



Capitalists, Workers, and Thomas Piketty's
Capital in the 21st Century

Thomas R. Michl

June 2015

WORKINGPAPER SERIES

Number 383

**POLITICAL ECONOMY
RESEARCH INSTITUTE**

Capitalists, Workers, and Thomas Piketty's
Capital in the 21st Century

Thomas R. Michl¹
Department of Economics
Colgate University
13 Oak Drive
Hamilton, NY 13346
tmichl@colgate.edu

May 19, 2015

¹Paper forthcoming in the *Review of Political Economy*. The author thanks the Economic Policies in the Age of Globalization (EPOG) Masters Course program at Kingston University during Spring 2014 for the opportunity to give the lectures that led to this paper. He thanks Engelbert Stockhammer (his host at EPOG), Ozlem Onaran, Rafael Wildauer, Javier Lopez Bernardo, Paul Auerbach, and Dimitris Sotiropoulos for their comments and the conversations made possible by EPOG. He thanks Steven Fazzari and Philip Arestis for conversations about the saving rate, and Duncan Foley, Lance Taylor, Gregor Semieniuk, and Rishabh Kumar for sharing their thoughts on Piketty's book. All the views and errors are the sole responsibility of the author, of course.

Abstract

Capitalists, Workers, and Thomas Piketty's *Capital in the 21st Century*
by Thomas R. Michl

JEL B22, B50, E12, O40

Keywords: Rate of profit, wealth distribution, Cambridge equation,
Pasinetti's theorem, Pasinetti paradox.

This paper interprets Piketty's influential work through the lens of structuralist macroeconomic theory, which is a synthesis of the classical, Marxian, and Keynesian traditions. It shows that Piketty's key inequality, $r > g$ (the rate of profit is greater than the rate of growth) measures the influence of capitalist consumption on capital accumulation in the context of a growth model with capitalists and workers in the tradition of Nicholas Kaldor and Luigi Pasinetti. The paper shows how in the structuralist model the connections Piketty makes between growth and inequality become more transparent and less confusing than they are in the neoclassical theory he resorts to using. The paper also examines his data with emphasis on two central paradoxes of neoliberalism: with all the upward redistribution of income, there is surprisingly little concentration of the wealth distribution; and with a higher profit rate, there has been no corresponding increase in growth. The hypothesis suggested by structuralist growth theory is that neoliberal capitalism has transformed Marx's "accumulate, accumulate" into "consume, consume." The political-economic implications of this hypothesis are significant.

1 Introduction

This paper engages with Thomas Piketty's *Capital in the 21st Century* from the perspective of structuralist economic theory. Structuralist economics¹ is a synthesis of classical, Marxian, and Keynesian economics that emphasizes the institutional, historical, and, well, structural nature of modern economic systems and eschews the ahistorical methodological individualism of neoclassical theory. Piketty's book has been criticized by some structuralist thinkers (Galbraith, 2014) for its reliance on elements of neoclassical theory long discredited by the Cambridge capital controversies, and it is hard to deny that the aggregate well-behaved production function plays far too large a role in his work. Like Taylor (2014), we argue that his neglect of the other bone of contention in those important debates—Pasinetti's demonstration that a capitalist class occupies a privileged position in the structure of accumulation—is perhaps even more important. (Pasinetti's Cambridge Theorem is certainly one of most significant discoveries in 20th century macroeconomics, on a par with the theory of effective demand.)

Yet it would be a mistake to condemn the whole Piketty enterprise on this account alone. Indeed, one reason this book has given rise to such a vibrant secondary literature is precisely his unwillingness to confine his thinking to conventional channels. One could argue that far from offering the unified theory of wealth distribution that Paul Krugman describes in his *New York Review of Books* essay, Piketty embodies contradictory elements of neoclassical and structuralist thinking. This paper endeavors to show that a structuralist-classical growth model does a better job (even emending Piketty in some instances) of making sense of the behavior of growth and distribution in a capitalist society, especially the critical gap between the rate of profit and the rate of growth. The paper starts with a basic growth model, but then uses it to interpret Piketty's data on rising income and wealth inequality in the U.S. during the neoliberal era since 1980. Two questions frame this foray into empirics: is the modest increase in wealth inequality consistent with the large increase in the profit share, and with all those profits, where is the growth?

2 Theory

Since we are considering the behavior of a capitalist economy over fairly long time periods, it seems appropriate to assume that the system is operating at normal capacity utilization on average. For example, there may be intrinsic or extrinsic mechanisms that stabilize the level of demand around full capacity, such as capitalist saving and investment decisions or the interventions of an inflation-targeting central bank. In this case, we can legitimately suppress the Keynesian question of how planned investment and saving are coordinated, by in effect, conflating saving and investment. For simplicity, we will refer to this flow as “saving” without necessarily committing on the question of which of the investment-saving pair is dominant. We might call this a structuralist-classical model.

2.1 A Growth Model

In a one-commodity system with Leontief technology, the technique of production is described by any two of three parameters: labor productivity (or the output-labor ratio), $x = X/N$, capital productivity (or the output-capital ratio), $\rho = X/K$, and capital intensity (or the capital-labor ratio), $k = K/N$. The determination of r , the net rate of profit (the gross profit rate after depreciation, δ) follows directly from the wage-profit equation, which can also be written in share terms (π is the gross profit share and w is the wage rate):

$$r = \frac{x - w}{k} - \delta = \pi\rho - \delta. \quad (1)$$

It is also useful to define the maximal rate of profit, $R = \rho - \delta$ since it crops up frequently in the analytical expressions we will encounter.²

In a two-class world comprising capitalist and worker agents, we need to specify the saving functions for both agents. The most straightforward assumption for the capitalists has them saving a constant fraction of their income or wealth, and for our purposes it makes sense to elect a constant propensity to save out of wealth. For those who insist on such things, this can be rationalized as the solution to the intertemporal choice problem of a “dynastic” capitalist agent (Foley & Michl, 1999) or as the solution for a finite capitalist agent who values wealth (wealth-in-the-utility-function) for its own sake (Michl, 2009), in both cases specialized to a logarithmic utility function. Let g represent the rate of growth of capitalist wealth³ and β_c their

propensity to save out of end-of-period wealth defined as their wealth plus any net profits earned within the period, or $(1+r)K^c$. Their wealth in the next period, K_{+1}^c , will then be equal to their saving out of current wealth. The growth factor $(1+g)$ will be the ratio K_{+1}^c/K^c , giving us a form of the capitalist saving function that is called the Cambridge Equation in honor of such pioneers as Joan Robinson and Nicholas Kaldor:

$$(1+g) = \beta_c(1+r). \quad (2)$$

Cohorts of workers are assumed to arrive in a sequence of overlapping generations, and to save a constant fraction of lifetime wealth (β_w) for life-cycle purposes. Again, this can be rationalized as the solution to an intertemporal choice problem with a log utility function (Foley & Michl, 1999). In any given period the active workers are saving for retirement and the retired workers are consuming their accumulated savings.⁴ A worker's lifetime wealth is just her wage, and thus the aggregate saving of workers is their individual saving scaled up by the number of workers or

$$K_{+1}^w = \frac{w\beta_w}{k}K. \quad (3)$$

We now have, in Equations (1) through (3), the elements for constructing a fully-specified growth model, provided we can close the model with an assumption about the labor market. The assumption most clearly consistent with the “surplus approach” to distribution (to use Pierangelo Garegnani's apt characterization of the structuralist view) is that the wage rate or perhaps the wage share is determined outside the model by historical, political and institutional factors. In short, the profit share is a structural feature of capitalism, an economic surplus (over)determined by factors such as bargaining power in the labor market, the pricing power of firms in the product market, corporate policies, and state fiscal and monetary policies. In this case, labor supplies are available in the long run, perhaps because there is a sizable global reserve army of labor, leaving the growth rate free to be determined endogenously.

But we can also use the same apparatus to take on board the alternative and more conventional view (which is also that of Piketty) that capital accumulation adapts to a pre-existing “natural” rate of growth, n , under full employment. The surplus approach undergoes a kind of figure-ground reversal for as Kaldor (1956) pointed out, in this case distribution adjusts

endogenously, and the wage share is regulated by the surplus or residual income after deductions for full-employment investment.

2.2 Why is $r > g$? Use the Cambridge Theorem.

This model lies in the Kaldor-Pasinetti tradition of two-class models and it is well-known that there are two “solutions” depending on the parameter values. If we take distribution to be exogenous and growth to be endogenous, the model can be represented by a linear difference equation having two roots or eigenvalues, $\lambda_1 = \beta_c(1 + r)$ and $\lambda_2 = \beta_w(R - r)$. If $\lambda_1 > \lambda_2$, we have a two-class solution. This is the world described by Luigi Pasinetti’s celebrated Cambridge Theorem, in which the Cambridge Equation is the dominant eigenvalue. The remarkable feature of this world highlighted by the Theorem is that the capitalist saving rate mediates the relationship between the rate of profit and the rate of growth, with no role for worker saving or technology (hence the soubriquet “Pasinetti paradox”).⁵ Worker saving does, however, affect the steady state distribution of wealth, to which we return below.

When we rearrange the Cambridge Equation to solve for the capitalist propensity to consume out of wealth, we find:

$$(1 - \beta_c) = \frac{r - g}{1 + r}.$$

Through the Cambridge Theorem we have arrived at an answer to the question why $r > g$ in real economies. The gap between these fundamental variables measures the consumption of capitalist agents in a two-class world.⁶ The limiting case in a two-class model is $r = g$, in which case the capitalist agents are pure engines of accumulation. This is the much-discussed golden rule.

The other solution is a one-class world in which worker-owned wealth eventually eclipses capitalist wealth.⁷ To violate the $r > g$ inequality in an endogenous growth setting would require that the worker saving rate rise well beyond the threshold that separates the two-class and one-class solutions.⁸ The economic logic is that in a one-class world with life-cycle saving, an increase in the worker saving rate (out of wages) drives up the growth rate for a given rate of profit, so that $r < g$ reflects acute thriftiness on the part of workers.

Curiously, in the one-class solution for the exogenous growth closure with growth at the natural rate, $r < g$ reflects acute spendthriftiness on the part of workers.⁹ The economic logic is that a decrease in worker saving (out of wages recall) with a constant growth rate requires a higher wage and lower rate of profit to maintain full employment growth. The counterfactual or at least counterintuitive implication of life cycle saving that a lower rate of profit increases the rate of accumulation is often cited as a reason to reject this as a comprehensive theory of saving. That prolonged periods with $r < g$ are never observed is one piece of circumstantial evidence (albeit insufficient) against the relevance of the one-class solution. It is to Piketty's credit that he rejects the simplistic overlapping generations view of wealth formation.

Returning to the two-class case that does resonate with really-existing capitalism, if we follow Piketty and conventional growth theory by taking growth to be exogenous, then distribution adapts endogenously to ensure a full employment growth path at the natural rate. Again, the model assumes the form of a difference equation that has two solutions, as was discovered in the exchanges between Pasinetti (1962) and Samuelson & Modigliani (1966). This is the original setting for the Cambridge Theorem in the two-class solution and our interpretation of $r - g$ remains valid.

An increase in $r - g$ can be created in this full-employment case by a decline in the capitalist saving rate, which necessitates that the profit share rise in order to maintain growth at the natural rate. We can see how income inequality reflects the class structure of accumulation, but only because we have taken some care to write out a model with structuralist and classical architecture. In the endogenous growth case, such a decline will reduce growth and leave the rate of profit constant. Below we will see that these scenarios affect the wealth distribution quite differently.

Piketty writes as if the rate of profit is constant and the $r - g$ gap is driven by changes in the natural rate of growth. His reasoning leans heavily on the marginal productivity theory of distribution, and his belief that the elasticity of substitution between capital (or wealth in his accounting) and labor must be greater than unity to explain the relative stability of r . His projections of rising inequality in the 21st century are premised on a decline in the natural rate of growth, chiefly for demographic reasons. Free as it is of the distortions associated with the well-behaved neoclassical production function, the structuralist-classical model presented here clarifies the issue. As long as the capitalist saving propensity remains constant, it is clear from the Cambridge Equation that a decline in $1 + n$ will effect a rising wage share

(falling π) and reduce $1 + r$ proportionately one-for-one. In other words, if this model describes faithfully the real world, we should anticipate that the 21st century will be an Eden of rising equality.¹⁰ That this shows no signs of occurring is something of a rebuke to the full employment model of capital accumulation.

2.3 An aside on stable r

An alternative to the marginalist theory of distribution is the fossil production function that treats changes in the production parameters as expressions of technical changes over time, rather than as choices from an *ex ante* book of blueprints. Under Piketty's assumption that growth is pinned down by the natural rate in the long run, the fossil production function in a classical-structuralist model produces exactly the pattern that Piketty identifies as a consequence of a high (greater than one) elasticity of substitution in a neo-classical production function, viz. increases in the capital-output ratio are associated with stable profit rates and increasing profit shares.

To see this, we again exploit the Cambridge Theorem to restrict the profit rate to $(1 + n)/\beta_c$. Now consider a decline in capital productivity, which is equivalent to an increase in the capital-output ratio that Piketty focusses on. A discrete technical change that reduces capital productivity must also improve labor productivity if it has any chance of being adopted by profit-maximizing capitalists. Let $\chi < 0$ and $\gamma > 0$ represent the proportional change in those productivities, ρ and x . Foley & Michl (1999)[Ch. 7] call this Marx-biased technical change and show that the new technique will be profitably adopted as long as it clears a viability threshold, which is:

$$\pi < \frac{(1 + \chi)\gamma}{\gamma - \chi}$$

This viability condition is derived by assuming the firm adopts a new technique if it increases the rate of profit evaluated at the prevailing real wage. The intuition behind this condition is that a technical change that saves on labor but uses more capital will only be profitable if labor costs are a sufficiently large proportion of total costs (or equivalently that profits are a sufficiently small share of value added).

In a labor-constrained world, dispersion of this new technique will create an incipient excess demand for workers (since it tends to raise the rates of

profit and accumulation). In the new steady state, real wages will be higher, but not proportionately as much higher as labor productivity. The Cambridge Theorem constrains the profit rate, requiring a compensating increase in the profit share to accompany any reduction in capital productivity so that growth remains at the natural rate. The profit share will be driven up by Marx-biased technical change. The pattern that Piketty identifies, rising capital-output ratios with stable profit rates, does not require any incredible assumptions about elasticities or well-behaved production functions at all.¹¹

2.4 Wealth distribution

These models provide a natural environment for studying the relationship between the distributions of income and wealth. The only form of wealth in them is capital, owned by workers or by capitalists. Define the workers' share of wealth by

$$\phi = \frac{K^w}{K}$$

so that the capitalist share of wealth is $1 - \phi$. Without a more granular treatment of the population of capitalist agents it is not clear how well this metric aligns with practical measures of wealth concentration. As it stands, the capitalist population is in effect normalized to one. We will assume that the share of the population comprising workers remains fairly constant so that these wealth shares map into standard measures like the top centile share of wealth, at least to a first approximation.

In the endogenous growth case, the steady state distribution of wealth is described by the ratio of the two eigenvalues

$$\phi^* = \frac{\lambda_2}{\lambda_1} = \frac{\beta_w(R - r)}{\beta_c(1 + r)}. \quad (4)$$

Since the eigenvalues represent the growth factors for capitalist and worker wealth taken in isolation from one other, this expression conveys the powerful intuition that the distribution of wealth is the outcome of a race between the incipient growth of worker wealth and the actual growth of capitalist wealth.

This equation can be applied to the the exogenous growth case by substituting $(1 + n)$ for $\beta_c(1 + r)$, recognizing that the r in this case is now an endogenous variable. In either case, we can extend our discussion of the effects of changes in $r - g$ to the distribution of wealth. For example, a decrease

in the capitalist saving propensity under the exogenous growth closure led to an increase in the profit share and rate, and we see from Equation (4) that this will reduce the workers' share of wealth since $\beta_c(1+r)$ is by assumption unchanged.

But with the endogenous growth closure, a decline in capitalist saving has the *opposite* effect on the wealth distribution. Intuitively, this decline reduces the capitalist entry in the growth race described above. Thus, Piketty's treatment of $r > g$ as the central contradiction of capitalism through its capacity to generate rising wealth inequality has to be understood as a contingency, not a law of distribution. It is clearly possible for the $r - g$ gap to rise while inequality diminishes.¹²

Similarly, the assertion that a reduced natural rate of growth in the 21st century must increase income inequality has already been questioned above, and now we can see that a lower natural growth rate will also reduce wealth inequality in a full employment regime.

2.5 Income and wealth

One way to visualize the steady state wealth distribution is to consider the relationship between steady state growth and the distribution of wealth implied by the capitalist and worker saving functions, each taken separately.

In the case of capitalist saving, it is clear that the relationship collapses to the Cambridge Equation. The distribution of wealth consistent with capitalist saving behavior (call it $\tilde{\phi}$) can be any number between 0 and 1. In the case of workers, the distribution of wealth consistent with worker saving behavior (call it $\hat{\phi}$) is given by:¹³

$$\hat{\phi} = \frac{\beta_w(R-r)}{1+g^*}.$$

The economic intuition behind this equation is that in an overlapping generations world, faster growth implies that the proportion of inactive workers (retirees) in the working class population must decrease, and since they are effectively the sole custodians of working-class wealth, so too must the proportion of total wealth held by workers.

The steady state equilibrium is formed by the equality, $\tilde{\phi}(g^*) = \hat{\phi}(g^*)$, giving us a tool for visualizing the comparative dynamics. Point A on Figure 1 represents an initial steady state where the equality is satisfied.

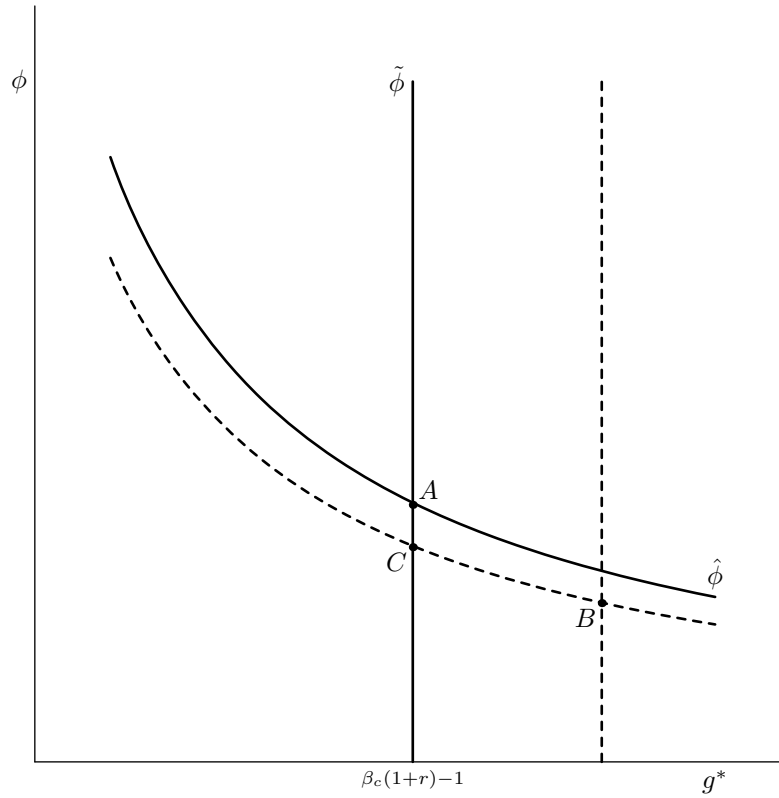


Figure 1: In an endogenous growth model, an increase in the profit share will shift both the capitalist wealth-growth curve, $\tilde{\phi}$, and the workers wealth-growth curve, $\hat{\phi}$, as shown by the dashed lines and the new steady state at point B . Here ϕ represents the workers' share of wealth and g the rate of growth. Point C identifies a new steady state in which the capitalist saving rate has declined such that the rate of accumulation stays constant. Alternatively, in an exogenous growth setting, point C could represent a new steady state generated by a decline in the capitalist saving rate, which also requires an increase in the profit share and rate in order to stabilize g .

A question of great interest is how this model responds to a change in the underlying class structure that redistributes income toward capital, one of the defining features of neoliberalism. As a first step toward interpreting Piketty’s data through the structuralist-classical growth model, we can elaborate on the quantitative relationship between the income and wealth distributions. Differentiating Equation (4), we find that

$$\frac{d\phi^*}{d\pi} = \frac{-\beta_w \rho (1 + R)}{\beta_c (1 + r)^2}.$$

The change in the distribution of wealth associated with an increase in the profit share is illustrated in Figure 1 by the movement from point A to B. The increase in the rate of profit shifts the workers’ wealth-growth curve down, and shifts the capitalist wealth-growth curve (which is just the Cambridge Equation) to the right.

It also makes some sense (or will later in the paper) to ask how a change in the profit share will affect wealth distribution in the event that the growth rate remains constant, either because the system is labor-constrained or because there has been a simultaneous decline in the capitalist saving propensity, β_c , that channels all the increased profit share into capitalist consumption. In this case, the relevant derivative for a constant growth rate, g^* , is

$$\frac{d\phi^*}{d\pi} = \frac{-\beta_w \rho}{1 + g^*}$$

and the visual reference in Figure 1 is the movement from point A to point C. It is clear that in this case the wealth distribution will not change as much as in the previous case but it is not clear what the magnitudes might be. For that, we need some empirics.

3 Empirics

Piketty’s signal achievement has been to document the spectacular rise in income inequality during the neoliberal era (roughly 1980 to the present), to assess its historical significance over very long time horizons, and to raise the question of a return to levels of inequality in income and wealth not seen since the nineteenth century. The classical growth model provides a natural framework for addressing some of these issues empirically, and we will focus

Table 1: **Calibration of the capitalist wealth share**

$1 - \phi$	With variable g		With constant g	
	$d\phi/d\pi$	$\Delta(1 - \phi)$	$d\phi/d\pi$	$\Delta(1 - \phi)$
0.2	3.62	0.28	1.19	0.12
0.4	2.71	0.21	0.90	0.09
0.6	1.81	0.14	0.60	0.06
0.8	0.90	0.07	0.30	0.03

Parameter values at annual frequency are $\rho = .45$, $\pi = .33$, $g = 0.025$, and (at generational frequency of 30 years), $\delta = 1$. In each row, values for β_w have been chosen to give the initial capitalist wealth share, $1 - \phi$, as indicated by the left-hand column. The discrete changes in the capitalist wealth share have been generated by incrementing the profit share by 0.10.

on the question of rising income inequality, accumulation, and neoliberalism in the U.S.

3.1 Calibrating the model

To sharpen our understanding of the two scenarios described in the previous section, Table 1 presents a calibration using “realistic” values for the parameters that are fairly standard in the OG growth literature (de la Croix & Michel, 2002, Appendix A.5.1). Rather than concentrating on one value of the wealth share, the calibration covers a range from 20-80%, which is the interval under debate in the Modigliani-Kotlikoff controversy of the 1980s over the proportion of wealth that is life-cycle related. A generational period of 30 years has been selected, and annual parameter values have been converted to generational frequency. The point of the exercise is not to achieve perfection but to generate insight about the neoliberal era. To this end, the table shows values of the two derivatives above as well as the discrete change in the wealth shares associated with a 10 percentage point increase in the profit share, a reasonable figure for the income redistribution under neoliberalism in the U.S. as we will see below.

The main insight is that a rising rate of surplus value should have a large effect on the capitalist wealth share. The first set of results with a variable rate of growth corresponds to point B in Figure 1. These suggest that the

change in the wealth share should be a multiple, perhaps twice the size of the change in the profit share, depending on the initial capitalist share of wealth. The second set of results with constant growth corresponds to point C in the figure. Even here, it is clear that we should expect to see a substantial effect on the wealth share, perhaps nearly as large as the initial change in the profit share.

We can take these benchmarks to the data on wealth and income, subject to some caveats. First, the theoretical model describes a steady state, and the real economy, to the extent that it gravitates toward a balanced growth path, may be in a transitional phase so that the full effects of income redistribution have yet to make themselves felt in the wealth distribution. In other words, it may be too soon to say. Second, we have abstracted from other parameter changes that may be significant in practice. But one of the most prominent of these is the sharp decline in working class and middle class saving driven by the rising indebtedness of the household sector. This is now a well-established fact documented by an extensive literature; see Cynamon & Fazzari (2014) in particular. This change works toward an even larger change in the wealth shares. (In Figure 1, this shifts the workers' wealth-growth curve further downward.) On balance it seems that an interrogation of the data guided by our model and these numbers would be a worthwhile but hardly definitive exercise.

3.2 What do Piketty's data tell us?

We can now turn from the abstract world of the model to a tour of the concrete historical record, with a focus on the nature of neoliberal capitalism. Our first destination is the relationship between the distribution of income and the distribution of wealth on display in Table 2. These data have been taken from various on-line appendices provided by Piketty, or from the sources that he used to construct those appendices. To his credit, by making his data available with ample documentation he has made this conversation possible.

In order to operationalize the classical growth model, we have to have some sense of how to define the capitalist shares of income and wealth, and this would appear to be a question of judgment more than science. One piece of evidence on the income distribution is that Yakovenko (2012) finds a break indicative of class structure somewhere around the top 3%, where the distribution shifts from an exponential form to a power law *à la* Pareto.

Table 2: U.S. income and wealth distribution, selected years

Year	Income		Wealth (top 1 %)		
	Profit Share	Top 1%	Kopczuk-Saez	Wolff	Piketty (SCF)
1980	0.203	0.100	0.191	0.338	0.301
1990	0.228	0.143	0.209	0.372	0.329
2000	0.235	0.215	0.208	0.334	0.331
2010	0.289	0.198	—	0.354	0.338
Change 1980-2010	+0.086	+0.098	+0.017	+0.016	+0.037

The profit share in national income is from Appendix Table A48 from the on-line data appendix to Piketty & Zucman (2014a). The share of income for the top centile is from Table S8.2 in the online data appendix from Piketty (2014). The Kopczuk-Saez (KS) and Piketty (SCF) wealth shares are from Table TS10.1DetailsUS in the online data appendix from Piketty (2014). The Wolff wealth shares are from Table 2 of Wolff (2012). The Piketty (SCF) data are decennial averages. The KS value for 1980 is actually from 1982. The Wolff data are from 1983, 1992, 2001, and 2010. The KS data are based on estate records; the other wealth series are based on survey methods.

Most of the reported data on top groups lacks the granularity to implement this exact threshold, but it seems reasonable to stick to the top 1% that has become a fairly standard statistic. The top 5% is probably too broad, as it includes a lot of well-paid professionals like doctors, lawyers and even some college professors. Since wealth is considerably more concentrated than income, the top 1% there probably conforms reasonably to what we mean analytically by capitalist households, which is households whose class position is defined by their ownership of wealth.

The first thing that is apparent in Table 2 is that the income distribution has shifted dramatically. Thirty years ago, some version of “Bowley’s Law” that the wage and profit shares are historically constant was still among the accepted stylized facts of modern capitalism. Neoliberal capitalism has clearly revoked Bowley’s Law. To be precise, the share of profits in national income (which does not exactly conform to our π because it nets out depreciation in both the numerator and the denominator) has risen in the U.S. by a little less than 100 basis points. Whether this is the best measure of profits is not entirely clear, however. In particular, changes in executive compensation in the neoliberal era have raised the salaries of corporate managers to phenomenal levels. The share of income captured by the top centile has risen, again by about 100-115 basis points, largely as a result of this characteristic feature of neoliberalism. As Piketty has been careful to demonstrate, the composition of top incomes has changed over historical time, and the most recent period has seen a marked increase in the share of compensation in the total income of the top groups, with a corresponding decline in the share of property income. Thus, one could argue that the conventional national income accounting practice of assigning executive pay to labor compensation has outlived its usefulness (if it ever had any), and that the true profit share has increased by more, perhaps substantially more, than the reported values.¹⁴

The second generalization that is apparent in the table is that the wealth distribution has grown more unequal¹⁵, as we would expect, but by no means by the same order of magnitude. Here the data sources differ by methodology (estate tax records versus surveys, which may not be directly comparable), as reflected in different levels for the top centile wealth share, but they do seem to agree that the wealth share has only increased by around 20-40 basis points.¹⁶

These data are consistent with the hypothesis that neoliberal capitalism is characterized by two structural features, one widely accepted and the

Table 3: Implementing the Cambridge equation for the U.S.

Variable	Years		Change
	1950-1980	1980-2010	
$1 + g_Y$	2.83	2.27	-0.56
$1 + g_W$	2.75	2.62	-0.13
$1 + r$	8.69	7.83	-0.86
$1 + r_a$	4.01	4.40	+0.39
Implied $(1 - \beta_c)$ using:			
g_Y, r	0.67	0.71	+0.04
g_W, r	0.68	0.67	-0.02
g_Y, r_a	0.30	0.48	+0.19
g_W, r_a	0.32	0.40	+0.09

Growth factors for output (Y) and wealth (W) are calculated from the data in Table US5a in the on-line data appendix for Piketty & Zucman (2014a). For example, for 1950-1980, $1 + g_Y = Y_{1980}/Y_{1950}$. Total return factors over a generational horizon, $(1+r)$ for the before-tax return and $(1+r_a)$ for the after-tax return, are calculated from the annual profit rates, r_t , using $\prod_{t=1}^{30} (1+r_t)$. The annual before-tax rate of profit and the annual after-tax rate of profit are taken from Table US3c in the same on-line data appendix. The capitalist consumption propensity, $(1 - \beta_c)$, is calculated using $1 - (1 + g)/(1 + r)$ for the combinations shown in the lower left-hand corner block.

other less well recognized. On the one hand, there has surely been a sizeable concentration of income toward profit and profit-like forms like executive compensation. But on the other hand, the wealth distribution has not concentrated to the same extent, suggesting that the neoliberal capitalist class has consumed a great deal of its “winnings” rather than saving and investing them.

Some further evidence for this hypothesis emerges from Piketty’s data on growth rates and profit rates on offer in Table 3. This table implements the classical growth model, assuming a generational period of 30 years, and exploits the Cambridge Theorem to extract estimates for the capitalist propensity to consume. Note that all growth factors and profit rates are being reported at the generational frequencies appropriate to the model. The propensity to consume (whose complement to one is often interpreted as a discount factor) is also reported at generational frequency, and that explains

why the consumption rate is so much lower than the annual values we are familiar with.

This exercise necessarily involves some leaps of faith and imagination. In particular, it is based on a fictional capitalist “household” which saves and consumes out of profits, and (to use Marx’s expression) “personifies capital.” In practice, capitalist saving takes place at the level of actual capitalist households as well as at the level of the business enterprise. Much saving (perhaps 30-60 % of total net saving in the U.S.) takes the form of retained corporate earnings. The fictional capitalist household in this exercise needs to be conceptualized as embedded in this matrix of institutional forms. The consumption or saving rate we are measuring does not correspond one-to-one to the observed saving rates of rich households.¹⁷

Perhaps more importantly, a one-commodity model with only one asset (capital) abstracts from the distinction between capital and financial wealth. In the simplest model of corporate capitalism with financial wealth equal to the stock market value of firms the Cambridge equation suggests that capitalists will consume a constant fraction of their wealth. The ratio of wealth to capital, or the valuation ratio (more or less Tobin’s Q), then regulates consumption. An increase in Q associated with a stock market boom (a characteristic feature of neoliberal capitalism) would thus increase the consumption rate as measured. Thus, the implied $(1 - \beta_c)$ reported in Table 3 is not necessarily a measure of capitalist *preferences* since it can systematically rise just because of a rise in the valuation ratio.¹⁸

Because Piketty’s accounting system casts such a wide net in defining capital (which he equates with wealth of all kinds, including real estate, land, financial assets, etc.) and because he measures productive capital using financial measures rather than using, for example, NIPA estimates grounded in the perpetual inventory method, I have elected to report growth factors using real income as well as wealth. If the output-capital ratio remains constant for very long periods (which on some accounts it has, more or less), then the growth of output would faithfully reflect the growth of capital. Note that both measures of growth decline over the sample range, but that growth of wealth declines by substantially less. That may be a reflection of asset price inflations in the recent decades. Significantly, there is no evidence here for an increase in growth in the neoliberal era.

Piketty reports both the before-tax rate of return on wealth as well as the after-tax rate of return, taking into account all the taxes on capital income, and I have chosen to use both of these measures. The after-tax return

probably gives the best estimate of the capitalist propensity to consume (or save), but it is significant that it has actually increased over the sample. This is presumably the result of changes in tax policy, since the before-tax rate of profit declines. Thus, we have four possible combinations of estimates for $1 - \beta_c$, and all but one of them suggest that the neoliberal era has been characterized by a rising rate of capitalist consumption (falling saving rate). The one exception uses the growth of wealth and the before-tax rate of profit.¹⁹ The most meaningful calculation (since it uses the same definition of wealth for the growth factor and profit rate) is probably the ultimate row which shows a modest increase in capitalist consumption.

3.3 Conclusion

Taken together, the behavior of the income and wealth distribution, the pattern of growth rates and rates of return, and our estimates for the capitalist propensity to consume lend support to the hypothesis that the effect of income redistribution on the wealth distribution has been attenuated by a decline in rates of saving and investment out of profits. This hypothesis resolves a major paradox for the whole class of profit-led growth models, including the structuralist-classical model offered here: with such a dramatic rise in the profit share under neoliberal capitalism, where's the growth? A central contradiction of neoliberal capitalism is that it depends on mechanisms like financialization and globalization that have simultaneously intensified the pursuit of profit share and disincentivized the investment and capitalist saving that rising profitability could potentially support.²⁰ It would be worthwhile to pursue this line of investigation, perhaps by improving the conformity between the classical growth model and the data categories.

If this hypothesis is correct, it has significant political economy implications. For one, it highlights the extent to which neoliberalism erodes one ideological prop beneath capitalism that Keynes so well articulated in *The Economic Consequences of the Peace*—the implicit social contract giving the capitalists ownership over most of the wealth on the condition that they don't consume much of it. For another, it raises the question of whether slower population growth in the 21st century will be allowed to express itself in the real wage gains suggested by the classical model of full employment growth, or whether these potential wage gains will be obstructed by the luxury consumption of an increasingly remote financial elite. Even if this hypothesis turns out to be erroneous, the structuralist-classical model that inspired it re-

mains a powerful tool through which to interpret the growth and distribution issues that Piketty has so effectively raised.

References

- Auerbach, A., Hagemann, R., Kotlikoff, L. J. & Nicoletti, G. (1989) *The Economics of Aging Populations: The Case of Four OECD Economies*. Organization for Economic Cooperation and Development, Paris. Working Paper No. 62.
- Bernardo, J. L., Martinez, F. L. & Stockhammer, E. (2014) *A Post-Keynesian Response to Piketty's "Fundamental Contradiction of Capitalism"*. Post Keynesian Economics Study Group. Working Paper 1411.
- Cynamon, B. Z. & Fazzari, S. M. (2014) *Inequality, The Great Recession, and Slow Recovery*. Washington University, St. Louis. Xerox.
- de la Croix, D. & Michel, P. (2002) *A Theory of Economic Growth: Dynamics and Policy in Overlapping Generations* (Cambridge UK: Cambridge University Press).
- Foley, D. K. & Michl, T. R. (1999) *Growth and Distribution* (Cambridge MA: Harvard University Press).
- Galbraith, J. K. (2014) Kapital for the Twenty-First Century? *Dissent*.
- Kaldor, N. (1956) Alternative theories of distribution. *Review of Economic Studies*, 23, pp. 83–100.
- Kopczuk, W. (2015) What do we know about the evolution of top wealth shares in the United States? *Journal of Economic Perspectives*, 29, pp. 47–66.
- Michl, T. R. (2009) *Capitalists, Workers, and Fiscal Policy: A Classical Model of Growth and Distribution* (Cambridge MA: Harvard University Press).
- Mohun, S. (2012) Rate of profit and crisis in the U.S. economy: A class perspective. In L. Taylor, A. Rezai & T. Michl, eds., *Social Fairness and Economics: Economic Essays in the Spirit of Duncan Foley* (Abingdon: Routledge).

- Palley, T. I. (2013) Cambridge and neo-Kaleckian growth and distribution theory: Comparison with an application to fiscal policy. *Review of Keynesian Economics*, 1, pp. 79–104.
- Pasinetti, L. L. (1962) Rate of profit and income distribution in relation to the rate of economic growth. *Review of Economic Studies*, 29, pp. 267–279.
- Piketty, T. (2014) *Capital in the Twenty-First Century* (Cambridge MA: Harvard University Press).
- Piketty, T. & Zucman, G. (2014a) Capital is back: Wealth-income ratios in rich countries 1700-2010. *Quarterly Journal of Economics*, 129, pp. 1255–1310.
- Piketty, T. & Zucman, G. (2014b) Wealth and inheritance in the long run. In *Handbook of Income Distribution*, vol. 2 (North-Holland).
- Samuelson, P. A. & Modigliani, F. (1966) The Pasinetti paradox in neo-classical and more general models. *Review of Economic Studies*, 33, pp. 269–301.
- Taylor, L. (2014) *The Triumph of the Rentier? Thomas Piketty vs. Luigi Pasinetti and John Maynard Keynes*. Schwartz Center for Economic Policy Analysis, New York.
- Wolff, E. N. (2012) *The Asset Price Meltdown and the Wealth of the Middle Class*. National Bureau of Economic Research, Cambridge MA. Working Paper No. 18599.
- Yakovenko, V. M. (2012) Applications of statistical mechanics to economics: Entropic origin of the probability distributions of money, income and energy consumption. In L. Taylor, A. Rezaei & T. Michl, eds., *Social Fairness and Economics: Economic Essays in the Spirit of Duncan Foley* (Abingdon: Routledge).

Notes

¹The term structuralist macroeconomics, first proposed by Lance Taylor, is arguably more accurate than the commonly used “heterodox” economics. After all, Adam Smith could qualify as a structuralist and it would be awkward to call him heterodox. Moreover, “heterodox” conveys the subaltern status of a permanent minority.

²I am sticking with the nomenclature used in previous work, and since this differs from the nomenclature used by Piketty there is some potential confusion, in particular because he uses β to refer to the capital-output ratio while I use β_c and β_w to refer to capitalist and worker saving propensities.

³Below this symbol does double duty and represents the growth of total (capitalist and worker-owned) capital since in the steady state they will be the same.

⁴One advantage of making the generational structure explicit is that it answers the hoary question of whether the saving rate has a class structure (differing by class) or a behavioral structure (differing by income category); see Palley (2013).

⁵For a full (probably too full) formal treatment of the model, see Michl (2009, Ch. 3).

⁶Piketty and much of the growth literature work with continuous time versions of the Cambridge Equation or its more general cousin, the Ramsey model. With a utility function having a constant elasticity of (intertemporal) substitution, the former applies when the elasticity is unity. In either case, the $(1+r)$ term disappears, but the interpretation of $r-g$ remains valid.

⁷To be more precise, as long as $\beta_w < \beta_c(1+r)/(R-r)$ the system remains in the two-class solution. If worker saving breaks this barrier, the system enters the one-class regime in which worker-owned wealth grows faster than capitalist wealth.

⁸The condition for $g > r$ in a one-class world with given distribution of income is $\beta_w > (1+r)/(R-r)$.

⁹With this closure in a one-class world, the condition for $r < n$ is that $\beta_w < (1 + n)/(R - n)$. Compare to the previous footnote to see how the golden rule creates a kind of symmetry between the two cases.

¹⁰This in fact was once a common argument in the world of calibrated growth models; see Auerbach et al. (1989).

¹¹In fact, Foley & Michl (1999) show that continuous Marx-biased technical change at rates χ and γ will create an *ex post* fossil production function with Cobb-Douglas form and an exponential term equal to the viability threshold parameter. Obviously, this exceeds the profit share, thus violating the central prediction of marginal productivity theory. For more discussion of the theory and some empirical evidence, see Michl (2009)[Chs. 10 and 11].

¹²Bernardo et al. (2014) point out more generally that Piketty commits a fallacy of composition in conflating the behavior of individual wealth accumulation (taking r as given) and accumulation at the aggregate level (where r becomes an endogenous variable in a Pasinetti-type model).

¹³To derive this expression, divide Equation 3 by K and use $K_{+1} = (1 + g^*)K$.

¹⁴Simon Mohun (2012) reports a “class rate of profit” that treats managerial salaries as a form of profit and finds that it rises from about 22% to 26% over the 1980-2010 period. The conventional rate based on NIPA profits fluctuates in a band around 10-13%. The class rate appears to be higher in the neoliberal era compared to the Golden Age, which is not true for the conventional rate. These differences would presumably be of material importance for the calculations below of the capitalist propensity to consume.

¹⁵By now it seems that the claim by *Financial Times* journalist Chris Giles that Piketty’s data are fatally flawed owing to errors of commission or judgment has been safely laid to rest by Piketty himself, and that most researchers agree that the wealth distribution has not grown more equal in the U.S.

¹⁶In his most most recent publication on wealth, published after his book, Piketty and his collaborators report that using tax records and assumptions about asset yields to capitalize property income streams results in a substantially greater increase in the top centile wealth share. These data, developed

by Emmanuel Saez and Gabriel Zucman, have not been posted on-line, but one can visually estimate an increase of around 100 basis points between 1980 and 2010 in Piketty & Zucman (2014b, Figure 3.5). It is not clear whether this methodology, which depends on getting the asset yields right, is substantially more accurate than, say, the survey methods used by the Federal Reserve Board, which conducts a high-income supplement to compensate for the notorious under- and mis-reporting by the very rich. Kopczuk (2015) summarizes this work and records his own preference (see p. 64) for the survey-based approach.

¹⁷There are few direct estimates of the capitalist saving rate at the household level. Visual inspection of Figure 5 in Cynamon & Fazzari (2014) suggests that the saving rate of the top 5% of households (by income) has perhaps trended down, but the data start rather late (1989) and the authors are of the (not unreasonable) opinion that any fluctuations can be explained by consumption smoothing.

¹⁸The easiest way to see this point is to switch to continuous time where the capitalists consume a constant fraction of beginning-of-period wealth or $C = (1 - \beta_c)QK$, thus eliminating complications with the rate of return on wealth. In effect, the methodology in the table captures the whole term $(1 - \beta_c)Q$.

¹⁹Piketty's on-line data appendix provides enough material to construct a rate of profit and rate of growth for "other domestic capital" which might conform better to the classical conception of capital as an accumulable productive resource, but the earliest date for a complete data set is 1970, rendering the calculations in Table 2 impossible. However, I have experimented with different calculations to get as close to the table as possible, and found that the results are very similar to those for wealth reported there. One minor exception is that the capitalist consumption propensity using the before-tax rate of return does not actually decline, though its increase is very small.

²⁰To fully appreciate this contradiction requires a model of effective demand. Its resolution seems to take the form of chronic realization difficulties, assuming that in the short-run demand is wage-led, which would explain why asset bubbles and household debt play such a prominent role during the neoliberal era.