

Piketty Crib Sheet

Cooke 5/21/14

"There is one great advantage to being an academic economist in France: here, economists are not highly respected in the academic and intellectual world or by political and financial elites. Hence they must set aside their contempt for other disciplines and their absurd claim to greater scientific legitimacy, despite the fact that they know almost nothing about anything." Piketty, Thomas (2014-03-10). Capital in the Twenty-First Century (p. 32). Harvard University Press. Kindle Edition.

"I define "national wealth" or "national capital" as the total market value of everything owned by the residents and government of a given country at a given point in time, provided that it can be traded on some market. It consists of the sum total of nonfinancial assets (land, dwellings, commercial inventory, other buildings, machinery, infrastructure, patents, and other directly owned professional assets) and financial assets (bank accounts, mutual funds, bonds, stocks, financial investments of all kinds, insurance policies, pension funds, etc.), less the total amount of financial liabilities (debt). If we look only at the assets and liabilities of private individuals, the result is private wealth or private capital. If we consider assets and liabilities held by the government and other governmental entities (such as towns, social insurance agencies, etc.), the result is public wealth or public capital. By definition, national wealth is the sum of these two terms: National wealth = private wealth + public wealth" Piketty, Thomas (2014-03-10). Capital in the Twenty-First Century (p. 48). Harvard University Press. Kindle Edition.

$$\beta = \text{Kapital} / \text{Income} = K / I; [\beta] = [\$ / (\$/y)] = y.$$

In France and UK, $\beta = 5$ or 6 years, in US $\beta = 3$ or 4 years.

Sometimes Piketty talks of β as % (??)

First Fundamental Law of Capitalism:

$\alpha = r \times \beta$; α = Share of income from capital in national income, r = rate of return on capital.
 $[\alpha/r] = \% / (\$/(\$/y)) = y$. This is an "accounting identity", i.e. a definition α or r . Write $I = I_K + I_L$ (income from capital + income from Labor); $\alpha = I_K / (I_K + I_L)$; then

$$r = \alpha / \beta = (I_K / I) / (K / I) = I_K / K.$$

Second Fundamental Law of Capitalism

$\beta = s / g$; s = savings percentage, g = growth rate of national income (pp growth rate + pop growth rate).

- holds 'in the long run'
- s is net of capital depreciation,
- applies to capital that can cumulate.
- assumes asset prices evolve as consumer prices.

WHY? ($K' := dK(t)/dt$):

$$I \times s = K' \quad \& \quad I = K/\beta, \rightarrow s/\beta = K' / K = g. \quad [\beta] = [s/g] = \% / (\$/(\$/y)) = y.$$

Piketty says that g is growth rate of Income. $[I' / I] = (\$/ y^2) / (\$ / y) = 1/y$.

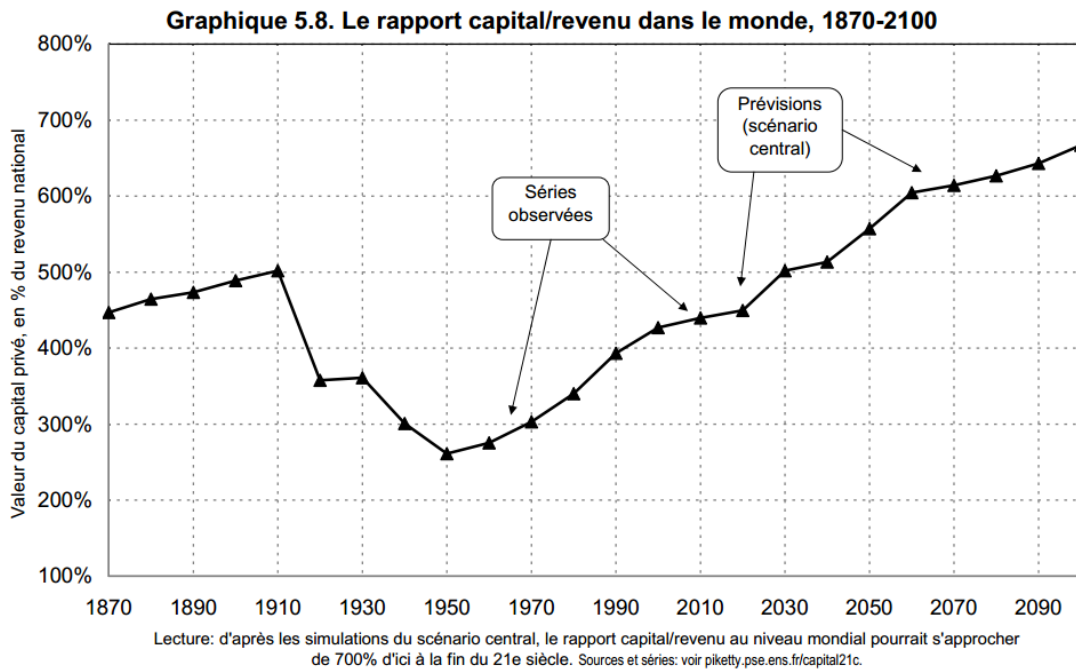
Is $K' / K = I' / I$? and what means 'long run'?

if $s' = 0$: $K'' = I' \times s \rightarrow I' / I = K'' / K'$ and $K' / K = K'' / K' \leftrightarrow K'^2 = K'' \times K \leftrightarrow (d/dt) (K'/K) = 0$.

(Since $(d/dt) (K'/K) = K''/K - K'^2 / K^2$)

SO "long run" means constant growth rate of Kapital, which is then constant growth rate of Income (assuming $s = \text{constant}$).

"annual capital depreciation in the developed economies is on the order of 10– 15 percent of national income and absorbs nearly half of total savings, which generally run around 25– 30 percent of national income, leaving net savings of 10– 15 percent of national income" Piketty, Thomas (2014-03-10). Capital in the Twenty-First Century (p. 178). Harvard University Press. Kindle Edition.



The interesting question is therefore not whether the marginal productivity of capital decreases when the stock of capital increases (this is obvious) but rather how fast it decreases. In particular, the central question is how much the return on capital r decreases (assuming that it is equal to the marginal productivity of capital) when the capital/ income ratio β increases. Two cases are possible. If the return on capital r falls more than proportionately when the capital/ income ratio β increases (for example, if r decreases by more than half when β is doubled), then the share of capital income in national income $\alpha = r \times \beta$ decreases when β increases. In other words, the decrease in the return on capital more than compensates for the increase in the capital/ income ratio. Conversely, if the return r falls less than proportionately when β increases (for example, if r decreases by less than half when β is doubled), then capital's share $\alpha = r \times \beta$ increases when β

increases. In that case, the effect of the decreased return on capital is simply to cushion and moderate the increase in the capital share compared to the increase in the capital/ income ratio. Based on historical evolutions observed in Britain and France, the second case seems more relevant over the long run: the capital share of income, α , follows the same U-shaped curve as the capital income ratio, β It is nevertheless important to emphasize that both cases are theoretically possible. Everything depends on the vagaries of technology, or more precisely, everything depends on the range of technologies available to combine capital and labor to produce the various types of goods and services that society wants to consume. Piketty, Thomas (2014-03-10). *Capital in the Twenty-First Century* (p. 216). Harvard University Press. Kindle Edition.

Cobb Douglas says $\alpha = \text{constant}$, but data says:

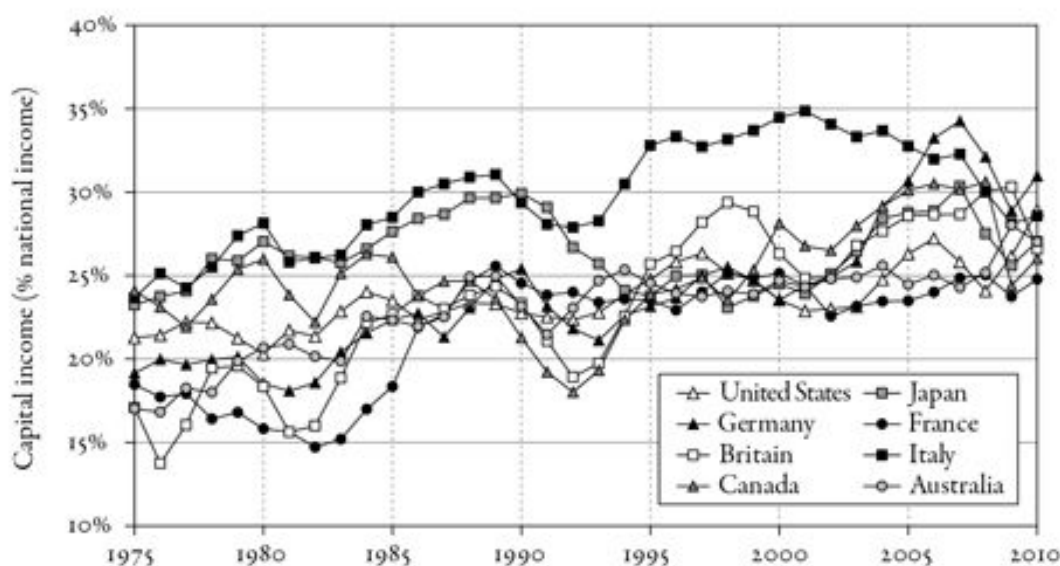
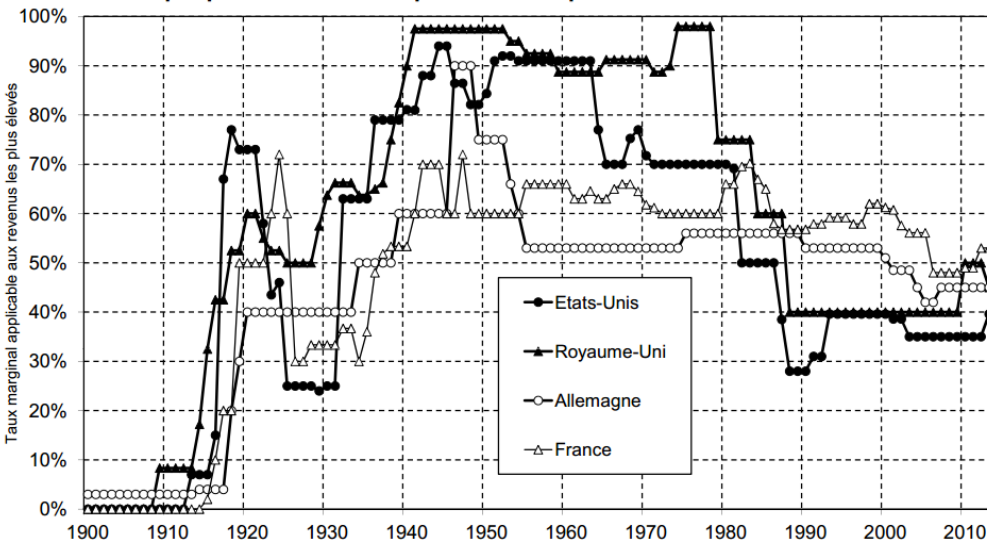


FIGURE 6.5. The capital share in rich countries, 1975–2010
Capital income absorbs between 15 percent and 25 percent of national income in rich countries in 1970, and between 25 percent and 30 percent in 2000–2010.

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

Graphique 14.1. Le taux supérieur de l'impôt sur le revenu 1900-2013



Lecture: le taux marginal supérieur de l'impôt sur le revenu (applicable aux revenus les plus élevés) aux Etats-Unis est passé de 70% en 1980 à 28% en 1988. Sources et séries: voir piketty.pse.ens.fr/capital21c.

The rich world is rich, but the governments of the rich world are poor. Europe is the most extreme case: it has both the highest level of private wealth in the world and the greatest difficulty in resolving its public debt crisis— a strange paradox. Piketty, Thomas (2014-03-10). *Capital in the Twenty-First Century* (p. 540). Harvard University Press. Kindle Edition.

An exceptional tax on private capital is the most just and efficient solution. Failing that, inflation can play a useful role: historically, that is how most large public debts have been dealt with. The worst solution in terms of both justice and efficiency is a prolonged dose of austerity— yet that is the course Europe is currently following. Piketty, Thomas (2014-03-10). *Capital in the Twenty-First Century* (p. 541). Harvard University Press. Kindle Edition.

according to Maddison's calculations, both demographic and economic growth rates between year 0 and 1700 were below 0.1 percent (more precisely, 0.06 percent for population growth and 0.02 percent for per capita output). Piketty, Thomas (2014-03-10). *Capital in the Twenty-First Century* (p. 74). Harvard University Press. Kindle Edition.

Take the bicycle. In France in the 1880s, the cheapest model listed in catalogs and sales brochures cost the equivalent of six months of the average worker's wage. And this was a relatively rudimentary bicycle, "which had wheels covered with just a strip of solid rubber and only one brake that pressed directly against the front rim." Technological progress made it possible to reduce the price to one month's wages by 1910. Progress continued, and by the 1960s one could buy a quality bicycle (with "detachable wheel, two brakes, chain and mud guards, saddle bags, lights, and reflector") for less than a week's average wage. All in all, and leaving aside the prodigious improvement in the quality and safety of the product, purchasing power in

terms of bicycles rose by a factor of 40 between 1890 and 1970. 15 Piketty, Thomas (2014-03-10). Capital in the Twenty-First Century (p. 89). Harvard University Press. Kindle Edition.

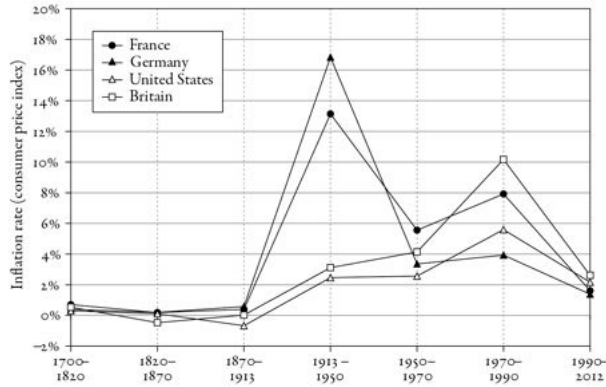


FIGURE 2.6. Inflation since the Industrial Revolution
 Inflation in the rich countries was zero in the eighteenth and nineteenth centuries, high in the twentieth century, and roughly 2 percent a year since 1990.
 Sources and series: see piketty.pse.ens.fr/capital21c.

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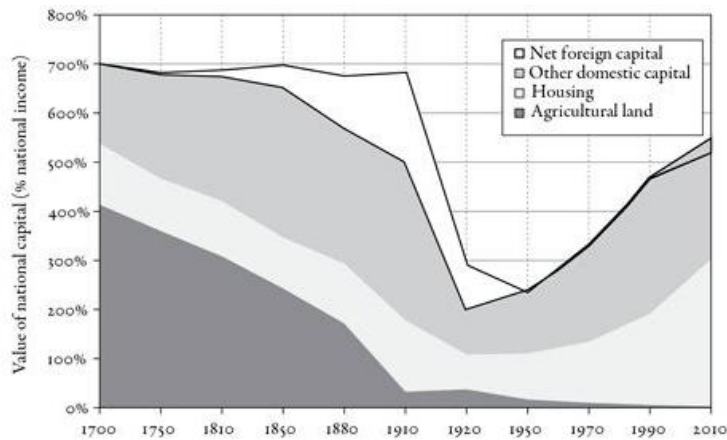


FIGURE 3.1. Capital in Britain, 1700–2010
 National capital is worth about seven years of national income in Britain in 1700 (including four in agricultural land).
 Sources and series: see piketty.pse.ens.fr/capital21c.

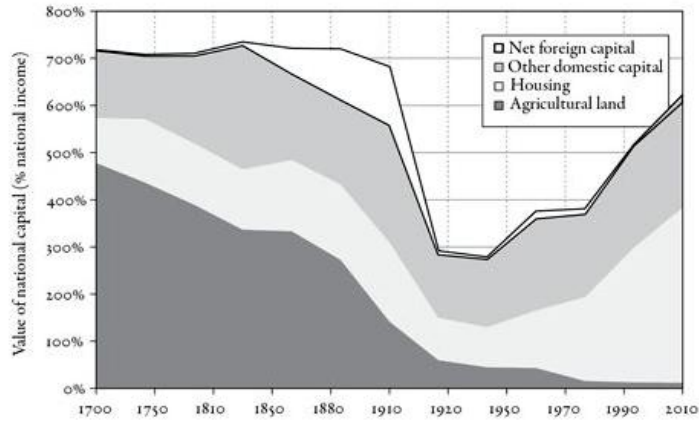


FIGURE 3.2. Capital in France, 1700–2010

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

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

TABLE 3.1.
Public wealth and private wealth in France in 2012

	Value of capital (% national income) ^a		Value of capital (% national capital)	
National capital (public capital + private capital)	605		100	
Public capital (net public wealth: difference between assets and debt held by government and other public agencies)	31		5	
	Assets	Debt	Assets	Debt
	145%	114%	2.4%	19%
Private capital (net private wealth: difference between assets and debt held by private individuals [households])	574		95	
	Assets	Debt	Assets	Debt
	64.6%	72%	10.7%	12%

Note: In 2012, the total value of national capital in France was equal to 605% of national income (6.05 times national income), including 31% for public capital (5% of total) and 574% for private capital (95% of total).

a. National income is equal to GDP minus capital depreciation plus net foreign income; in practice, it is typically equal to about 90% of GDP in France in 2012; see Chapter 1 and the online technical appendix.

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

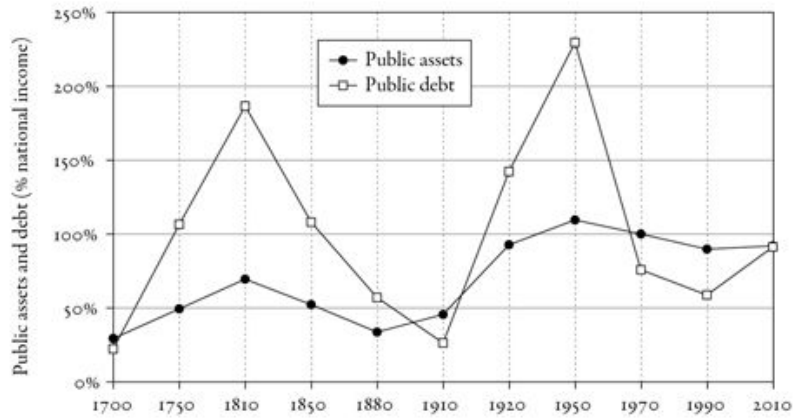


FIGURE 3.3. Public wealth in Britain, 1700–2010

Public debt surpassed two years of national income in 1950 (versus one year for public assets).

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

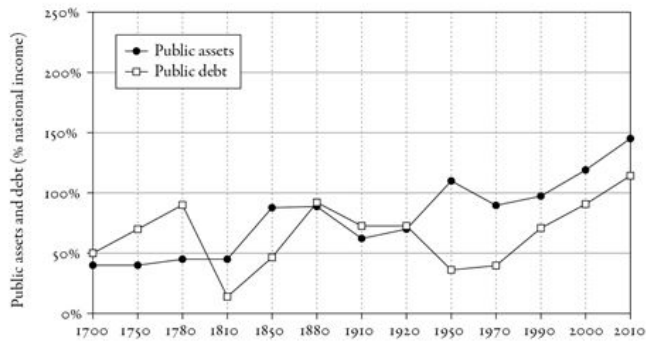


FIGURE 3.4. Public wealth in France, 1700–2010

Public debt is about one year of national income in France in 1780 as well as in 1880 and in 2000–2010.

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

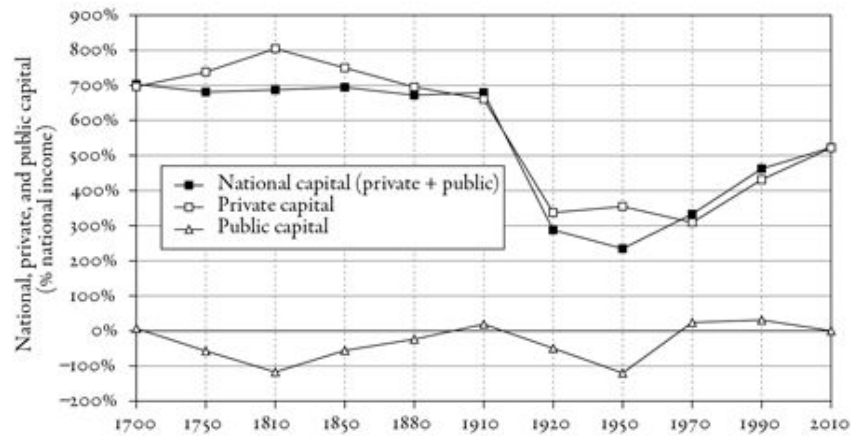


FIGURE 3.5. Private and public capital in Britain, 1700–2010

In 1810, private capital is worth eight years of national income in Britain (versus seven years for national capital).

Sources and series: see niketty.nse.ens.fr/capital210

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 (≈ US 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

Note: 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 the online technical appendix.

TABLE 7.1.
Inequality of labor income across time and space

Share of different groups in total labor income	Low inequality (= Scandinavia, 1970s–1980s)	Medium inequality (= Europe 2010)	High inequality (= US 2010)	Very high inequality (= US 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

Note: 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 with values from 0 to 1) is equal to 0.19. See the online technical appendix.