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Capital in the twenty-first century: a critique

David Soskice[1,2]

Abstract

I set out and explain Piketty's model of the dynamics of capitalism based on two equations and the $r > g$ inequality (his central contradiction of capitalism). I then take issue with Piketty's analysis of the rebuilding of inequality from the 1970s to the present on three grounds: First, his model is based on the (neo-classical) assumption that companies are essentially passive actors who invest the amount savers choose to accumulate at equilibrium output – leading to the counterintuitive result that companies respond to the secular *fall* in growth (and hence their product markets) from the 1970s on by *increasing* their investment relative to output; this does indeed imply increased inequality on Piketty's β measure, the ratio of capital to output. I suggest a more realistic model in which businesses determine investment growth based on their expectations of output growth, with monetary policy bringing savings into line with business-determined investment; the implication of this model is that β does not change at all. And in fact as other recent empirical work which I reference has noted, β has not changed significantly over these recent decades. Hence Piketty's central analysis of the growth of contemporary inequality requires rethinking. Second, despite many references to the need for political economic analysis, Piketty's analysis of the growth of inequality in the period from the 1970s to the present is almost devoid of it, his explanatory framework being purely mathematical. I sketch what a political economic framework might look like during a period when politics was central to inequality. Third, inequality in fact rose on a variety of dimensions apart from β (including poverty which Piketty virtually makes no reference to in this period), but it is unclear what might explain why inequality rose in these other dimensions.

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1. Introduction

Going back to the eighteenth century and providing fascinating detail for the whole of the twentieth and into the twenty-first century, Piketty sets out a

Soskice (School Professor of Political Science and Economics, London School of Political Science and Political Science) (Corresponding author email: d.w.soskice@lse.ac.uk)

remarkable collection of statistics of wealth relative to national income for a number of major countries, as well as associated rates of return. This is supplemented by the equally gripping data on top incomes in the last century or so.[3] From the extraordinarily inegalitarian world of the *Belle Epoque*, he shows the very large shift in an egalitarian direction from World War I to the 1970s. But he also argues that this shift was substantially reversed in most advanced economies in recent decades. Based on the analytic framework he develops to analyse these changes, he projects major and very striking increases in the wealth income ratio in the rest of the current century. It is presumably to this that the title, *Capital in the Twenty-First Century* (2014), makes reference; and to the associated inequality, $r > g$, his 'central contradiction of capitalism', that accounts for the extraordinary success of the book. It is one of the most compelling books I have read in a long time, lucidly and easily written and exceptionally interesting.

I focus in this review essay primarily on the period from the 1950s to the present, and in particular on his explanation of the reversal over the past four decades of the more egalitarian thirty year postwar period from the mid-1940s, the *Trentes Glorieuses*. From the 1970s on inequality has visibly and uncomfortably increased along a range of dimensions in the advanced world; and, as the title suggests, the book speaks to a deep contemporary unease.[4]

Yet it is in his more recent analysis that Piketty is unconvincing.

The analysis of the last 70 years (and used through the book) is based on a parsimonious mathematical argument, built up from Piketty's three fundamental laws of capitalism, which purports to explain the historical dynamics of capitalism. It is of course intellectually an exceptionally exciting claim.

How does Piketty's argument work? His key analytic variable is the ratio of capital (or wealth) to output – hence the first word of the title of the book, *Capital*. It is the height of this ratio in a particular country (which he labels β) which is Piketty's summary measure of that country's inequality.

(The reader may be initially confused by wealth being composed of property and industrial and financial capital, and in the term 'capital' Piketty uses wealth (including property) and capital interchangeably. But in his modelling (which draws on the framework of Solow's famous growth model (Solow, 1956)) Piketty confines the definition to capital used in production of goods and services. It is Piketty's interpretation in his modelling which I use in this critique of his model.)

His simple apparatus for understanding changes in β, the capital to output ratio, is based on his three 'fundamental laws of capitalism', consisting of two equations and an inequality, the latter the now famous $r > g$. In this inequality, r is the rate of return on capital or wealth and g the growth of output. Piketty establishes that over very long periods of time r is between 4 per cent and 6 per cent and g is much lower. This empirical inequality, that $r > g$ (with r significantly greater than g), is his *central contradiction of capitalism*. The intuition of

Piketty's explanation of the long-term dynamics of capitalism is straight-forward: A high rate of return *r* on capital gives capitalists the resources to accumulate further capital. So with a high *r* and a low *g*, the growth of capital will be high (reflecting the high *r*) relative to the low growth of output *g*. Hence *β*, the capital to output ratio and his basic measure of inequality, will inexorably rise. But these long periods of rising values of *β* are brought to sudden ends by wars or long recessions (or, post-1945, social democratic governments) which destroy capital. *β* then falls back until the long process begins again.

Thus (in modern times) the extended period of capital accumulation relative to output of the late nineteenth century led to the high water mark of inequality in the *Belle Époque* before the First World War. There followed the collapse of *β* in the destruction of wealth from 1914 to 1945; and *β* was subsequently stabilized during the egalitarian parenthesis of the *Trentes Glorieuses* from the mid 1940s to the mid 1970s when abnormally high growth pushed *g* close to *r*. But from the 1970s on, economic growth fell from this high rate to much lower rates, reestablishing the *r > g* inequality: in Piketty's parsimonious perspective, the reversal of inequality from the 1970s to the present – the very great rise of *β* (as he sees it) back to early twentieth century levels – was the *mechanical* consequence of the move back to the long-run empirical regularity of *r > g*, as a result of the secular fall in *g*.

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I have two major issues with Piketty's analysis of recent decades. First, his model is not appropriate to the dynamics of capitalism, since it sees investment as driven by the decisions of savers while effectively ignoring the role of business; this is the consequence of adopting a neo-classical methodology. Second, his parsimonious mathematical model (neat and clever though it is) almost completely ignores the interacting relations between politics, history and technological change, despite the seismic political economic shifts since the Second World War and their great relevance to inequality, and despite his repeatedly expressed concern that they should be integrated.

(1) In his model, decisions on capital accumulation are made by savers (existing wealth holders reinvesting their *r* returns). In Piketty's simplest *saver-dominated* version, the growth of capital – call it g_K – is equal to *r*; hence $r = g_K > g$ directly implies his increasing capital to output ratio, *β*. Necessary for Piketty's saver-dominated mechanism to work is the standard neo-classical assumption that companies will invest in capital equipment the amount that savers (in the simple case above capitalists saving the returns to their wealth) decide to save at full (or equilibrium) employment.

But this is implausible: For it is businesses which actually make investment decisions about capital equipment, not savers. And it is deeply counter-intuitive that in a period of slow and uncertain growth businesses would be choosing to *increase* investment and the growth of capital to ramp up

inexorably their capital to output ratios. A *business-dominated* version in the period from the 1970s to at least the mid-1990s of slow growth and substantial uncertainty is likely one in which businesses make investment decisions on the basis of expected growth of their markets – in a very simple change of Piketty's model to accommodate this (in the next section) β does not change. Moreover, it now turns out that β probably did *not* increase over the period from the 1970s to the present. In three independent contributions by economists in recent months it is argued that there was in fact no increase in the capital to output ratio if 'capital' is the capital employed in business (in terms of which Piketty explains the reversal of equality); instead the significant rise in wealth which occurred was in property, and largely reflects house price inflation (Bonnet et al. 2014; Rowthorn 2014; Rognlie 2014). Of course, inequality rose along a range of dimensions over the period, but it is unclear how that relates to the rise in the price of property; nor indeed is the rise in property prices explained by Piketty's model.

In section 2 I start with Piketty's model for readers who want to understand the relevant economics; and then explain why I see it as wrongly specified. I also, in addition, set out and critique Piketty's explanation of the rise in α, the share of profits in output along the lines of Rowthorn (2014).

(2) My second problem with Piketty's analysis of the whole period from the end of the Second World War to the present is different. His analysis rests wholly on a simple parsimonious mechanical model. There is no political economic framework to understand the complex history of the egalitarian postwar decades, major shifts in technological regimes from Fordism to the ICT revolution, and the role of politics in advanced democracies.[5] Despite his plea for a 'political and historical economics', it plays no part in his model.

He asks for 'a political and historical economics', and sees 'economics as a subdiscipline of the social sciences, alongside history, sociology, anthropology, and political science' (2014: 573). 'For far too long economists have sought to define themselves in terms of their supposedly scientific methods. In fact, those methods rely on an immoderate use of mathematical models, which are frequently no more than an excuse for occupying the terrain and masking the vacuity of the content' (2014: 574). These are sentiments with which I agree. Moreover he provides delightful and well-chosen quotations from Jane Austen and Balzac. But his core analysis, especially of recent decades, is straightforwardly based on relatively standard neoclassical mathematical models.

Thus Piketty makes virtually no substantive reference to the massive technological developments of recent decades, to the political decisions – often conflictual – which enabled them to be carried through, including allowing capital mobility and financial liberalization; he seems to argue that the capture of democracy by capitalism is at the root of the growth of inequality yet does not ask why decisive (middle-class) voters in most (but not all) well-functioning democracies have been opposed to redistribution to compensate the losers of

the shift from Fordism to knowledge economies. In section 3 I sketch a brief political economic framework of the second half of the twentieth century, and the role of democratic politics in 'institutionalizing' technological change, to provide an account of how interests get formed by external changes and how consequentially conflicting interests get resolved by political institutions.

(2a) I have two further related subsidiary issues with Piketty's analysis of the great reversal, which I tie into the political economic framework in section 3: While Piketty's fundamental focus is on wealth/capital and on top incomes, the main concern of many students of contemporary inequality is poverty and low incomes, which have risen substantially since the postwar decades. Yet Piketty more or less neglects poverty. Apart from a short section on minimum wages, Piketty appears almost indifferent to the bottom end of the income distribution. His illustrative income distributions break income earners into top 10 per cent, middle 40 per cent, bottom 50 per cent – thus excluding poverty by definition as an independent category. Of 17 references to poverty in the advanced world in the entire book, arguably only three relate to post-1914 and one to the present.

(2b) Contemporary inequality consists of more than the high capital to output ratio β (assuming it is in fact high). Inequality has risen over the whole period on a range of dimensions (OECD 2008), including top incomes and also poverty and low incomes. Yet all that Piketty explains in his model encapsulating the three fundamental laws of capitalism is the high value of the single variable β, the capital to output ratio.

So is the reader meant to infer some sort of reductionist quasi-Marxist position that a high capital to output ratio gives capital political power, with the latter allowing the development of a range of other inequalities without compensatory democratic political responses? In developing a political economic analysis, I argue that such a position is difficult to sustain. For Piketty this seems a key question, but the parsimony of his model and the absence from it of a political economic framework in which politics plays an important role, leaves us without an answer.

2. Piketty's model of accumulation

In sub-sections 2.1 and 2.2 in this section, I set out Piketty's model for explaining β, the capital to output ratio – combining his second and third fundamental laws. This is purely for readers who want a bit more background than Piketty himself provides; and they may want to consult chapters 3 and 8 of a recent text on modern macroeconomics by Carlin and Soskice (Carlin and Soskice 2014). I develop a simple critique of his explanation of the increase in β from the 1970s to the present in 2.3, in fact suggesting that we should not expect the period of low growth and uncertainty to imply such an increase. And in 2.4 I set

out evidence from different very recent studies by economists that in fact no increase in β did occur. In 2.5 this is related to independent critiques by Rowthorn (Rowthorn 2014) and Rognlie (Rognlie 2014) of Piketty's argument as to why the rise in β over recent decades explains a corresponding rise in α, the share of profits in output, his *First Fundamental Law*.

2.1

Piketty assumes that the ratio of capital (business capital) to income (or output or GDP), which Piketty calls β, rose substantially from the end of the 1960s to the present[6]. How does he explain this increase? If K is capital and Y national income, then β is defined as follows:

$$\beta \equiv K/Y$$

In his modelling of accumulation, Piketty has in mind an economist's view of the relation between capital and output which derives from growth theory: namely, output is produced by means of capital (think machines) and labour. (One reason why it is not always easy to follow Piketty's logic is that he switches between wealth as conceived of as capital used in production – which we will refer to as K, and wealth conceived of as the sum of K and the stock of housing. In this section we equate wealth with K.)

Why does Piketty argue that β increases? Piketty's argument is set out on a step-by-step basis to underline its *mechanical* nature. Leaving aside depreciation, the growth rate of the capital stock is $\Delta K / K$ where $\Delta K = I$, the level of investment. Hence, if the growth rate of national income is called g, then $\beta = K / Y$ increases when $I / K = \Delta K / K > g$, that is the growth rate of the capital stock is greater than the growth rate of output.

Next assume that savings is equal to investment. Savings and investment decisions are made by different agents, savings typically by households and investment decisions (how much capital equipment to buy) by companies. Exactly how they are brought into equality is at the heart of differences between neo-classical and Keynesian approaches, especially in an era of slow output growth as Piketty describes the environment of recent decades and that to come in future decades. Piketty takes the standard neo-classical position here that $I = S$ unproblematically. Also in line with Solow's growth model Piketty assumes that households decide how much to save by reference to a simple rule (Solow 1956). This rule is that households save a fixed proportion of their income, so that if Y is total income total savings S is given by:

$$S = sY$$

where s is the proportion of income saved. Hence

$$I = S \rightarrow I = sY$$

And dividing both sides of the equation by the capital stock K, it can be seen that

$$\frac{I}{K} = s\frac{Y}{K} \text{ so that } \frac{I}{K} = \frac{s}{\beta} \text{ since } \beta = \frac{K}{Y}$$

Now imagine the economy is in the postwar decades with a high rate of growth of both capital and output; imagine they are both growing at 5 per cent, so that β is stable; if it is further assumed that s is 10 per cent, then β will be 2. (5 per cent = 10 per cent/2).

Next take the decades from the 1970s on and assume that g, the growth of output, has now fallen to 2 per cent. Here is how Piketty argues that β will gradually but inexorably rise (assuming s stays constant at 10 per cent):

When the period of low growth starts in the 1970s, β is initially 2, and I / K is initially 5 per cent. Since g is now 2 per cent, capital is growing initially 3 per cent faster than output so that β, the ratio of capital to output will be slowly but steadily rising. $I / K = s / \beta$ so that I / K will be falling slowly over time as β rises. When I / K has eventually (over a long period of time) fallen to 2 per cent, so that the rates of capital and output growth are again equal, β will be equal to 5, since 2 per cent = 10 per cent/5.

The equation showing the relation in equilibrium between β and g is given by:

$$g = s/\beta \text{ (or } \beta = s/g\text{)}$$

and this is Piketty's *Second Fundamental Law of Capitalism*. It must hold over the longer term if s and g are constant. Thus Piketty's basic argument is that it is the fall in g from the high growth rates of the postwar decades to the much lower growth rates of recent decades which is then responsible for the growth of β between the end of the 1960s and the present.

2.2

This argument requires that s is constant: households save a constant proportion of their income. How reasonable is this constancy of s?

Piketty switches between the view that savings is well modelled by $S = sY$ with s constant, to a savings function which goes back to Pasinetti (Pasinetti 1962). Pasinetti proposed that capitalists saved their full return on capital while workers consumed all that they earned. In the Pasinetti case, $S = rK$. This radically simplifies Piketty's task: for now, if $I = S$ and $S = rK$, the growth of capital $I / K = rK / K = r$, so the condition for β increasing, that the growth of capital is greater than the growth of output is now simply

$$r > g$$

Piketty's *Third Fundamental Law of Capitalism* is that $r > g$ is an empirical regularity over prolonged periods of history.

He also calls the inequality the 'central contradiction of capitalism'. If $r > g$ is taken by itself, to call the inequality the central contradiction of capitalism is puzzling: for $r > g$ is perfectly consistent with the *Second Fundamental Law*, the standard neo-classical growth equation that $g = s / \beta$, as well as other standard stability conditions.[7]

$r > g$ becomes the central contradiction when it is combined with $S = rK$. For then the growth of capital $S / K = I / K = r$, and $r > g$ then implies that β is necessarily increasing in his model. Does β stabilize in the long-run as was the case with $S = sY$ when $\beta \rightarrow s / g$? Or does β just go on growing? Piketty shows that convergence will eventually occur, but it will take a very long time and will imply a very high level of β. In effect he is saying: if g is low then the equilibrium value of β in the long run will be so high that a realistic analysis implies a continuously rising β. For example, using the Cobb-Douglas production function as he does, and assuming realistically that the share of capital in output is 30 per cent, the condition for convergence is $g = 0.3 / \beta$ so that a 2 per cent growth rate of output implies that $\beta = 15$.

To all intents and purposes, $r > g$ and $S = rK$, during a prolonged period of low growth, implies a continuously rising β. Piketty thus invites us to a much broader and grander theory of the evolution of capitalism, and with it an apocalyptic view of the longer stretch of the twenty-first century. It is now clear why $r > g$ has become the famous and quite intuitive inequality associated with Piketty. Students in Cambridge Mass can be seen with this inequality on their T-shirts.

Piketty's *grand theory of capitalism* is then something like this: Historically, r has over long periods of time been between 4 per cent and 6 per cent. But g, the growth of output (the growth of the labour force plus technical progress), has almost always been much lower. Thus over long periods of time β rises, continually increasing the level of capital relative to output. Then, periodically, there is a significant destruction of capital, often associated with wars, and most significantly in the period from 1914 to 1945; and very rarely there are periods of high growth such as that from 1945 to the mid 1970s, the *Trentes Glorieuses*, which damp down the (inevitable eventual) operation of $r > g$. But then $r > g$ comes into operation to again, over time, produce high values of β. In looking to the next several decades, Piketty sees little to relief his concern for a future driven by $r > g$, unless it be major conflict. Not an unimpressive theory of capitalism!

Yet it should be clear that it is the *combination* of $r > g$ with the savings rule $S = rK$ – as well a mechanism to ensure that $I = S$ – which generates Piketty's very strong results for the future. Thus, much hangs on this combination of assumptions.

2.3

I argue here on analytic grounds – summarized at the start of this review – that Piketty's central $r > g$ model, explaining the rise in β, does not appear plausible for the period from the 1970s to the present. Importantly for this sub-section I cite recent work in 2.4 below showing that β does not seem to have increased empirically, which is what my amended model here of Piketty predicts.

So: Given both $r > g$ and the very significant secular decline in g since the 1970s, why didn't β increase? Piketty uses two related models as we saw in the last section. The difference between them lay in the modelling of savings behaviour, that savings is either proportional to income, $S = sY$ or $S = rK$. Both imply that a fall in g (or a rise in r) leads to a rise in β, and the key mechanisms are, for our purposes, similar. So take the $S = rK$ version which leads intuitively to the argument that $r > g$ implies that β is increasing. Explaining the intuition puts the finger on the key neo-classical assumption, namely that $I = S$. The simple intuition is then: if $I = S \rightarrow I = rK \rightarrow I / K = r$. The growth rate of capital is equal to r, so if the growth rate of output g is less than r, then β, the ratio of capital to output, must be increasing. This can be thought of as a savings-dominated approach to capital accumulation: that the latter reflects savings decisions that $S = rK$.

Decisions about I and S are (normally) taken by different agents: companies decide on how much they want to invest in capital equipment (I) and households (in this case wealthy households) decide how much they want to save (S). The (on the surface simple) assumption that $I = S$, that companies decide to invest the amount which households decide they want to save, requires a bit of sleight of hand in the neo-classical growth models. It was assumed that companies operated under conditions of perfect competition, so that they did not have problems in selling what they produced: their concern was that r, the marginal product of capital, fell by exactly the amount needed to make it profitable for them to invest the amount households wished to save at the new value of r. The neo-classical assumption was then that capital markets (or the monetary authorities) would ensure the requisite fall in r. In practice this has never been an important issue in growth theory in part because growth theorists have ben interested in other problems: Piketty's adoption of a saver-dominated view of capital accumulation is therefore perfectly in line with neo-classical growth theory.[8]

However, businesses operate under conditions of imperfect competition and there is still much controversy on the determinants of business investment during periods of low growth and uncertainty, as has characterized recent decades. So a major element is that expectations of future market growth for the products of the individual company are of key importance (given also that the return to investment is above the real cost of borrowing). Companies appear highly sensitive to the general economic climate of optimism and

pessimism. In this broader and more pragmatic perspective, the general climate of recent decades has not been propitious for the type of automatic adjustment implied by Piketty's model.

A highly simplified alternative to capital accumulation being saver domi-nated, $S = I = rK$, with investment coming into line with savings, would be to assume that companies determine investment which responds to the growth rate of markets, g: hence

$$I = gK$$

This is in fact the Harrodian-Keynesian accelerator theory of investment (rewritten it is simply $I = gK = \dfrac{\Delta Y}{Y} K = \beta \Delta Y$).[9] It of course directly implies (as it is designed to bring out the underlying structure of my take on Piketty's position) that β is precisely constant.

If households choose how much to save, how might that be brought into line with the investment decisions of companies. In modern macroeconomics the central bank targets inflation with the instrument of the so-called policy real interest rate (see chs 3 and 6 of Carlin and Soskice (Carlin and Soskice 2014)). In principle if the central bank can alter r then (in this very simplified model) all the central bank needs do is to set $r = g$, for then $S = rK = gK = I$.

In practice the central bank's policy operates largely on consumer durables including housing, and *de facto* to a much smaller extent on investment. More-over central bank inflation-targeting only developed in the 1980s. The general point to make is that, because investment decisions are business-dominated and concerned with confidence in the growth of product markets, aggregate demand management is generally more effective in keeping the economy in equilibrium by operating on consumption/savings rather than on investment.

The model is of course highly simplified and is meant as an illustration of how the problems of Piketty's argument can be avoided.

2.4 Reassessing Piketty's data on β

In a very recent and detailed statistical paper, a team of economists at LIEPP, Sciences Po, Odran Bonnet, Pierre-Henri Bono, Etienne Chapelle and Guillaume Wasmer, argue that Piketty is wrong in his presentation of data on β for the period at least from the 1970s to the present, the period of the reversal of equality on which this review focusses (Bonnet et al. 2014). What they show is that the increase in β over that period is largely an increase in wealth in property, rather than business capital in the sense in which Piketty uses capital in his $r > g$ model. Moreover they show that the increase in wealth largely takes the form of increases in house prices. Bob Rowthorn also comes to an identical conclusion in another recent article, to which I refer just below in 2.5 (Rowthorn 2014).

2.5 Piketty's First Fundamental Law

Piketty's *First Fundamental Law* (in fact just a definition) defines α, the share of profits in output, by $\alpha \equiv rK / Y = r\beta$. Piketty then argues that as β rises so will α, thus using the rise in β to explain a second increase in inequality, namely the share in profits in output. One step is necessary in the argument: As β, the capital to output ratio, rises so microeconomics generally implies that r, the rate of profit, falls. So to make his argument Piketty needs to assume that a 1 per cent rise in β is likely to imply a less than 1 per cent fall in r. This requirement (technically that the elasticity of substitution in the production function is greater than one – i.e. a relatively large change in β is the consequence of a given change in α) is asserted by Piketty to be econometrically the case.

The value of the elasticity of substitution (usually written σ) is very far from an uncontentious subject in contemporary economics. Until a decade or so ago, there had been a broad consensus, especially for the US economy, that $\sigma = 1$ (the Cobb-Douglas case). Since then a spate of articles has argued that, properly estimated, its value is less than one (Antras 2004; Chirinko 2008); the argument in any case has largely been between $\sigma = 1$ and $\sigma < 1$.

In his powerful critique, Rowthorn reinforces the position that the elasticity of substitution is less than one, while independently reiterating Bonnet et al's statistical conclusion to which this paper has already referred (Bonnet et al. 2014). As Rowthorn says:

> Piketty's assumption regarding the elasticity of substitution is not correct. There is considerable evidence that this elasticity is less than unity. Moreover, Piketty's method for measuring changes in the capital-output ratio is misleading. He fails to allow for the disproportionate increase in the market value of certain real assets, especially housing, in recent decades. This leads him to conclude, mistakenly, that the capital-output ratio has risen by a considerable amount. In fact, conventional measures of this ratio indicate that it has been either stationary or has fallen in most advanced economies during the period in question. This would suggest that the basic problem is not the over-accumulation of capital, but just the opposite. There has been too little real investment.

Thus Rowthorn reiterates from a different perspective the analytic conclusion to which I came in 2.3.

3. The absent role of political economy and technological change

3.1

A comparative political economic framework is in my view necessary to assess Piketty's most substantive claim that contemporary inequality is driven by the reappearance of capital.

Piketty does not have a serious comparative political economic framework. For example, his explanation of why the rise in top incomes is confined to the Anglo-Saxon economies is that

> I noted that the 'conservative revolution' that gripped the US and GB in the 1970s and 1980s and that led to among other things greater tolerance of very high executive pay was probably due to a feeling that these countries were being overtaken by others. . . . Obviously, however, other factors also played an important role. (2014: 333).

It is possible that I have missed key references in *Capital* and I have certainly not gone through the online resources which Piketty provides. But my impression is that the book lacks any coherent foundations in comparative political economy.

Let me sketch in a few paragraphs recent work in comparative political economy which integrates technological change with political economy and which bears on the increase in various dimensions of inequality between the 1970s and the present.[10] Fordism operated somewhat differently across the advanced economies, but three elements produced low unemployment and wage compression. There was a huge backlog of basic demand for autos and white goods which drove aggregate demand until the 1970s (with rather minimal help from Keynesian demand management); it was easy to integrate those with low education and social skills into semi-skilled employment – in Western Europe about two-thirds of young people in the 1960s left school at 15 or 16; and, given complementarities in production between skilled and semi-skilled labour, collective bargaining led to compression of wage differentials between skilled and semi-skilled.

Fordism gradually collapsed through the 1970s and 1980s as a competitive technology under the growing impact of the IT revolution in open world markets. Governments accepted trade openness and other measures of liberalization – as decisive voters wanted access to the more varied, sophisticated and higher quality products which the integration of ICT into production was increasingly making available: far from capital suborning democracy, there was in fact vociferous opposition to the Thatcher government from the CBI in the early 1980s for exposing business to market competition.

IT gives greater decision-making power to the individual employee, the effectiveness of which depends on his or her analytic skills; it also depends on social skills because employees now have to interact to a greater degree in taking decisions; at the same time, the return to physical power is correspondingly reduced. This has led to a large increase in the returns to education; and a corresponding, and very much continuing, increase in staying on rates in secondary and tertiary education (Oesch 2013). Thus a straightforward explanation for the low incomes and high unemployment rates of those who do leave school early, frequently those without social skills or cultural capital, is

that the jobs they have access to are low paid and without prospects – the consequence of technological change and democratic trade-openness strategies.

An analysis of democratic political institutions can take us further: The ability of children from disadvantaged backgrounds to benefit from the public educational system and avoid poverty thus reflects the system's efficacy and reach. By and large this is more limited in liberal market economies with majoritarian electoral systems, where dominant middle-class voters want the bulk of educational resources. It is particularly the case in the USA where decisions on the distribution of public educational expenditure are largely taken locally, de facto by middle-class home owners who can switch resources away from poor blacks. Hence poverty is higher in majoritarian systems (liberal market economies) than under PR (coordinated market economies); and significantly higher in the USA with decentralized majoritarian decision-making in education (as well as residential zoning).

For those who do lose out, political systems have not been generous in redistribution. Again this is a standard democratic response in the advanced countries, augmented by the effect of the IT revolution in increasing educational levels of the large majority, thus more sharply differentiating their interests from the low-skilled minority. This is most notably the case in majoritarian systems, which tend to have slightly right of centre governments on average (Iversen and Soskice 2006). But it is also true of PR systems on the continent (Esping-Andersen's Christian Democratic welfare states with high insurance and low redistribution), where CD parties with just left of centre, centrist and just right of centre components for coalitions with centrist parties. Only in Scandinavian countries with paradoxically strong right parties are the interests of the low-skilled included in coalitions between centrist and left parties (Iversen and Soskice 2015 forthcoming). Again, to summarize, the general limits to redistribution via the political system are the result of democratic decision-making, not the effect of capital.

Is there a direct sense in which the political power of capital has increased in recent decades, (which I take to be Piketty's proposition)? This is certainly a widely held view, often seen as associated with globalization and financialization, and perhaps one which has made many readers instinctively sympathetic to Piketty.

Clearly, 'money speaks' in American politics. But that has always been the case due to two interrelated aspects of American politics, which are reproduced nowhere else: that members of Congress can have individual effects on legislation, and that American parties are not highly disciplined as a result of the primary system. Thus large companies have always 'invested' in members of Congress. This was as true in the 1950s as at present. (What has changed – due to the collapse of Fordism – is the diminished role of unions and the dramatically changed structure of companies.)

The ICT revolution has had two major consequences for advanced capitalist companies in the advanced economies, both associated with globalization and both of which have paradoxically clipped their political wings. First the ICT revolution combined with globalization has hugely increased market competition between advanced capitalist companies in both goods and services: innovation is now central to competition, as is product variety, sophistication and quality. Whether or not groups of advanced companies could ever take collective action to make credible threats against advanced governments (outside explicit policy areas under coordinated capitalism), their ability is now much lower. The second point concerns the nature of MNE location decisions in other advanced economies: whatever their activity in other economies, knowledge-based MNEs do not behave like footloose capitalists in the advanced world; very generally they are concerned to invest in co-locations, setting up subsidiaries or buying into or building relations with companies, defined by pre-existing skill clusters or competence agglomerations. Thus credible exit threats have become much less important than they might be in non-advanced economies. It is therefore not obvious that the political power of advanced capitalist companies has increased in recent decades.

3.2

At the end of reading Piketty's book I am not sure what his basic position on the political power of advanced capitalism is. It is surely not accidental that his language and style evokes Marx: The title of the German translation is *Das Kapital im 21ste Jahrhundert*; he talks of three *fundamental laws of capitalism*; the third (that $r > g$ holds empirically over very long periods) he describes as the 'central contradiction of capitalism'.

But taking the book at face value, Piketty argues no more than that the ratio of wealth to output has risen in recent decades, as a result of a process of accumulation described by $r > g$. (Though, as suggested in 2.4 that seems not to have happened, with the wealth increase taking the form of house price increases.)

If Piketty's focus is just on the increase in β, without a wider political economic framework bringing in technological regimes, he can say little about why other dimensions of inequality have grown dramatically over recent decades. This is especially so at the low end of the income spectrum. To this needs to be added the rise in the share of profits in output, α, which as suggested in 2.5, his model appears not to explain. If β has also not risen, at least in the relevant sense of business capital, the reader is left with the question of how the rise in house prices is then responsible for the increase in all the other dimensions of inequality during the great reversal. Although the title of another recent publication, *Capital is Back*, (Piketty and Zucman 2014), is suggestive, the political power of capital in recent decades is not discussed.

Piketty probably wisely desists from clear political positions and prognoses – at least which go beyond his model. He gives the impression that democracy has been captured by capital – he states the need to *reprendre la démocratie*. But to go beyond his mathematical model he needs a political economic framework, which despite his protestations to the contrary he does not provide.

I believe it is not so easy to argue that the political power of capital has increased. And in setting out a simple comparative political economic analysis here, I suggest that many of our current problems of inequality in the advanced world are the consequence of democratic political systems in which decisive voters are unwillingly to redistribute resources to those lower down the income distribution. *Capital in the Twenty-First Century* paints, I believe misleadingly, a very different picture.

4. Rethinking growth pessimism

I want finally to close by asking whether Piketty's growth pessimism in coming decades is justified. A major basis for the striking, even apocalyptic, prediction of future decades which Piketty makes, is his view that slow growth is here to stay. As argued in 2.3 it is not evident to me that his prediction – of the inexorable growth of β – is correct even if slow growth remains. But the extraordinary success of the book rests on the pessimism he has (brilliantly) conveyed about the contemporary world. Should we be pessimistic about continuing low growth?

There are three points which it is worth making:

First, (as I read the book) he relies heavily on the analysis of just one economist, Robert Gordon, for his prediction of low growth in the future. There is no question that Gordon is a fine empirical economist. And his approach of basing future prediction on a good understanding of the past and present is one I am in close sympathy with – in opposition to a rational expectations approach which often puts quite unrealistic requirements on the common knowledge of the future attributed to current decision-makers.

Without question, the financial crisis has had and will continue to have sluggish effects on growth over the next decade. The 'great recession' has provided fertile soil for the pessimism of *Capital in the Twenty-First Century*. But the ICT revolution, ushering in the most important new general purpose technology since electricity, may constitute an historical break point. (Faraday's electromagnetic motor was invented in 1821, yet it took many decades of related innovations and the establishment of coordinating institutions before electricity began to reflect in enhanced productivity growth.) Exactly how this will develop is not predictable, but while there are references to it in Piketty,

it plays (as I see it) virtually no role in his argument. A useful point of entry into this literature as an antidote to Piketty's pessimistic position is *The Second Machine Age* by Erik Brynjolfsson and Andrew McAfee (Brynjolfsson and McAfee 2013).

Piketty also neglects the great changes in growth theory which have taken place in the last two decades. While it has long been accepted that most productivity growth has come from technological change, it was until relatively recently treated as its residual explanation in empirical applications of growth models after the effects of greater capital intensity had been taken account of. Contemporary growth theory, to which Acemoglu and Aghion are perhaps the most important contributors, is now centred on the active modelling of innovation (Aghion and Howitt 1997; Acemoglu 2009; Aghion and Howitt 2009). It is difficult not to see the importance given to innovation in modern growth theory as reflecting the major developing changes in the importance of innovation in growth which the ICT revolution has brought about. Rognlie provides some interesting suggestions about how this can be related to Piketty's work (Rognlie 2014).

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So, in conclusion: There is no question of the extraordinary importance of Piketty's work over many years in data collection on wealth. Nor is there of the compelling force of this lucidly-written and fascinating book. My criticisms in this review essay cover solely his analysis of the second half of the last century and the present. His neo-classical mathematical apparatus of three fundamental laws – however brilliant in its simplicity – does not provide a good account of capitalist development. Instead, to understand why inequality has grown so sharply in its many dimensions in this period a serious political economic framework is needed in place of a mechanical model.

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Notes

1. School Professor of Political Science and Economics, Government Dept., LSE.
2. I would like to thank Philippe Aghion, Cathy Boone, Jean-Luc Gaffard, Niki Lacey and Oyfind Skorge for very helpful suggestions; and Wendy Carlin and Torben Iversen on joint work on the ideas in sections 2 and 3.
3. The data is part of the extraordinary collection amassed by the team led by Atkinson, Piketty and Saez.

4. Clearly the financial crisis and its prolonged problematic aftermath is a major part of that unease, but I focus (as does Piketty) on the reversal of the relatively egalitarian postwar decades.
5. Jean-Luc Gaffard makes a similar set of points (Gaffard, J.-L. 2014).
6. Although as will be shown in 2.4 this is probably empirically incorrect as an assumption.
7. In fact $r > g$ is a central stability condition in economics. For example, the present value

of a stream of profits from an investment growing at rate g and discounted at rate r is finite only if $r > g$. With the standard neoclassical growth model $\beta = s \, / \, g$ and the assumption of a Cobb-Douglas production function $r > g$ when $\alpha > s$, where α is the share of profits in output (normally between 25 per cent and 35 per cent) and s, the savings ratio, between 5 per cent and 15 per cent – so almost always satisfied.

8. Specifically, with a Cobb-Douglas production function, the desired stock of capital is given by the condition that the marginal product of capital is equal to the rate of return: $K = \alpha Y \, / \, r$. Perfectly adjusting investment should ensure this relation holds continuously so that $I = K(g - g_r)$ where g_r is the per cent change in r.

9. This of course has something in common with both Joan Robinson and Harrod's position in the 1950s, though I tie this into a modern macroeconomics approach.

10. This section owes a great deal to ongoing collaboration with Torben Iversen.

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