Notes on Capital in the 21th Centrury

Introduction

Classical Thinking

Malthus & Young: the theory of overpopulation

Rapid population growth contributed to a stagnation of agricultural wages and an increase in land rents in the decades prior to the explosion of 1789.

Ricardo: the principle of scarcity

Once both population and output begin to grow steadily, land tends to become increasingly scarce relative to other goods. The only remedy was to impose a steadily increasing tax on land rents.

Marx: the principle of infinite accumulation

Capital was primarily industrial capital rather than land. In principle there was no limit to the amount of capital that could be accumulated. There was an inexorable tendency for capital to accumulate and become concentrated in ever fewer hands, with no natural limit to the process.

Kuznets: from apocalypse to fairy tale

Inequality increases in the early phases of industrialization, because only a minority is prepared to benefit from the new wealth that industrialization brings. Later, in more advanced phases of development, inequality automatically decreases as a larger and larger fraction of the population partakes of the fruits of economic growth. (Kuznets, 1955)

Major Results of the Study

The dynamics of wealth distribution reveal powerful mechanisms pushing alternately towards *convergence* and *divergence*. There is *no* natural, spontaneous to prevent destabilizing, inegalitarian forces from prevailing permanently.

Convergence:

The main force is the diffusion of knowledge and skills. The poor catch up with the rich to the extent that they achieve the same level of technological know-how, skill and education.

Divergence:

1. Top earners can separate themselves from the rest (e.g. separation of top managers of large firms form the rest of the population).

2. Growth is weak and the return to capital is high (the fundamental force for divergence: $r > g$). This has nothing to do with market imperfection (the more perfect the capital market is, the more likely $r > g$).

Income and Capital

Some Definitions

What is capital?

In the book, *capital* is defined as the sum total of nonhuman assets that can be owned and exchanged on some market. Capital includes all forms of real property (including residential real estate) as well as financial and professional capital (plants, infrastructure, machinery, patents, and so on) used by firms and government agencies.

The words "capital" and "wealth" are used interchangeably.

The first fundamental law of capitalism: $\alpha = r \times \beta$

α: the share of income from capital in national income

β: the capital/income ratio

r: the rate of return on capital

Growth and Inequality

Demographic growth

Strong demographic growth tends to play an equalizing role because it decreases the importance of inherited wealth: every generation must in some sense construct itself.

Economic growth

In a society where output per capital grows very fast every generation, it is better to count on what one can earn and save from one's own labor: the income of previous generations is so small compared with current income that the wealth accumulated by one's parents and grandparents does not count much.

When growth is zero or very low, the various economic and social functions as well as types of professional activity, are reproduced virtually without change from generation to generation. Growth can thus increase social mobility for individuals whose parents did not belong to the elite of the previous generation.

The stages of economic growth

Globally, the average growth of per capita output is *0.8 percent* over the period 1700-2012 (0.1 percent in the 18th century; 0.9 percent in the 19th century; 1.6 percent in the 20th century).

Purchasing power in Europe barely increased at all from 1700 to 1820, then more than doubled between 1820 and 1913, and increased more than sixfold between 1913 and 2012. It was not until the 20th century that economic growth became a tangible, unmistakable reality for everyone.

There is no historical example of a country at the world technological frontier whose growth in per capita output exceeded *1.5 percent* over a lengthy period of time.

Inflation

Inflation is insignificant over the periods 1700-1820 and 1820-1913, at most 0.2-0.3 percent per year. Inflation is largely a 20th-century phenomenon. Inflation led to various redistributions among social groups over the course of the 20th century, often in a chaotic, uncontrolled manner.

The Dynamics of the Capital/Income Ratio

The Metamorphoses of Capital

Capital/income ratio (Figure 1)

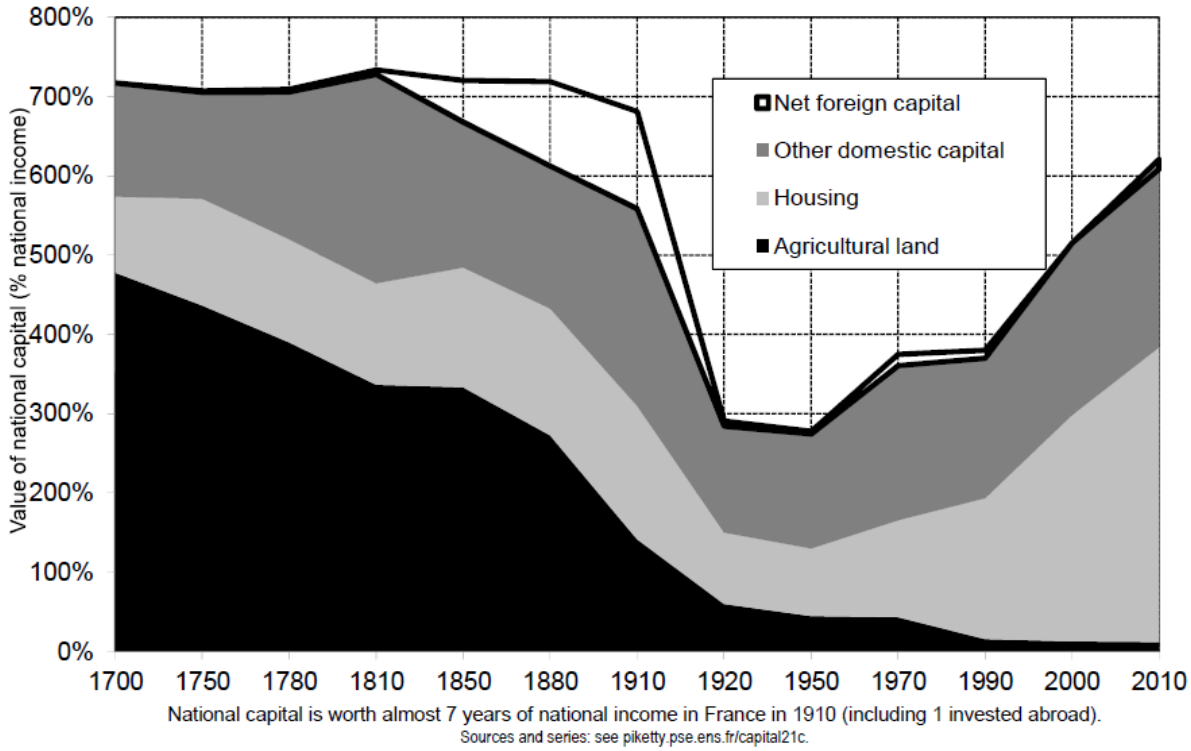

Figure 1: Capital in France, 1700-2010

1. The capital/income ratio fell by nearly two-thirds between 1914-1945 and then more than doubled in the period 1945-2012.
2. Agricultural land has been gradually been replaced by buildings, business capital and financial capital. The collapse in the value of farmland was counterbalanced by a rise in the value of housing.
3. British and France accumulated a large amount of foreign capital in the 19th century by colonization. These very large net positions in foreign assets allowed Britain and France to run structural trade deficits in the late 19th and early 20th century.

The dynamics of public capital (Figure 2)

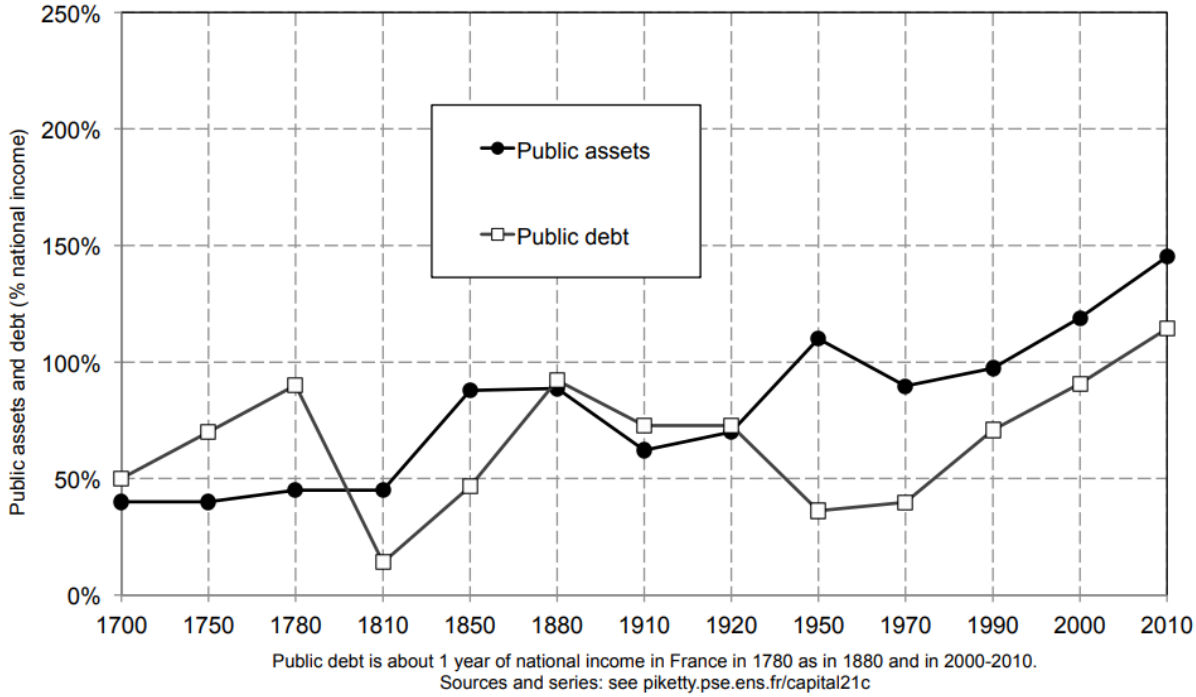

Figure 2: Public wealth in France, 1700-2010

1. In 1797 came what was called the "two-thirds bankruptcy", which was a massive default on two-thirds of the outstanding public debt.
2. In 1913-1950, French inflation averaged 13 percent a year. The debt was drowned by inflation.
3. The total value of public assets increased over the long run, which reflects the steady expansion of the economic role of the state over the course of history.

Public versus private capital (Figure 3)

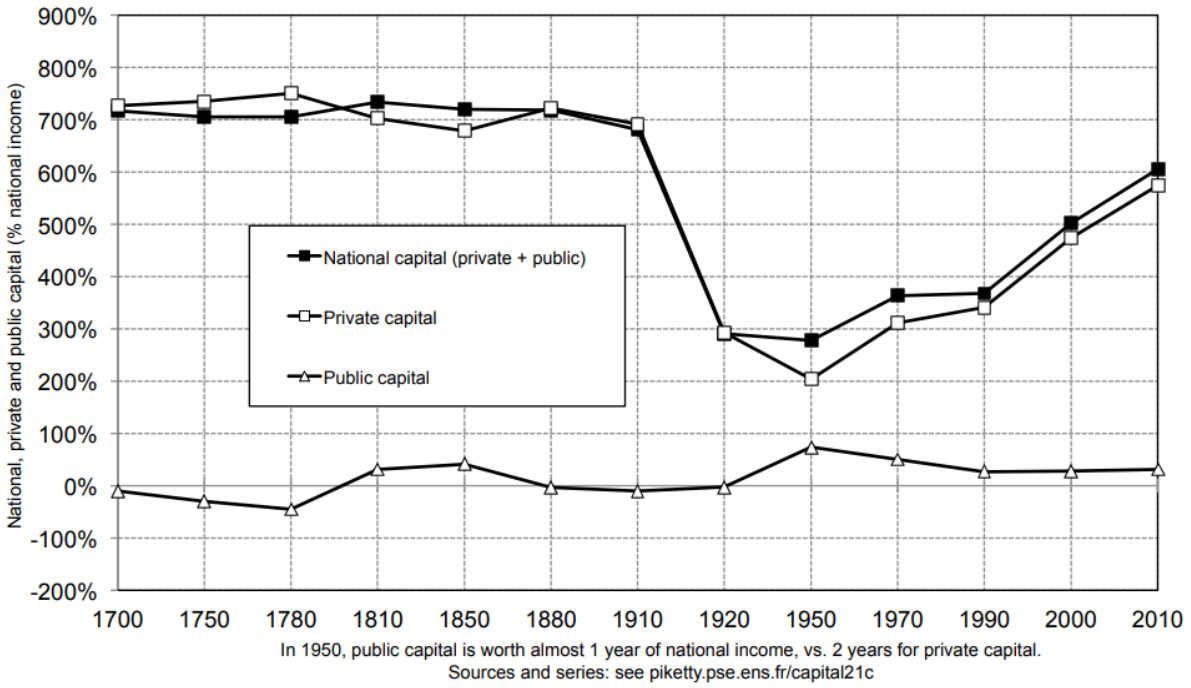

Figure 3: Private and public capital in France, 1700-2010

1. Private wealth was traumatized in the early 20th century (Great Depression).
2. The Trente Glorieuses (1945-1975), postwar nationalization, the state's share of capital exceeded 50% in industrial and financial sectors (capitalism without capitalists, or state capitalism).
3. The "Conservative revolution" (1979-1980), deregulation and privatization of capital.

Germany: Rhenish capitalism (Figure 4)

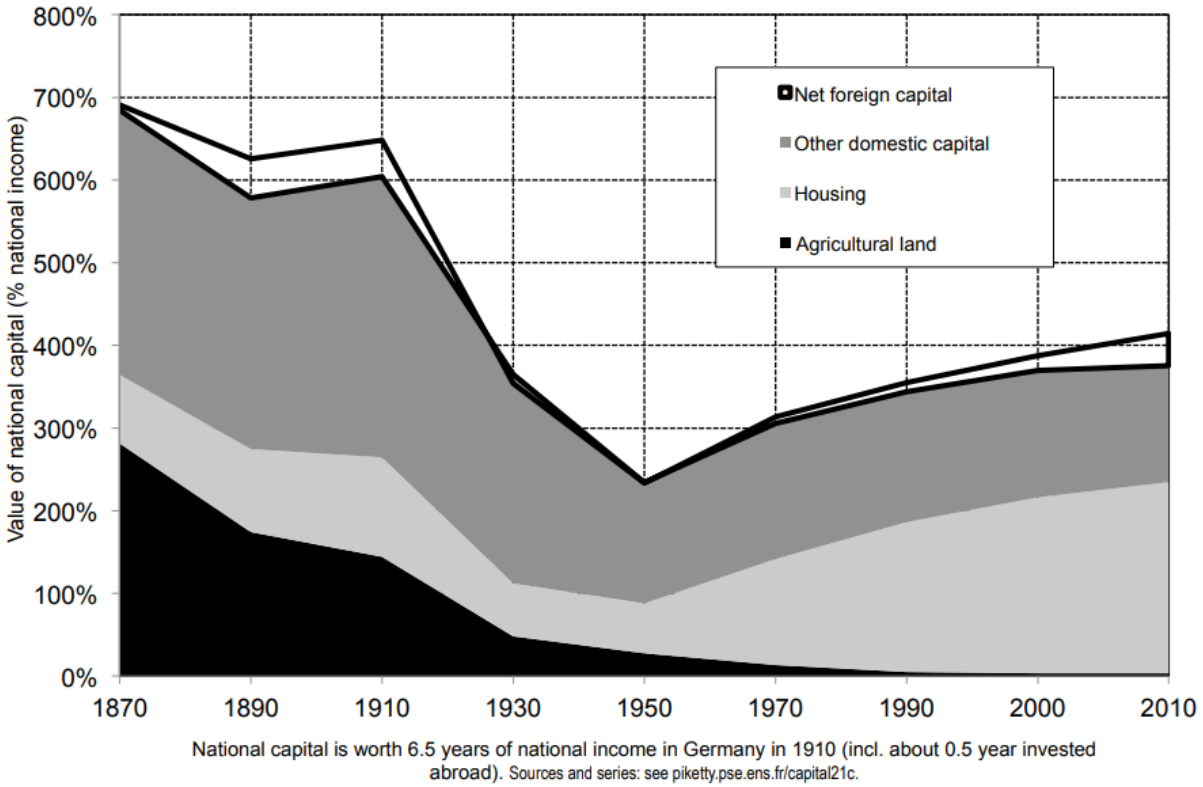

Figure 4: Capital in Germany, 1870-2010

1. German private wealth in 2010 was noticeable lower than private wealth in Britain and France. Given the high level of German saving, this low level of German wealth compared to other European countries is to some extent a paradox.
2. The gap rises not from the low valuation of German real estate but rather from the low stock market valuation of German firms. If, in measuring total private wealth, we used not stock market value but book value, the German paradox would disappear.
3. The low stock market valuation is due to German "Rhenish capitalism" or "the stackholder model", in which firms are owned not only by shareholders but also by other interest parties known as "stakeholders" starting with representatives of firms' workers, as well as representatives of regional governments, consumers' associate, environment group, and so on.

Stocks to capital in the 20th century

The main factors that explain the dizzying fall in the capital/income ratio between 1913 and 1950:

1. The collapse of foreign portfolios.
2. Physical destruction due to the two world wars.
3. Very low savings rate: owning to low growth and repeated recessions, the period 1914-1945 was a dark era for all Europeans but especially for the wealthy. Private savings rate was

very low, some people consequently chose to maintain their standard of living of selling off part of their capital (the above three factors explain 2/3-3/4 of the drop).

4. Low asset price: real estate values and stocks fell to historically low levels relative to the price of goods and services. Not only had confidence in the stock markets been strongly shaken by the Depression and the nationalization of the postwar period, but new policies of financial regulation and taxation of dividends and profits had been established, helping to reduce the power of stockholders and the value of their shares (price factor explains 1/3-1/4 of the drop).(Piketty and Zucman, 2014)

The Capital-Income Ratio over the Long Run

The second fundamental law of capitalism: $\beta = s/g$

s: savings rate

g: growth rate

A country that saves a lot and grows slowly will over the long run accumulate an enormous stock of capital (relative to its income), which can in turn have a significant effect on the social structure and distribution of wealth.

Capital's comeback in rich countries since the 1970s (Figure 5)

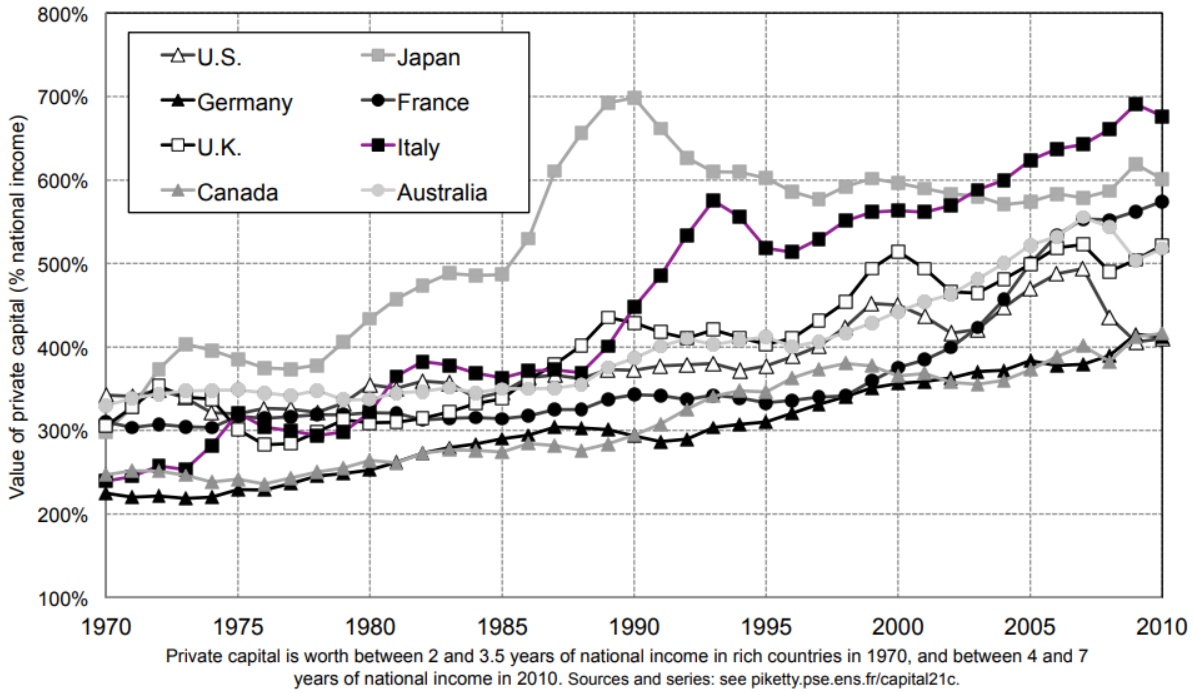

Figure 5: Private capital in rich countries, 1970-2010

This structural evolution is explained by three sets of factors:

1. Slower growth, especially demographic growth, which, together with a high rate of saving, automatically give rise to a structural increase in long-run capital/income ratio.

2. Gradual privatization and transfer of public wealth into private hands in the 1970s and 1980s.
3. The long-term "catch-up" of real estate and stock market prices, which also accelerated in the 1980s and 1990s in a political context that was favorable to private wealth than that of the immediate postwar decades (explains 1/4-1/3 of the increase of capital/income ratio).

What is saving?

1. Two components of savings: i. private savings; ii. savings by firms (retained earnings). The variation between countries with respect to the proportion of retained earnings in total private savings can be explained largely by differences in legal and tax systems.
2. Private saving does not include household purchases of durable goods: furniture, appliances, automobiles, and so on (these are counted as immediate consumption).
3. "Valuables" such as works of art, jewelry, and precious metals account for a very small portion of wealth.

Privatization

1. The public wealth in France and Germany represented as much as 1/4-1/3 of total national wealth in the period 1950-1970, whereas today it represents just a few percent (public asset just enough to balance public debt).
2. The revival of private wealth after the 1970s is partly due to the privatization of national wealth.
3. Privatization and the considerable growth of private wealth enriched certain individuals.

Prive effect vs volume effect

It is true that stock prices tend to rise more quickly than consumer prices over the long run, but the reason for this is essentially that retained earnings allow firms to increase their size and capital (so that we are looking at a volume effect rather than a price effect). If retained earnings are included in private savings, however, the price effect largely disappears.

The Capital-Labor Split in the Twenty-First Century

The capitl-labor split (Figure 6)

Figure 6: The capital-labor split in France, 1820-2010

1. From 1800-1860, the capital's share increased from 30% to 45% of national income. This was the time when Marx wrote *The Communist Manifesto (1848)*.
2. The capital's share decreased significantly in 1870-1900, during which period happened the "first truly international crisis" (or the Long Depression).
3. The capital's share increased by 10% between 1900-1910. The main explanation for this was the exodus of labor from the countryside and into the cities, together with technological changes that increased the productivity of capital.

The rate of return on capital (Figure 7)

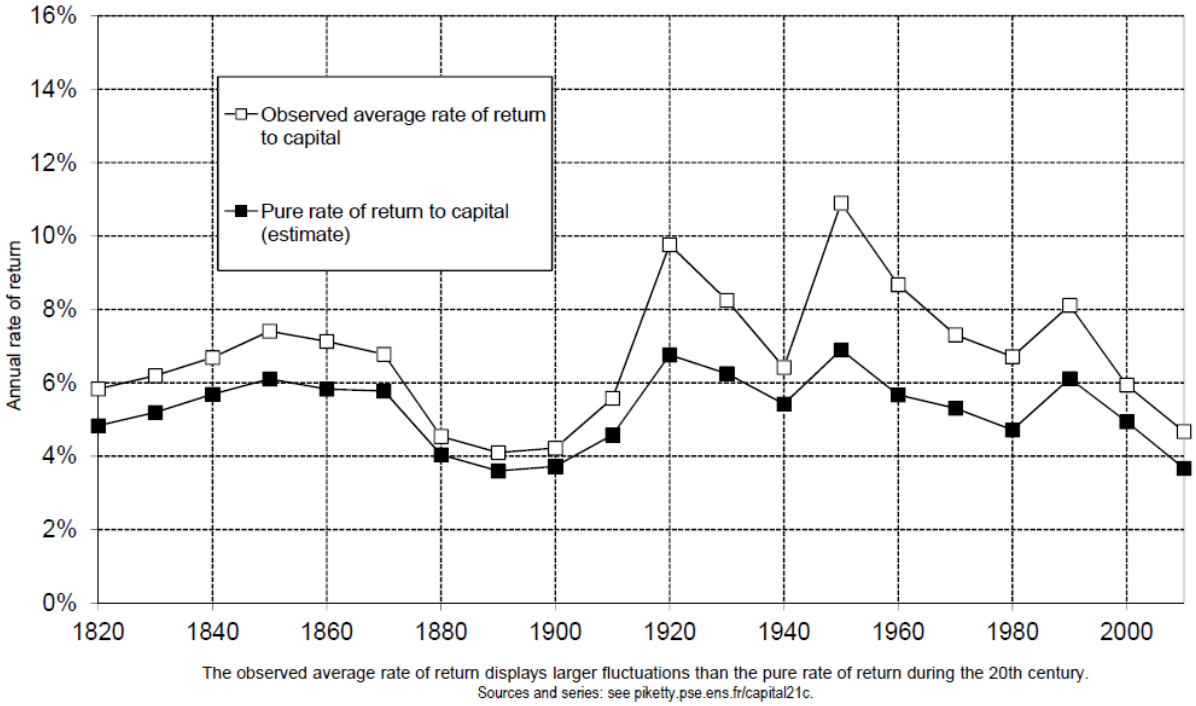

Figure 7: The pure rate of return on capital in France, 1820-2010

1. The *pure rate of return on capital* is calculated by deducting from the observed average return a plausible estimate of the informal costs of portfolio management (that is, the value of the time spent managing one's wealth).
2. The pure return on capital is relatively stable over the very long run, between 4-6 percent.
3. During 1913-1950, asset prices were extremely low, rendering very high capital yield.
4. The pure return on capital has decreased slightly over the very long run: it often exceeds 4-5 percent in the 18-19th century, whereas in the early 21st century it seems to be approaching 3-4 percent.

Real and nominal assets

Real assets: assets directly related to a real economic activity, such as a house or shares in a corporation, the price of which evolves as the related activity evolves, and therefore rises at least as rapidly as the consumer price (not only must we not substract inflation from the annual rents or dividents received on such assets, but we often need to add to the annual return the capital gains earned when the asset is sold).

Nominal assets: assets whose value is fixed at a nominal initial value, such as a sum of money deposited in a checking or savings account or invested in a government bond that is not indexed to inflation. Nominal assets are subject to a substantial inflation risk.

What determines the rate of return on capital?

In perfect competition economy, the rate of return on capital is exactly equal to the *marginal productivity of capital* (that is, the additional output due to one additional unit of capital).

Two determinants of the marginal productivity of capital:

1. Technology (what is capital used for). If capital is of no use as a factor of production, then the marginal productivity is zero.
2. The abundance of the capital stock. The marginal productivity of capital decreases as the stock of capital increases.

How fast does the rate of return on capital decrease as the stock of capital increases? It is determined by the elasticity of substitution between capital and labor. The higher the elasticity, meaning the easier to substitute capital for labor, the more likely to maintain the rate of return on capital.

The elasticity of substitution between capital and labor

1. If the elasticity < 1 (relatively inelastic), then an increase in the capital/income ratio β leads to a decrease in the marginal productivity of capital large enough that the capital share $\alpha = r \times \beta$ decreases.
2. If the elasticity > 1 (relatively elastic), an increase in the capital/income ratio β leads to an increase in capital share α.
3. If the elasticity $= 1$, then the two effects cancel each other out: the return on capital r decreases in exactly the same proportion as the capital/income ratio β increases, so that the capital share α does not change.

Capital-labor substitution in the twenty-first century (Figure 8)

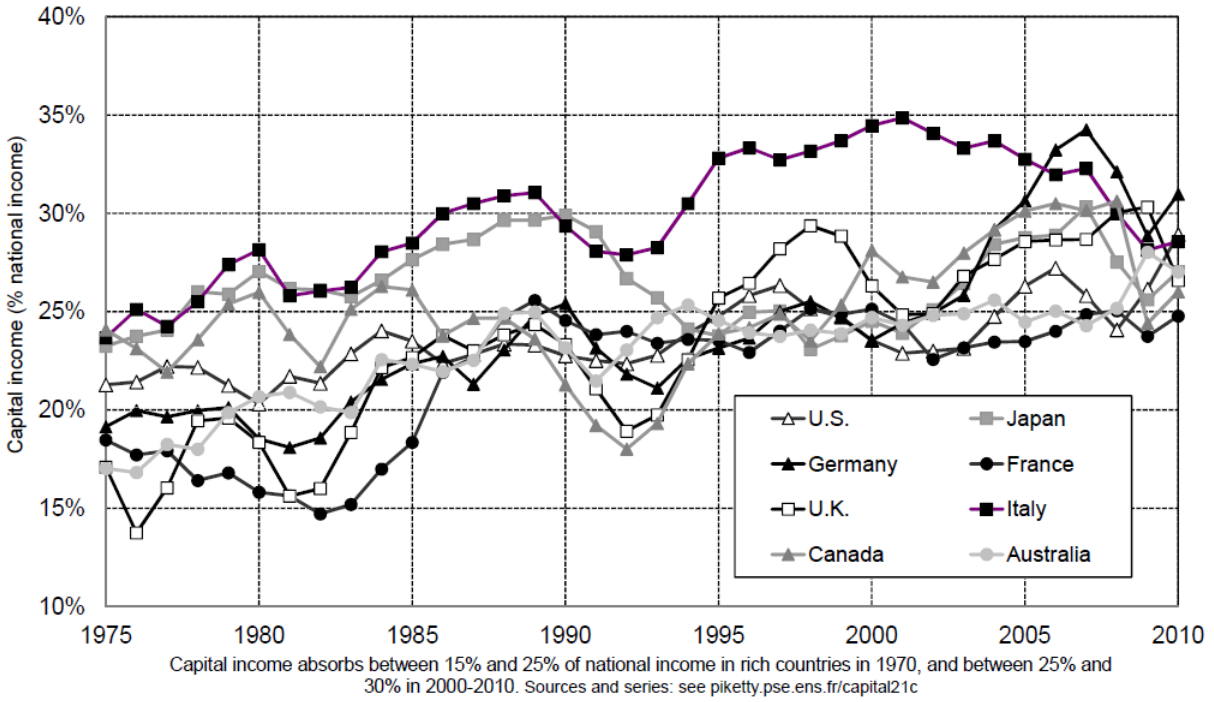

Figure 8: The capital share in rich countries, 1975-2010

1. Over a very long period of time, the elasticity of substitution between capital and labor seems to have been greater than 1: an increase in the capital/income ratio β seems to

have led to a slight increase in capital's share of national income α. This corresponds to a situation in which there are many different uses for capital in the long run (traditional agricultural societies have an elasticity of substitution significantly less than 1).
2. The trend is exaggerated by an increase in capital's bargaining power *vis-à-vis* labor over the past few decades, which have seen increased mobility of capital and heightened competition between states eager to attract investments.
3. No self-corrective mechanism exists to prevent a steady increase of the capital/income ratio β together with a steady rise in capital's share of national income α.

The Structure of Inequality

Inequality and Concentration

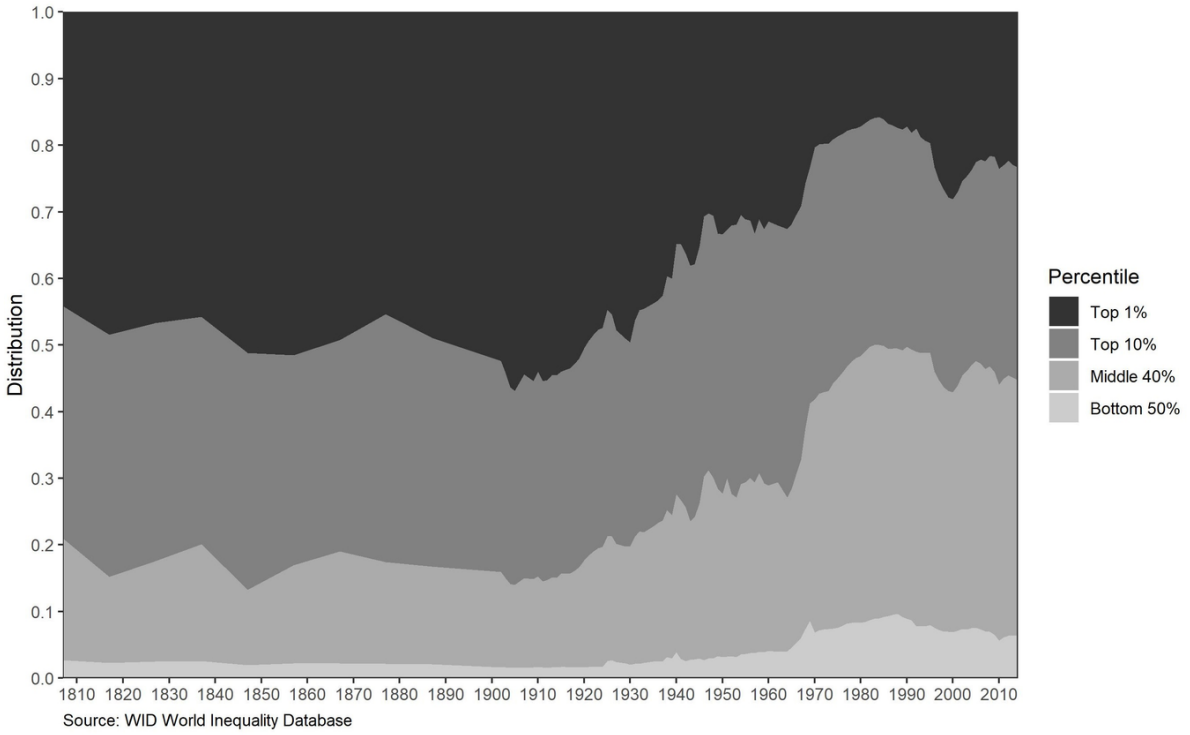

Figure 9: Wealth distribution in France, 1807-2014

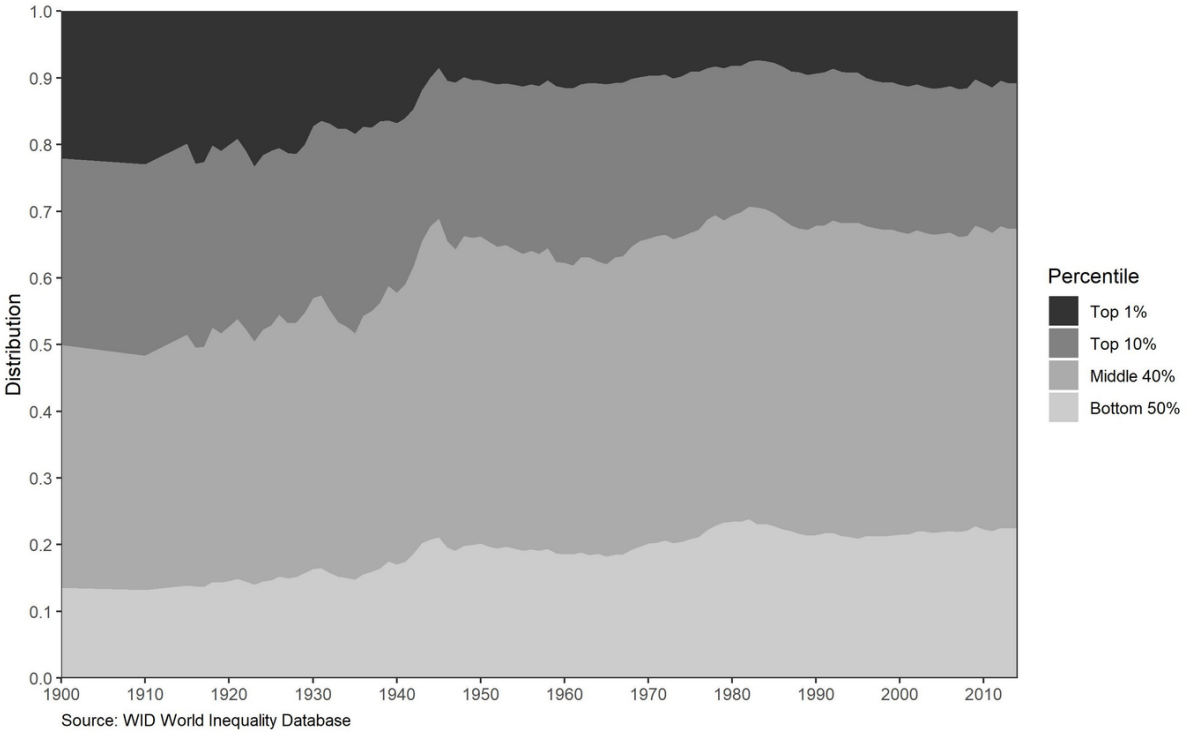

Figure 10: Income distribution in France, 1900-2014

Wealth inequality (Figure 9)

1. The inequality with respect to capital is always greater than inequality with respect to labor. The bottom 50% of the distribution literally owns nothing at all.
2. The emergence of a patrimonial middle class: the middle 40% own only 5% of national wealth in 1900-1910, whereas the middle class own a third of the national wealth in 2010.
3. Real estates dominate the wealth of the middle class. In the top centile, by contrast, financial and business assets clearly dominate over real estate.

Under what conditions do such concentrated wealth emerge, persist, vanish and perhaps reappear?

Income inequality (Figure 10)

Income = income from labor + income from capital

1. Mechanism of income from labor: supply and demand for different skills, the state of education system, and the various rules and institutions that affect the operation of the labor market and the determination of wages
2. Mechanism of income from capital: savings and investment behavior, lows governing gift-giving and inheritance, and the operation of real estate and financial market

Two ways of achieving high income inequality:

1. "Society of rentiers": the total income hierarchy is dominated by very high income capital, especially inherited capital.

2. "Society of supermanagers": the peak of the income hierarchy is dominated by very high incomes from labor (large corporation executives) than by inherited wealth.

Inequality of Labor Income

Income inequality in France (Figure 11)

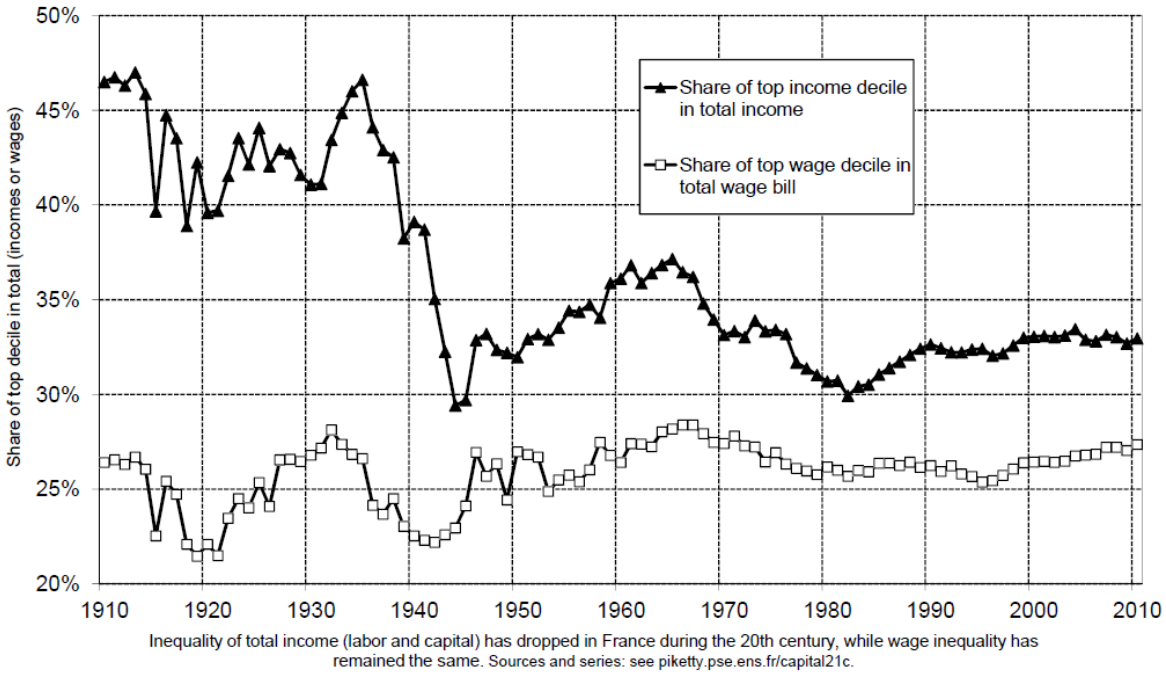

Figure 11: Income inequality in France, 1910-2010

1. Income inequality has greatly diminished in France since the Belle Epoque.
2. The significant compression of income inequality over the course of twentieth-century was due entirely to diminished top incomes from capital (the fall of the "rentier").
3. To a large extent, it was the chaos of war, with its attendant economic and political shocks, that reduced inequality in the twentieth century (destruction caused by wars, bankruptcies caused by the depression, new policies enacted in the period).
4. The wage distribution (income from labor only) is relatively stable over time.
5. No generalized structural process if inequality compression (a particularly wage inequality compression) seems to have operated over the long run.
6. The top decile encompasses two different worlds: "the 9 percent" in which income from labor dominate (doctors, lawyers, merchants, entrepreneurs); "the 1 percent" in which income from capital becomes progressively more important.
7. Actual capital income is underestimated owning both to tax evasion and the existence of various tax exemptions that allow whole categories of capital income to legally avoid the income tax.

History of income inequality

1. 1929-1935: "the 1 percent" share plummeted during the Great Depression, as the economy collapsed, profits fell, and firms went bankrupt. However, "the 9 percent" including many

managers, were the great beneficiaries of the Depression, who suffered much less from unemployment than industrial workers.

2. During both world wars, the wage hierarchy was compressed: economic activity decreases, inflation increases, and real wages fell. However, real wages at the bottom of the wage scale generally rise (workers share certain perceptions of social justice and norms of fairness, an effort is made to prevent the purchasing power of the least well-off from dropping too sharply, while their better-off comrades are asked to postpone their demands until the war is over).
3. 1945-1967, inequality rose "procyclically" in the postwar reconstruction period. In economic booms, the share of profits in national income tends to increase, and pay at the top end of the scale (including incentives and bonuses) often increases more than wages of the bottom and middle.
4. 1967-1981, inequality decreased in the seething social and political climate when governments felt obliged to boost the minimum wage significantly. The purchasing power of the minimum wage increased by 130% during this period.
5. 1982-1990, the government decided to "turn toward austerity": the policy to boost the minimum wage was abandoned, the share of profits in national income skyrocketed.
6. 1990-2010, the very salaries, and especially the pay packages awarded to the top executives of the largest companies and financial firms, reached astonishing heights.

Inequality in the United States (Figure 12)

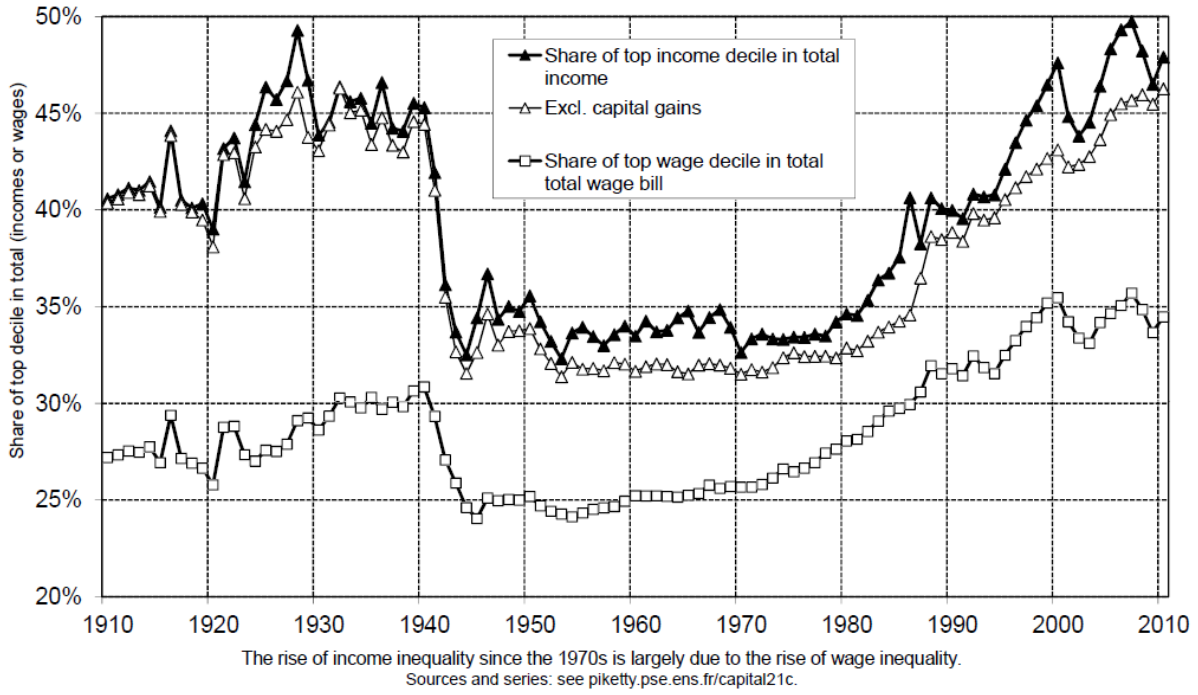

Figure 12: High incomes and high wages in the United States, 1910-2010

1. The rise of supermanagers is largely an Anglo-Saxon phenomenon. This suggests that institutional differences between countries rather than general and a priori universal causes such as technological change played a central role.
2. 1941-1945, the government agency had to approve all wage increases in the United States

and generally approved raises only for the lowest-paid workers.

3. Since the 1980s, income inequality has exploded in the United States. The purchasing power of the lower and middle classes stagnate.
4. From 1977 to 2007, the richest 10% appropriated 75% of the growth. The richest 1% alone absorbed nearly 60% of the total increase of US national income. (Atkinson et al., 2011)
5. A very substantial and growing inequality of capital income since 1980 accounts for 30% of the increase in income inequality in the United States.
6. The financial crisis as such cannot be counted on to put an end to the structural increase of inequality in the United States (excluding capital gains does not make any better).
7. Wage inequalities increased rapidly in the United States and Britain because US and British corporations became much more tolerant of extremely generous pay packages after 1970.
8. "Pay for luck": executive pay rises rapidly when sales and profits increase for external reasons.

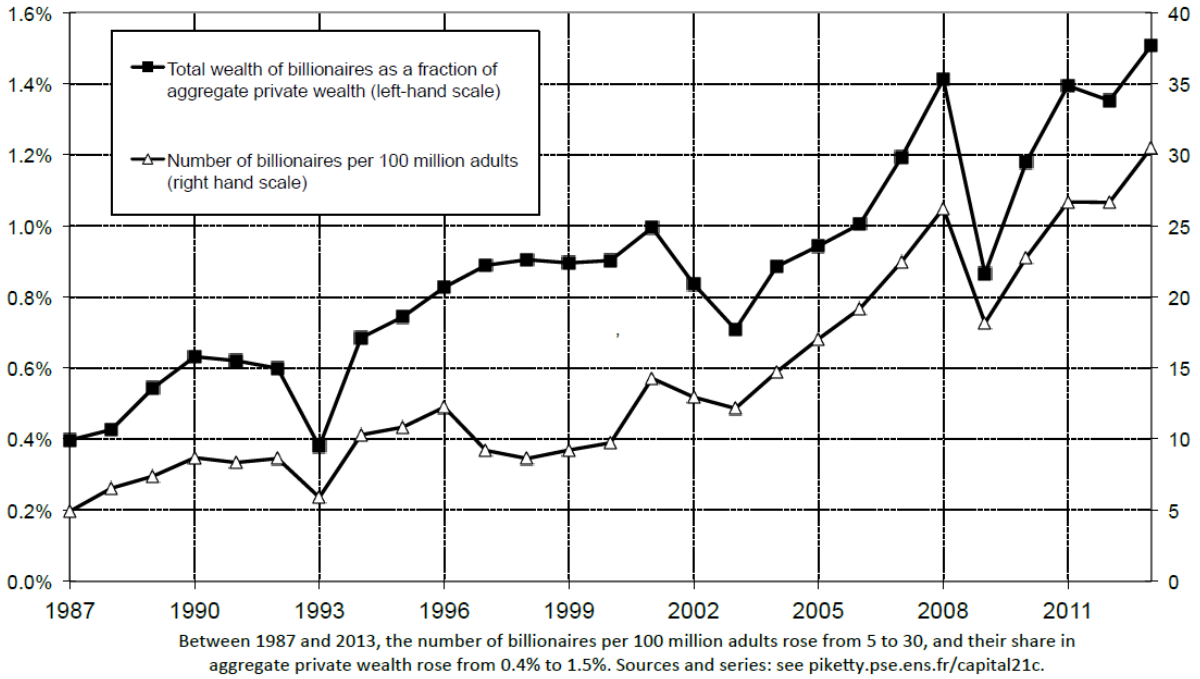

Figure 13: Billionaires as a fration of gloabl population and wealth, 1987-2013

Inequality of Capital Ownership

Wealth inequality in France (Figure 14)

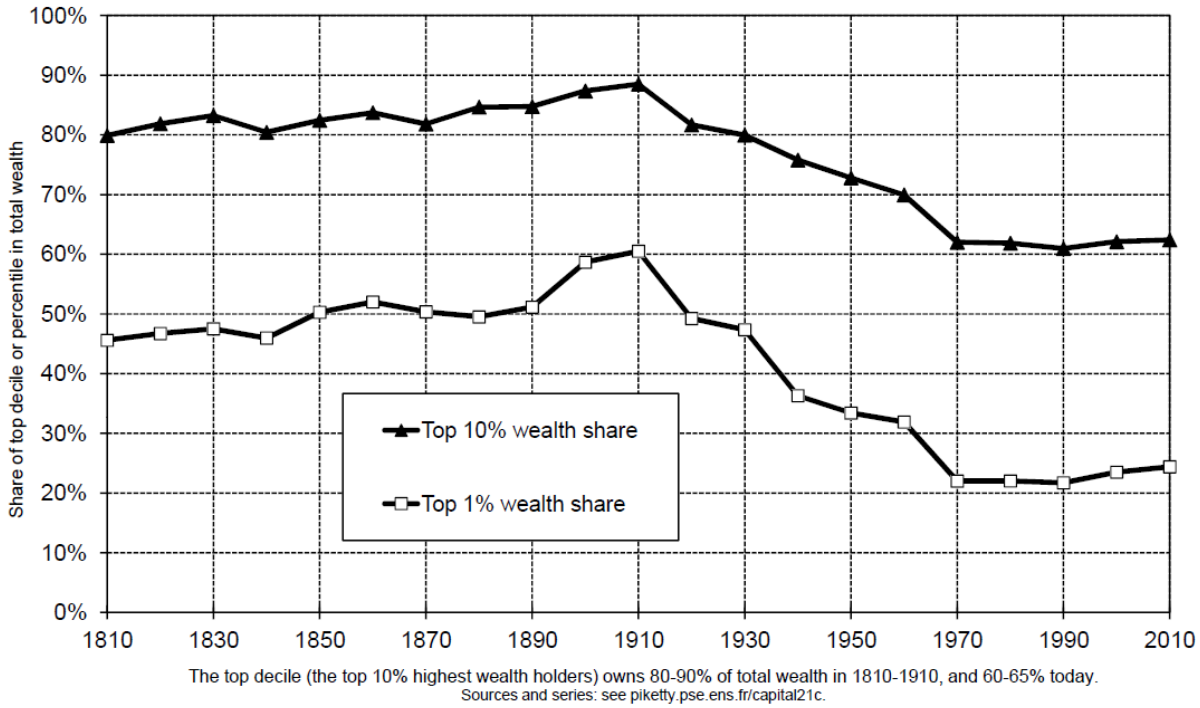

Figure 14: Wealth inequality in France, 1810-2010

1. 1810-1913: hyperconcentration of wealth in Europe up to World War I;
2. 1914-1945: substantial compression of wealth inequality following the shocks during 1914-1945;
3. 1946-Now: the concentration of wealth has not regained the record heights set in Europe in the past.

The mechanism of wealth divergence

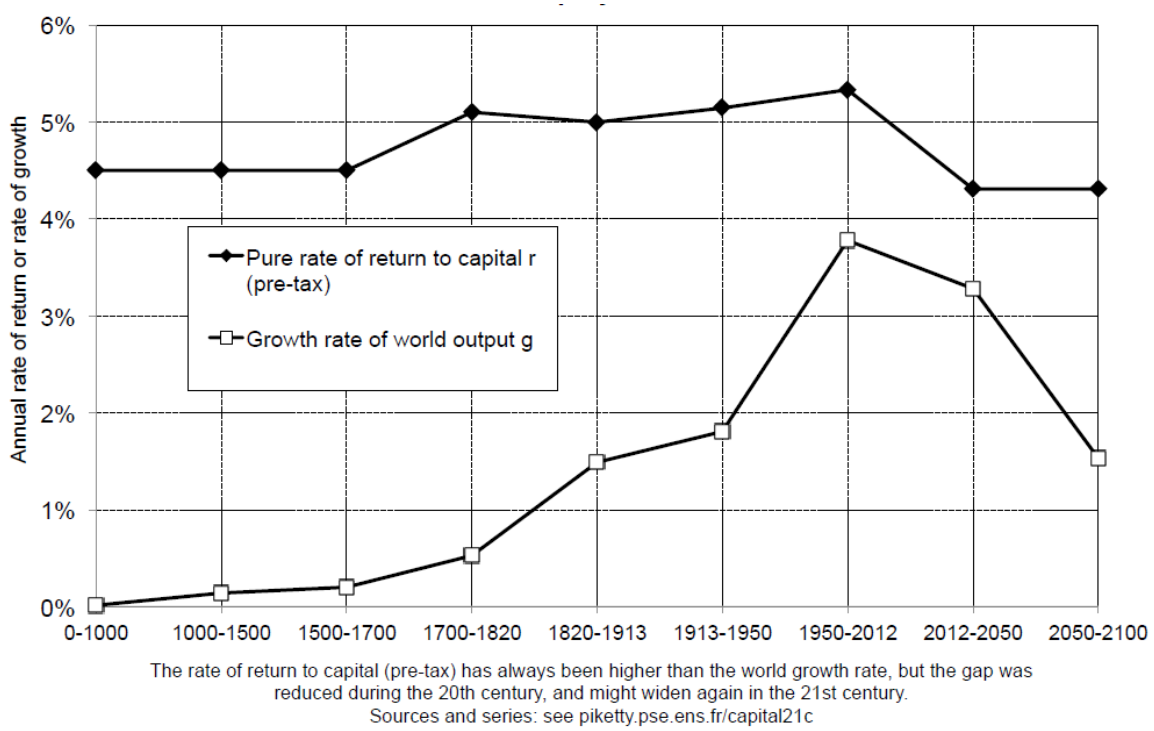

Figure 15: Rate of return versus growth rate at the world level, from Antiquity to the Future

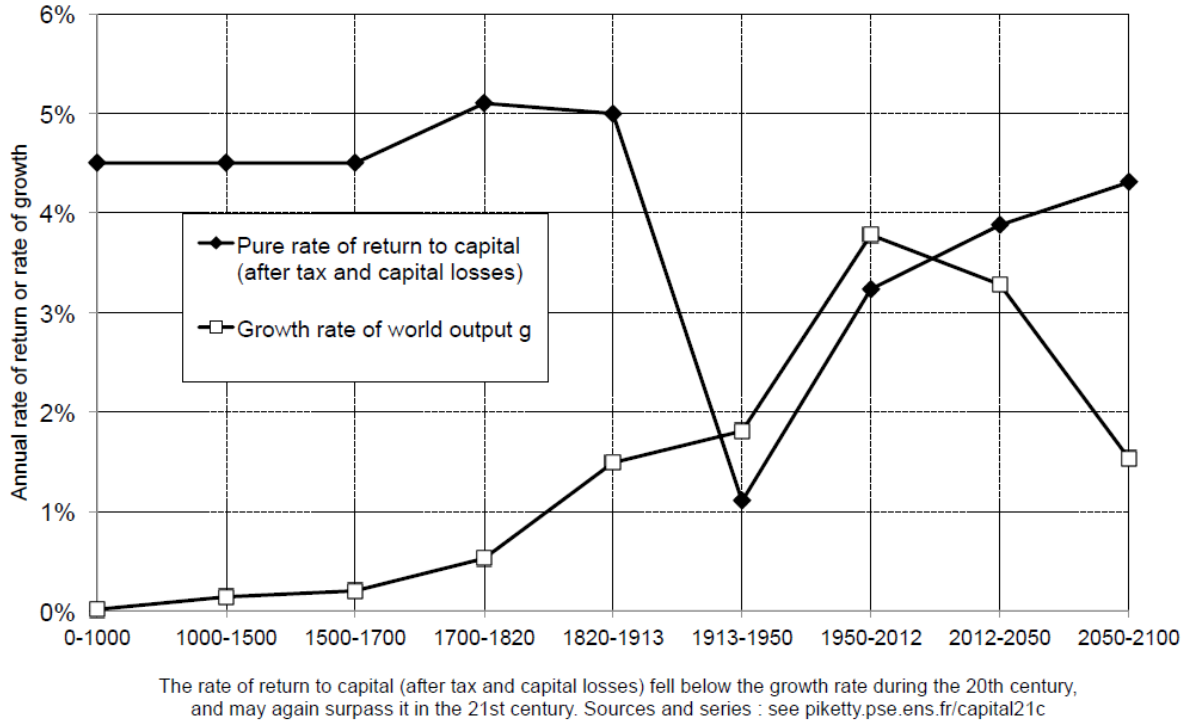

Figure 16: After tax rate of return versus growth rate at world level, from Antiquity to the Future

1. Historical fact: the rate of return on capital was always at least 10 to 20 times greater than the rate of growth of output (Figure 15).
2. The inequality $r > g$ implies that wealth accumulated in the past grows more rapidly than output and wages (capital reproduces itself faster than output increases). If the rate of return on capital was markedly and durably higher than the rate of growth, the one's fortune will increase more rapidly than the economy, and inequality of wealth will tend to increase even if one contributes no income from labor.
3. After World War I, the tax rates on top incomes, profits, and wealth rose to historically high levels. The return on capital, net of taxes (and losses), fell to 1-1.5 percent in the period 1913-1950, which was less than the rate of growth (wartime destruction, progressive tax policies made possible by the shocks of 1914-1945, and exceptional growth during the three decades following the end of World War II, created a historically unprecedented situation, which lasted for nearly a century, see Figure 16).
4. The inequality $r > g$ has clearly been true throughout most of human history, right up to the eve of World War I, and it will probably be true again in the 21st century (fiscal competition will gradually lead to the total disappearance of taxes on capital in the 21st century).
5. The distribution of wealth tends toward a long-run equilibrium and that the equilibrium level of inequality is an increasing function of $r - g$. (Piketty)

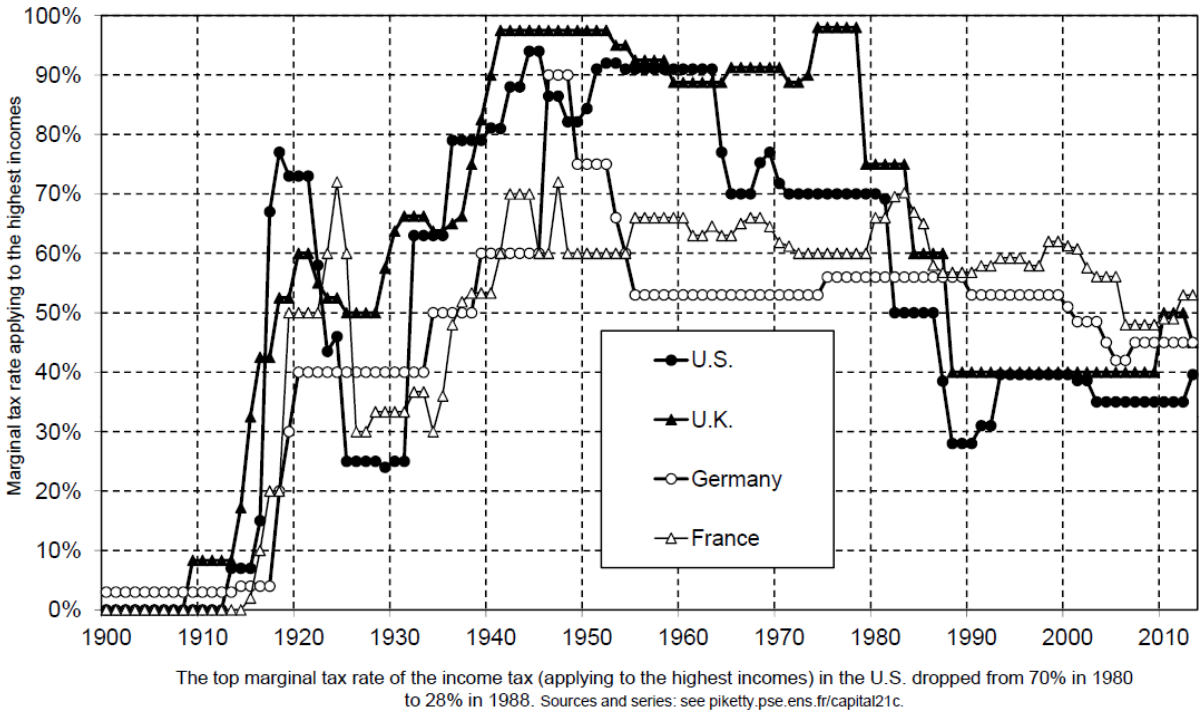

Figure 17: Top income tax rates, 1900-2013

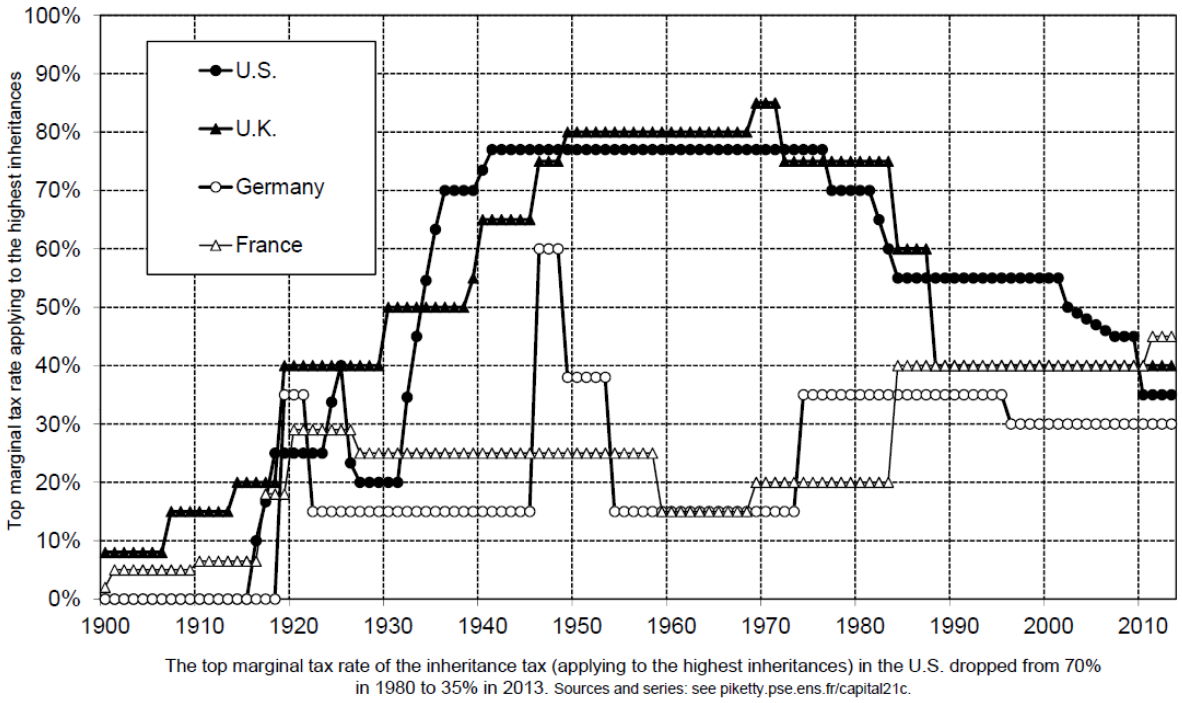

Figure 18: Top inheritance tax rates, 1900-2013

1. Why has the inequality of wealth not returned to the level achieved in the Belle Epoque? The most natural and important explanation is that governments in the 20th century began taxing capital and its income at significant rates (Figure 17, 18).
2. The effect of tax on capital income is *not* to reduce the total accumulation of wealth but to modify the structure of the wealth distribution over the long run, for the simple reason that the decrease in the upper centile's share of wealth is compensated by the rise of the middle class.
3. The right solution is a progressive annual tax on capital. This will make it possible to avoid an endless inegalitarian spiral while preserving competition and incentives for new instances of primitive accumulation.

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