Thomas Piketty's Historical Macroeconomics: A Critical Analysis

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1. *CAPITAL*

Though Piketty's book was published as *Capital in the Twenty-First Century*, the title is often abridged as Piketty's '*Capital*', and a link straightforwardly established with Marx's *Capital*—Piketty as the Marx of the twenty-first century. The ambitions and contents of the books are, however, quite distinct. Marx's analysis had two main purposes already clearly set out in the *Communist Manifesto*. First, the demonstration that the specific mechanism of extraction of surplus-labor—the common property of all modes of production as class societies—in capitalism is the appropriation of surplus-value in a commodity producing economy based on the private ownership of the means of production. Second, the historical character of this phase in the history of human societies is expressed in its inner contradictions, notably the propensity of the economy to enter into episodes of crisis (that might become deeper and deeper). A whole conceptual apparatus was put forward by Marx to these ends, beginning with the labor theory of value and the definition of capital as value taken in a movement of self-expansion, then moving to the analysis of the tendencies of technical change and income distribution and the fundamental instability inherent in capitalism (as in the business cycle, an analytical project never truly fulfilled by Marx) and financial instability in the accumulation of fictitious capital.

The object of Piketty's investigation is much more limited, namely the *dynamics of wealth* (a broader notion than capital), its accumulation, and the unequal distribution of this wealth among households—in combination with income inequality. A central element is the identification of a tendency toward the rising concentration of wealth in the hands of a

privileged minority of households. There, Piketty sees a political rather than economic limitation. (Piketty [2014a] does not hesitate to refer to 'revolution', p. 263.) This tendency was superseded (even inverted) during the first half of the twentieth century as an effect of 'shocks' (the two world wars and the Great Depression) but is again apparent since the 1970s or 1980s in what Piketty calls the 'comeback of capital'.

Since the seminal article of 2003 with Emmanuel Saez (Saez and Piketty [2003]), Piketty and his research collaborators spent years collecting and analyzing income data and building estimates of wealth stocks within the United States and, gradually more, other countries. The empirical findings immediately appeared of utmost interest and relevance to the analysis of contemporary societies. The reason is that, since the mid-1970s, the rise of inequality has become a crucial feature of the societies of the United States and the United Kingdom, and is more and more perceived as such. The link with our own research, also focused on high income and wealth, is tight. Piketty's work showed that crucial information was embodied in tax data to assess the income and, indirectly, the wealth of upper classes.

What is really new in *Capital in the Twenty-First Century* is the broad historical interpretation briefly sketched above. When Piketty began to publish his data, we were already engaged in the analysis of 'neoliberalism' (a term that Piketty never uses), as the phase in which capitalism entered in the late 1970s or early 1980s. In the mid-1990s, for the first time, we gave a class interpretation of neoliberalism, as a new 'social order' whose objective was the restoration and increase of the income and wealth of upper classes. In this reading of history, the word 'restoration' is important. Our understanding was that—considering at least the United States—the income of these classes had been diminished after the Great Depression and World War II and was, then, restored in neoliberalism. This is precisely the meaning of the U curves in Piketty's analysis, symbolically denoting the profile of wealth and inequalities, 'high-low-high'. Contrary to Piketty, however, we do not interpret this historical pattern as the effect of shocks affecting a fundamental mechanism linking wealth to national income, rather as the result of successive episodes of class struggle with diverging outcomes. Besides the identification of the U pattern, a new point of convergence is now the central role conferred on 'managers', a key point in our reading of history. [1] (See Piketty's Section *From a 'Society of Rentiers' to a 'Society of Managers'*, p. 276, and the reference to 'supermanagers', p. 315.) Though the class analysis remains implicit in Piketty's framework, Piketty's utopia is a meritocracy, that is, a society under managerial leadership, politically oriented to the left (a form of 'capitalist-managerial welfare state').

Fully acknowledging the importance of the collection of data, we do not consider Piketty's *Capital* provides a relevant interpretation of the historical dynamics of capitalism. Given the complex of convergences and divergences, we devoted several studies to the variegated facets of the debate (Duménil and Lévy [2014a], [2014b], and [2014c]). Most of the papers published on Piketty's book stress that the object of the analysis is not 'capital' in the sense of the resources used by firms in production, but total 'wealth'. The demonstration of this obvious property is not the object of the present study. The focus is here on the specific

[1] A recent presentation of this thesis can be found in Duménil and Lévy (2011). This aspect of Piketty's analysis is clearly identified by Beker (2014), who writes 'If Piketty's claim is correct, it would be a formidable empirical argument in favour of managerial theories of the firm. References to the structures of power relations can also be found in Wade (2014) and Ghosh (2014). Correspondingly, both Beker and Wade point to the growing importance of wages at the top of income hierarchies.

content of the *analytics* of Piketty main theses on the history of capitalism. The ambition is to demonstrate the empirical failure of Piketty's analysis and put forward original interpretations of the profiles observed.

Section Two briefly discusses Piketty's first law, an identity. Section Three is devoted to the dynamics of wealth. Piketty considers the wealth of households (or households' and government's wealth, that is, national wealth) as a ratio to national income. The value of this ratio is explained by the rate of saving divided by the growth rate of the economy in Piketty's second law. The basic line of reasoning is intuitive (savings feed the stock of wealth but the ratio of wealth to national income is also impacted by the growing output in the denominator), but the model is based on empirical assumptions that are not satisfied. Section Four analyzes the profile of wealth stocks as compared to national income, a first expression of the U curve as observed in Europe. (This historical profile is apparent in the data for European countries, but not significantly manifest in the United States.) Section Five considers the upward trend of wealth inequality. Piketty explains the concentration of wealth at the top of social hierarchies by the observation that the rate of return on wealth (on 'capital') is larger than the growth rate of the economy. Taken at face value, this mechanism is apparently straightforward, as income on wealth is the source of savings of households holding assets (setting aside the consumption of these households); larger rates of return allow for the faster growth of the stock of wealth. We contend, however, that this interpretation is not convincing. Section Six concludes with respects to Piketty's economics.

2. FIRST LAW: THE AMBIGUOUS CHARACTER OF A FAMILIAR IDENTITY

Reading Piketty's *Capital*, an economist will not be surprised by Piketty's first law: $\alpha = r\,\beta$. The first variable, α, is the share of 'income from capital in national income'; r is 'the rate of return on capital'; and β is 'the capital/income ratio' (p. 52). Using a familiar notation (with Π for profits, Y for national income, and K for capital), one will easily recognize the well-known relationship $\Pi/Y = (\Pi/K)\times(K/Y)$. Piketty is perfectly aware that this 'law' is an identity.

The important and obvious point here is that such a relationship is valid for *any* definitions of the three variables. Economists familiar with traditional frameworks such as the production function or the Marxian falling profit rate will, however, tend to identify the three variables in relation to production, namely profits, capital used in production, and national income. As noted in most commentaries of the book (for example in Stiglitz [2014] or Yanis Varoufakis [2014]), this is not Piketty's choice. 'Capital' is understood as total wealth (excluding human capital); 'capital income' is any income flow derived from the ownership of wealth; only 'national income' (or 'national product') is what is usually meant by the phrase.

A last observation is that the way a relationship like $\alpha = r\,\beta$ is written is not innocent. For example, Piketty does not write $r = \alpha / \beta$, which would be suggestive of a traditional calculation of a profit rate. As discussed in the following sections a direction of causation is implied from r and β toward α (see Piketty's Chapter 6).

3. SECOND LAW: THE VALUE OF NATIONAL WEALTH

This section is devoted to the determination of the ratio of national wealth to national income, that is, Piketty's 'second great law' of capital (actually wealth). The ratio, β, is explained by the relationship $\beta = s / g$, dividing the rate of saving, s, by the growth rate, g, of national

income. We first address the theoretical foundations of this relationship and, then, discuss its empirical relevance for the United States. An alternative model is finally defined.

3.1.Getting richer by saving: An asymptotic dynamic

It is first necessary to emphasize that the relationship $\beta = s / g$ accounts for the features of an asymptotic equilibrium. Each of the two variables, the stock of wealth and national income, of which β is the ratio, follows its own historical dynamics: (i) National income grows at an exogenously given growth rate, g; and (ii) At each period, savings (national income minus consumption) are added to the existing wealth stock. It is easy to show that, independently of the initial value of wealth, these two dynamics result in the *asymptotic convergence* of β toward s / g (an equilibrium value).[2] Piketty's framework is not formally wrong.

Two properties of this analytical framework must, however, be emphasized, whose importance will later become obvious:

1) In such a model, the wealth stock only grows as a result of saving. This property rules out any form of 'price effect', an increase (diminution) of wealth manifesting the variations of stock market indices or of the price of (urban) land.
2) For given values of s and g, the asymptotic value of β is determined, and wealth grows at the same rate as output. The prevalence of an equilibrium value of β means that the ratio of wealth to output is asymptotically constant and this property prohibits any historical tendency to the rise of this ratio. Correlatively, any rise or decline of β must be interpreted as a process of new convergence back toward equilibrium after a shock affecting wealth or output, or resulting from a change in the values of the two exogenous parameters in the model, s or g (which displaces the equilibrium).

The model obviously rests on the assumption that the two exogenous parameters, s and g, are constant or, at least, are subject to very slow variations.

3.2.An empirical failure

It is easy to determine the values of the two series, s and g, for the U.S. economy since World War II, thus empirically testing for the model for a period of more than half a century. They are shown in Figure 1. Their short-term fluctuations are not at issue here, only average values over periods of a few years. It is, therefore, more appropriate to consider trend lines. The ratio s/g can be calculated dividing the figures in the first trend line by those in the second.

Figure 1 here

A preliminary observation is that the trend line of the rate of saving is the object of much larger variations than the trend line of the growth rate, despite Piketty's insistence on the opposite observation. (Piketty emphasizes the dominant impact of growth rates now doomed to mediocre performances within the most advanced countries, those of the 'technological

[2] Piketty's model is described in the technical appendix to the book. He assumes that g and s can vary slowly, but 'if the savings rate and the growth rate both stabilize at some given level (...), then the wealth/income ratio β_t must necessarily converge to $\beta=s/g$" (Piketty [2014b, 28]).

frontier', p. 94). Growth rates diminished slightly at the end of the period (as noted by Piketty) but, overall, the figure shows that the rate of saving decreased much more. A preliminary observation is, therefore, that the general trend of s/g is downward and not upward, in particular within neoliberalism.

The ratio of the two trend lines in Figure 1 is shown in Figure 2, jointly with the estimates of the ratio β, which s/g is supposed to explain. There was no point in expecting a strict coincidence as the manifestation of the law is subject to shocks, but it appears that β and s/g, actually, have nothing in common. The main reason is that the assumption of constant values of s and g is not confirmed by empirical observation or, more rigorously, that parameters s and g vary more rapidly than the variable, β, thus invalidating the model.[3]

3.3. The central role of production capital in the interpretation of historical trends

This section suggests an alternative interpretation. In the 'empirical model' introduced below, the *production capital* of firms plays a crucial role, a variable that remains alien to Piketty's analysis.

Figure 2 here

Estimating the wealth of institutional sectors is rendered difficult by the existence of reciprocal financial relationships. For example, households may borrow from financial institutions, but the same households or others may also be the owners of these institutions as shareholders; the government debt is also an asset of financial institutions and households; etc. A process of 'consolidation' is required. The national wealth (the wealth of final owners, households and the government), is equal to the sum of all wealth components that do not disappear after consolidation, namely: (i) real (or nonfinancial) wealth, that is, land, housing, the real wealth of the government, and firms' production capital; and (ii) the net assets held on the rest of the world. This is equivalent to saying that, once cancelled the complex network of reciprocal financial relationships, it appears that financial institutions and financial mechanisms play a role of intermediary.

In such a calculation, the stocks representing the ownership of corporations are valued at their price on the stock market (their market price), instead of their price as derived from the accounts of corporations (their book value). The ratio of the former to the latter is known as Tobin q. The difference between the two estimates necessarily disturbs the process of consolidation, though not to the point of blurring the final correspondence between the resulting estimates and observed data. (The outcome may be distinct when bubbles or financial crises are observed.) A final note is that we use the phrase 'production capital' to refer to the fixed capital of firms, to which the value of inventories and intangible assets (patents, trademarks, and the like) is added, and which we estimate as a given percentage of fixed capital.

The second property is a specific empirical feature of the U.S. economy. In this country, after the consolidation of financial relationships has been performed and the value of production

[3] Boyer (2014) raises the issue of the duration of the convergence process.

capital set aside, the value (as number of years of national income) of other assets amounts to an approximately constant figure. This observation, avoiding the separate consideration of each other component, greatly simplifies the investigation: Only an estimate of firms' fixed capital is required to derive an approximate value of β.[4] The third variable in Figure 2 is the outcome of such a calculation:

1) Obviously, a strict reconstruction of the series could not be expected. The figure shows, however, that this empirical model matches the profile of wealth in the United States since the Civil War much more closely than Piketty's ratio s/g. One will, in particular, notice the capability of the model to account for the rise of β at the end of the nineteenth century as well as the quite significant decline between World War I and the 1950s.
2) Two main types of approximations are involved in the interpretation of the observed deviations: (i) the neglect of the varying values of q; and (ii) the assumption that the total of the other components of wealth was constant. A temporary significant deviation is observed at the end of the period, probably the outcome of stock market and housing bubbles. Piketty discusses the possible effects of such developments (p. 103), acknowledging their potential amplitude, but asserts that they do not upset the fundamental relationships.[5]

The conclusion of this undertaking is straightforward. Without engaging in the analysis of the accumulation process of each separate component of wealth, one observes that the ratio of fixed capital to national income (that is, the national product) provides a very satisfactory estimate of the secular fluctuations of the ratio of the wealth of households to national income, for which Piketty wants to account by the relationship $\beta = s / g$. The ratio of fixed capital to national income is the inverse of the apparent productivity of capital, one of the basic parameters (with labor productivity) that define the technique of production. Thus, the profile observed hacks back to historical changes in technology and organization, of which much could be said (know-how, institutions, management, labor costs and skills, available resources, etc.). Such processes are, however, in no sense the expression of the dynamics of historical macroeconomics such as those considered by Piketty (and which, correspondingly, do not measure up to empirical test).

4. THE BIG 'U' IN EUROPE

The historical pattern of the big U put forward by Piketty to account for the sequence of declining, low, and rising values of β, is not clearly evident in the United States, or only in a quite limited fashion. The present section discusses the first (decline) and third (rise) phases in Europe: in France and, more specifically, the United Kingdom.

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[4] Reference is frequently made to the Cambridge controversy on the measurement of capital in the assessment of Piketty data (Taylor [2014], Moseley [2014]), and in four articles of the *Real-world economics review*, 69 (Syl [2014], Ghosh [2014], Baker [2014], Varoufakis [2014]). We do not believe, however, Piketty's analysis should be criticized on such grounds.

[5] Besides this fluctuation, a significant decline is observed at the end of World War I, the likely expression of the collapse of stock market indices (corrected for inflation).

4.1. The World War I collapse

For the two European countries, France and the United Kingdom, Piketty locates a sharp fall—the equivalent of four years of national income—of the ratio of national wealth to national income around World War I. The sudden devaluation of the component *Net foreign capital* severely affected the wealth of the rentier class, marking the end of a period (the end of a form of imperialism in which the export of capital played a crucial role), and cannot be interpreted as a shock affecting a fundamental tendency, whose recovery could be expected. Two thirds of this fall actually mirror the decline of the component *Other domestic capital* (as distinct from *Agricultural land*, *Housing*, and *Net foreign capital*), revealing a sudden collapse that is not easy to interpret in Piketty's data and questions the corresponding estimates:

1) The collapse of *Other domestic capital* could mirror the ruin of 'rentiers' as a result of the devaluation of government debt by inflation during the war, but this explanation must be rejected. The series under investigation account for national wealth, including the government and households. The debt of the government is consequently not involved after consolidation. (Considering the variations of the debt, the opposite of a collapse was actually observed, as the government debt as a percentage of GNP skyrocketed during the war; only after World War II, the debt was reduced by inflation.)
2) An alternative explanation could be the devaluation of the fixed capital of firms. The series collected by Charles Feinstein for the United Kingdom show that no decline was observed when fixed capital is assessed at current or constant prices.[6] A major fall of stock market indices (after correction for inflation) occurred during World War I, and could account for part of the break. In the general case, however, Piketty's series do not reflect the fluctuations of stock market indices (in particular prior to World War I). One may, thus, wonder why it would be the case only during World War I. We, consequently, have serious doubts concerning the calculation (the broad subtraction of particular components from a total) of *Other domestic capital*.

Surprisingly enough, Piketty does not provide any precise answers to the above interrogations. With respect to shocks in Europe, the period 1914-1945 is generally considered as a whole—the triple shock of the two world wars and the Great Depression—while, in the data, the fall is entirely located between 1910 and 1920. It is worth reading on this issue the Section 'Shocks to Capital in the Twentieth Century' (p. 146), where answers could be provided. The analysis moves from one war to the next, up the 1950s, and no convincing assessment of the impacts of distinct events can be found, notably to take stock of what can be imputed to World War I.

To sum up, we consider the uncertainty levels are so high that any interpretation based on the big break in the series in Europe around World War I would be hazardous.

4.2. The comeback of capital

Piketty denotes the third segment (the final upward trend) in the big U that accounts for the profile of β as the 'comeback of capital'. This comeback marks the end of the temporary

[6] The series is reproduced in the technical appendix of Piketty and Zucman (2013).

decline of the ratio, following the triple shock of the two world wars and the Great Depression. Wealth returns to its equilibrium value as modeled in the fundamental relationship $\beta = s / g$.

A first observation is that this comeback of capital is weak in the United States (as was the decline). In Piketty's data, the comeback is basically a European phenomenon (in the United Kingdom, Germany, and France). The main aspect was the sharp rise of the value of housing. In France, for example, housing reached 61 percent of total wealth in 2010. In Germany, the percentage was 57 percent in 2011, also a high figure, all the more striking than no rise at all was observed for the other components of wealth since 1950.

The question must, therefore, be raised of the explanatory power of Piketty's framework concerning the rise of the value of housing. It is, first, clear that a theoretical framework accounting for the rise of wealth by the accumulation of savings cannot be applied to non-reproducible resources such as agricultural land or urban land, whose price is basically impacted by the upward trend of rents, rather than by the price of construction. Piketty certainly acknowledges the importance of such price effects but, once recognized that their effect is dominant, such mechanisms should have been substituted for the fundamental law. The analytical scheme of a fundamental law of accumulation of savings is here fully irrelevant.

5. THE UPWARD TREND OF WEALTH INEQUALITY

Piketty points to the existence of an upward trend of wealth inequality as a major historical tendency in capitalism. This thesis is well received in the left, as it matches the widely-held insight that, in capitalism, a parasitic financial class or sector has acquired an unbounded capability to increase its wealth independently of what is produced in the economy. The tendency is explained by the observation that the rate, r, of return on wealth is larger than the growth rate of the economy ($r > g$), thus accounting for the concentration of wealth at the top.[7] We contend that the larger values of the rate of return cannot account for any *unlimited rise* of wealth inequality but can explain the *elevated levels* of wealth inequality.

The two properties introduced in Section 3.1 are here crucial:

1) The consideration of the capital (wealth) gains that follow the rising price of a component of wealth is irrelevant here. Only the increment of wealth that follows from the accumulation of savings is in debate. One way of accounting for an upward trend of income inequality would be to assume the prevalence of an unbounded upward trend of a set of prices, independently of fundamental underlying trends in the economy, for example a permanent rise of stock market indices from which the upper fractions of the population would benefit. (Under such circumstances, it would be fully appropriate to refer to 'fictitious capital'.) It is possible to contemplate the

[7] Galbraith (2014) points to the *non sequitur*: 'Even it is generally true that $r > g$, it does not follow that capitalist economies have a necessary tendency toward an increasing share of profit in income. (…) If the share of profit in income is not rising, there is no obvious reason for wealth to become more concentrated." ('Unpacking the first fundamental law.

existence of such a historical tendency, though it is not supported by empirical observation, but this trend would, anyhow, be alien to Piketty's framework.[8]

2) Piketty wants to account for an *unbounded upward tendency* of wealth inequality in the same secular time frame as implied in the consideration of the basic relationship $\beta = s / g$. In other words, the issue here is not the discussion of a comeback (a new convergence) toward the historical trajectory of capitalism after a sequence of shocks. In this context, Piketty should immediately recognize the impossible joint consideration of a law stipulating the unbounded rise of inequality (the enchanted world in which the growth rate of the wealth of rich people would be larger than the growth rate of national income) and an homothetic trajectory along which all growth rates are equal. As the two properties are incompatible, a mistake in the line of argument is necessarily involved. The point is that no link is established by Piketty between the rise of wealth and investment, when the two variables are equal to savings. Piketty's framework of analysis 'neglects' this fundamental macro relationship. In other words, Piketty erroneously assumes that the two parameters, r and g, are exogenous and independent.[9]

Actually, the explanatory power of the relationship between r and g is not the one assumed by Piketty. For the *growth* of wealth inequality, one must substitute its *level*. Wealth inequality is all the more elevated than r is larger than g. For example, Piketty establishes a link between wealth inequality and the transmission of wealth by inheritance, comparing the wealth stocks following from the income generated by a life of work to the stocks garnered by inheritance (p. 26). In this framework, one can contend that elevated rates of return and low growth rates result in larger ratios between inherited wealth and the new wealth following from the accumulation of savings during the year. Inheritance unquestionably feeds wealth inequality (Duménil and Lévy [2013c]).

In the analysis of the upward historical trend of wealth inequality, a common-sense line of reasoning can be substituted for Piketty framework. The assumption that a subset of holders of wealth saves more than others is straightforward. Big holders save more and become richer. One could add that they also benefit from larger rates of return, thus increasing their records

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[8] Stiglitz (2014) points to this issue, certainly relevant when applied to Europe: '(…) Piketty's book (…) get the impression that the accumulation of wealth — savings —is responsible for the rise in inequality. (…) in fact, you cannot explain what has happened to the wealth/income ratio by that analysis. A closer look at what has gone on suggests that a large fraction of the increase in wealth is an increase in the value of land [not agricultural land, urban land and natural resources], not in the amount of capital goods.

[9] The discussion around the possible relationships between the growth rate and the rate of return ($g < r$, $g = r$, $g > r$) is surrounded by considerable ambiguity. In Piketty's book, as in many commentaries, g and r are treated as exogenous parameters and may, consequently, take any values. In other instances, the parameters are endogenous and linked to one another. A quite unusual and puzzling statement is made by Boyer (2014): 'It is easy to understand that in this pure real economy model, a gap between the profit and growth rates cannot occur", that is, $g = r$.

By definition, with I denoting investment, one has $r = \Pi / K$ and $g = I / K$ and, consequently, $g = r\, I / \Pi$. In both Kaleckian and postKeynesian long-term accumulation models, investment is equal to savings, $I = S$. One, therefore, has: $g = r\, S / \Pi$. (a) With the Kaleckian assumption that only capitalists save, $S = s\, \Pi$, one has: $g = s\, r$. (b) In the postKeynesian perspective, as in Taylor (2014), savings are derived from total income: $S = s\, Y$ and $g = r\, s\, Y / \Pi = r\, s / \pi$ (where $\pi = \Pi / Y$ is the profit share). Thus Taylor can write: 'Evidently $r > g$ is tantamount to $\pi > s$".

as wealth accumulators. Under such assumptions, a concentration of wealth to the advantage of the wealthiest fraction of the population follows along a trajectory converging toward a situation in which the entire national wealth would be owned by this favored minority, the asymptotic equilibrium of the model. This outcome (the hyper-concentration of wealth) also reveals the limited relevance of this approach. There is no doubt that capitalism potentially embodies such tendencies toward the concentration of wealth (evocative of Marx's 'concentration of capital'), but a theory of counter-tendencies is required. Anyhow, Piketty only sees in such mechanisms subsidiaries developments strengthening the fundamental tendency (pp. 26-27).

6. THE POVERTY OF PIKETTY'S ECONOMICS OF WEALTH

The great law $\beta = s / g$ is quite telling of Piketty's historical macroeconomics: (i) the growth rate of the economy is an exogenous variable ; and (ii) No economic theory is called on in order to account for growth (the growth rate of the economy being explained by the growth rate of the population). The disconnection is total between saving and investment in all of its components, directly linked to production or not.

Our perspective is symmetrical to the above. We contend that, in the United States, the profile of β is basically explained by the fixed capital of firms (its ratio to national income). A specific feature of this component of wealth is that the national income is equal to the national product, that is, the total output produced by firms on the basis of capital stocks. The 'normalization' of wealth stocks by output or, equivalently, national income (that is, the consideration of the ratios of wealth stocks to output) is here questionable, since fixed capital and output cannot be considered independent variables. As contended in the previous sections, the inverse of β is the apparent productivity of capital. Thus, when Piketty mistakenly believes he is giving a straightforward measure of wealth as a number of years of national income, he actually describes the historical pattern of technical change.

The confusion is here total, actually an 'inversion'. The comparative decline of fixed capital in relation to output during the first decades following World War II was actually the expression of a capability to produce gradually more on the basis of a given stock of capital, that is, a tendency intrinsically beneficial to capitalist owners, instead of their impoverishment (which had other causes) as contended by Piketty; symmetrically, the rise of β from the 1970s onward (a decline of the output that could be realized on the basis of a given stock of capital) mirrored the exhaustion of a favorable trajectory of technical change, and a return to the patterns of technical change observed during the late nineteenth century, nothing of an enrichment. The more favorable position of capitalist classes in neoliberalism had other causes (Duménil and Lévy (2011]).

A second expression of the distance taken by Piketty vis-à-vis basic economic principles is that, despite the objective of building a truly general theory, the ground rent is finally forgotten. The theoretical framework neglects 'price effects' (capital gains and losses) in the treatment of non-reproducible resources.

Summarizing the overall assessment in a very compact statement, one can contend that Piketty's failure mirrors the fact that, in our opinion, there can be no simple general theory of the accumulation of wealth in relation to national income—not even allowing for a significant degree of approximation. Piketty's endeavor is vain. Multiple causes are involved, depending on the variety of components, their distinct patterns of formation, and the fundamental

relationship that links one particular and important component, production capital, to national income through production technology whose exogenous character is engraved in the data and cannot be derived from any macroeconomic laws such as those put forward by Piketty.

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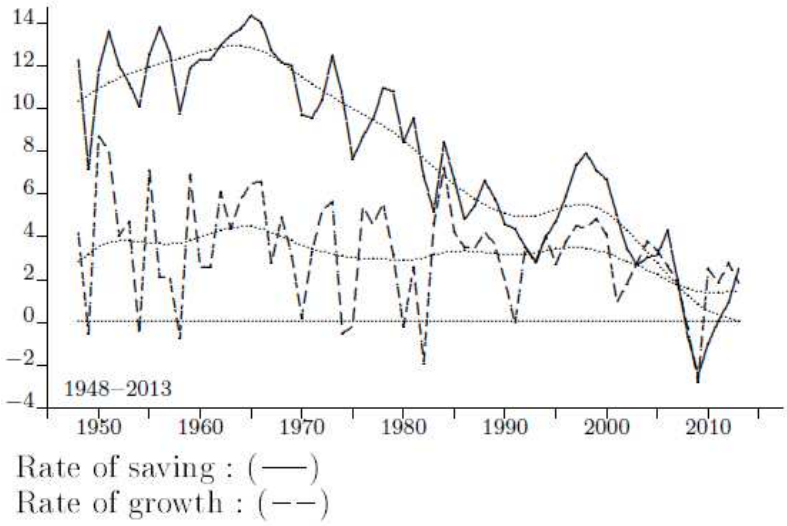
Figures

Figure 1 – The saving and growth rates: The United States since World War II (percent)



Source: U.S. national accounting.

Figure 2 – The ratio of wealth to income (percent): The United States since the Civil war

Sources: The yearly estimates of β are from : Piketty and Zucman (2013). The stock of fixed capital (net of depreciation) of U.S. firms since the Civil War are derived from the authors' earlier research and available at the following address: http://www.jourdan.ens.fr/levy/uslt4x.txt.