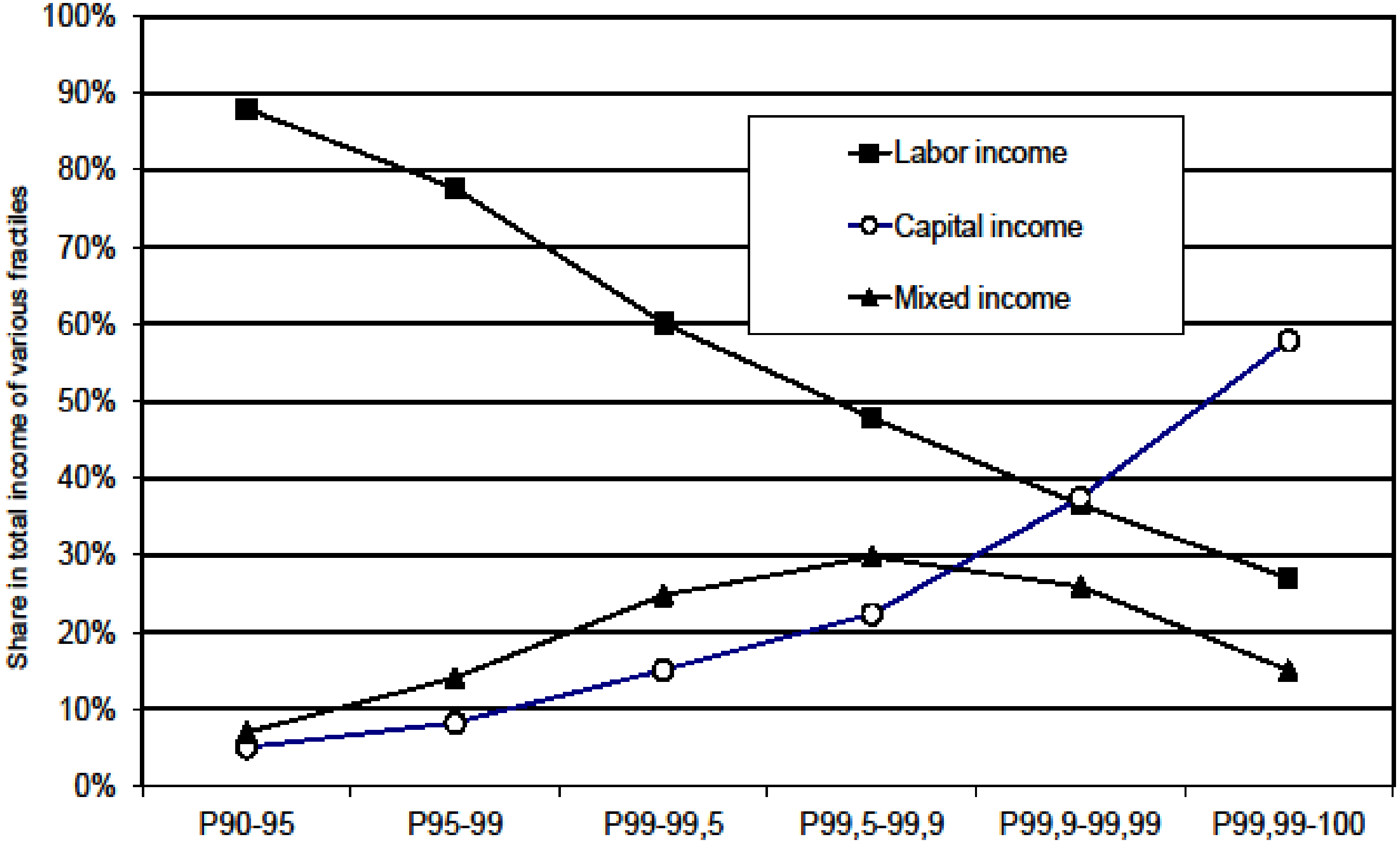
The fall in the top percentile share (the top 1% highest incomes) in France between 1914 and 1945 is due to the fall of top capital incomes. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.3. The composition of top incomes in France in 1932



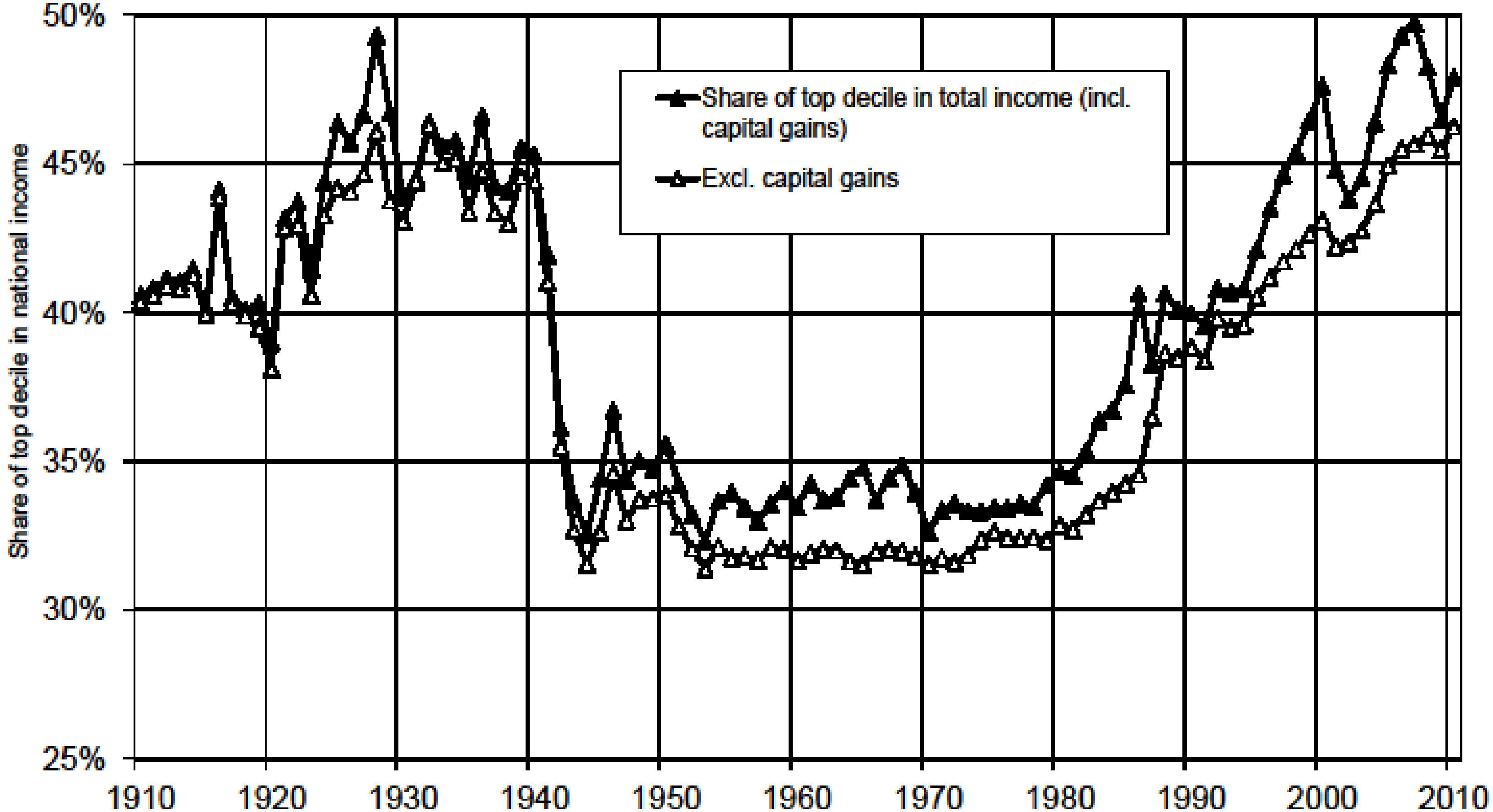
Labor income becomes less and less important as one goes up within the top decile of total income. Notes: (i) "P90-95" includes individuals between percentiles 90 to 95, "P95-99" includes the next 4%, "P99-99,5" the next 0,5%, etc. (ii) Labor income: wages, bonues, pensions. Capital income: dividends, interest, rent. Mixed income: self-employment income. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.4. The composition of top incomes in France in 2005



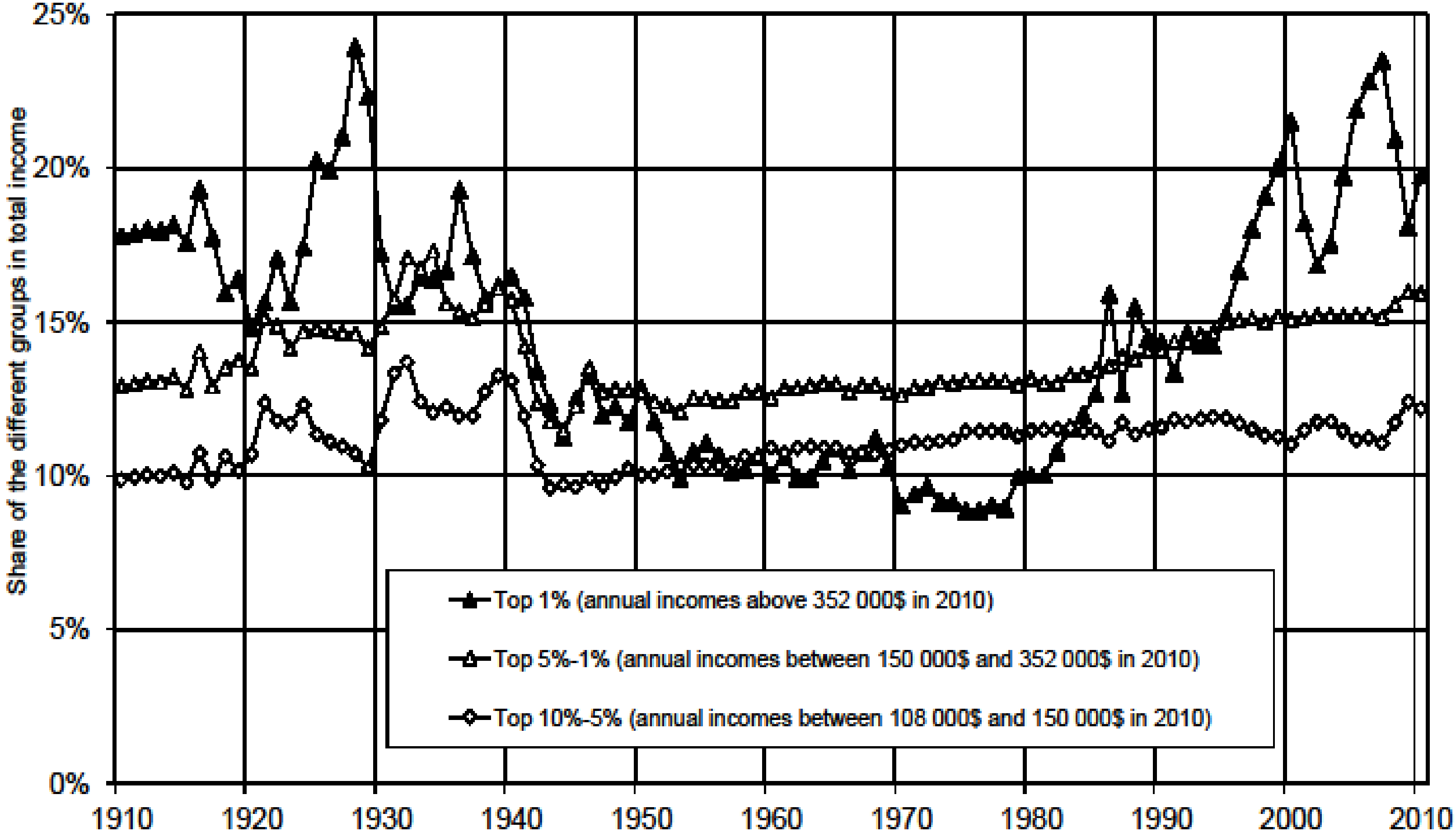
Capital income becomes dominant at the level of the top 0,1% in France in 2005, as opposed to the top 0,5% in 1932. Sources and series: see piketty.pse.ens.fr/capital21c.

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



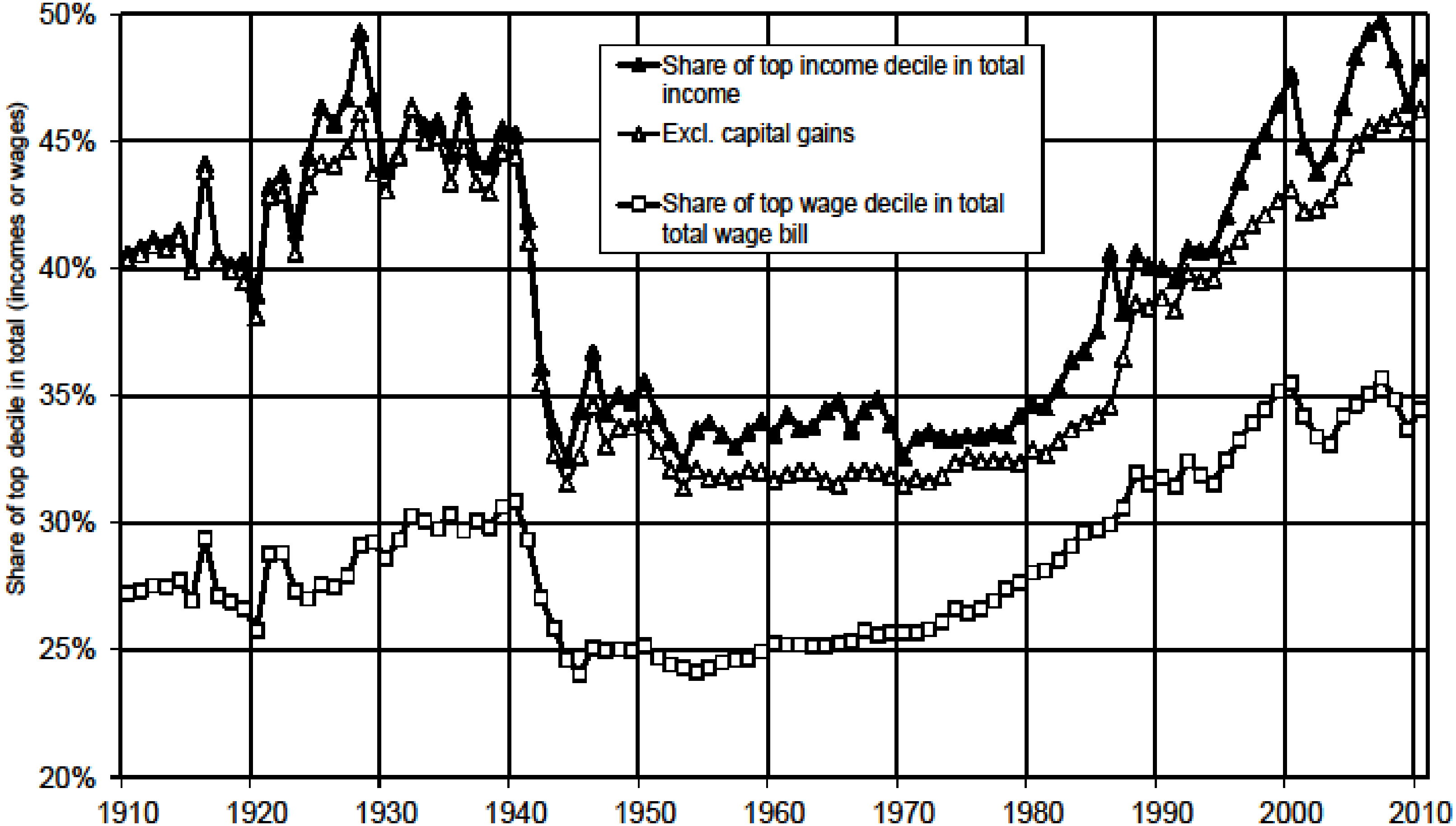
The top decile income share rose from less than 35% of total income in the 1970s to almost 50% in the 2000s-2010s. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.6. Decomposition of the top decile, U.S. 1910-2010



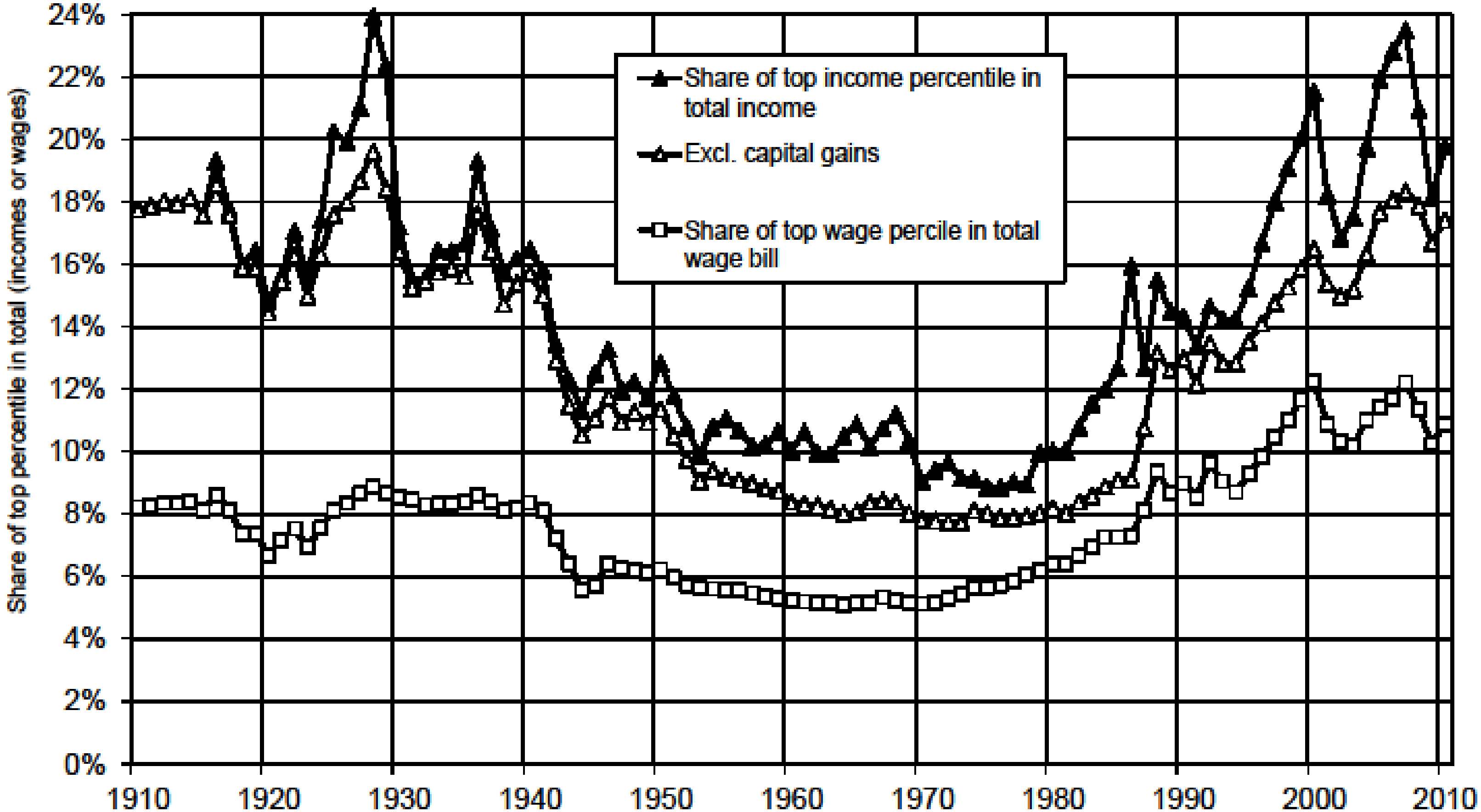
The rise of the top decile income share since the 1970s is mostly due to the top percentile.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.7. High incomes and high wages in the U.S. 1910-2010



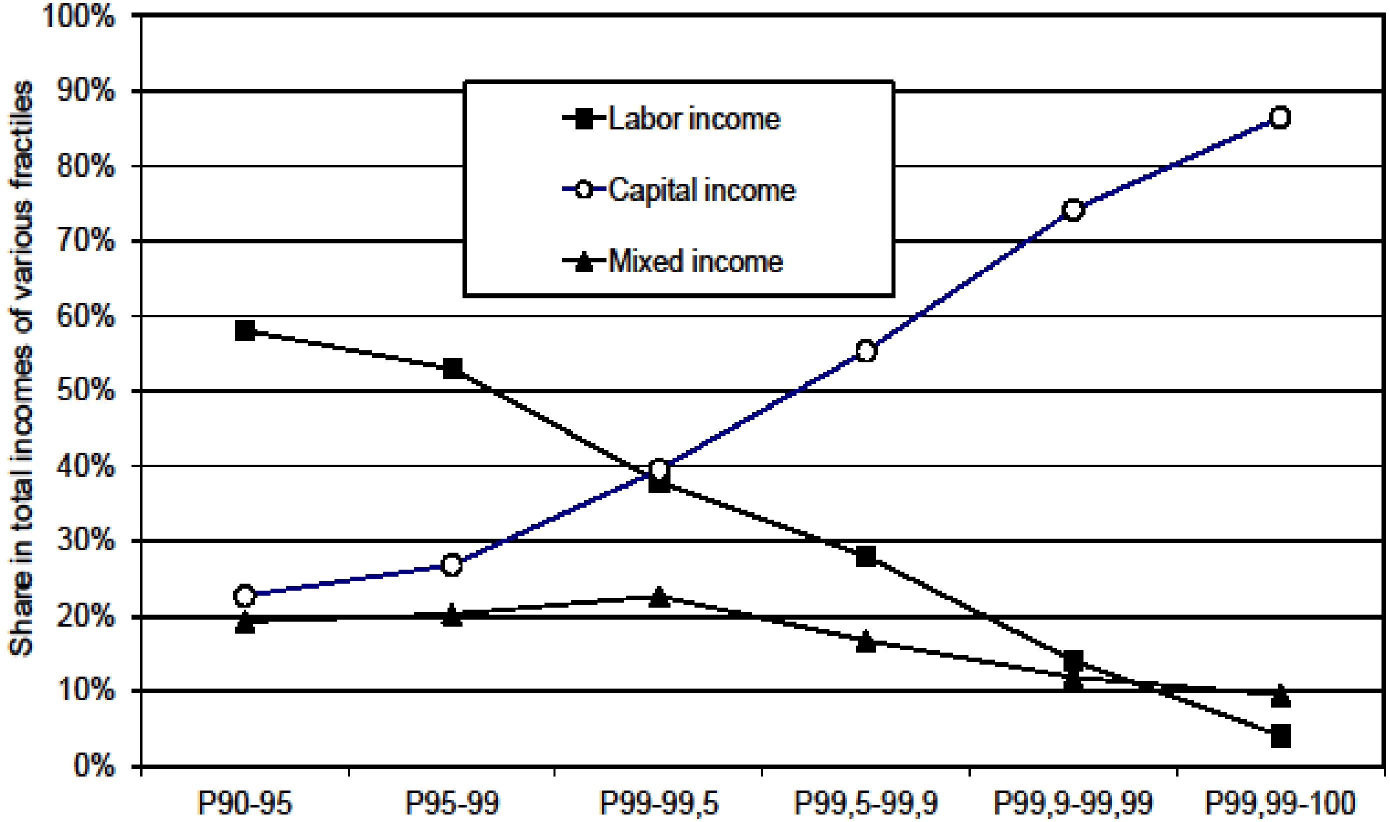
The rise of income inequality since the 1970s is largely due to the rise of wage inequality.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.8. The transformation of the top 1% in the United States



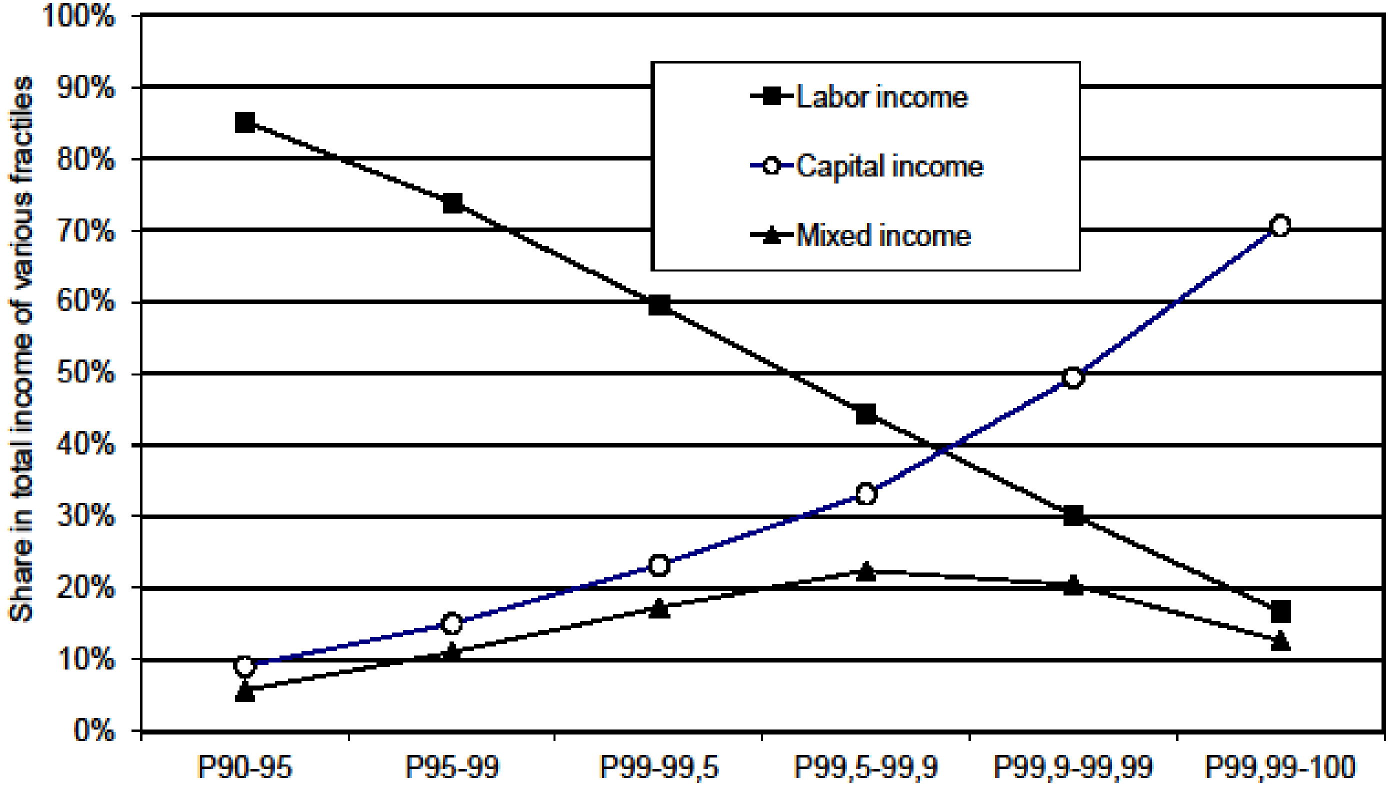
The rise in the top 1% highest incomes since the 1970s is largely due to the rise in the top 1% highest wages.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 8.9. The composition of top incomes in the U.S. in 1929



Labor income becomes less and less important as one moves up within the top income decile.
Sources and series: see piketty.pse.ens.fr/capital21c

Figure 8.10. The composition of top incomes in the U.S., 2007



Capital income becomes dominant at the level of top 0,1% in 2007, as opposed to the top 1% in 1929. Sources and series: see piketty.pse.ens.fr/capital21c.

The determinants of labor income inequality

- The main story: the race between education (skill supply) and technology (skill demand)
- Assume $Y = F(L_s,L_u)$ (or $Y = F(K,L_s,L_u)$)

with L_s= high-skill labor, L_u= low-skill labor

- Assume technical change is skill-biased, i.e. high skills are more and more useful over time, so that the demand for high-skill labor L_s ↑ over time

  (say, $F(L_s,L_u) = L_s^{\alpha} L_u^{1-\alpha}$, with α ↑ over time)

- If the skill supply L_s is fixed, then the relative wage of high-skill labor w_s/w_u (skill premium) will ↑ over time
- The only way to counteract rising wage inequality is the rise of skill supply L_s through increased education investment: the race between education and technology

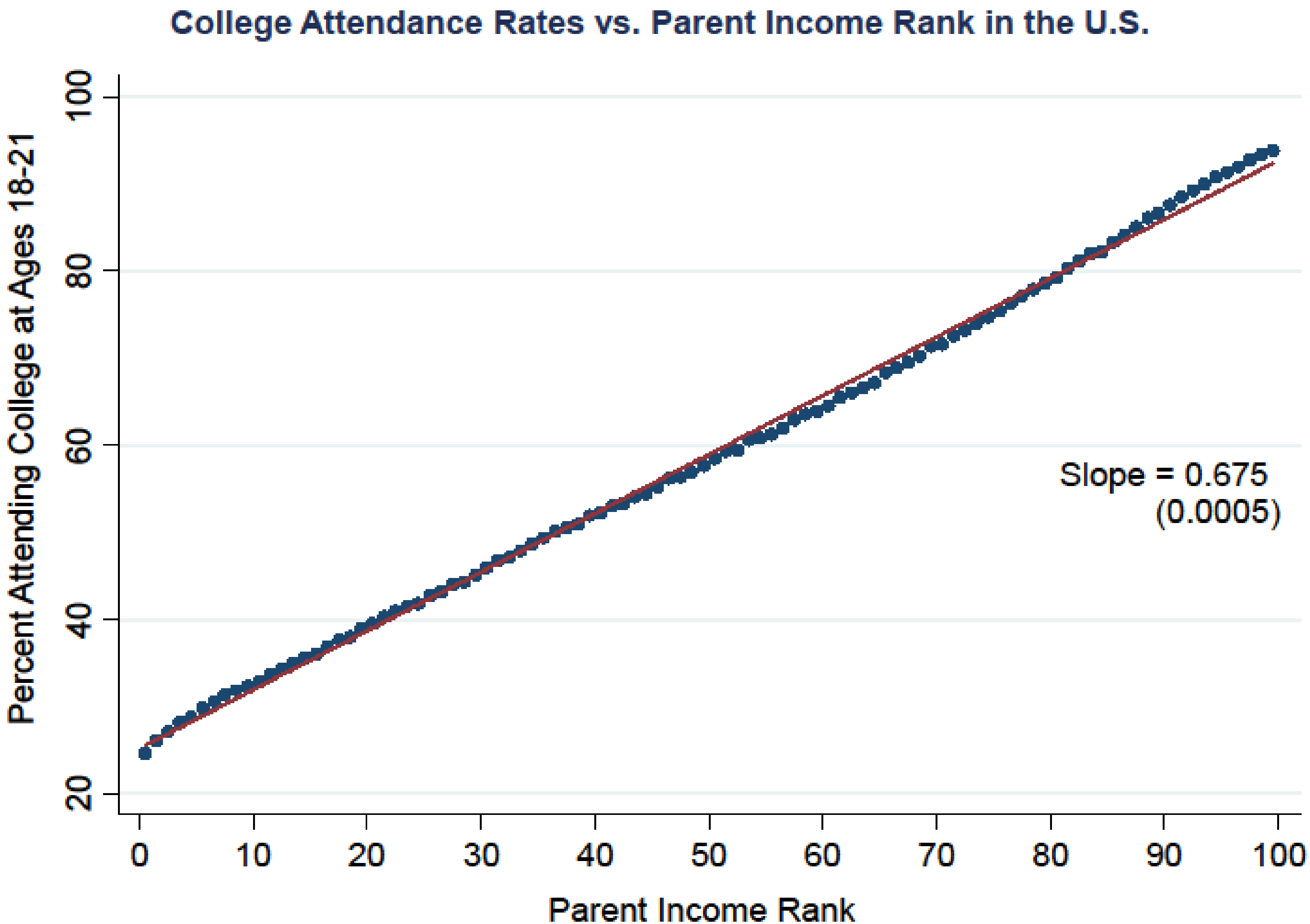
- See Goldin-Katz 2010, « The Race Between Education and Technology: The Evolution of US Education Wage Differentials, 1890-2005 »
- They compare for each decade the growth rate of skills (college educated workers) and the change in skill premium, and they find a systematic negative correlation
- Starting in the 1980s-90s, the growth rate of skills has been reduced (still >0, but less than in previous decades), thereby leading to rising kill premium and rising wage inequality

→ the right way to reduce US wage inequality is massive investment in skills and increased access to higher education (big debate on university tuitions in the US)

Table 1
Changes in the College Wage Premium and the Supply and Demand for College Educated Workers: 1915 to 2005 (100 × Annual Log Changes)

	Relative Wage	Relative Supply	Relative Demand (σ_{SU} = 1.4)	Relative Demand (σ_{SU} = 1.64)	Relative Demand (σ_{SU} = 1.84)
1915-40	-0.56	3.19	2.41	2.27	2.16
1940-50	-1.86	2.35	-0.25	-0.69	-1.06
1950-60	0.83	2.91	4.08	4.28	4.45
1960-70	0.69	2.55	3.52	3.69	3.83
1970-80	-0.74	4.99	3.95	3.77	3.62
1980-90	1.51	2.53	4.65	5.01	5.32
1990-2000	0.58	2.03	2.84	2.98	3.09
1990-2005	0.50	1.65	2.34	2.46	2.56
1940-60	-0.51	2.63	1.92	1.79	1.69
1960-80	-0.02	3.77	3.74	3.73	3.73
1980-2005	0.90	2.00	3.27	3.48	3.66
1915-2005	-0.02	2.87	2.83	2.83	2.82

- Other implication of the « race btw education and technology » story: in France, wage inequality has remained stable in the long run because the all skill levels have increased roughly at the same rate as that required by technical change; the right policy to reduce inequality is again education
- According to this theory, the explanation for higher wage inequality in the US is higher skill inequality; is that right?
- According to recent PISA report, inequality in educational achivement among 15-yr-old (math tests) is as large in France as in the US…
- But it is possible that inequality in access to higher education is even larger in the US than in France: average parental income of Harvard students = top 2% of US distribution; average parental income of Sciences Po students = top 10% of French distribution
- See works by Grenet on improving access to high schools and universities in France, or by Chetty-Saez on local segregation and social mobility in the US (equality of opportunity project)



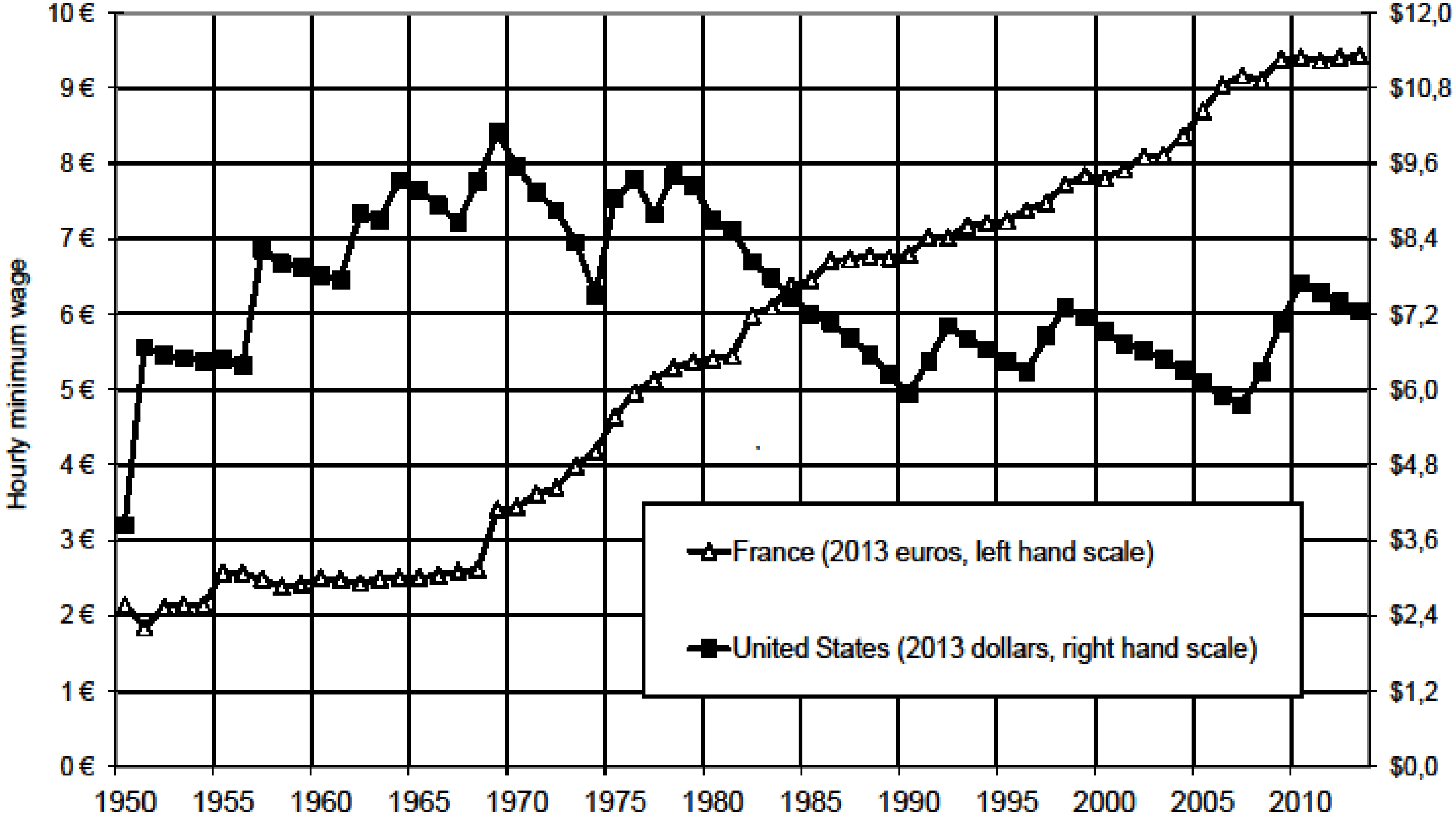
College Attendance Rates vs. Parent Income Rank in the U.S.
Percent Attending College at Ages 18-21
Parent Income Rank
Slope = 0.675
(0.0005)
20
40
60
80
100
0
10
20
30
40
50
60
70
80
90
100

The limitations of the basic story

- Education vs technology = the main determinant of labor income inequality in the long run
- However other forces also play a role: **labor market institutions** (in particular salary scales and minimum/maximum wages)
- Basic justification for rigid (or quasi rigid) salary scales: the « wage = marginal product » story is a bit too naive; in practice it is difficult to measure exactly individual productivities; so one may want to reduce arbitrariness in wage setting
- Also, hold-up problem in presence of firm-specific skill investment: in terms of incentives for skill acquisition, it can be better for both employers and employees (via unions) to commit in advance to salary scales and long run labor contracts
- Extreme case of hold-up problem: local monopsony power by employers to hire certain skill groups in certain areas; then the efficient policy response is to raise the minimum wage
- See Card-Krueger debate: when the minimum wage is very low (such as US in early 1990s… or in 2010s), rasing it can actually raise employement by raising labor supply

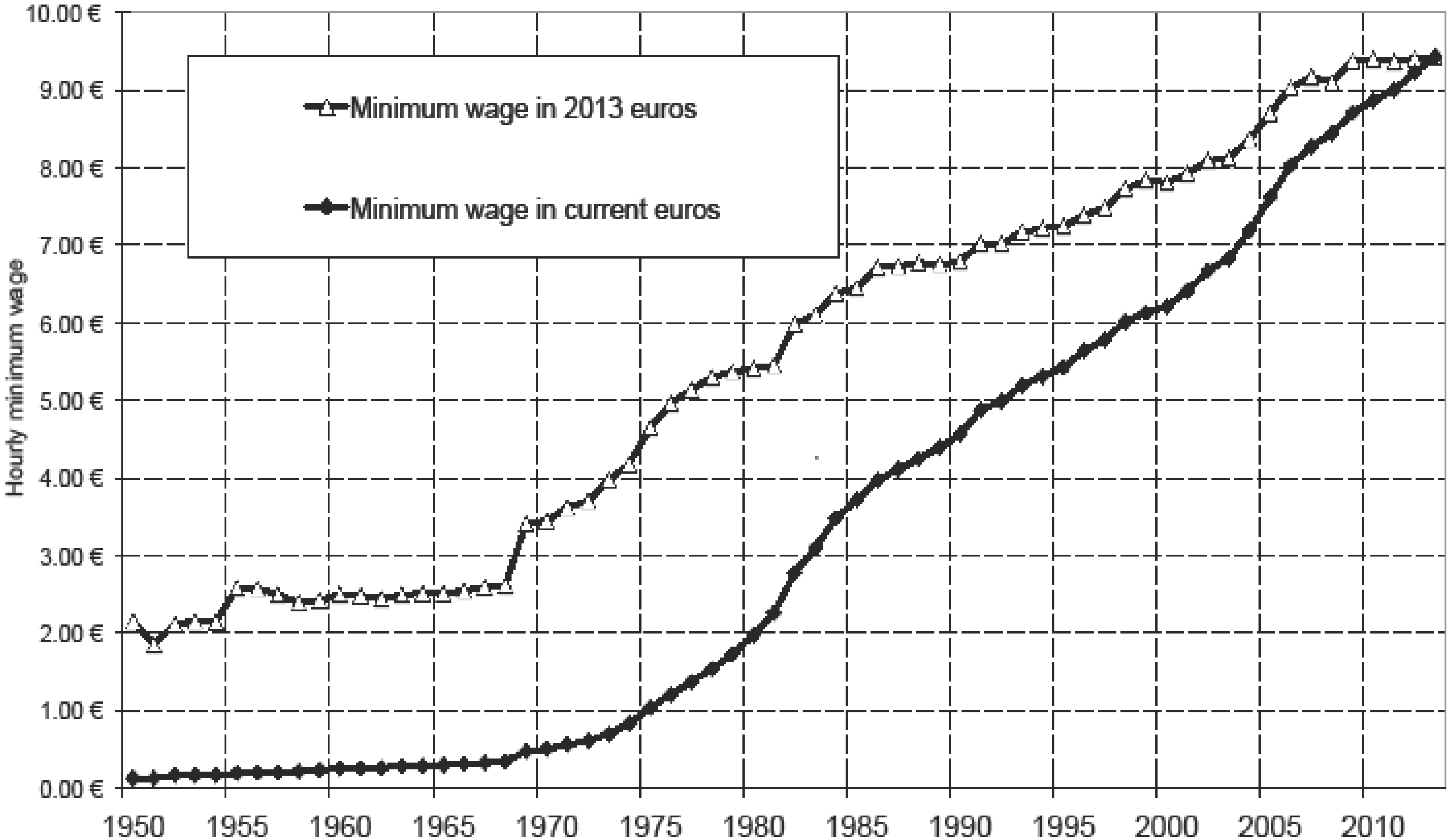
- Minimum wages have a rich and chaotic history: **see graphs** on US vs France 1950-2013
- A national minimum wage was introduced in the US in 1933; it is now equal to 7,2$/h, and Obama would like to raise it to 9$ in 2015-16 (very rare adjustments in the US)
- In France, MW introduced in 1950; now equal to 9,5€/h
- Introduced in UK in 1999 (6,2£/h, i..e. 8,1€)
- No national MW in Germany (but new Merkel-SPD coalition plans to introduce MW at 8,5€/h in 2014-15) or in Nordic countries, but binding salary scales negociated by unions and employers
- Minimum wages are useful, but it’s all a matter of degree; and the right level also depends on the tax system and the education system
- If high low-wage payroll tax & poor training system for low-skill workers, then the employment cost of high minimum wages can be very large

Figure 9.1. Minimum wage in France and the U.S., 1950-2013



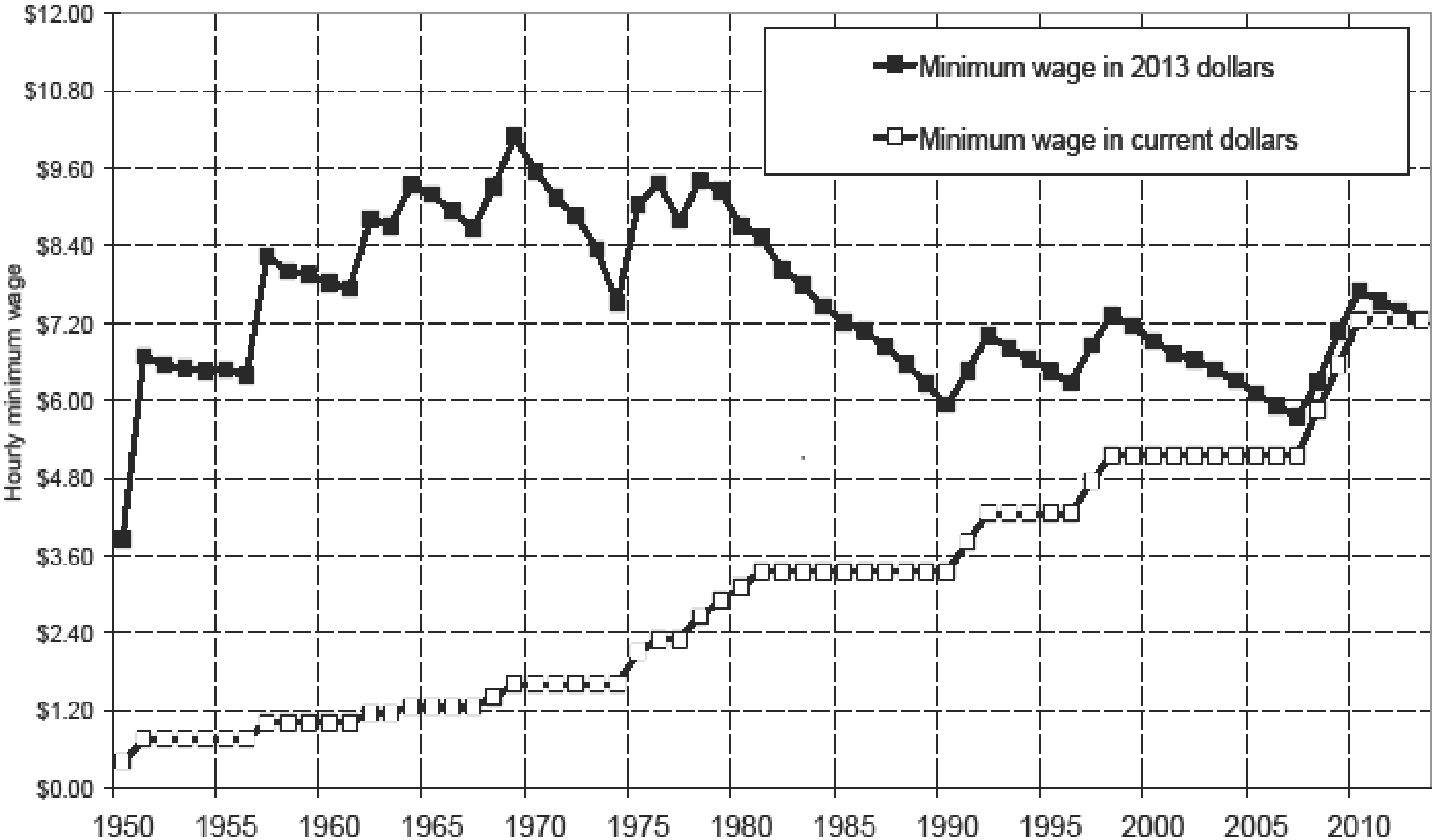
Expressed in 2013 purchasing power, the hourly minimum wage rose from 3,8$ to 7,3$ between 1950 and 2013 in the U.S., and from 2,1€ to 9,4€ in France. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure S9.1. Minimum wage in France, 1950-2013



Expressed in 2013 purchasing power, the hourly minimum wage rose from € 2.1 to €9.4 in France between 1950 and 2013. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure S9.2. Minimum wage in the United States, 1950-2013



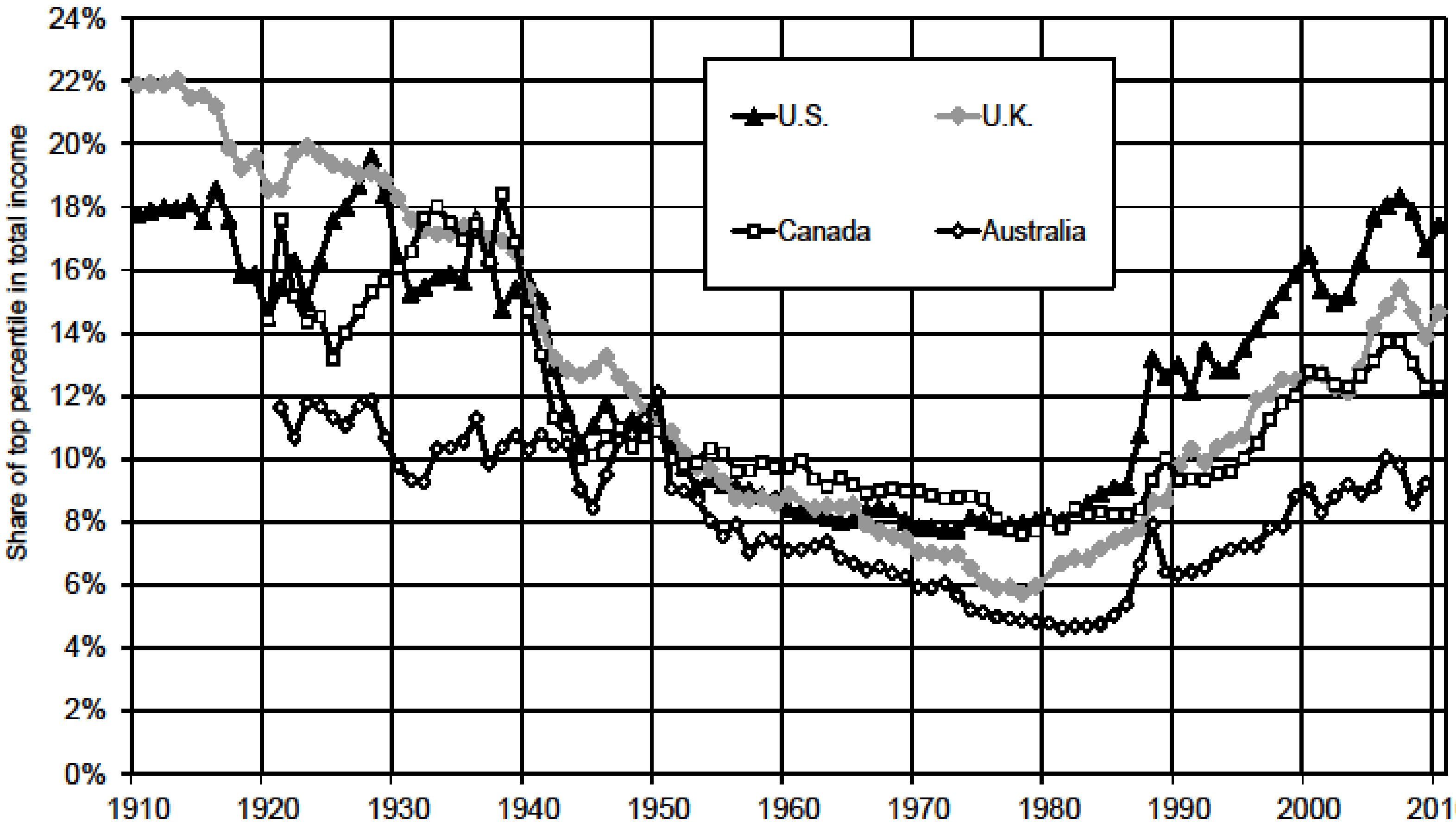
Expressed in 2013 purchasing power, the hourly minimum wage rose from $3.8 to $7.3 between 1950 and 2013 in the U.S. Sources and series: see piketty.pse.ens.fr/capital21c.

- Top wages = other key limitation of the perfect-competition model: with a pure "education vs technology" story, it is difficult to understand why the recent rise in inequality is so much concentrated within very top incomes, and why it occurred in some countries and not in others
(globalization and technical change occurred everywhere: Japan, Germany, Sweden, France.., not only in US-UK!)
- Model with imperfect competition and CEO bargaining power (CEOs sometime extract some than their marginal product & do so more intensively when top tax rates are lower) = more promising
- In particular, this can explain why top income shares increased more in countries with the largest decline in top tax rates since the 1970s-80s (i.e. US-UK rather than Japan-Germany-France-etc.)
- For a theoretical model and empirical test based upon this intuition, see Piketty-Saez-Stantcheva, AEJ 2014 (see also Slides)

- More generally, differences in legal systems, particularly in labor law & company law (stakeholder rights: "codetermination") can contribute to explain different levels of wage inequality
- See McGaughey 2015 on corporate law & inequality; see also McGaughey 2015 & Schuster 2015 on codetermination in Germany, Sweden and other European countries :
more codetermination → more equal salary scales
(see lecture 3)

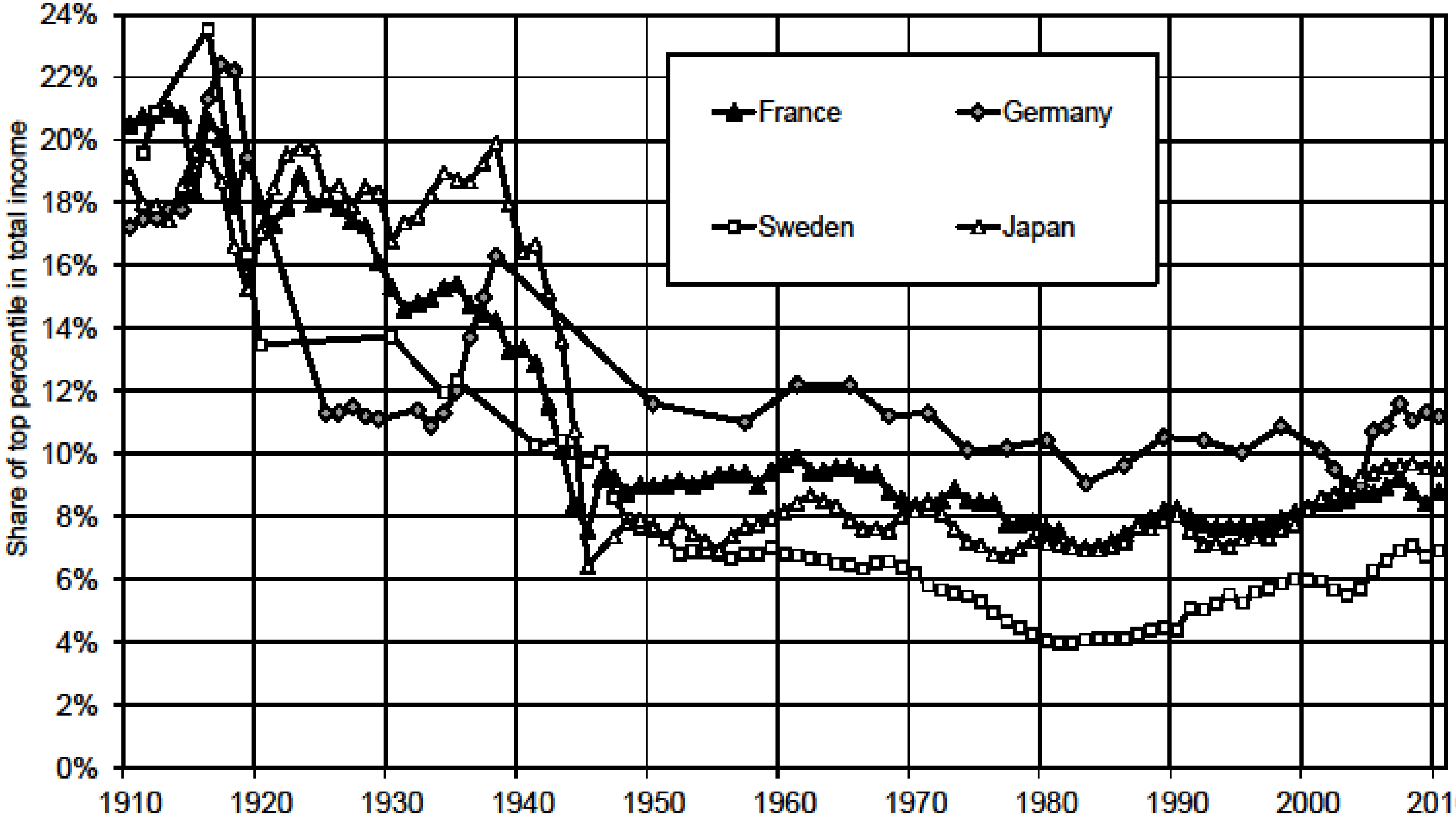
- **To summarize: higher US wage inequality is both a matter of unequal skills and of institutions → large cross-country differences**

Figure 9.2. Income inequality in Anglo-saxon countries, 1910-2010



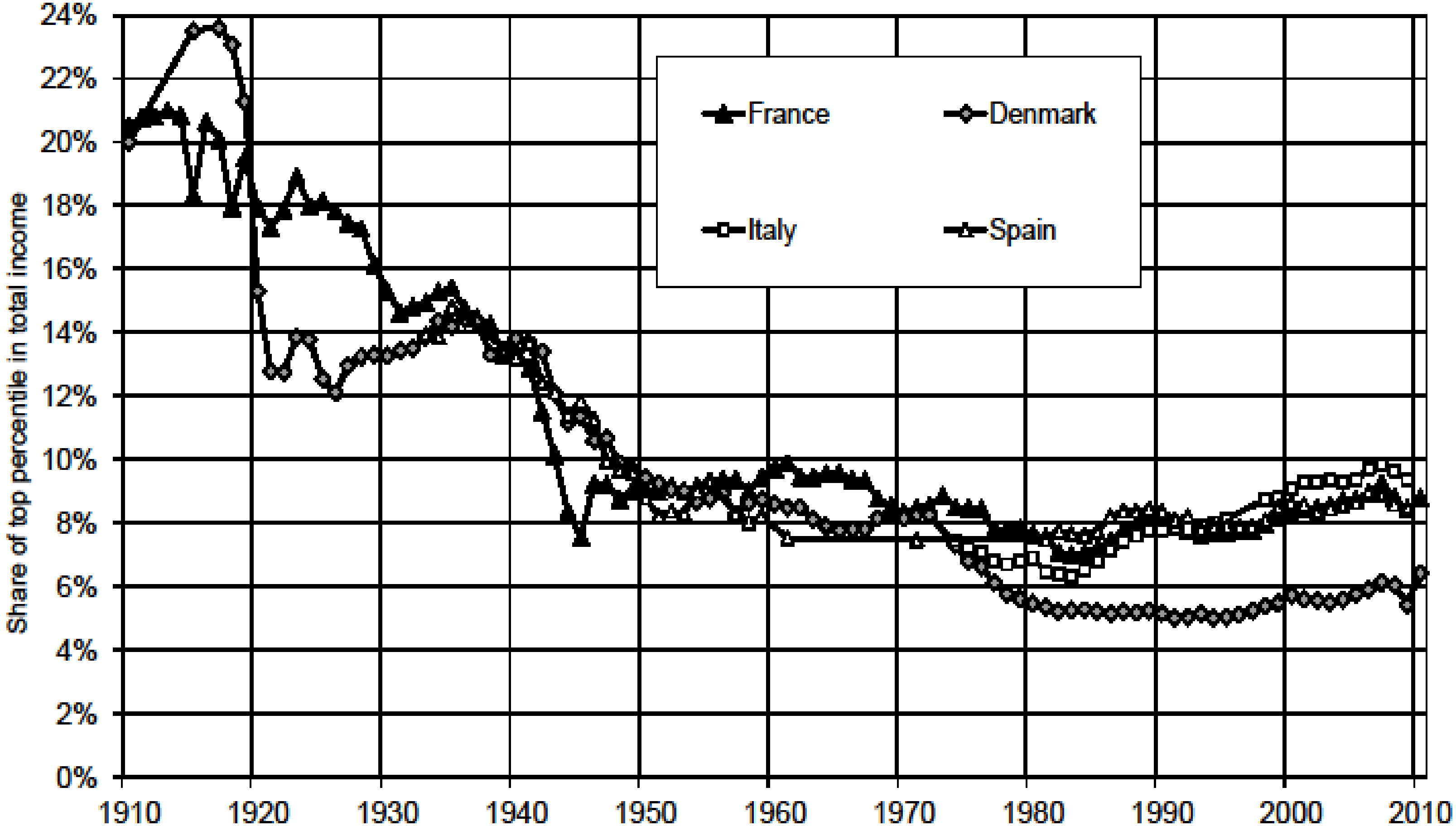
The share of top percentile in total income rose since the 1970s in all Anglo-saxon countries, but with different maginitudes. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 9.3. Income inequality: Continental Europe and Japan, 1910-2010



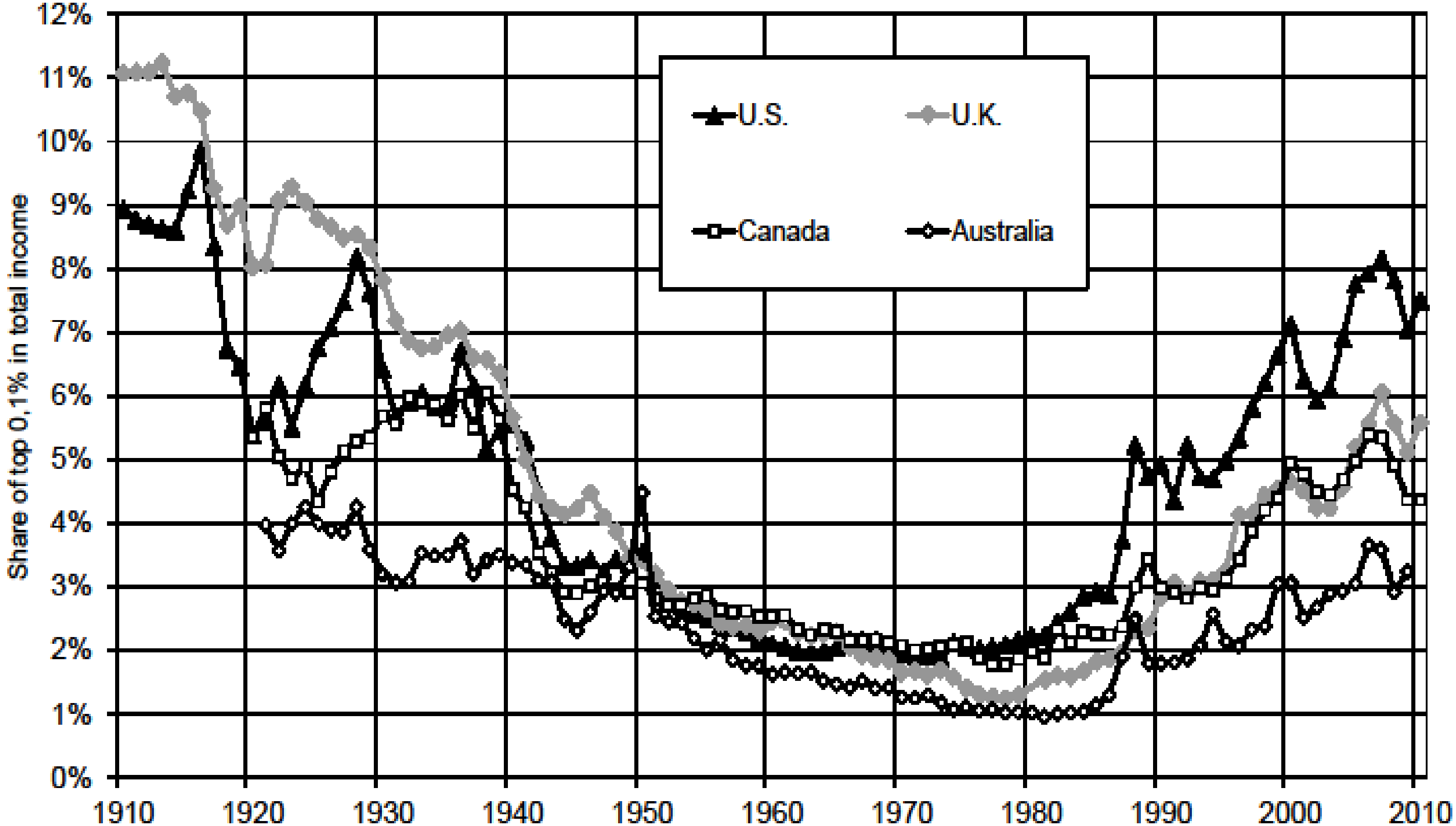
As compared to Anglo-saxon countries, the share of top percentile barely increased since the 1970s in Continental Europe and Japan. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 9.4. Income inequalty: Northern and Southern Europe, 1910-2010



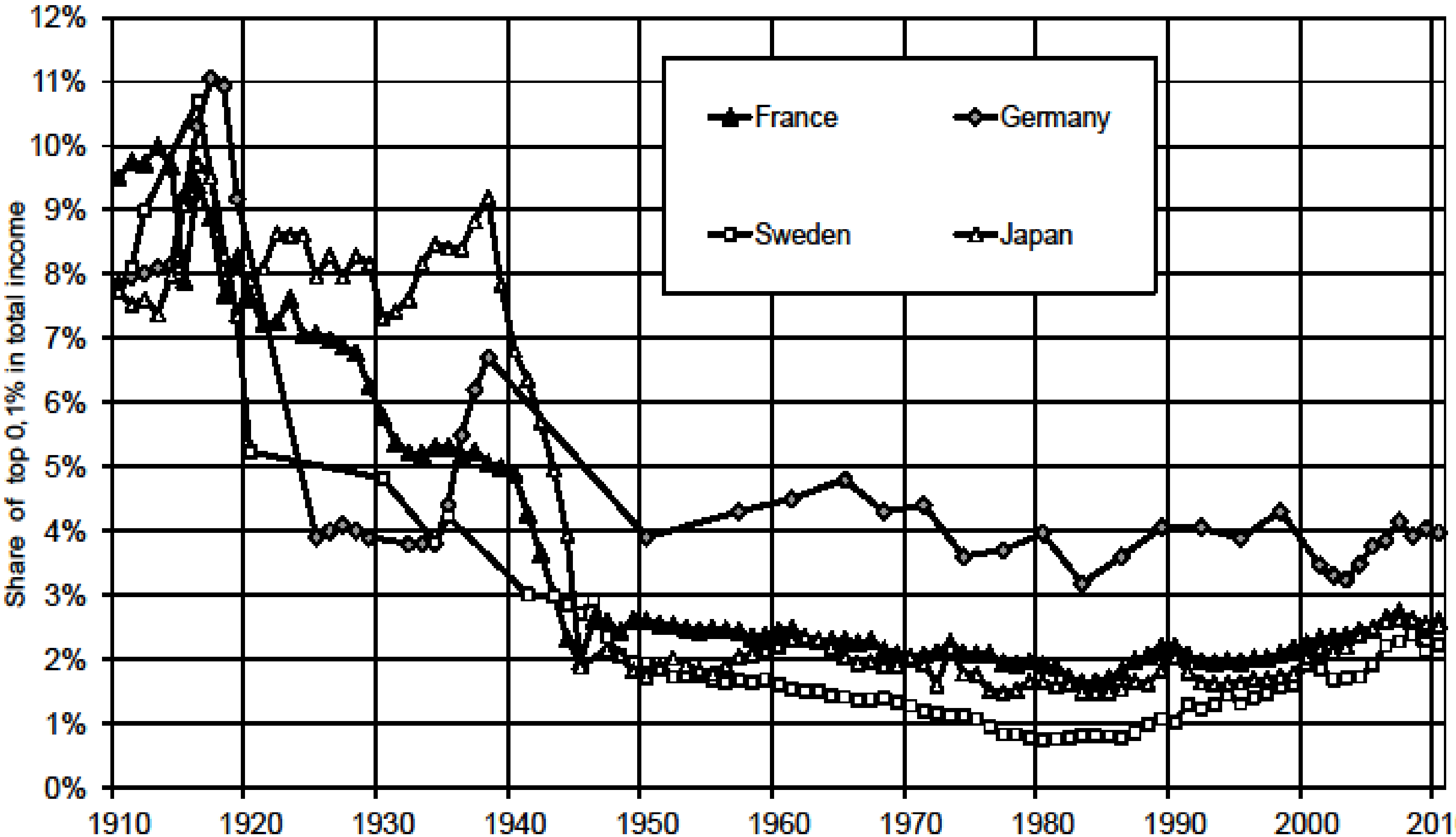
As compared to Anglo-saxon coutries, the top percentile income share barely increased in Northern and Southern Europe since the 1970s. Sources and series: see piketty.pse.ens.fr/capital21c

Figure 9.5. The top 0,1% income share in Anglo-saxon countries, 1910-2010



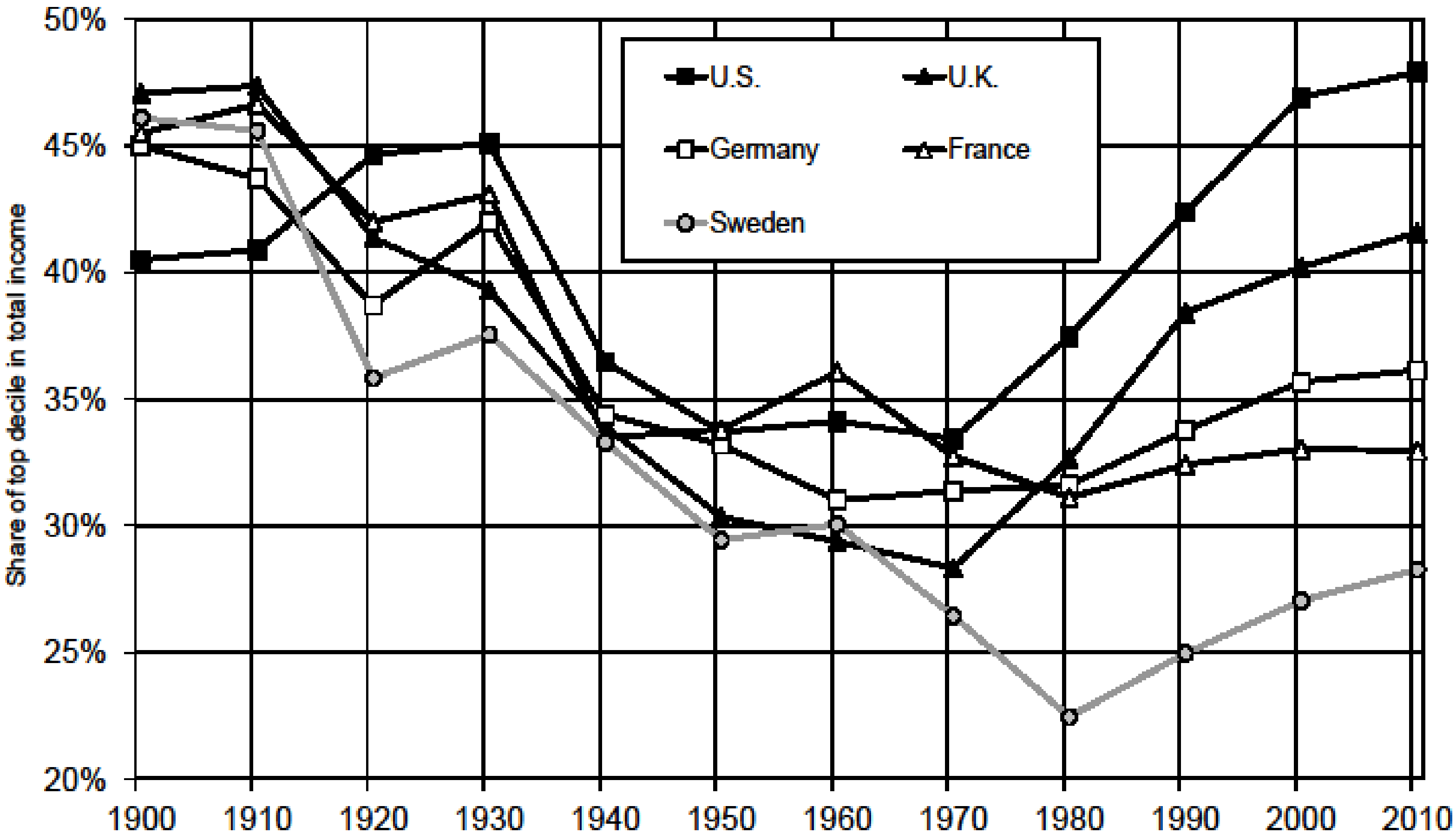
The share of the top 0,1% highest incomes in total income rose sharply since the 1970s in all Anglo-saxon countries, but with varying magnitudes. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 9.6. The top 0,1% income share: Continental Europe and Japan, 1910-2010



As compared to Anglo-saxon countries, the top 0,1% income share barely increased in Continental Europe and Japan. Sources and series: see piketty.pse.ens.fr/capital21c.

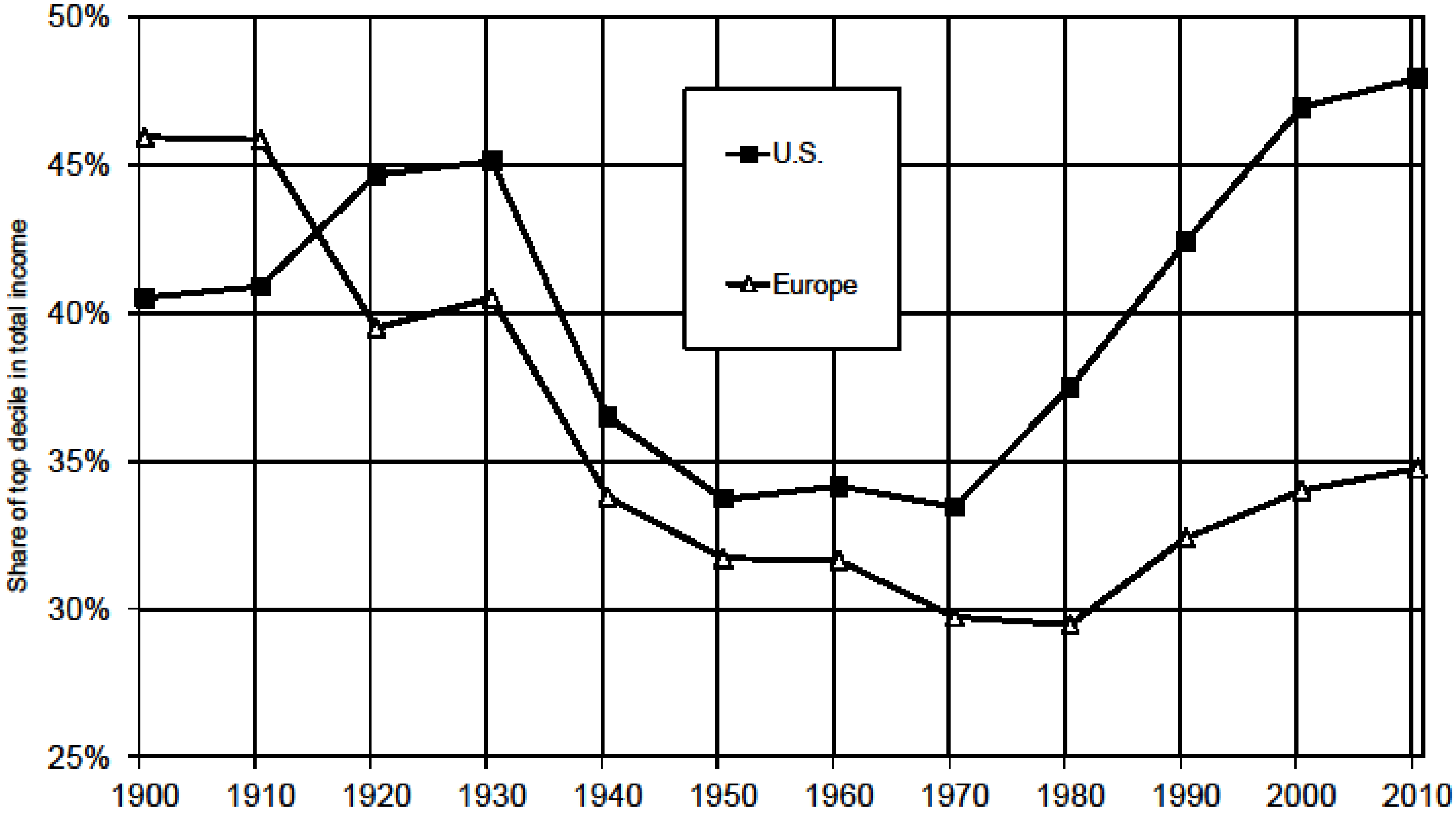
Figure 9.7. The top decile income share: Europe and the U.S., 1900-2010



In the 1950s-1970s, the top decile income share was about 30-35% of total income in Europe as in the U.S.

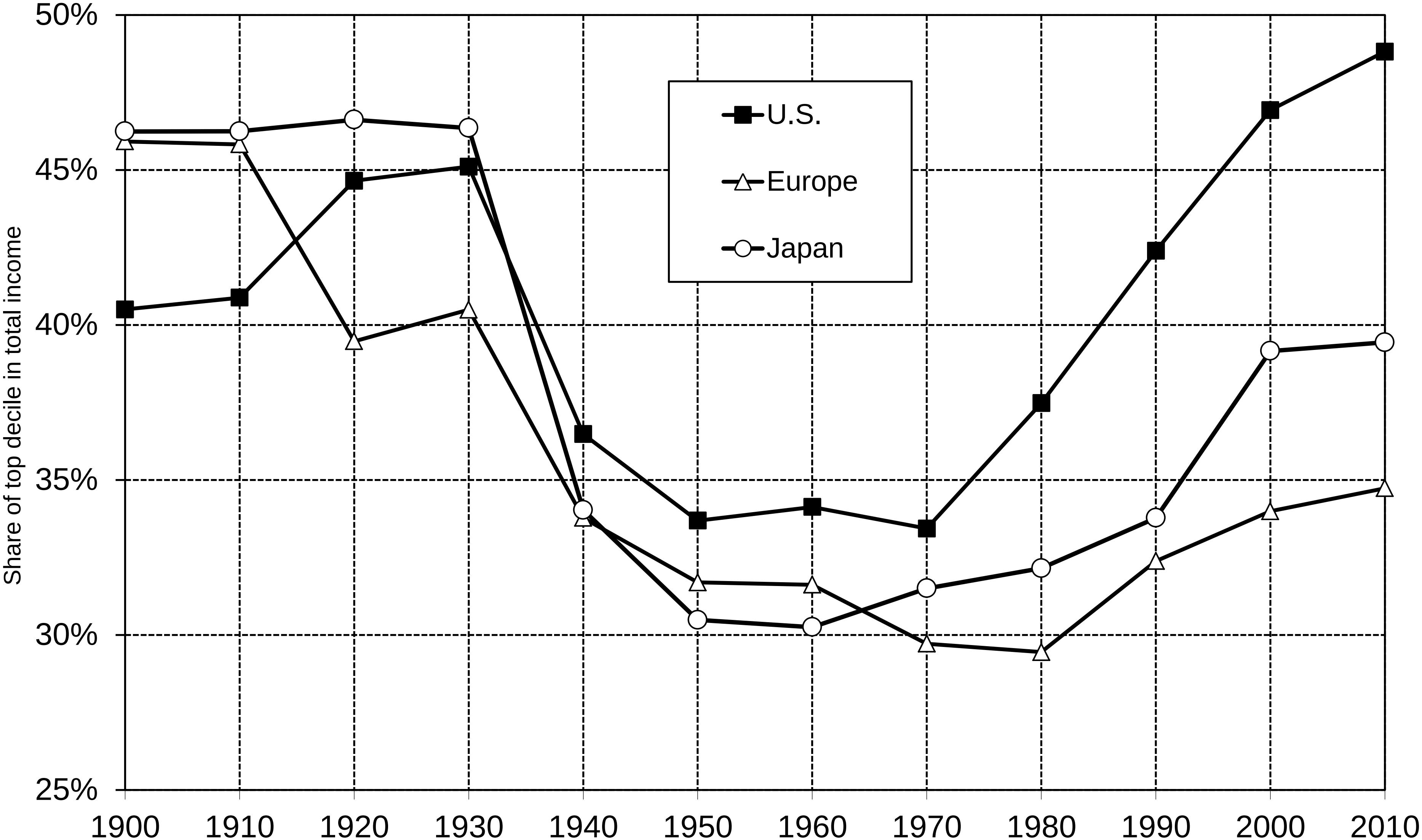
Sources and series: see piketty.pse.ens.fr/capital21c.

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.

Top 10% Income Share: Europe, U.S. and Japan, 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.

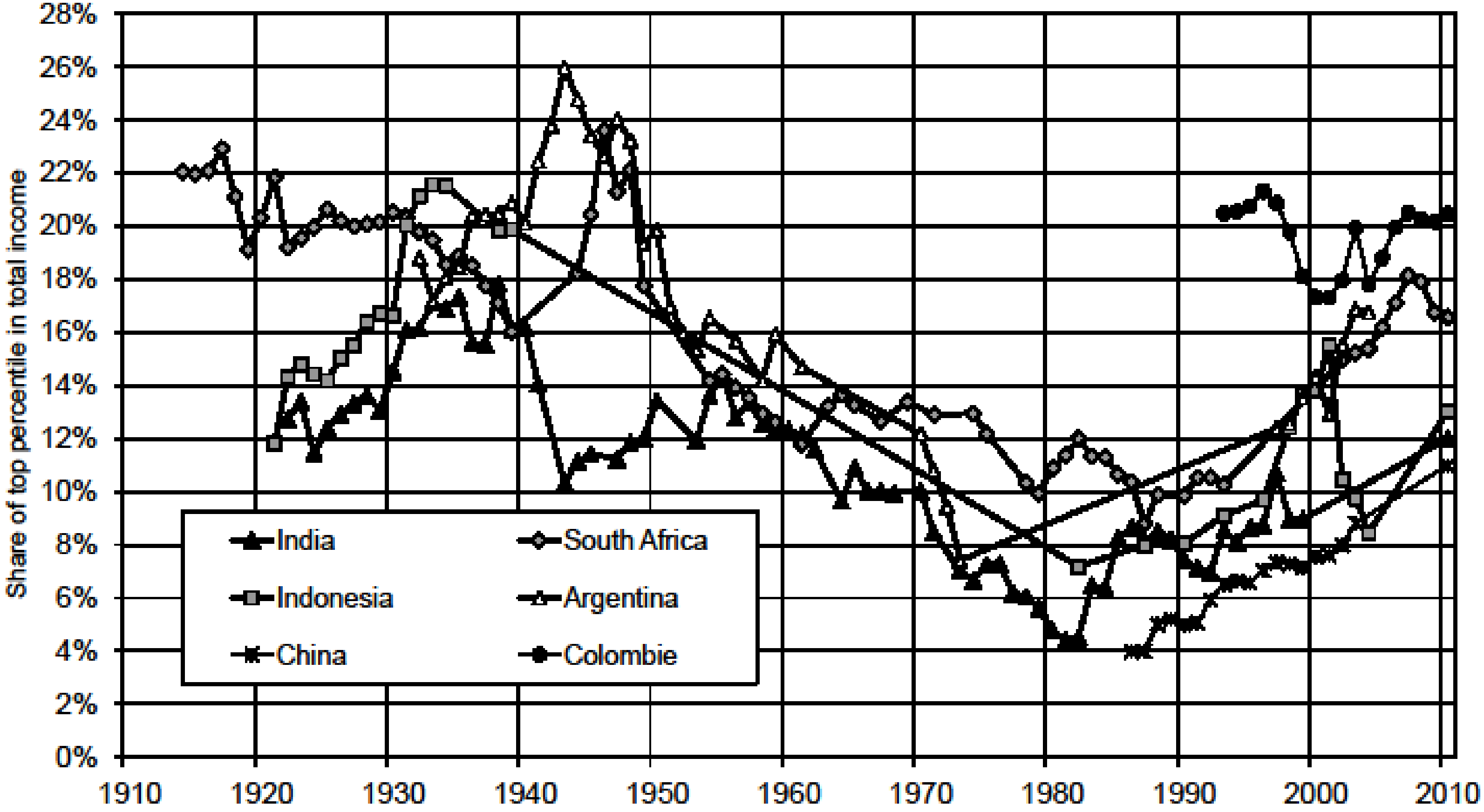
Why do perceptions of inequality differ?

- In order to explain different institutional trajectories, one needs to explain different perceptions & belief systems about inequality
- Why more tolerance for inequality in the US?
- In Europe, extreme inequality is associated to the past (19c and Belle Epoque, or even to 18c and Ancien Regime), and nobody wants to return there: strong attachement to post-WW2 high-growth egalitarian ideal… but intense tax competition
- In the US, there is no historical experience with extreme inequality (except slavery..), so « extremist meritocratic » discourses by the elite (« the rich are job creators, the poor are lazy ») do fly more easily than in Europe
- China, Russia: given the catastrophic egalitarian experience with communism, maybe public opinion is ready to accept levels of inequality that are even more extreme; « Russian oligarchs », and soon « Chinese oligarchs »?

Inequality in poor and emerging countries

- Much less historical research than for rich countries; highly imperfect data sources
- Existing series suggest a long-run U-shaped pattern, with orders of maginitude close to rich countries: e.g. in India, Indonesia, South Africa, top 1% income shares seem to be close to 15-20% in 2000-10, i.e. close to interwar levels in these countries, and less than today's levels in US (but top 10% share higher: different inequality structure)
- It is striking to see that inequality of labor income is higher in the US than in many poor countries: very high inequality of skills in the US, or specific institutions/social norms, or data problems?

Figure 9.9. Income inequality in emerging countries, 1910-2010



Measured by the top percientile income share, income inequality rose in emerging countries since the 1980s, but ranks below U.S. level in 2000-2010. Sources and series: see piketty.pse.ens.fr/capital21c.

- China: official inequality estimates are unplausibly low; lack of transparency of tax statistics; new survey data on income and wealth recently collected by Chinese universities suggest high and rising inequality; see e.g. Li Shi 2013

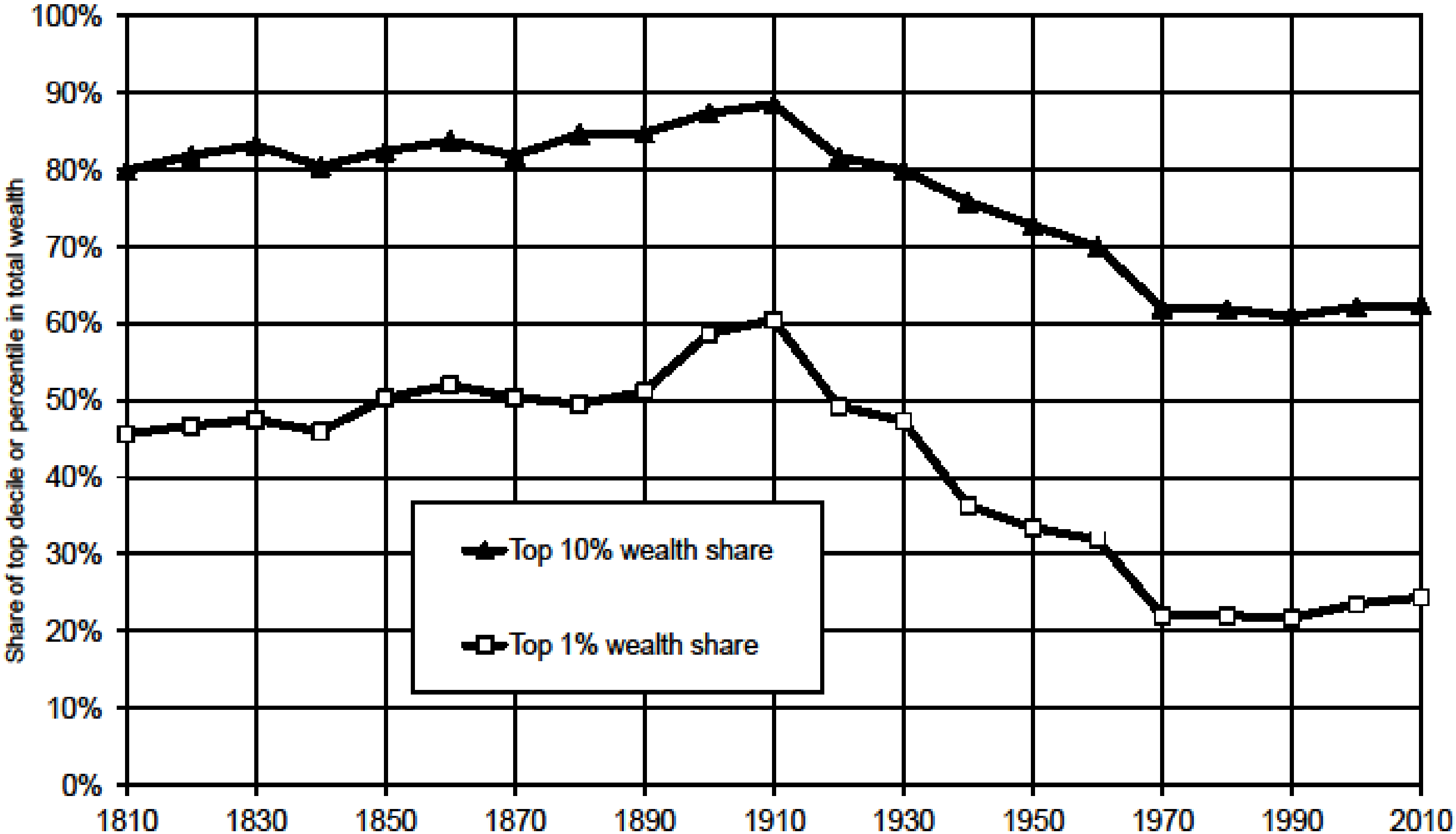
- On-going research on colonial inequality: very high top shares due to tiny colonial elite? See lecture 4

Basic facts about the long-run evolution of wealth concentration

- Europe: extreme wealth concentration during 19c, up until WW1: ≈90% for top 10% (incl. ≈60-70% for top 1%)
- No « natural » decline: if anything, upward trend until WW1; then sharp decline following WW shocks and until 1950s-60s
- Then wealth inequality ↑ since 1970s-80s. But it is still much lower in the 2010s (≈60-70% for top 10%, incl. 20-30% for top 1%) than in the 1910s
- US: wealth inequality was less extreme than in Europe in 19^c (there's always been a white middle class), but declined less strongly and therefore become larger than in Europe during 20^c

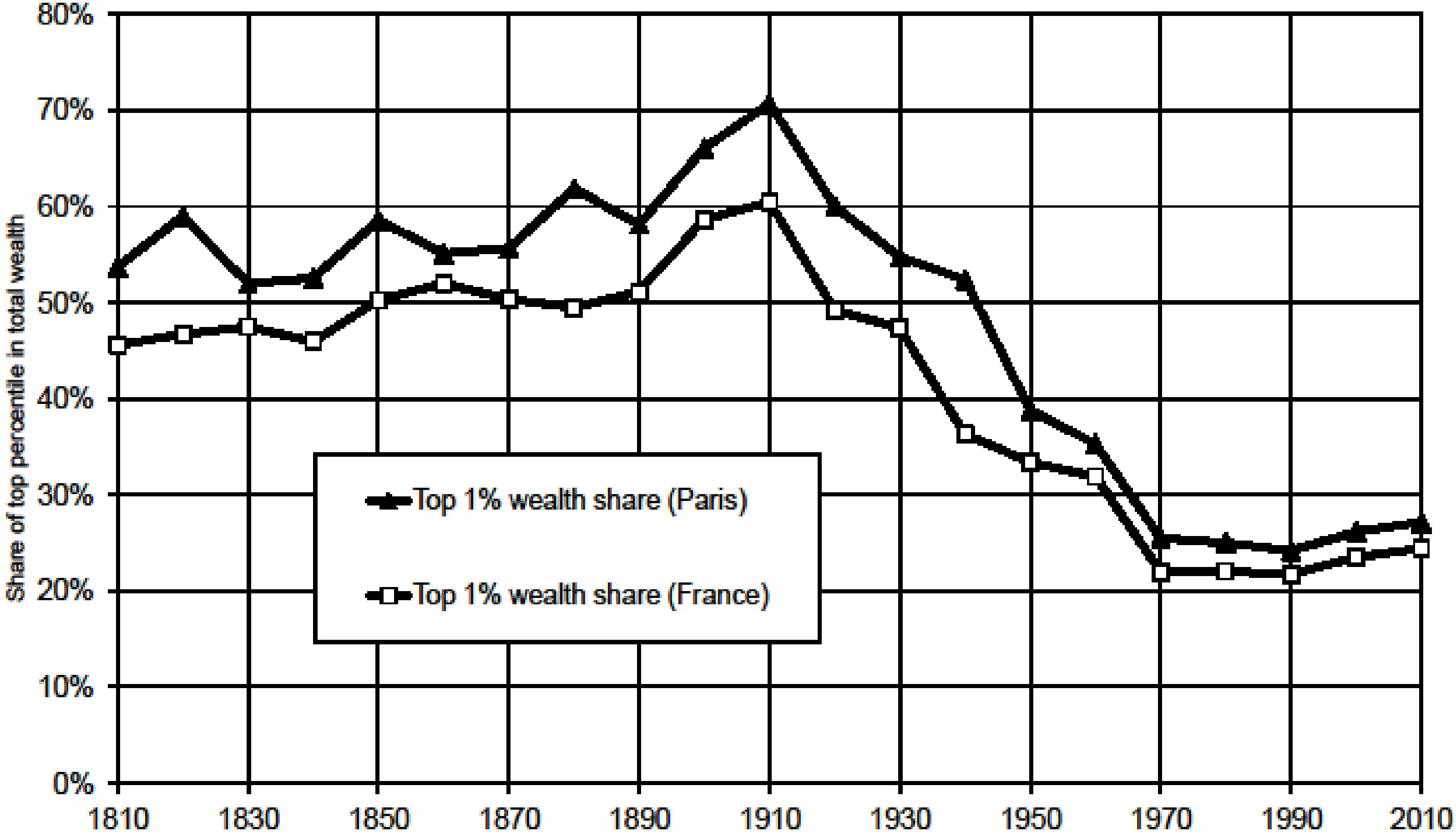
- How can we explain these facts?

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

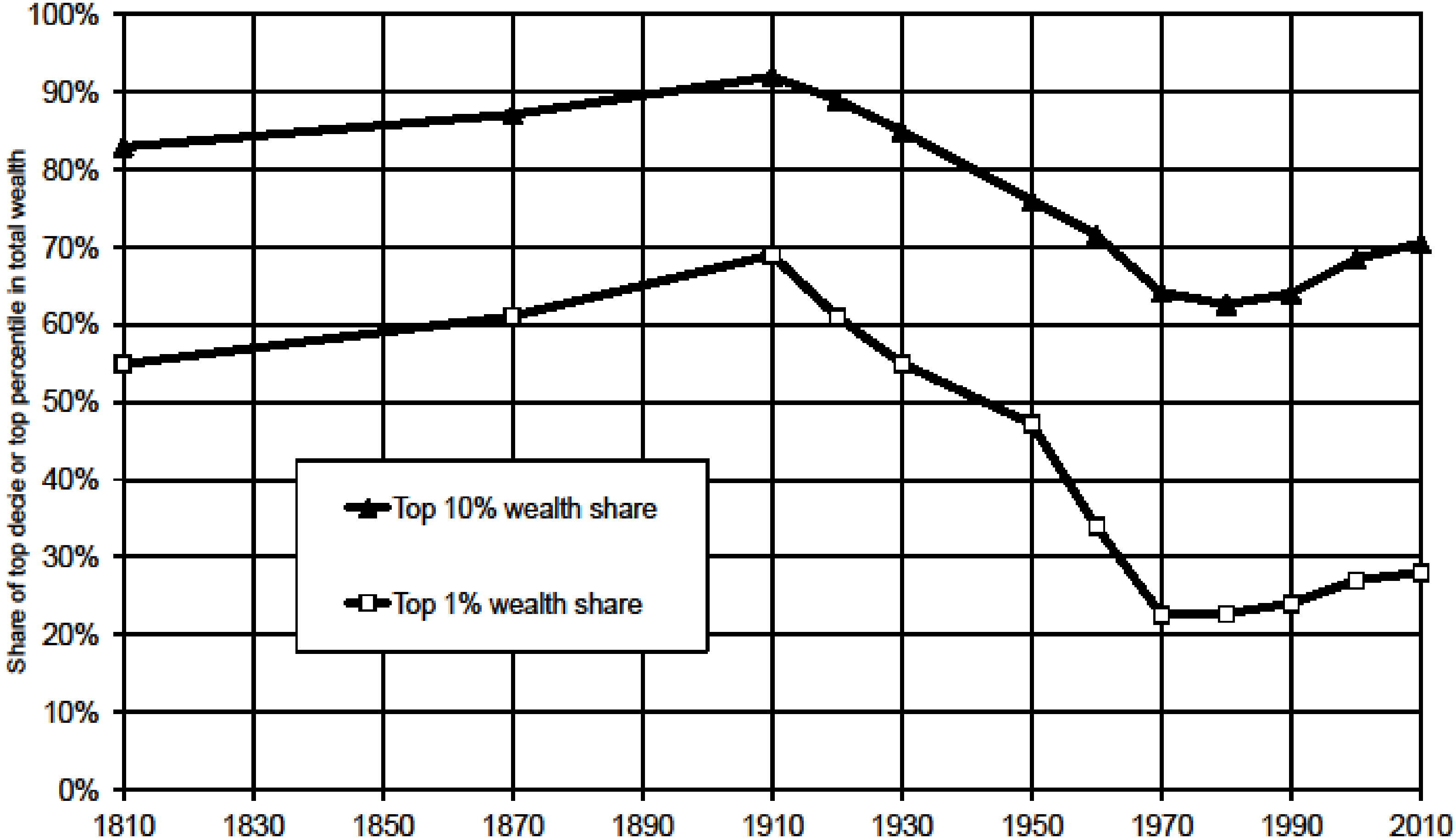


The top percentile (the top 1% wealth holders) owns 70% of aggregate wealth in Paris at the eve of World War I.
Sources and series: see piketty.pse.ens.fr/capital21c

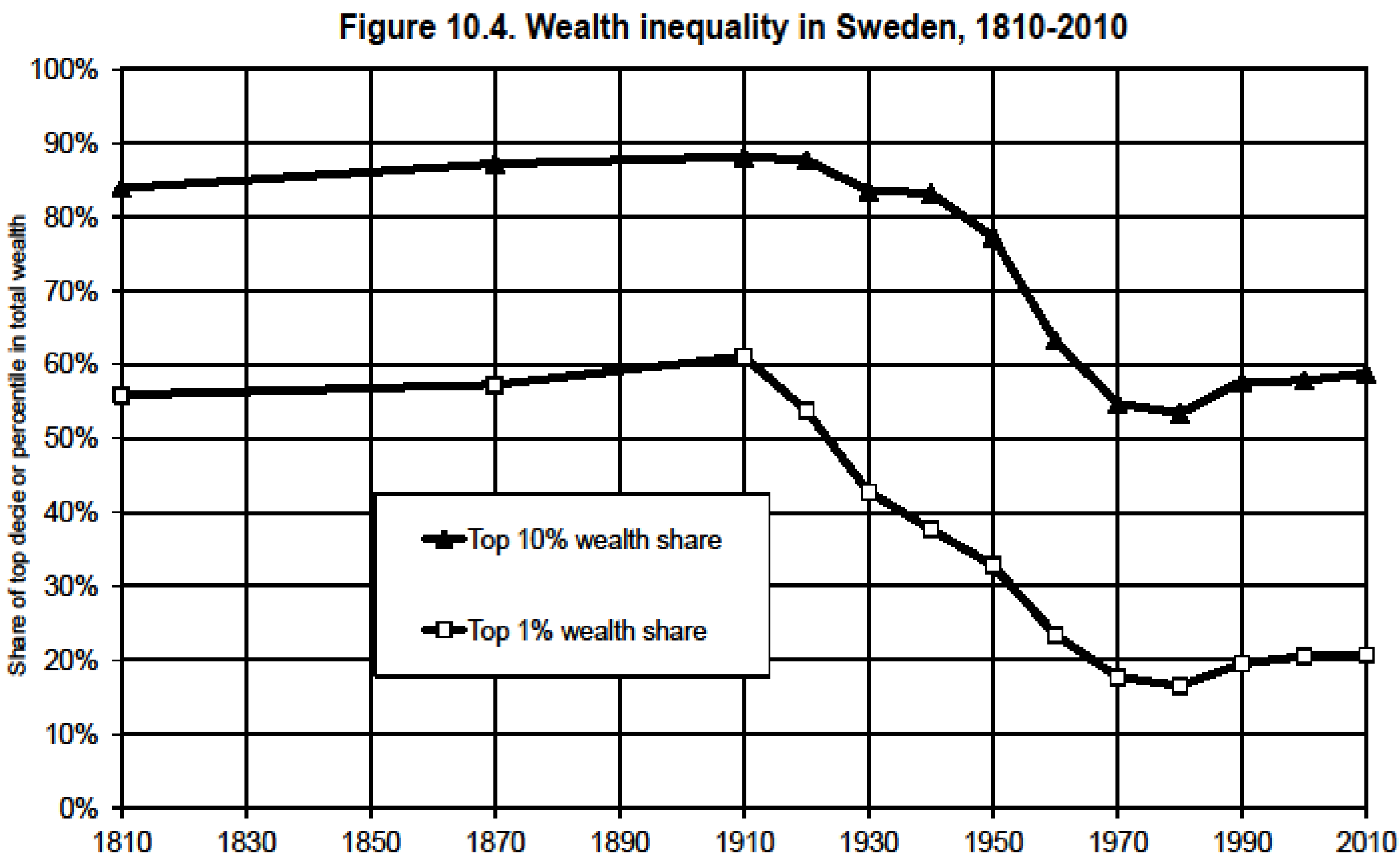
The failure of the French Revolution

- The fact that wealth concentration was so extreme in France & Paris around 1900-1910, and probably even higher than in 1780-1790 under Ancien Regime (or at least as large), is very striking
- The French Revolution, with end of aristocracy, equal formal rights (in particular property rights), and equal sharing between siblings, was supposed to lead to an equal society
- See Condorcet 1794, *Esquisse d'un tableau historique des progrès de l'esprit humain*, Leroy-Beaulieu 1881 *Essai sur la répartition des richesses et sur la tendance à une moindre inégalité des conditions* = very optimistic (& self-serving) view
- French Republican elites in late 19^{c} & early 20^{c}: « thanks to French Revolution, we are a country of equals, so we do not need progressive taxation, unlike aristocratic Britain » (→ France was the last country to introduce progressive income tax, in july 1914)
- Except that French inheritance archives show extreme inequality.. See PPVR, « Wealth concentration in a developing economy: Paris and France, 1807-1994 », [AER 2006]

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

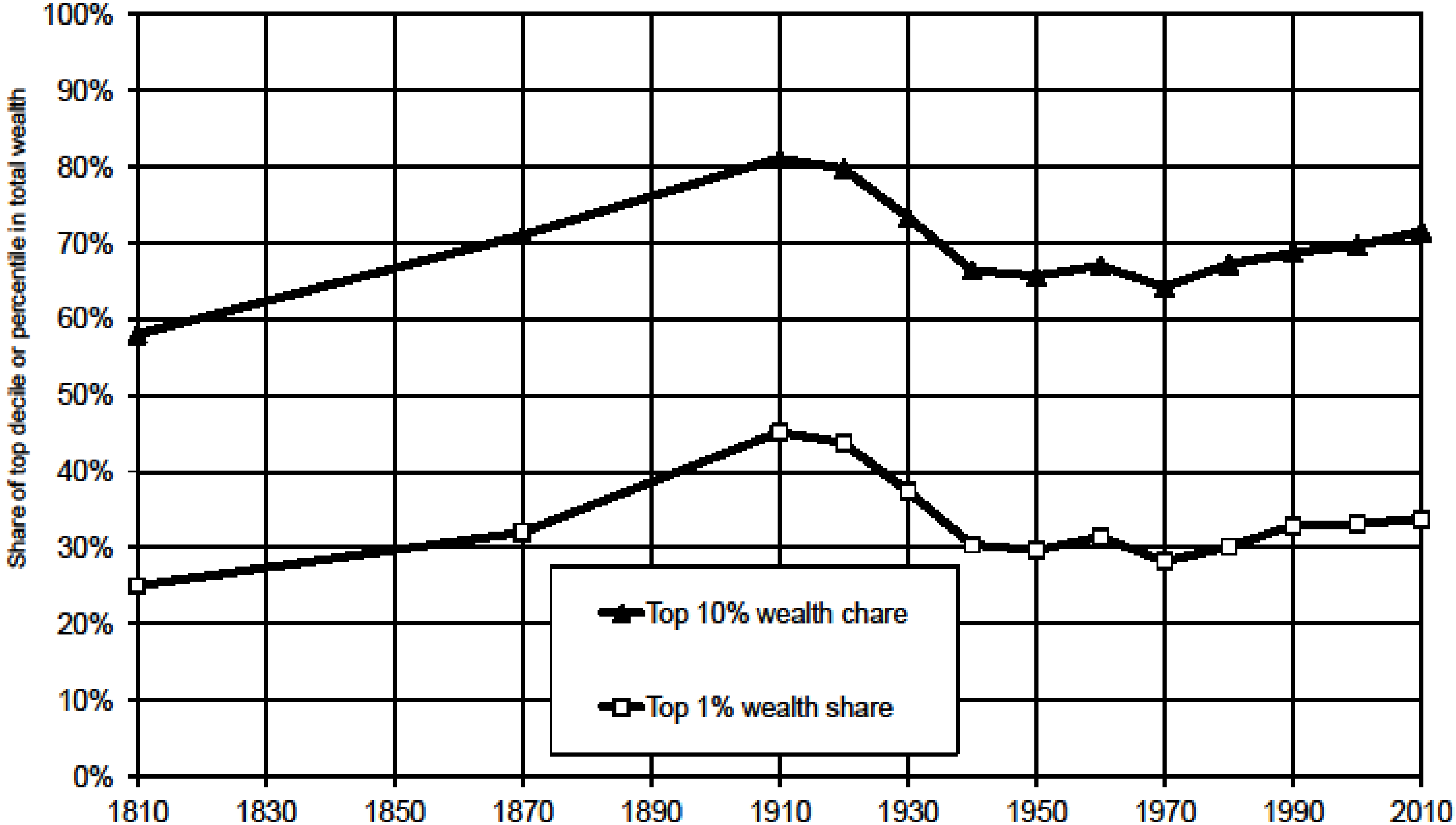


The top decile owns 80-90% of total wealth in 1810-1910, and 70% today.
Sources and series: see piketty.pse.ens.fr/capital21c.



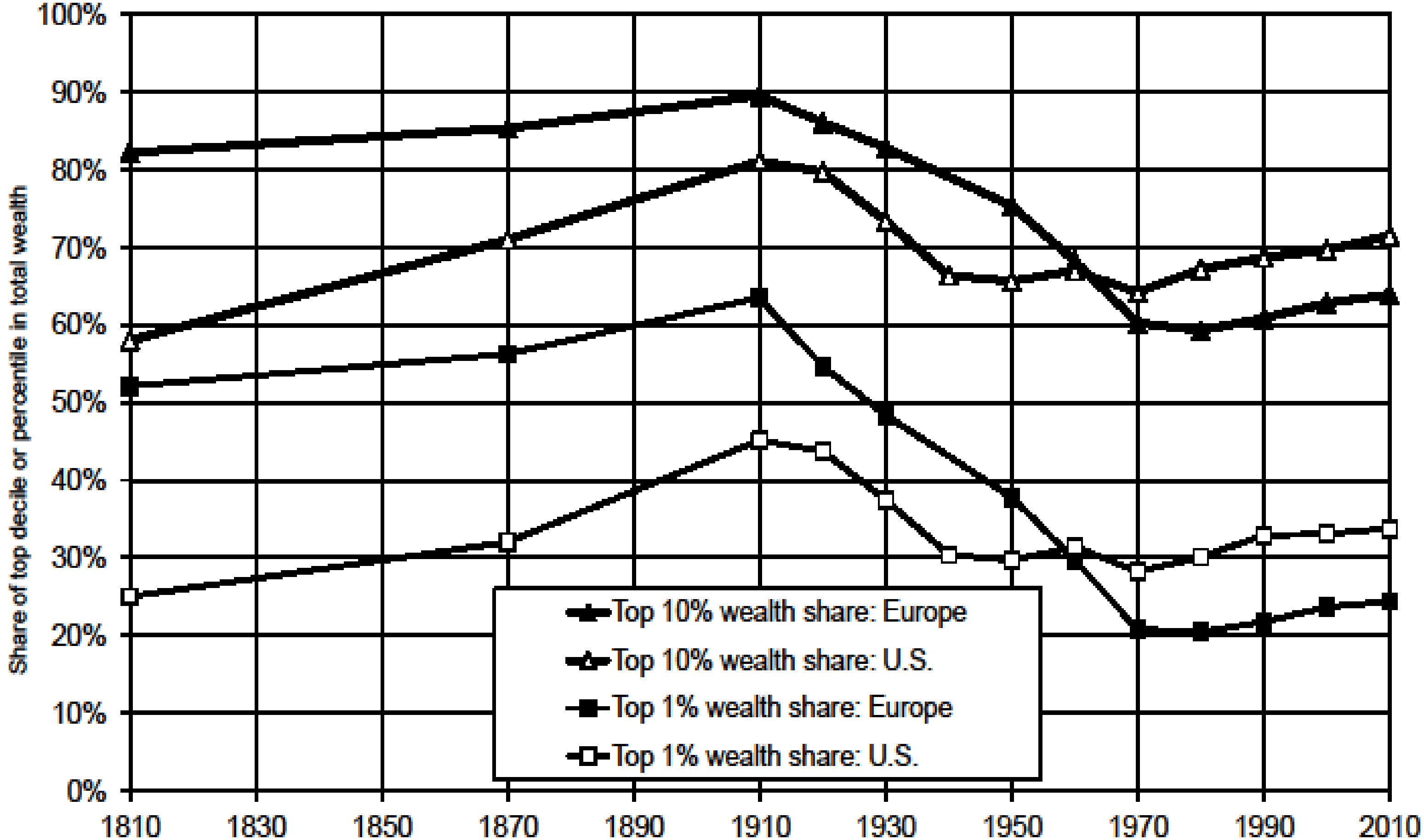
The top 10% holds 80-90% of total wealth in 1810-1910, and 55-60% today.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 10.5. Wealth inequality in the U.S., 1810-2010



The top 10% wealth holders own about 80% of total wealth in 1910, and 75% today.
Sources and series: see piketty.pse.ens.fr/capital21c.

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.

Table 10.1. The composition of Parisian porfolios in 1872-1912										
	Real estate assets (buildings, houses, land,.)	incl. Real estate Paris	incl. Real estate Province (outside Paris)	Financial assets	incl. Equity	incl. Private bonds	incl. Public bonds	incl. Other financial assets (cash, deposits, etc.)	Furnitures, jewels, etc.
Composition of total wealth										
1872	42%	29%	13%	56%	15%	19%	13%	9%	2%
1912	36%	25%	11%	62%	20%	19%	14%	9%	3%
Composition of top 1% wealth holders portfolios										
1872	43%	30%	13%	55%	16%	16%	13%	10%	2%
1912	32%	22%	10%	65%	24%	19%	14%	8%	2%
Composition of next 9%										
1872	42%	27%	15%	56%	14%	22%	13%	7%	2%
1912	41%	30%	12%	55%	14%	18%	15%	9%	3%
Composition of next 40%										
1872	27%	1%	26%	62%	13%	25%	16%	9%	11%
1912	31%	7%	24%	58%	12%	14%	14%	18%	10%

In 1912, real estate assets made up 36% of total wealth in Paris, financial assets made up 62%, and furnitures, jewels, etc. 3%. Sources: see piketty.pse.ens.fr/capital21c.

Problems with wealth inequality measurement

- Five data sources can be used to measure wealth inequality:

(1) household surveys (big under-reporting pb at the top)

(2) annual wealth tax data (ideal source if available… and well-administered)

(2) inheritance tax data (mortality multiplier techniques)

(3) income tax data (income capitalization method)

(4) billionnaire rankings (uncertain data source…; but still useful given the imperfections of other sources)

- All of these data sources are imperfect and need to be combined
- See recent study by Saez-Zucman 2015 on US wealth inequality using capitalization method
- See Vermeulen 2014, Kapeller 2014, 2015, Bach 2015, Grabka 2015 on supplementing household surveys with billionaire rankings at the the top

Problems with Pareto approximations

- In practice the problem is not so much to estimate the unique Pareto coefficient b, but rather the « Pareto shape » b(y)=E(y/y>z)/y

- See exemples of Pareto shapes for income distributions in France 1997-2006; see also Fournier 2015

- Current research: one can combine the different data sources to estimate Pareto shapes
- Estimating two-dimensional Pareto distributions (labor income vs capital income) & copula distributions (see Aaberge et al 2013) (see also Atkinson 2016)
- See WID website for on-going work & missing countries

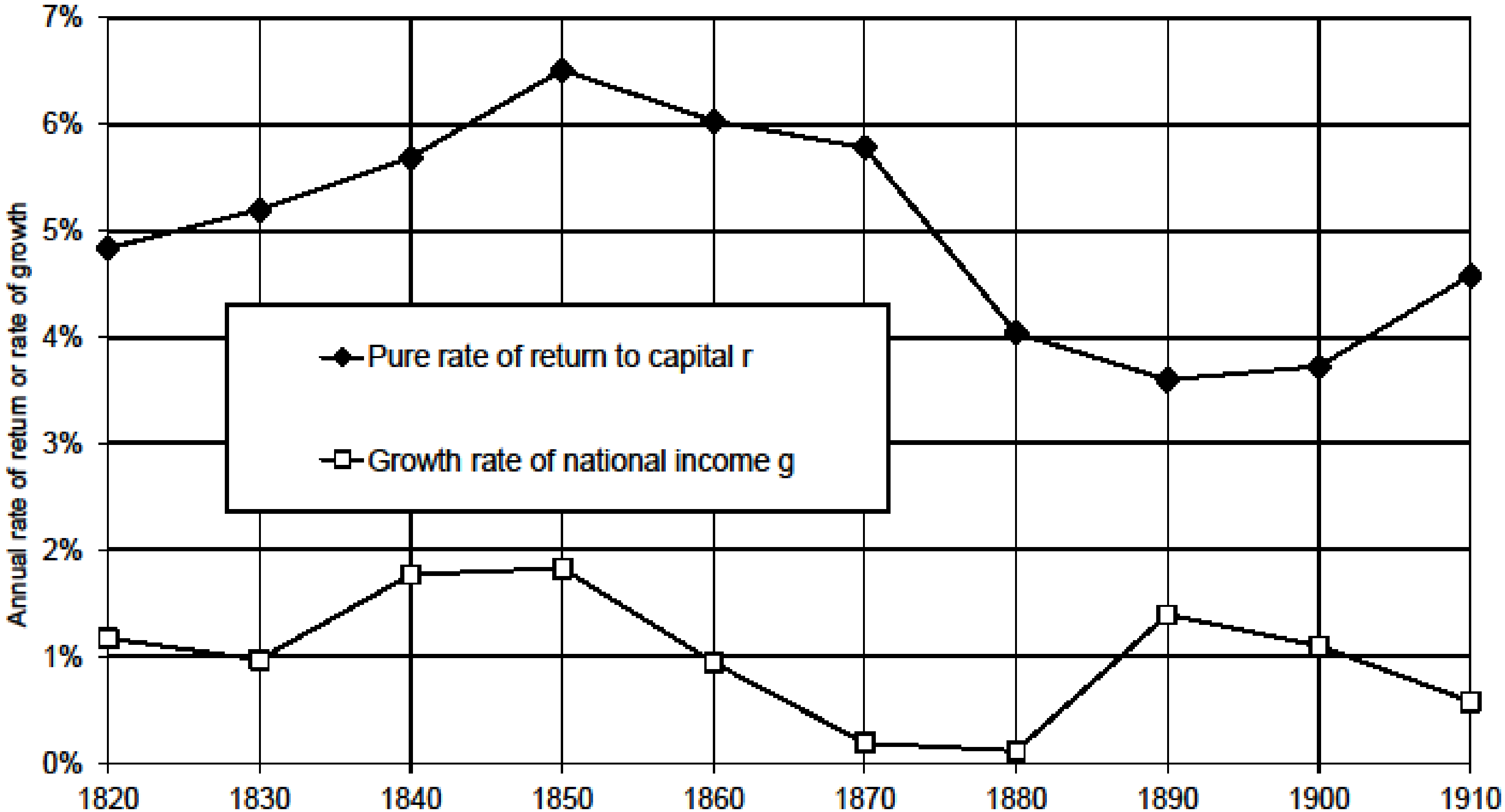
Which models of wealth accumulation and distribution can explain the facts?

- The fact that wealth inequality is always a lot larger than labor income inequality is hard to explain with a pure precautionary-saving model (wealth less unequal than labor income) or a pure life-cycle model (wealth as unequal as labor income)
- One needs dynamic models with cumulative shocks over long horizon – random shocks, inheritance – in order to account for the high wealth concentration that we observe in the real world
- Infinite-horizon dynastic model: any inequality is self-sustaining

- **Dynamic random shocks model: inequality ↑ as r – g ↑**

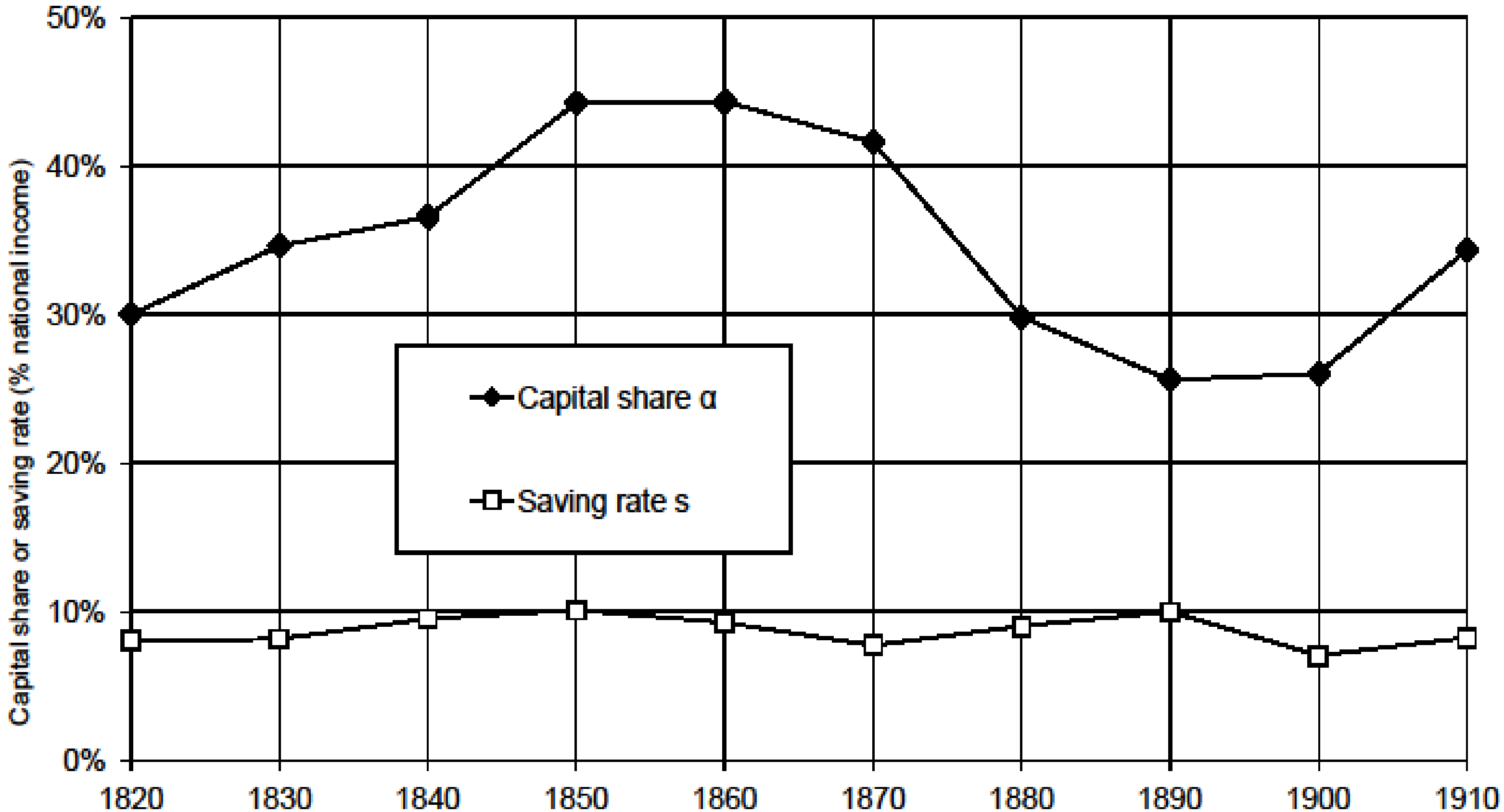
→ This can explain both the historical evolution and the cross-country variations: see Course notes on wealth models & Piketty-Zucman, « Wealth & inheritance in the long run », HID 2015 (section 5.4)

Figure 10.7. Return to capital and growth: France 1820-1913



The rate of return on capital is a lot higher than the growth rate in France between 1820 and 1913.
Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 10.8. Capital share and saving rate: France 1820-1913



The share of capital income in national income is much larger than the saving rate in France between 1820 and 1913.

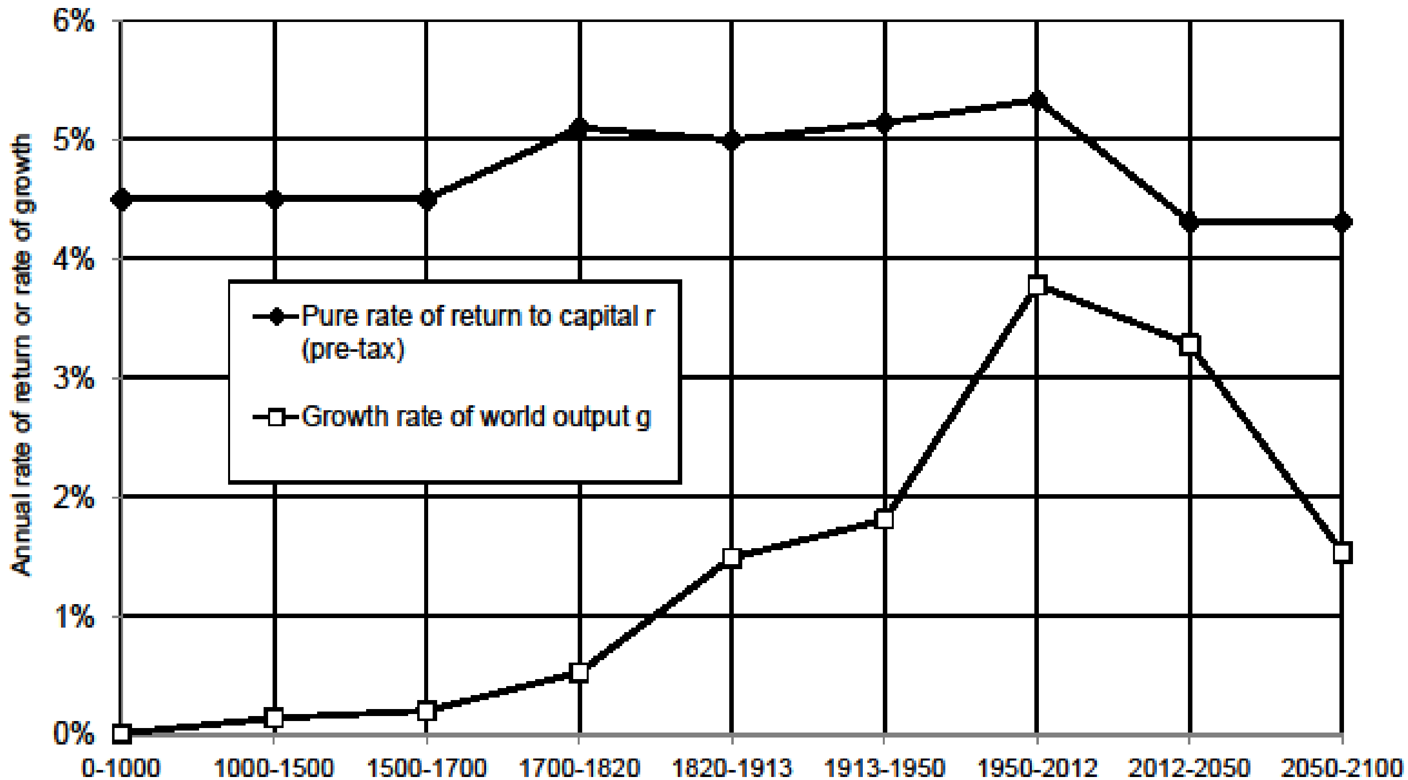
Sources and series: see piketty.pse.ens.fr/capital21c.

- Key finding: with multiplicative random shocks, one can generate very high levels of wealth inequality; the exact level of steady-state wealth inequality depends a lot on the differential r – g

- This can **contribute** to explain:

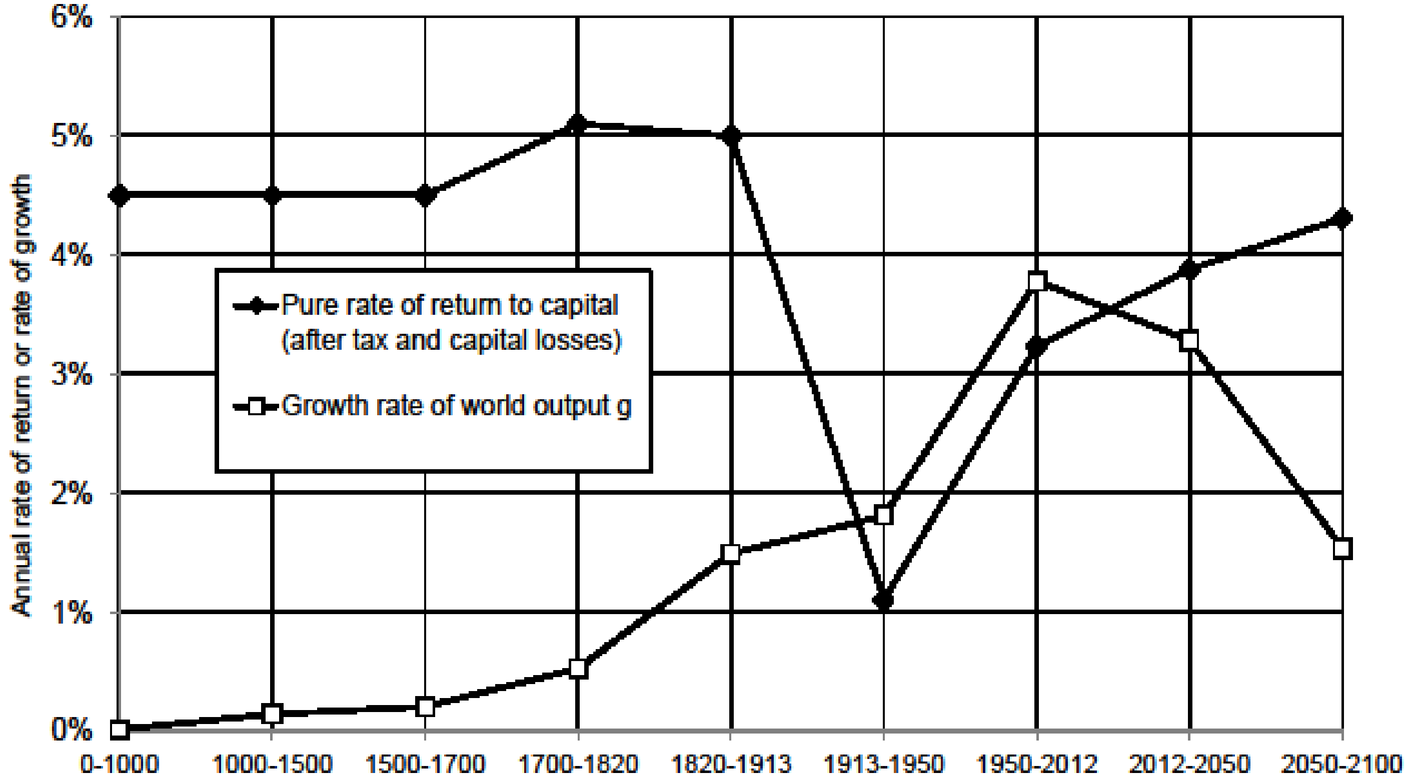
- extreme wealth concentration in Europe in 19c and during most of human history (high r-g)
- lower wealth inequality in the US in 19c (high g)
- the long-lasting decline of wealth concentration in 20c (low r due to shocks, high g)
- and the return of high wealth concentration since late 20c/early 21c (lowering of g, and rise of r, in particular due to tax competition)

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



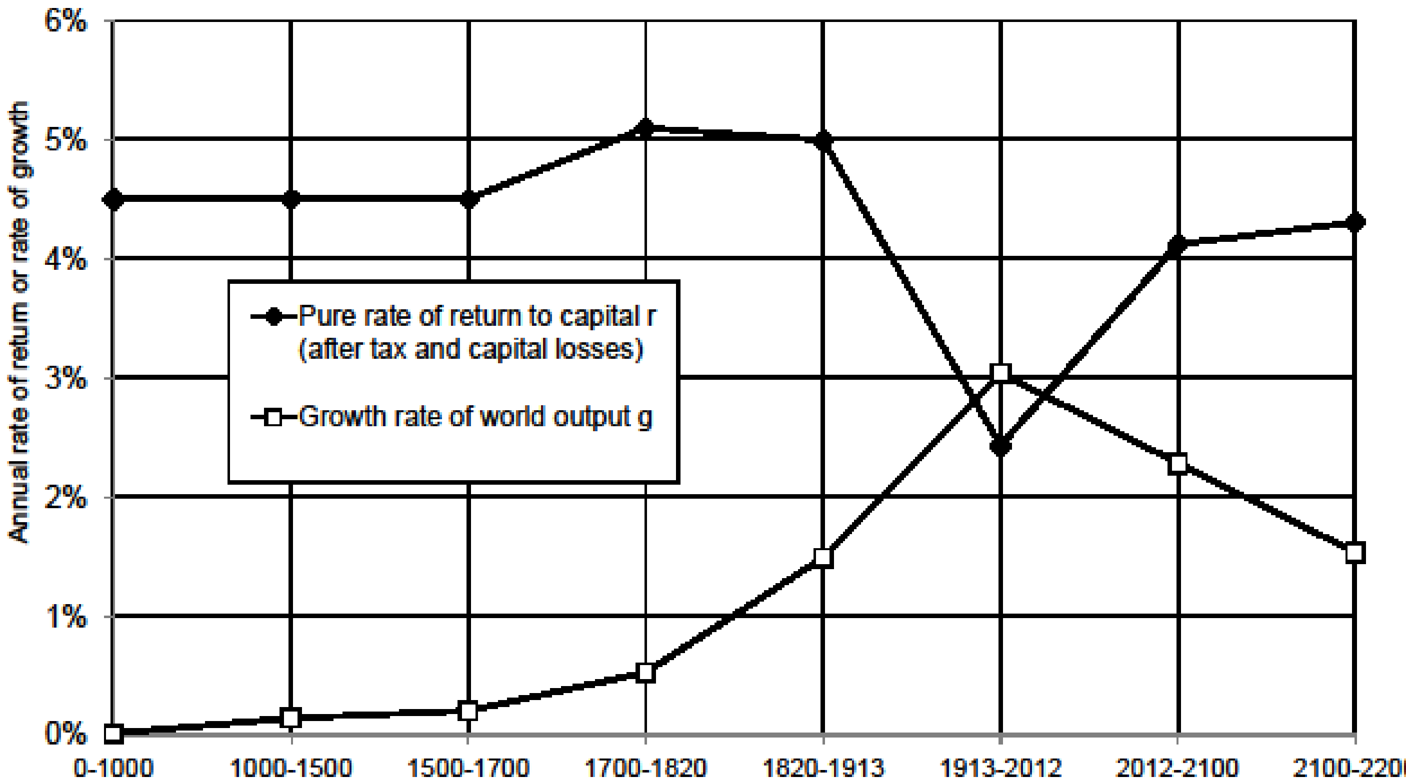
The rate of return to capital (pre-tax) has always been higher than the world growth rate, but the gap was reduced during the 20th century, and might widen again in the 21st century.
Sources and series: see piketty.pse.ens.fr/capital21c

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 10.11. After tax rate of return vs. growth rate at the world level, from Antiquity until 2200



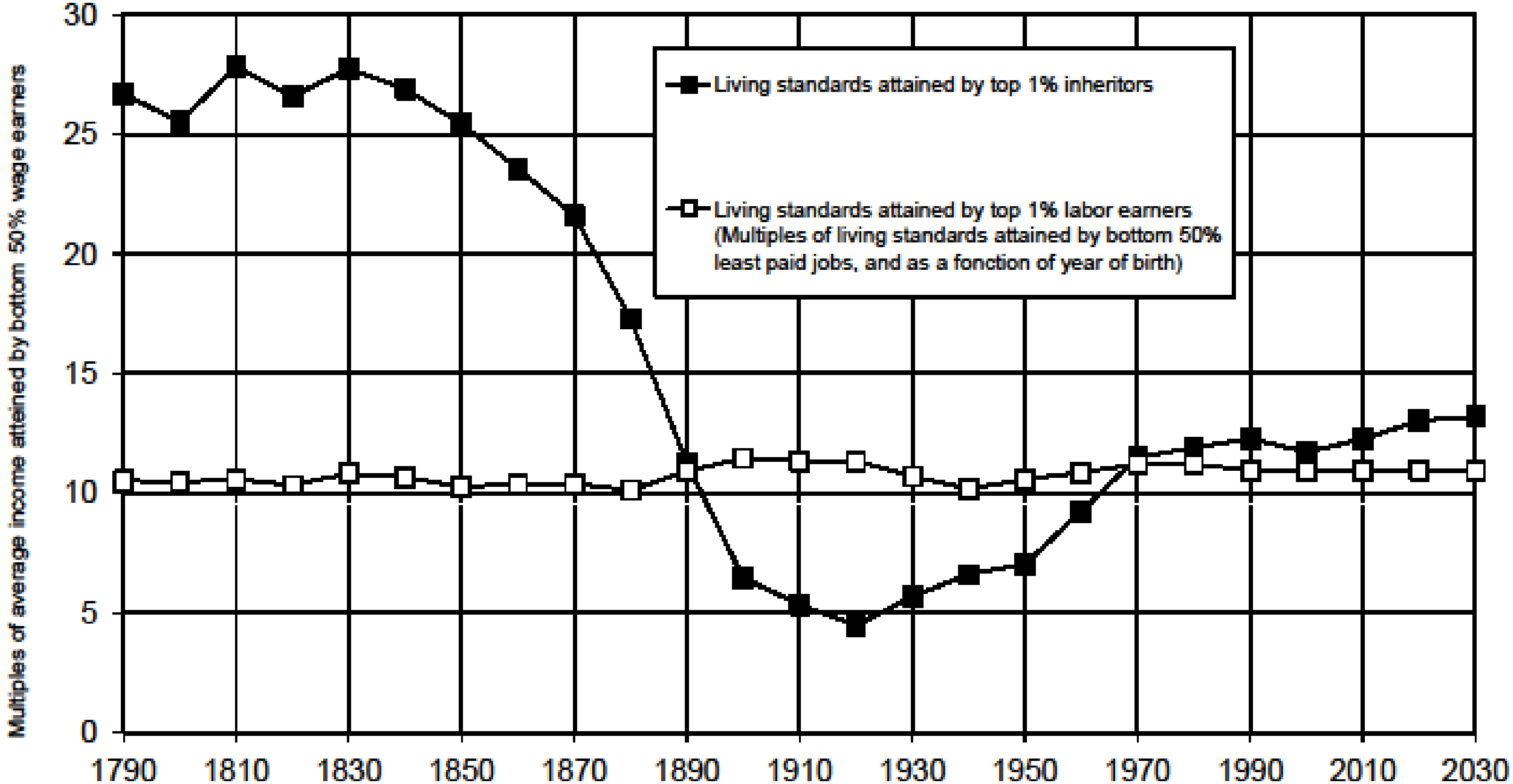
The rate of return to capital (after tax and capital losses) fell below the growth rate during the 20th century, and might again surpass it in the 21st century. Sources and series: see piketty.pse.ens.fr/capital21c

Inheritance vs work

- If we put all findings together (wealth-income ratios, labor income inequality, wealth inequality), we can compute for each generation the relative importance of inheritance & work in their life opportunities
- **In 19c**, inheritance was key to success if you want to reach very high living standards: see comparison between top 1% inheritance vs top 1% labor income (Balzac, Rastignac, Vautrin) (→ **patrimonial society**)
- **In 20c**, wealth-income ratios fell, together with wealth concentration: for the first time maybe in history, work was more important than inheritance in order to reach the highest possible living standards in society (→ **the accidental rise of meritocracy**)
- **In 21c, return of aggregate inheritance to 19c levels, but with less extreme wealth concentration**: fewer very large inheritors (sufficientely large to stop working entirely), but more moderately large inheritors (larger than bottom 50% lifetime labor earnings)

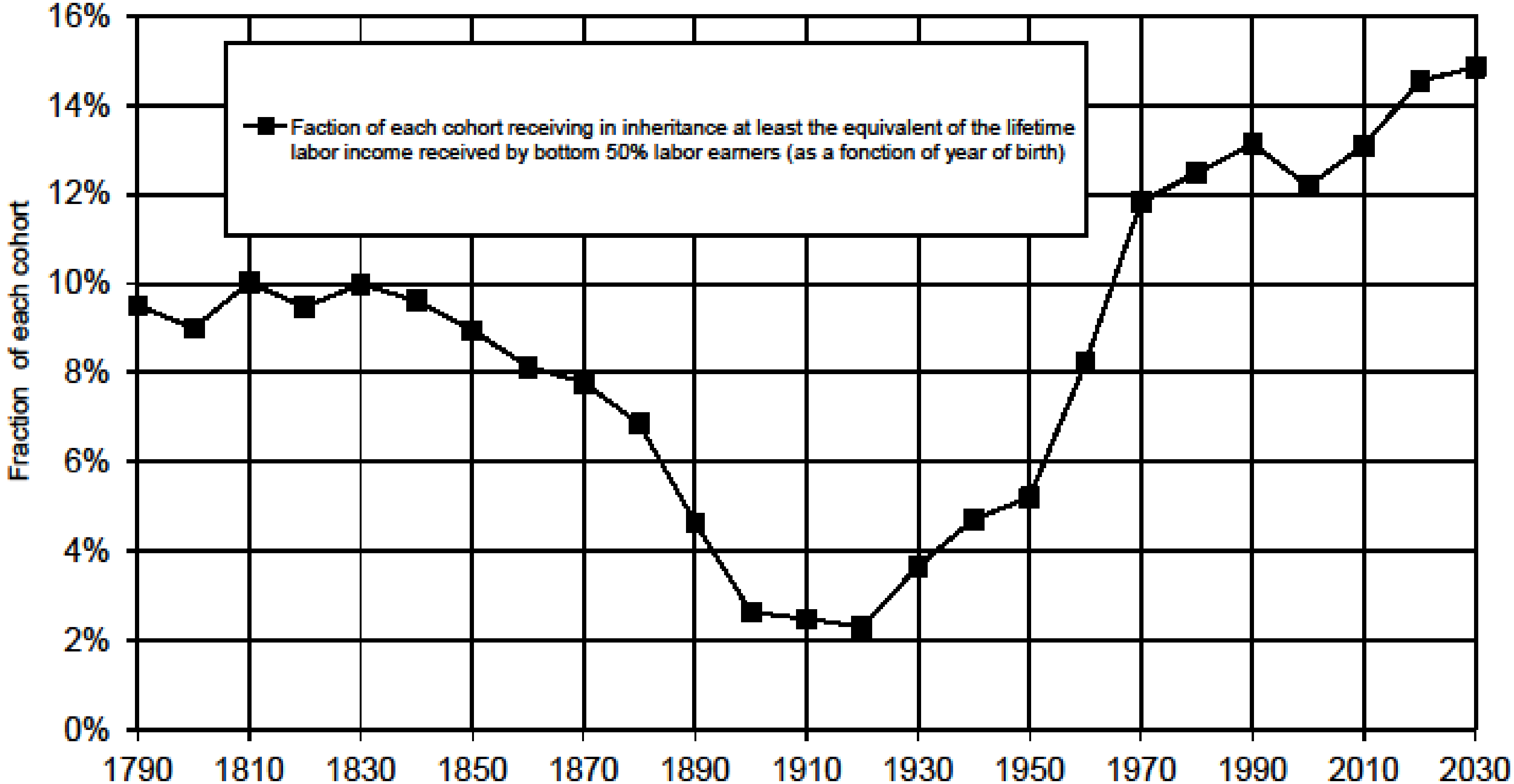
(for more details, see « On the long run evolution of inheritance: France 1820-2050 », QJE 2011 & Course Notes on Wealth Models)

Figure 11.10. The dilemma of Rastignac for cohorts born in years 1790-2030



In the 19th century, the living standards that could be attained by the top 1% inheritors were a lot higher than those that could be attained by the top 1% labor earners. Sources and series: see piketty.pse.ens.fr/capital21c.

Figure 11.11. Which fraction of a cohort receives in inheritance the equivalent of a lifetime labor income?



Within the cohorts born around 1970-1980, 12-14% of individuals receive in inheritance the equivalent of the lifetime labor income received by the bottom 50% less well paid workers. Sources and series : see piketty.pse.ens.fr/capital21c

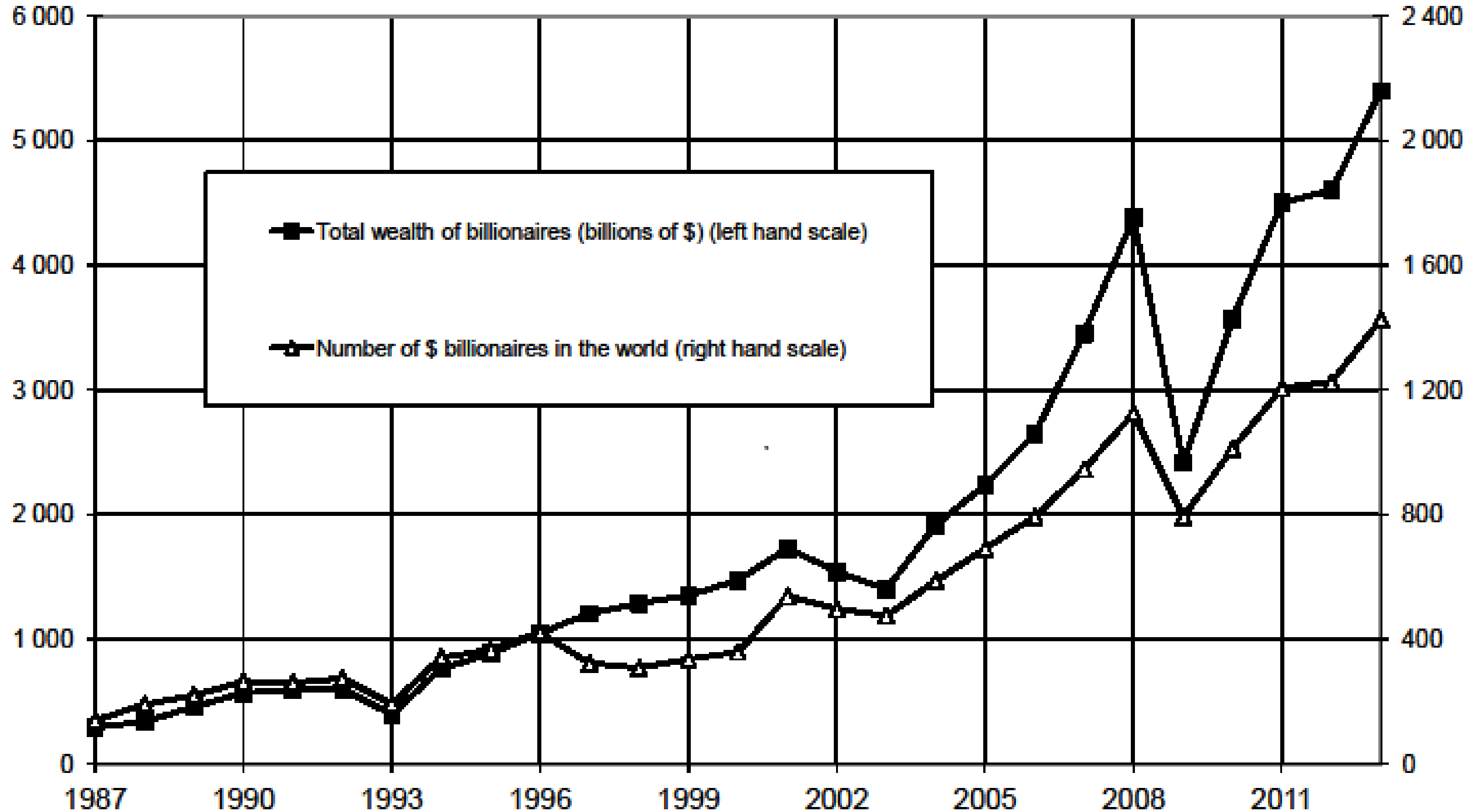
The world dynamics of the wealth distribution

- It is more and more difficult to study wealth inequality at the national level: one needs to take a global perspective
- In the long run, in case r – g ↑ at the global level, then world wealth inequality will ↑
- **Other important force**: in today's global capital markets, r might well vary with wealth level w, i.e. r=r(w) (scale economies in portfolio management and/or risk taking)

(≠ perfect k market: everybody receives r = world F_K)

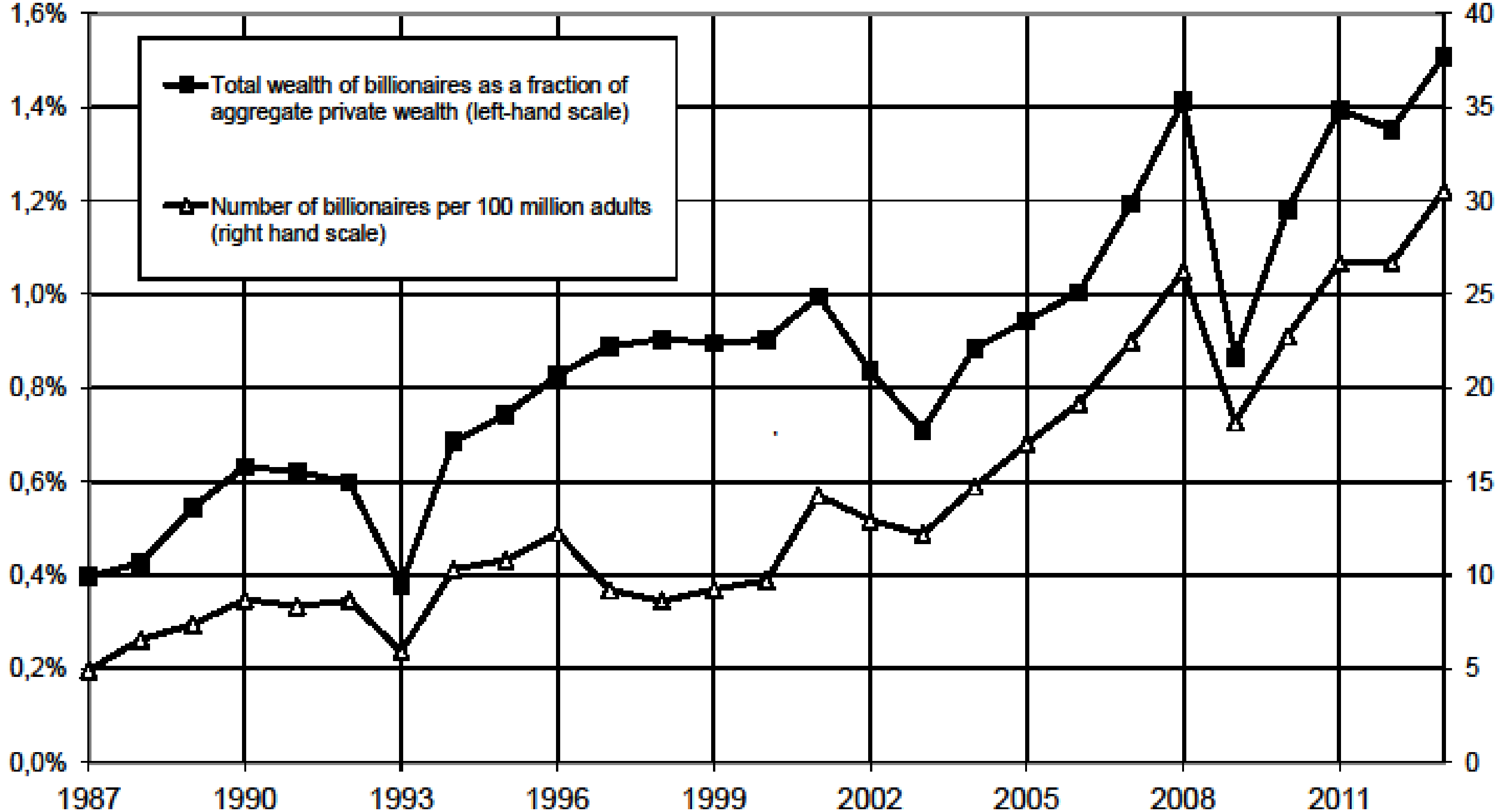
- See data from Forbes rankings and university endowments on varying r = r(w)

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



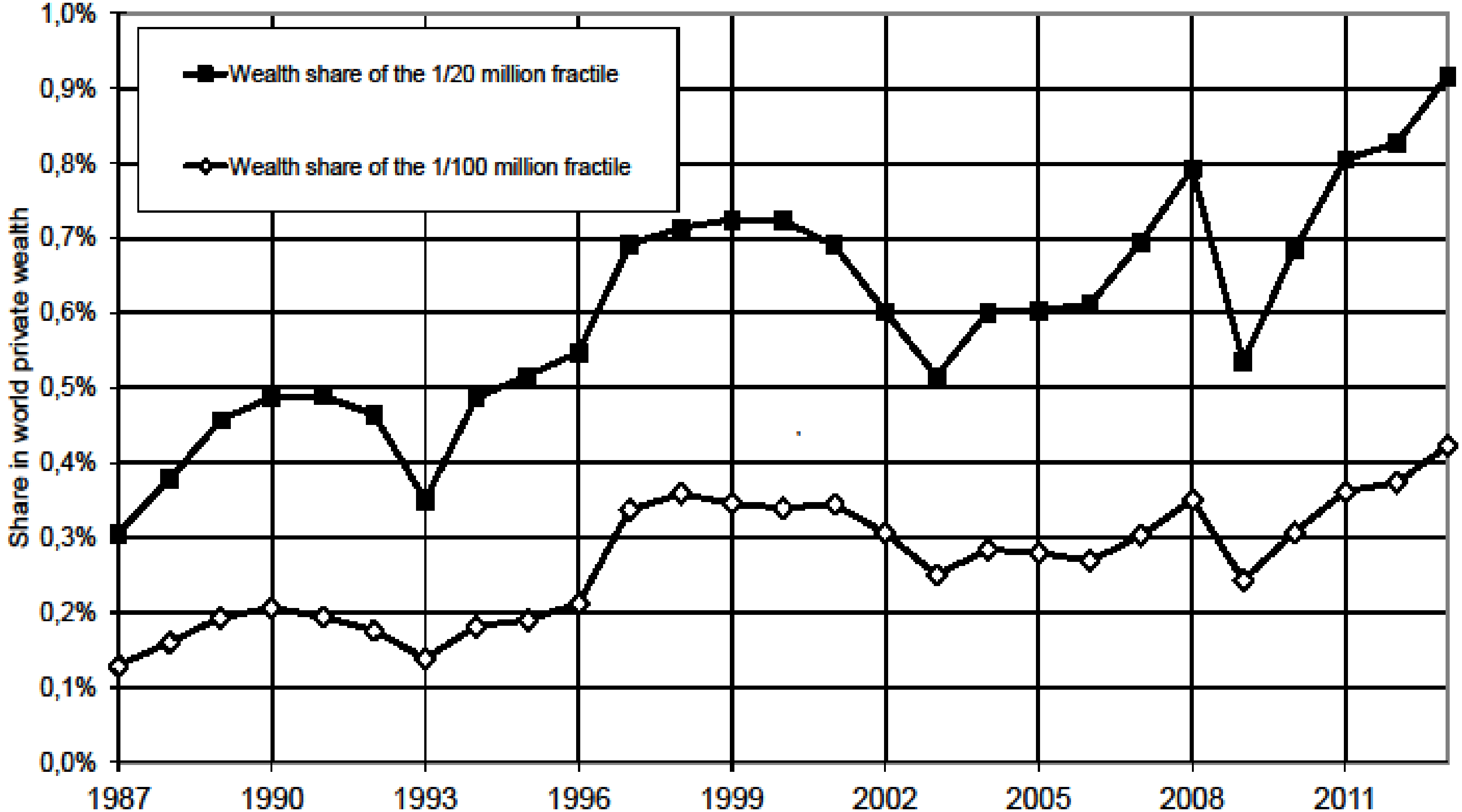
Between 1987 and 2013, the number of $ billionaires rose according to Forbes from 140 to 1400, and their total wealth rose from 300 to 5 400 billions dollards. Sources and series: see piketty.pse.ens.fr/capital21c.

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 S12.1. The growth rate of top wealth portfolios in the world, 1987-2013		
Average real growth rate per year *(after deduction of inflation)*	1987-2013	1990-2010
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%	4,1%
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%	3,8%
Average world wealth per adult	2,1%	2,0%
Average world income per adult	1,4%	1,5%
World adult population	1,9%	1,9%
World GDP	3,3%	3,4%

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.

- Data on university endowments: much higher quality than Forbes data on individual wealth
- ≈ 800 universities in the US, with average endowment ≈ 500 millions $: aggregate endowment ≈ 400 billions $ in 2013
- This is << than global wealth billionaires (≈ 5500 billions $, i.e. 5,5 trillions $ = about 1,5% of world wealth ≈ 350-400 trillions $)
- But at least universities provide very detailed data on their porfolio strategy and observed rates of return

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 millions $ (226)	7,1%
dont: Endowments less than 100 millions $ (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.

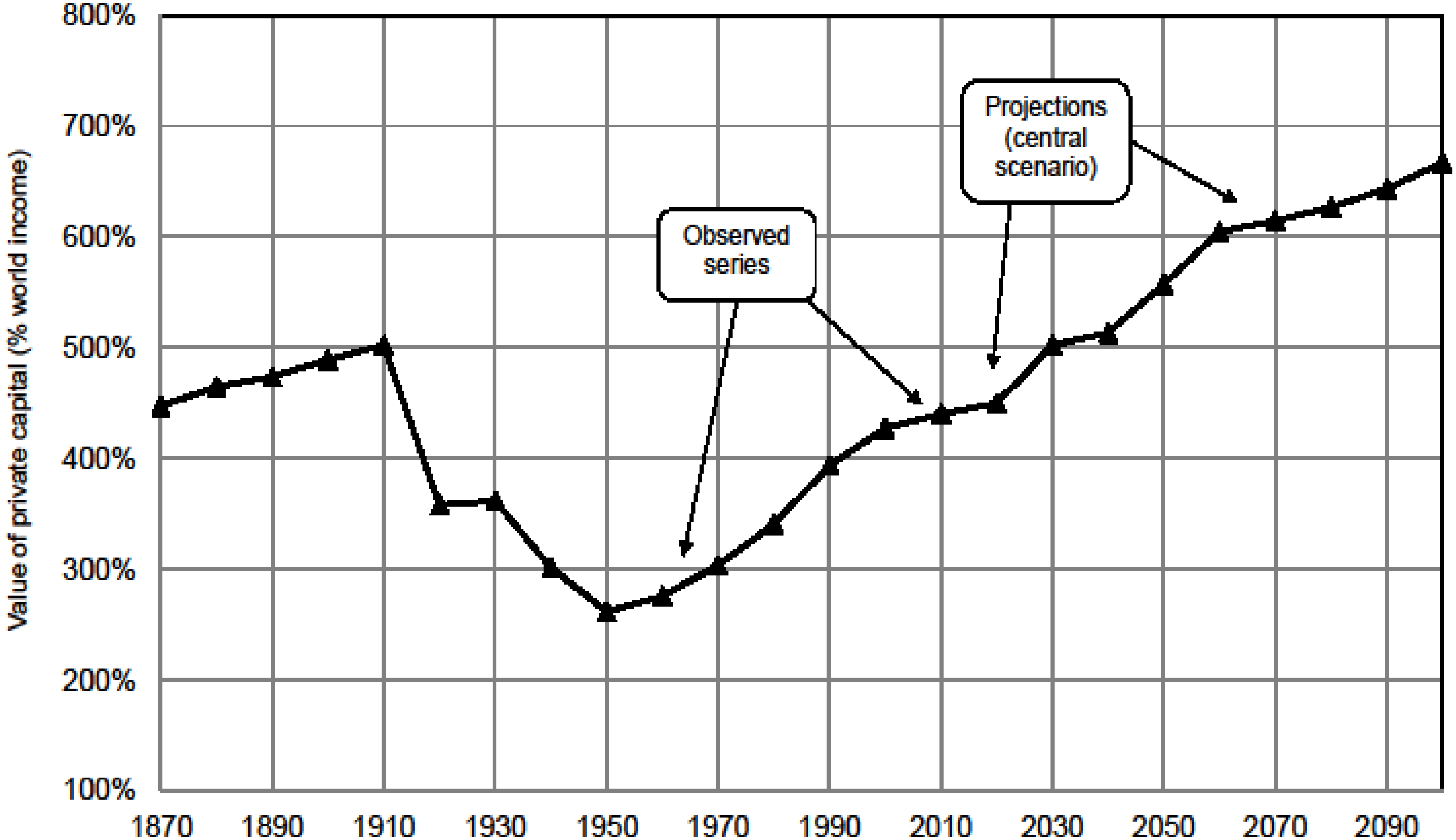
Table S12.2. The return on the capital endowments of U.S. universities, 1980-2010

Average real annual rate of return *(after deduction of inflation and all administrative costs and financial fees)*	1980-2010	1990-2010
All universities (850)	8,2%	7,2%
incl.: Harvard-Yale-Princeton	10,2%	10,0%
incl.: Endowments higher than 1 billion $ (60)	8,8%	7,8%
incl. Endowments between 500 millions and 1 billion $ (66)	7,8%	6,3%
incl. Endowments between 100 and 500 millions $ (226)	7,1%	5,9%
dont: Endowments less than 100 millions $ (498)	6,2%	5,1%

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.

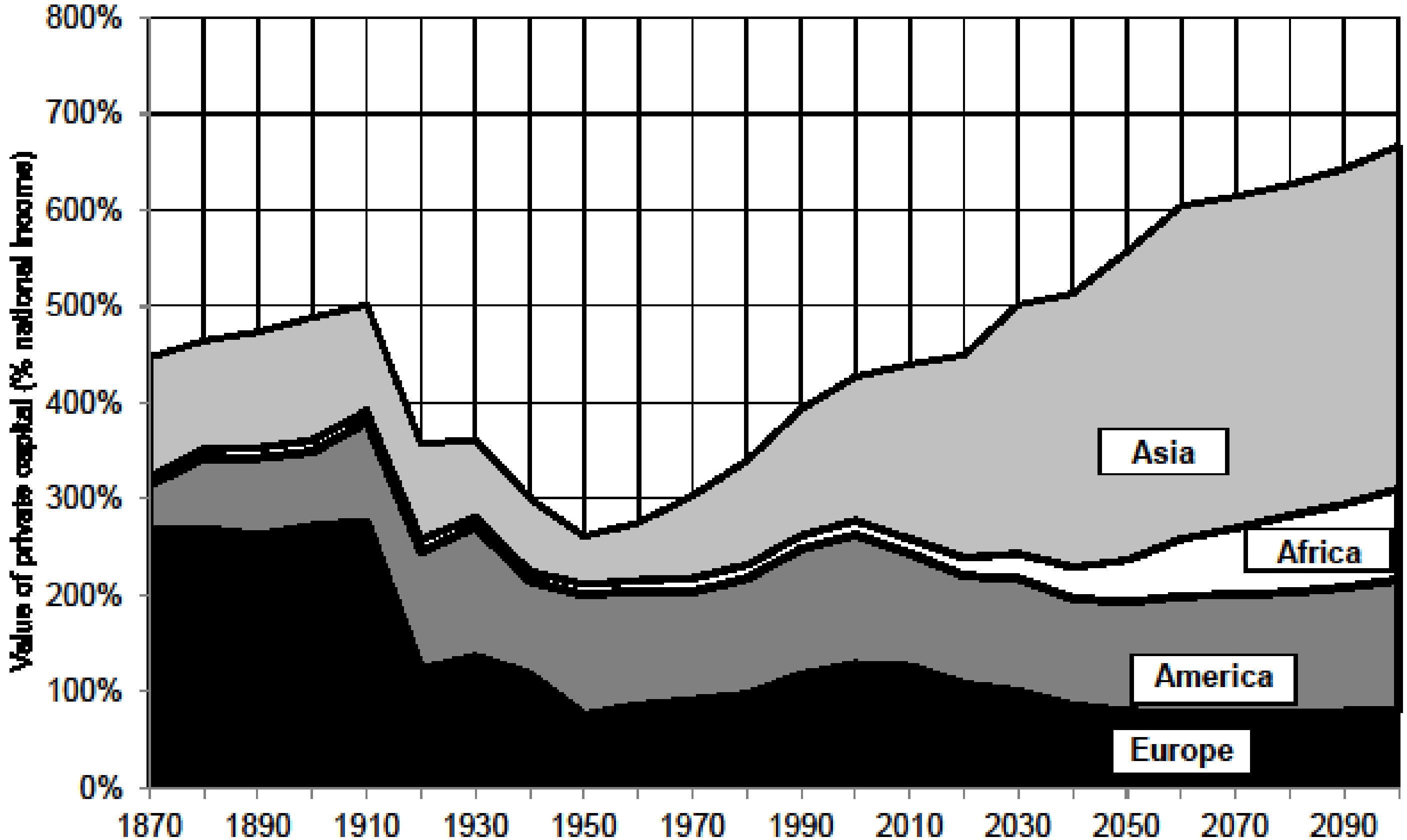
- Returns on sovereign wealth funds (SWF) seem to very from very high (Abu Dhabi: ≈ 700 billions € = twice as large as all US universities endowments combined) to relatively low (Norway, Saudi Arabia: less risk, huge US public debt component: economics or politics?)
- But data is relatively low quality: very little transparency
- All SWFs: about 5,5 trillions (≈ global billionaires), including 3,5tr for oil countries and 2tr for non-oil countries (1tr for China)
- Other reason for divergence: different saving rates, e.g. because of different pension strategies, can lead to huge net foreign asset positions ($\beta_1=s_1/g > \beta_2=s_2/g$), quite independantly from $r > g$; but of course low g and $r > g$ can amplify initial NFAs

Figure 12.4. The world capital/income ratio, 1870-2100



According to the simulations (central scenario), the world capital/income ratio might be near to 700% by the end of the 21st century. Sources and series: see piketty.pse.ens.fr/capital21c.

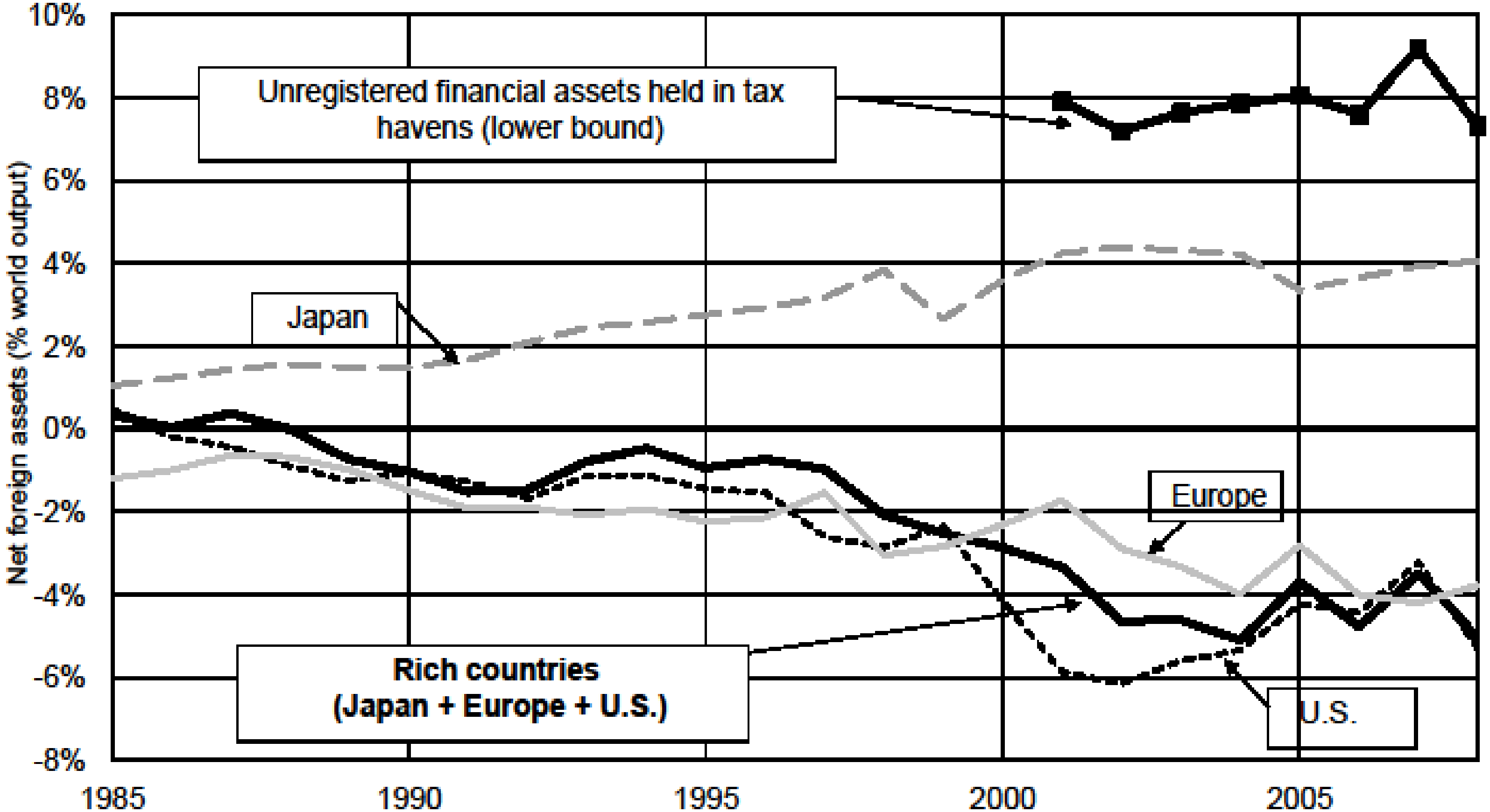
Figure 12.5. The distribution of world capital 1870-2100



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.

- Is « oligarchic divergence » (rise of global billionaire wealth: billionaires own a rising share of global wealth) or « international divergence » (rise of foreign wealth: countries own other countries) more likely?
- Both can happen. But international divergence is relatively easier to deal with (capital controls). Oligarchic divergence = harder to deal with, because it requires detailed information on individual wealth levels and strong international coordination.
- As of today, offshore wealth is enough to turn rich countries' NFA from <0 into >0; could rise in the future
- See Zucman QJE 2013, « The missing wealth of nations: are Europe and the US net debtors or net creditors? »; « Taxing across borders: Tracking personal wealth and corporate profits », JEP 2014

Figure 12.6. The net foreign asset position of rich countries



Unregistered financial assets heldin tax havens are higher than the official net foreign debt of rich countries.
Sources and series: see piketty.pse.ens.fr/capital21c.

Table 1
The World's Offshore Financial Wealth

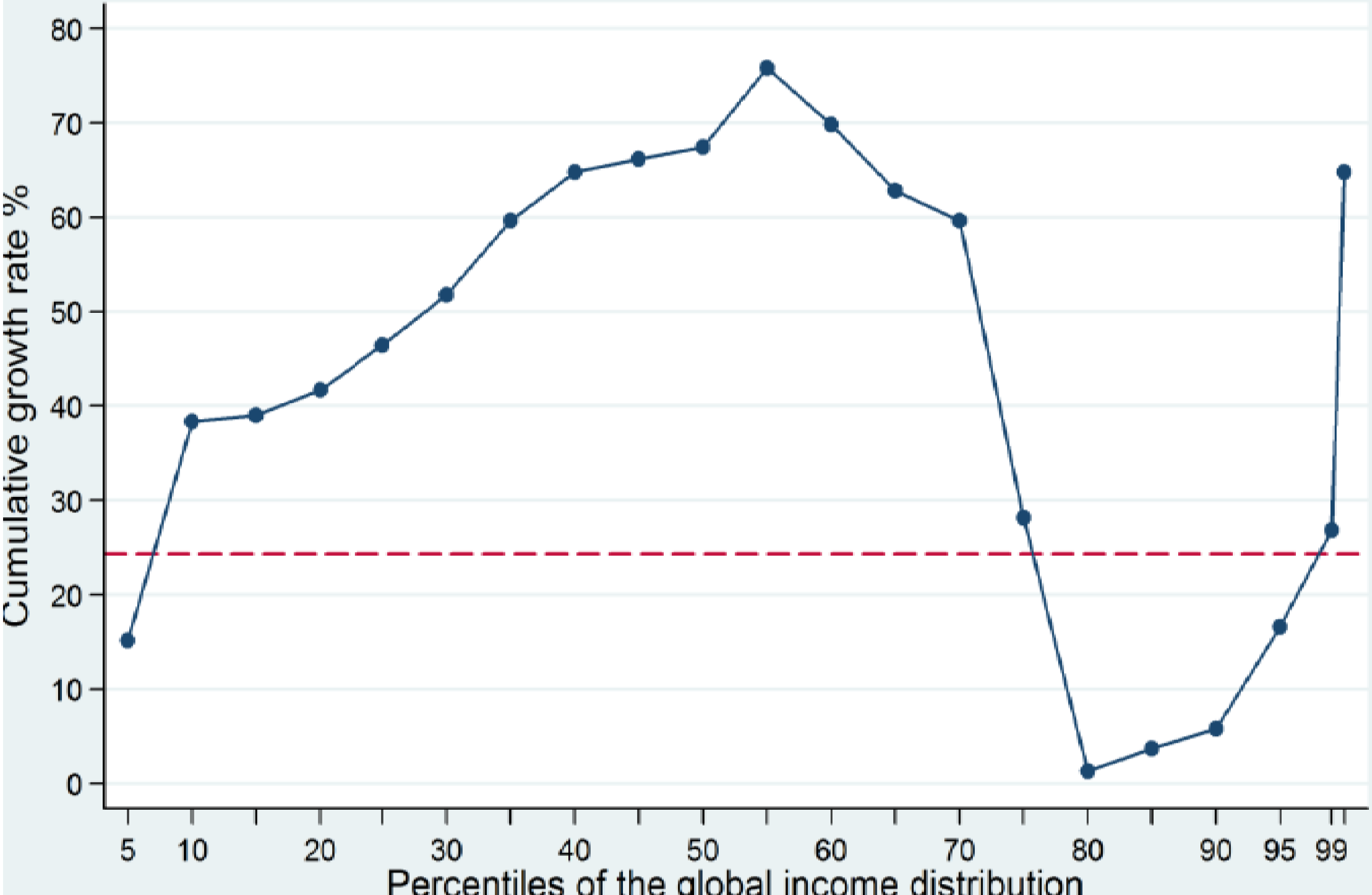
	Offshore wealth ($ billions)	*Share of financial wealth held offshore*	*Tax revenue loss ($ billions)*
Europe	2,600	10%	75
United States	1,200	4%	36
Asia	1,300	4%	35
Latin America	700	22%	21
Africa	500	30%	15
Canada	300	9%	6
Russia	200	50%	1
Gulf countries	800	57%	0
Total	**7,600**	**8.0%**	**190**

Source: Author's computations (see Zucman 2013a, b) and online Appendix.
Notes: Offshore wealth includes financial assets only (equities, bonds, mutual fund shares, and bank deposits). Tax revenue losses only include the evasion of personal income taxes on investment income earned offshore as well as evasion of wealth, inheritance, and estate taxes.

Summing up: what have we learned about global inequality dynamics since 1800?

- History shows that inequality often goes too far (Europe's 19c extreme wealth concentration, colonial inequality, etc.): we need more transparency about wealth and income dynamics & appropriate policy intervention (progressive taxation etc.) if we want to avoid this
- World inequality dynamics involve complex & contradictory trends: convergence between countries, but rising inequality within countries, & rising inequality at the top (for top labor incomes and top wealth)
- One way to summarize these contradictory trends: Lakner-Milanovic 2013 « global growth incidence curve » 1988-2008
- Other work on global distribution: see Anand-Segal 2015, Davies-Shorrocks 2014 Global wealth report (Credit Suisse)
- However we still know far too little about global inequality dynamics; in particular, major uncertainties for most BRIC countries (Brasil-Russia-India-China: low-quality household surveys + very limited access to income and wealth tax data) → major challenges for WID database

Figure 1(a): Global growth incidence curve, 1988-2008



Y-axis displays the growth rate of the fractile average income (in 2005 PPP USD). Weighted by population.
Growth incidence evaluated at ventile groups (e.g. bottom 5%); top ventile is split into top 1% and 4% between P95 and P99.

What do we know about preindustrial inequality?

- Using wealth registers from North Italy and the Low Countries, work by Analfi and others suggest a gradual rise of wealth concentration over 1300-1800 period (e.g. from 50-60% to 70-80% for top 10% wealth share). See Analfi, « Economic Inequality in Preindustrial Europe 1300-1800 », 2016, Slides, JEH 2015; Analfi-Ryckbosch « Growing apart in early modern Europe? A comparison of inequality trends in Italy and the Low Countries, 1500–1800 », EEH 2016

(on mobility see also Barone-Mocetti 2016; and G. Clark)

- Possible explanations: long steady-state adjustment process given r, g and other shocks? Or changing parameters?
- **Or structural rise in exctraction ratio, i.e. inequality possibility frontier, as average income goes up?** I.e. one can extract more from the poor in a more productive society, so that in effect richer societies can be more unequal.

- I.e. consider a low-productivity society where per capita output is very low, say 2 times subsistence level. Then bottom 50% individuals need to have at their disposal at least half of average income, so that their income share cannot be < 25% of total income (even in a slave society).
- In constrast, in very rich societies such as the USA today, it is possible to have extreme inequality (bottom 50% income share around 10%), at least from a subsistence viewpoint. Trivial argument, but important.
- However this argument holds for income (and consumption), not for wealth: in terms of wealth, the bottom 50% or 90% can have a zero share (or negative share: debt, slavery).
- Pb with Analfi registers: only wealth holders are covered; this needs to be combined with other sources for the poor (demographic). Same general pb with inequality measurement: one viewpoint is not enough.
- With better coverage of the poor, all inequality levels will go up; maybe the 1300-1800 rise would be from 70-80% to 80-90% for top 10% wealth share, i.e. always very high. More research is needed.