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May 2016

WORKINGPAPER SERIES

Number 419

POLITICAL ECONOMY RESEARCH INSTITUTE

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August 26, 2015

[1]The author thanks Javier Lopez Bernardo for challenging him to tackle the problem of corporate capitalism and for guiding him through the relevant literature on financial markets. He thanks Engelbert Stockhammer for hosting him in the Economic Policies in the Age of Globalization (EPOG) Masters Course program at Kingston University, which made these conversations possible in the first place, and Laura Carvalho for helpful comments on an earlier draft. Finally, he thanks Duncan Foley for suggesting some key formalizations that facilitated constructing the model and helpful comments on an early draft. All views and errors in the paper are the sole responsibility of the author, of course.

Abstract

Profit-led Growth and the Stock Market
by Thomas R. Michl
JEL E12, E21, E44
Keywords: Pasinetti Paradox, Cambridge equation, q-ratio, heterodox growth model, stock-flow consistency

This paper presents a simple stock-flow consistent model of corporate capitalism with a financial market for firm equities issued by managers as part of their investment plan with the investment rate in turn sensitive to the q-ratio, workers who save for life-cycle motives, and capitalist rentier households who save from a bequest motive. The model assumes full capacity utilization; saving and investment decisions are co-ordinated through changes in the valuation of the capital stock or q-ratio. Changes in valuation can induce enough investment and capitalist consumption to fill the demand gap left by a reduction in the wage share. But unless there is a strong sensitivity of investment to the q-ratio, the increased profitability will be dissipated in a profit-led stock market boom. The model helps resolve the neoliberal paradox of rising profitability with little growth. It also clarifies the relationship between classical and Keynesian growth models which can be seen as special cases arising from limiting values of the investment sensitivity to the q-ratio.

When I was in graduate school at the New School for Social Research, the venerated Keynesian economist Ed Nell asked us the following question on the qualifying exam for macroeconomics: "What is the significance of the fact that wages are both the largest component of costs and the major source of demand for consumption goods?" It would not be an exaggeration to say that I have been searching for a good answer–joined by a major part of the heterodox community–for several decades! This paper puts forward one answer by writing out a simple model of corporate capitalism with a financial market for firm equities issued by managers as part of their investment plan, workers who save for life-cycle motives, and capitalist rentier households who save from a bequest motive. The model finesses the hoary debate over capacity utilization by only studying fully adjusted steady state positions with utilization at its normal level in order to focus on an alternative mechanism besides utilization for co-ordinating investment and saving decisions–changes in the valuation of the capital stock.[1] This setup stacks the deck against wage-led growth by showing how changes in valuation can induce enough investment and capitalist consumption to fill the demand gap left by a reduction in the wage share–probably not the answer Ed was looking for. But it turns out that profit-led growth is *not* a foregone conclusion.

Previous writings (Michl, 2009, 2008) ventured the opinion that capitalist economies are Keynesian (demand-constrained) in the short run, but become classical (profit-constrained) in the long run as they return to normal levels of capacity utilization following in the tradition of Duménil and Lévy (1999). The homeostatic mechanism proposed for achieving this adjustment is a heterodox version of the 3-equation model. The key assumptions are that a Phillips curve-like relationship governs the inflation process, that it stabilizes around normal utilization, and that the monetary authority follows an explicit or implicit policy of inflation-targeting using the interest rates under its control to manage aggregate demand through the investment function. In this kind of model, depending on the shape of the investment function, demand can be wage-led or profit-led in the short run for all the reasons explored by Bhaduri and Marglin (1990).[2] But once the system returns to normal utilization, the positive feedback from wage-led consumption demand to utilization and back to investment loses its purchase and the model reverts to profit-led behavior. Using the notation of the present paper, if capitalists consume a constant fraction, β, of their wealth, at full utilization the growth rate, g, and the profit rate, r, will satisfy a version of the Cambridge Equation or $g = r - \beta$.[3]

[1] There is an extensive literature on corporate capitalism, including the Moore (1975) paper that we use below. Other important examples include Moss (1978), Lavoie (1998) and Skott and Ryoo (2008). For a survey of work on finance-constrained models of neoliberalism, including papers in the Bhaduri-Marglin tradition in which capacity utilization is treated as a long-run endogenous variable, see Hein and van Treeck (2010).

[2] Indeed, in Michl (2009) the investment function includes only capacity utilization and the real interest rate so that wage-led growth is the only possibility in the short run.

[3] To anticipate some possible confusion, this equation is the continuous time form of the discrete time Cambridge Equation that appears in Foley and Michl (1999), with a change of notation. Here β is a propensity to consume from wealth, while we used it in the discrete

This approach underwrites a clear division of labor in a macroeconomic research program insofar as it supports specialized models of growth in the classical tradition as in Foley and Michl (1999) that abstract from aggregate demand issues. But it suffers from several shortcomings. In particular, it privileges saving decisions over investment decisions in the long run. Even if the managers making investment decisions are relatively autonomous over the short run (so that the paradox of thrift can occur), the homeostatic property of the system prevents them from having any influence over the long run growth rate determined by the Cambridge Equation. This approach, in other words, sweeps the potential for a conflict between the capitalist as rentier and the capitalist as manager under the rug. Moreover, it does not provide a very satisfying resolution to a paradox of neoliberal capitalism that should be a priority concern to any economist who believes that on some level growth is profit-led. With all the profits, where is the growth?

This paper in a sense bends the stick back toward the post-Keynesian view that the relative autonomy of capitalist managers is central to understanding macroeconomics. We will maintain the assumption that the demand side of the system is fully adjusted (perhaps through the mechanisms described above) so that we study steady states with full utilization. But we will include a market for corporate equity and a valuation ratio similar to Tobin's Q that in effect resolves the contradiction between managers and rentiers. This model can shed light on the theoretical status of classical growth models (which emerges as less secure than described above), on the role of the stock market in corporate capitalism, and on the paradox of neoliberal capitalism.

1 Accounting

Worker households hold a proportion ϕ of stock shares issued by firms, and capitalist households hold the rest. The balance sheets of the households and the firms are given by three equations, written in the standard order with assets on the left-hand side and financial liabilities plus net worth on the right. This follows from the definition of net worth or wealth as assets minus liabilities. The balance sheets are

$$\begin{aligned} \phi P_E E &= J_W \\ (1-\phi) P_E E &= J_C \\ K &= P_E E + J_F. \end{aligned}$$

Here E (for equities) is the number of stock shares and P_E is the price of a share. Capitalist net worth is J_C, worker net worth is J_W, and firms are

time equation to refer to the propensity to save out of wealth. The change reduces clutter in the equations below.

Table 1: **A SAM for the corporate capitalist economy**

	Output costs	Expenditures w	c	f		Changes in claims	Sum
Output uses		C^w	C^c		I		Y
Incomes							
w	W			$\phi(1-s_F)rK$			Y^w
c				$(1-\phi)(1-s_F)rK$			Y^c
f	rK						Y^f
Flow of funds							
w		S^w				$-\phi P_E\dot{E}$	0
c			S^c			$-(1-\phi)P_E\dot{E}$	0
f				S^f	$-I$	$P_E\dot{E}$	0
Sum	Y	Y^w	Y^c	Y^f	0	0	

Here w, c, and f refer to worker households, capitalist households, and firms, and Y^i (i =w,c,f) is each sector's income. S^i is sector saving on a national accounting basis.

assumed to have net worth, J_F. The valuation ratio, q (since it is similar to Tobin's q), is the ratio of wealth to capital or $q = J/K$, making $J_F = (1-q)K$.

Corporate managers decide on the growth of capital (investment) and make financial decisions about external financing which is restricted to stock issuance since we abstract from loans, bonds, and banks. For simplicity, assume that capital does not depreciate, making the net and gross rates of profit identical and equal to the product of the profit share and the output-capital ratio (aka capital productivity) or $r = \pi\rho$. Managers retain a fraction of profits, s_F, and distribute $(1 - s_F)$ as dividends to the households. Working with continuous time, and using the dot notation to indicate a time derivative, their financial plan is to combine retained earnings and stock issuance to finance investment:

$$I = s_F(rK) + P_E\dot{E}.$$

A *social accounting matrix*, abbreviated SAM, is a useful tool for showing the relationship among firms and households, both worker and capitalist. Table 1 presents the SAM for a corporate capitalist economy following Foley and Taylor (2006) with some minor changes. The conventions are straightforward. Corresponding rows and columns have equal sums, rows show the sources, and the columns show the uses of funds. The first row shows the demand breakdown of domestic product into worker and capitalist consumption and investment. The first column gives the decomposition of domestic product into wages and profits. The next set of columns, w through f, shows how income is allocated over consumption and saving. The next column (unlabeled) is where firm investment spending is placed. Investment is a pivot to the next column that shows the

stock sales used to finance investment.

The second block of rows, w through f, shows the "flow of funds" for each sector. The convention is that sources of funds are assigned a positive sign, and uses of funds receive a negative sign. Worker saving (S^w) and capitalist saving (S^c) are used to purchase the stocks issued by firms to fund investment. Capitalist firms use retained earnings (S^f) and stock issuance to finance investment.

We need to be careful and note that capitalist and firm saving are defined here using the national income accounting definition which is value-added minus consumption. In the U.S., the national income and product accounts are often abbreviated NIPA, so let us call this "NIPA saving."

The alternative definition of saving includes capital gains as part of income. Since this is a more inclusive definition of income, it is sometimes called *comprehensive* saving. Comprehensive saving is the change in net worth of each sector or the sum of its NIPA saving from the SAM and capital gains from rising stock prices. With this adjustment the flow of funds from the SAM cumulates smoothly into changes in balance sheets.

This cumulation operates through the *revaluation accounts*, which can be written as three equations that result from differentiating the balance sheets and solving for the change in net worth (i.e., comprehensive saving) using the fact that with no depreciation $I = \dot{K}$:

$$\begin{aligned} \dot{J_W} = \phi(P_E\dot{E} + \dot{P_E}E) &= S^w + \phi\dot{P_E}E \\ \dot{J_C} = (1-\phi)(P_E\dot{E} + \dot{P_E}E) &= S^c + (1-\phi)\dot{P_E}E \\ \dot{J_F} = I - P_E\dot{E} - \dot{P_E}E &= S^f - \dot{P_E}E. \end{aligned}$$

Notice that capital gains and stock transactions are offset between firms and their owners so that the familiar national accounting identity between saving and investment holds for both definitions of saving, or

$$\dot{J_W} + \dot{J_C} + \dot{J_F} = S^w + S^c + S^f = I.$$

Capital gains are a potential source of confusion. For the individual capitalist, the fact that others are willing to purchase her stocks for a higher price creates the opportunity to realize a capital gain in order to finance consumption and constitutes an increase in private wealth. But at a social level, capital gains represent purely fictitious income or wealth since they cannot increase the aggregate wealth of the capitalist households and the firms they own which in our model is the actual capital stock, $K = J_W + J_C + J_F$. This equation is the consolidated national balance sheet.

2 The financial market

With this accounting framework and the financial plan of the firms, we can follow Moore (1975) to derive several key relationships that must prevail in a

steady state in the capital market. The rate of growth of the number of shares depends on the rate of retained earnings.[4] The rate of growth is $g = I/K$. Then we can see that the growth of stocks is

$$\dot{E}/E = \frac{g - s_F r}{q}.$$

From the balance sheet identity of the firms, we can derive an expression for the steady state growth of stock prices. In a steady state, valuation will stabilize and $\dot{q} = 0$. Stock prices obey

$$\dot{P_E}/P_E = \frac{g(q-1) + s_F r}{q}.$$

(This will also be the growth rate of dividends in a steady state.) We can see how corporate financial policy determines the growth of stock prices in a steady state with stable valuation ratio and constant growth.

While the firms earn the profit rate, r, on capital, households earn a rate of return on their stock holdings, r_E, that we will call the *equity yield*.[5] In a steady state that lasts indefinitely, the equity yield is often thought of as the discount rate that capitalizes the future dividends and capital gains at existing stock prices, and it is frequently referred to as the required rate of return or the cost of (equity) capital.[6] It can be defined as the sum of the *dividend yield* and the rate of appreciation of stock prices, or *capital gains*:

$$r_E = \frac{(1 - s_F) r K}{P_E E} + \frac{\dot{P_E}}{P_E}.$$

These definitions and balance sheet identities are sufficient to define the relationship between the rate of profit and the equity yield. The managerial decision about the mix of external and internal financing drops out, and we are left with:

$$r_E = \frac{1}{q}[r + g(q-1)].$$

When firms' capital is valued one-to-one in the financial markets and $q = 1$, these rates will be equal.[7] We will see how this situation validates the abstraction of a classical economy with pure capitalists making saving and investment decisions that are identical by construction.

[4] It is sometimes convenient to represent the share of investment financed by stock issuance, $\iota = P_E \dot{E}/I$. Replacing $P_E \dot{E}$ with ιI, and rearranging we find that $\iota = 1 - s_F(r/g)$.

[5] The term return on equity is sometimes used instead of equity yield but that has an alternative usage referring to leveraged financial institutions, in particular banks, which is a potential source of confusion. I am indebted to Javier Lopez Bernardo for pointing this out.

[6] This latter term is deeply misleading from a classical point of view because it commits a category error. There is no "cost" to a firm to selling stocks that is analogous to the cost of buying labor-power or intermediate goods. The usage is an atavism that reflects the belief in neoclassical economic theory that capital is a resource rather than a social relationship.

[7] An alternative way of writing this equation is to solve for the valuation ratio, in which case we have the Kahn formula $q = (r - g)/(r_E - g)$ which shows how the valuation ratio represents the relative profitability of capital.

But when the valuation ratio is not unity, the returns that households experience on their accumulated wealth will not be the same as the returns the managers experience on real accumulation. When q is greater than unity, the return on stock holdings will fall short of the rate of profit, and vice versa.

It is significant that the corporate saving rate drops out of the derivation. Once the equity yield is determined, the managers' decisions about financing establish how those returns will be split between dividend yield and capital gains, but they have no deeper significance.

3 Distribution

We will adopt the classic closure for this growth model by treating the profit share as 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 regulatory, 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.[8] Together with the assumption of normal utilization, which makes the output-capital ratio exactly ρ, this closure determines the rate of profit.

Since a global increase in the profit share has been a pervasive characteristic of neoliberal capitalism at the end of the twentieth and dawn of the twenty-first century, we will endeavor to interpret this structural change through the model.

4 Households

We will adopt models of worker saving and capitalist saving from Foley and Taylor (2006), a resource for heterodox economists that also provides us with a model of investment in the next section.

4.1 Workers

Workers save for life-cycle reasons and maintain a target wealth-wage income ratio, λ. Out of a steady state, they make partial adjustments in saving in order to converge over time on their target wealth-wage ratio but we will focus on steady states in which they are continuously achieving their target so that $J_W = \lambda W = \lambda(1-\pi)\rho K = \lambda(\rho - r)K$. Differentiating this expression gives their comprehensive saving equation for a steady state in which $\dot{K} = I = gK$

$$\dot{J_W} = \lambda(\rho - r)gK.$$

Combined with the workers' revaluation account, this equation plays an important role in the model's construction. Another important equation relates

[8] Foley and Michl (1999) call this closure the classical conventional wage share model.

the workers' share of wealth to the q-ratio in a steady state. Since $J_W = \phi q K$, we can see that when workers achieve their desired wealth stock their wealth share will be

$$\phi = \frac{\lambda(\rho - r)}{q}.$$

Worker saving and consumption are sensitive to the level of stock prices and the q-ratio. A stock market boom, for example, makes it easier to achieve a target level of wealth and in this way encourages consumption and discourages worker saving. Workers' steady state wealth share will decline as a result of a stock boom. This insight will prove useful in interpreting the comparative equilibrium analysis of the model's steady states.

4.2 Capitalists

Capitalists save for bequest purposes and consume a constant fraction, β, of their beginning-of-period wealth. Thus, their consumption is simply $C^c = \beta(1-\phi)qK$. Subtracting C^c from income (comprehensive or NIPA) gives capitalist saving. For example,

$$\dot{J_C} = (1-\phi)(1-s_F)rK + (1-\phi)\dot{P_E}E - \beta(1-\phi)qK$$

gives the comprehensive saving of the capitalist households.

For purposes of comparison with the version of the Cambridge Equation used in Foley and Michl (1999), the capitalists save out of their dividends and capital gains so that the growth rate of their wealth is given by[9]

$$\frac{\dot{J_C}}{J_C} = r_E - \beta.$$

Notice that capitalist wealth also depends on the q-ratio. There is a strong wealth effect from a stock market boom because it makes the individual capitalist households feel wealthier, want to consume more relative to the capital stock, and save correspondingly less. Alternatively, we could say that a high valuation ratio implies a low equity yield and this reduces the desired growth of capitalist wealth according to the modified Cambridge Equation.

5 Firms

There certainly is much to be said about managerial capitalists but the model focusses on their power over the investment decision to the exclusion of other economic roles.[10]

[9] As a reminder, to reduce clutter we are using β as a propensity to consume rather than as a propensity to save.

[10] Crotty (1990) makes a persuasive case that this role has been underappreciated in the q-theories of investment of Keynes, Tobin, and even Minsky.

We will generally assume that managers respond to the valuation ratio (which can also be interpreted as a measure of the relative profitability of capital). Their investment equation might take some simple affine form such as

$$g = \bar{g} + \eta(q - 1)$$

where $\eta \geq 0$ is the *q-sensitivity of investment*. In this form, $\bar{g}$ gives the planned rate of investment (normalized by the capital stock) when $q = 1$ and captures the *animal spirits* of the managers. This form implements the q-theory of investment proposed by Keynes (1936). This equation will be labelled as the GG curve in Figure 1 below.

While in real economies, the sensitivity of investment to the q-ratio, if it even exists, probably lies in an intermediate region, the two extreme cases bear close attention because they capture important economic principles. If $\eta = 0$, we have a kind of pure *managerial capitalism* in which managers have considerable autonomy and the separation of ownership and control is pushed to the limit. At the other extreme, as $\eta \to \infty$, we can replace the investment equation with the condition that $q = 1$. In this case, we have a kind of stockholder or *rentier capitalism* in which the managers give the wishes and desires of the owners their utmost attention.[11]

In what follows, for expositional purposes we will begin by assuming the investment decision has been decided so that we can understand the changes in the valuation ratio that are needed to maintain investment-saving equilibrium.

6 Investment-saving equilibrium

With a given investment rate, $I = gK$, we are in a position to describe investment-saving equilibrium in a steady state. We will call this the *QQ curve*. It differs from the traditional IS curve since we have set the investment equation aside for expositional purposes.

Substituting into the investment-saving equation for NIPA saving, we find that firm saving drops out on simplifying and we have

$$W - C^w + rK - C^c = I.$$

Capitalist consumption can be replaced by the capitalist consumption equation. The term $W - C^w$ can be replaced using the comprehensive saving of worker households, their revaluation account, and the income identities from the SAM. Dividing through by the capital stock normalizes everything by K, and, since $K = P_E E/q$, this leaves the growth rate of stock prices to eliminate using the equation derived in the section on the capital market.[12]

The QQ curve shows the locus of q-ratios consistent with investment-saving equilibrium for chosen rates of investment. Solving for the q-ratio, we find that

[11] To be clear, note that this term is sometimes used to describe the increased role of finance capital, which is not what is meant in this paper.

[12] It is also necessary to use $\lambda(\rho - r)g/\phi = gq$, which follows from the definitions of λ and q.

all the parameters related to worker households and the distribution of wealth cancel out and we are left with our QQ curve:

$$q = \frac{r - g}{\beta}.$$

This would appear to be a variation of the Cambridge Theorem or Pasinetti Paradox. Here, interpreting the q-ratio as a measure of the profitability of capital relative to the yield on equity, we see that changes in worker saving have no effect on the equity yield, given the rate of profit, capitalist propensity to consume out of wealth, and the investment rate.

Solving the QQ equation for the rate of accumulation perhaps makes the connection even clearer:

$$g = r - q\beta.$$

We might call this the corporate capitalist form of the Cambridge Equation for it shows that the relationship between growth and profitability is mediated by capitalist consumption, including the effect of valuation, independently of worker saving.

We can now solve for the general equilibrium in which the investment equation is also satisfied. Substituting for g in the QQ curve, we find that the equilibrium valuation ratio q^* is

$$q^* = \frac{r - \bar{g} + \eta}{\beta + \eta}.$$

The equilibrium growth rate, g^*, is then given by the investment equation, $g^* = \bar{g} + \eta(q^* - 1)$. The left-hand panel of Figure 1 illustrates a steady state equilibrium with $q^* = 1$, which conveniently locates the important landmarks that position the QQ and GG curves, where the GG curve is the investment equation. Let us call this diagram the QQ-GG model. Readers should have no difficulty using it to interpret the next two paragraphs.

It is significant that $q^* = 1$ implies that $g^* = \bar{g} = r - \beta$ because this is the Cambridge Equation that anchors the classic growth models in Foley and Michl (1999) and Michl (2009). In a sense, in this case managers have selected the growth rate that the rentiers would have chosen if they had control of the firm.

On the other hand, if, for example, $\bar{g} < (r - \beta)$, we can see from the QQ curve that $q^* > 1$, implying that $r_E < r$. We learn from this model that the q-ratio is a measure of the lack of coordination between managers and owners. In this case, managers consulting their animal spirits plan less accumulation than the capitalist owners would have chosen. The rise in the q-ratio above unity makes the rentier households feel wealthier and incents them to consume more and save correspondingly less (normalized by the capital stock). The q-ratio adjusts in order to make rentier saving plans consistent with the investment decisions of the managers. The opposite inequalities, of course, can be interpreted as the resolution of the conflict between rentiers who want more real growth than managers. The QQ-GG model for a corporate capitalist economy is a transparent tool for interpreting the role of the stock market in the structure of capital accumulation.

7 Wealth distribution

To complete the model, we turn to the distribution of wealth in a steady state by exploiting the fact that the growth rates of capitalist and worker wealth must maintain equality in balanced growth or

$$\frac{\dot{J_C}}{J_C} = \frac{\dot{J_W}}{J_W}.$$

By substituting from the expressions for comprehensive capitalist and worker saving (without inadvertently making investment equal national saving, which leads back to the QQ curve above), we arrive at the equation governing wealth distribution in a steady state:

$$\phi = \frac{\lambda(\rho - r)g}{r - \beta q + (q-1)g}.$$

This equation shows combinations of ϕ, q, and g that are consistent with equality in the growth of capitalist and worker wealth. As we have seen, the model solves recursively and we can substitute from the QQ-GG system above in order to arrive at the equilibrium value ϕ^*:

$$\phi^* = \frac{\lambda(\rho - r)}{q^*}.$$

This equation (solved for q) appears in the right-hand panel of Figure 1 and is labelled the $\Phi\Phi$ curve. Choosing an equilibrium at $q^* = 1$ makes it easy to locate the key landmarks. Notice that since workers cannot own more than the whole wealth stock, there is a lower limit on the q-ratio at $\lambda(\rho - r)$.

We have already seen the same equation as a direct implication of the workers' target wealth-wage ratio. This makes it possible to characterize the wealth dynamics in an informal way. For example, a point to the right of the $\Phi\Phi$ curve implies that workers hold more wealth relative to their wage income than they desire. Consequently, they will be reducing the growth of their wealth through a stock-adjustment process such as the one that Foley and Taylor (2006) use in their dynamic model.

The whole QQ-GG-$\Phi\Phi$ model in Figure 1 can be easily manipulated as an aid to understanding the effects of parameter changes on the corporate capitalist economy.

8 Steady states

The three endogenous variables in this model are q, g, and ϕ and they invite a comparative equilibrium analysis across steady states in which one of the core parameters has changed. Absent an explicit model of stock price behavior away from steady state equilibrium, we will proceed directly to the comparative analysis which will show presently that there are no awkward sign ambiguities

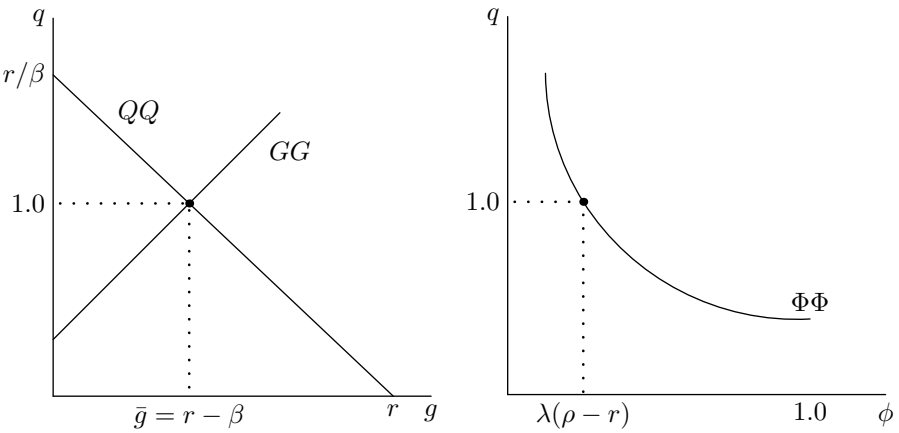

Figure 1: The QQ-GG-ΦΦ diagrams with steady state at $q = 1$ for expositional clarity. The model determines the q-ratio, q^*, the rate of growth, g^*, and the workers' share of wealth, ϕ^*. *Left panel* The QQ curve has the x-coordinate $r - \beta$ at $q = 1$. The GG curve (investment) has the x-coordinate $\bar{g}$ at $q = 1$. *Right panel* The ΦΦ curve has the x-coordinate $\lambda(\rho - r)$ at $q = 1$ and the y-coordinate (not shown) $\lambda(\rho - r)$ at $\phi = 1$.

that would call for an explicit dynamic formal structure in order to apply the correspondence principle. Given the well-known propensity of equity markets to lose contact with economic fundamentals, we should be cautious about assuming that actual economies operate close to their steady states. We should also remind ourselves that the model's assumption of full utilization suppresses any possible demand problems that might arise over shorter time horizons.

8.1 General case

Table 2 shows all the important possibilities for the general case with a generic investment equation without any extreme parameter values; we discuss the limiting cases separately. The table shows the effect of parameter changes on steady state equilibrium values of the endogenous variables. All of these thought experiments can be worked out with the aid of Figure 1.

Because of its central importance in the recent history of neoliberal capitalism, the table starts in the first column with a structural change in the profit share. An increase in the profit share will increase the profit rate, shifting the QQ curve to the right and the ΦΦ curve to the left in Figure 1. An increased profit share unambiguously reduces worker's share of wealth. It also increases the growth rate–this is a profit-led model–but some of this effect will be dissipated by an increase in the q-ratio that makes the capitalist households feel wealthier and induces them to consume more. We will gain a deeper appreciation of the economic logic reflected in this sign configuration below when we turn to the two extremes of rentier and managerial capitalism.

The second column shows the effect of a change in the worker households' desired wealth ratio, presumably driven by a desire to provide more or less

Table 2: **Comparative equilibrium results**

	$d\pi$	$d\lambda$	$d\beta$	$d\bar{g}$	$d\eta$	
					$q<1$	$q>1$
dq	+	0	−	−	+	−
dg	+	0	−	+	−	+
$d\phi$	−	+	+	+	+	−

The table shows the signs of dr/dc where r is the row entry and c is the column entry. It assumes that η, the q-sensitivity of investment, does not take extreme values; for these, see text. As a reminder, π is the profit share, λ is the workers' desired wealth-wage ratio, β is the capitalist propensity to consume out of wealth, and $\bar{g}$ is the animal spirits parameter of managers.

generously for retirement. Owing to the recursive structure of the QQ-GG component of the model, this change has no effect on growth or valuation in the long run. An increase in λ shifts the $\Phi\Phi$ curve to the right in Figure 1. An increase in worker saving would have a temporary effect on growth, but in the long run it will have only a level effect on the capital stock, giving workers a larger share of a larger capital stock that is growing at the same rate as before the change in worker saving.

The remaining columns show the effect of changes in capitalist or manager behavior. An increase in the capitalist households' propensity to consume out of wealth rotates the QQ curve inward in Figure 1 and reduces both the q-ratio and the equilibrium growth rate. The reduction in the q-ratio will raise the workers' share of wealth.

An increase in managers' animal spirits will shift the GG function to the right in Figure 1, reducing the q-ratio while increasing growth. The reduction in the q-ratio implies that the workers' share of wealth will increase, which is not particularly intuitive and we will return to the economic logic below.

Finally, an increase in the q-sensitivity of investment rotates the GG curve around the landmark at $q = 1$, where there is a climacteric because $dq/d\eta$ is zero at that point, as are the other two derivatives. For values of the q-ratio below (above) unity, this rotation will raise (lower) the q-ratio. Another way to think about this is to realize that as managers become more sensitive to valuation, the q-ratio will tend toward unity from whichever side of unity it starts. In the limiting case of rentier capitalism, their behavior will maintain $q = 1$.

8.2 Rentier capitalism

In the case of rentier capitalism, the investment equation collapses to $q = 1$ and the rate of growth follows the Cambridge Equation $g^* = r - \beta$. It is immediately clear that an increase in the profit share translates into higher growth. Indeed, this case represents the highest degree of profit-led growth possible in the QQ-GG-$\Phi\Phi$ model. Workers have lower wages and will reduce

their consumption accordingly. Capitalists have a larger share of wealth and their consumption increases. (In terms of the QQ-GG-ΦΦ diagram, the GG curve becomes horizontal at $q = 1$.)

In terms of the table of results, obviously the whole row for dq, the column for $d\bar{g}$, and both columns for $d\eta$ need to be zeroed out. The remaining signs in the table continue to apply with one interesting exception. Now an increase in the capitalist households' propensity to consume will have no effect on the distribution of wealth since it does not affect the ΦΦ curve or (as it would in the more general case) the q-ratio so that $d\phi/d\beta = 0$. In a sense, this property of rentier capitalism inverts the Pasinetti Paradox since it insulates the workers' share of wealth from capitalist saving behavior.[13] It will reduce growth of course.

8.3 Managerial capitalism

At the other extreme, when the investment equation reduces to $g = \bar{g}$, an increase in the profit share can get no purchase on growth. (In terms of the QQ-GG-ΦΦ diagram, the GG curve becomes vertical at this growth rate.)

Profit-led growth depends critically on the existence of some sensitivity to profitability in the investment equation. Without that sensitivity we have a profit-led stock market that drives up the valuation ratio which enriches the capitalist agents and boosts their consumption. The increased profit share dissipates itself entirely in a rising q-ratio and capitalist consumption. Workers also feel wealthier from the stock boom but they are constrained to save less (the wage share of income has fallen) and this erodes their share of national wealth.

In terms of the table of results, the entries in the row for dg (except $dg/d\bar{g}$) and the two columns for $d\eta$ need to be zeroed out by assumption. The remaining signs in the table continue to apply without exception.

This extreme case brings out the logic behind the positive effect animal spirits have on the share of worker wealth. We know from the QQ-GG component of the model that an increase in growth requires that household saving adapt through a decline in the valuation of capital that makes capitalists feel sufficiently "impoverished" that they reduce consumption, adjusting their saving plans to be consistent with the investment goals of the managers. Worker households also experience a negative wealth effect but evidently they increase their cumulated savings by more relative to the capitalists. This makes some sense because workers are saving for life-cycle reasons and will need to build their retirement portfolio more aggressively to make up for the loss of their stock market wealth.

[13] This is not true of the classical growth model in Michl (2009) which incorporates overlapping generations of workers who save for life-cycle purposes with capitalists who save for bequest purposes. In that model, a reduction in the capitalist saving propensity will increase the workers' share of wealth. The invariance in ϕ in the current model appears to be an artifact of the formalization of worker saving.

9 Interpretation

A few words on the significance of this model of corporate capitalism for heterodox political economy are in order. The extreme cases effectively represent the world of classical growth models (rentier capitalism) and post-Keynesian growth models (managerial capitalism). This means that classical growth models in the tradition of Foley and Michl (1999) need to be regarded as idealizations of a world that is close enough (at least as a good first approximation) to rentier capitalism to justify abstracting from the conflict between owners and managers. Obviously, the benefits of abstraction should not be overlooked: stripping out the complexities of a financial system can spotlight some of the important relationships between capitalists and workers that might be lost or obscured in more elaborate settings at a lower level of abstraction. That is the payoff to specialization.

It is interesting that the proximity of really existing capitalism to the classical idealization boils down to one parameter in the QQ-GG model, which is the q-sensitivity of investment spending. Unfortunately, empirical research, almost all of it motivated by the neoclassical version of q-theory, does not provide much grounds for optimism that the q-sensitivity is particularly large or prominent.[14] Yet the more Keynesian interpretation of the q-theory descending from the *General Theory* does appeal to common sense and intuition. The Keynesian intellectual tradition also points in the direction of a reconciliation with the disappointing empirical results that would emphasize the degree to which organized capital markets are not primarily concerned with valuing prospective yields so much as evaluating future stock prices themselves–in other words, stock markets are dominated by the spirit of speculation rather than of enterprise. It is hard to believe that the post-Keynesian idealization, referred to here as managerial capitalism, is on a noticeably firmer foundation, especially since the positive effects of profitability or cash flow on investment spending are well established.

That the intermediate case which really existing capitalist economies arguably inhabit combines elements of both the classical and Keynesian vision recommends the current model as a contribution to what theologians call "irenics," the process of reconciling conflicting doctrines. What, after all, can be more Marxian than the insight that the q-ratio is the financial form that resolves the contradiction between owners and managers who personify different aspects of the capital relation?[15] Or what can be more Keynesian than the insight that the q-ratio expresses the relative autonomy managers exercise over the investment decision?

In this intermediate case, it is of some significance that aggregate demand

[14] See Chirinko (1993), still regarded as an authoritative survey of empirical work on investment spending.

[15] We could take this a step further and observe that the use-value aspect of the commodity inscribes itself upon managers, concerned with real production and reproduction, while the exchange-value aspect of the commodity inscribes itself upon owners, concerned with pure wealth and its disposition, so that the contradiction between these capitalist personalities has roots in the very first chapters of *Capital*.

shocks in the form of changes in the animal spirits of managers have long-run growth effects. This does not happen in the simpler models of effective demand explored in Michl (2009) where it is argued that some kinds of demand shock have level effects rather than growth effects.

It is also of worth remarking that the q-ratio is as significant in understanding consumption behavior in this model as it is in understanding investment behavior. It would not be inaccurate to characterize the model as a synthesis of a q-theory of investment and a q-theory of consumption.

10 Unpacking the neoliberal paradox

The QQ-GG-$\Phi\Phi$ model can also can be a tool through which to interpret the historical and statistical record of modern capitalism. One's first instinct might be to view the neoliberal paradox of rising profit share without any apparent increase in accumulation as the outcome of a natural experiment that mimics our theoretical comparative equilibrium exercises, perhaps specialized to the case of managerial capitalism. But we need to be mindful of the distinction Joan Robinson makes between historical and logical time. Comparative equilibrium, indeed equilibrium itself, belongs to the realm of logical time where we have frozen everything else in order to study the effects of one mere parameter change. Real capitalist economies inhabit the space of historical time where everything changes at once and we are left to sort through the wreckage to understand the events.

Table 3 displays some relevant data, dividing up the last half century into two periods that represent the pre-neoliberal era and the neoliberal era. Because the main data source, the BEA's Integrated Macroeconomic Accounts (IMA), begins in 1960 I chose 1985 as the boundary in order to have a balanced sample of twenty-five years for each era. It is immediately clear that the neoliberal era has featured an increase in the profit share although compared to other data sources or methodologies, the increase of about one and a quarter percentage points appears to be on the low side. Averaging over twenty-five year periods probably understates the extent of redistribution during the neoliberal era because the profit share has risen over this era and because the profit share was unusually high during the 1960s. It should also be noticed that executive salaries and bonuses are treated as employee compensation in the national accounts, even though these are really quasi-profit type income, and reassigning at least some of this income to profits would certainly produce a more dramatic increase in the profit share.[16] With this in mind the table also displays the top one percent share of total income and labels it $\tilde{\pi}$ to signify that it is an alternative indicator of the profit share. It exhibits a much sharper increase between eras.

The last line shows the bottom 99 percentile share of wealth, which might

[16]Indeed, as a referee for this journal pointed out, OECD (2012, Ch. 3) removes the labor income of the top one percent from the U.S. wage share and reports that the profit share rose by 4.5 percentage points from 1990 to 2008, compared to only 2.3 percentage points without this adjustment.

Table 3: **Selected data for the U.S. economy, 1960-2010**

	1960-1985	1985-2010	Δ
π	25.97	27.22	+1.25
$\tilde{\pi}$	10.13	17.39	+7.25
q	0.76	0.95	+0.19
g	3.45	2.43	-1.03
C/Y	90.14	95.68	+5.53
ϕ	70.10	67.53	-2.58

The profit share, π, the worker share of wealth, and consumption ratio are in per cent, the growth rate is in per cent per year, and the q-ratio is a pure number in decimal form. The profit share is net operating surplus divided by net value added for the total U.S. economy, and the consumption ratio is final consumption divided by net value added for the total U.S. economy, both taken from Table S.1.a of the Intergrated Macroeconomic Accounts of the U.S. (IMA) The alternative profit share, $\tilde{\pi}$ is the income share of the top one percent in Figure 8.8 of Piketty (2014) from the on-line data appendix. The q-ratio is total liabilities (which includes the value of equities) of non-financial corporations divided by total assets from Table S.5.a of the IMA. The rate of capital accumulation is the annual growth rate of private fixed assets chain-type quantity index from Table 4.2 of Nonresidential Fixed Assets. All the data are available at the BEA website. The estimate of the worker share of wealth is (1 - top 1 percent wealth share) using the SCF estimate from Table TS10.1DetailsUS in the online data appendix from Piketty (2014). For 1960-85 I averaged the decade averages for 1960,1970 and 1980. For 1985-2010, I used 1980, 1990, 2000, 2010.

be a reasonable counterpart to what we mean by the workers' share of wealth in this model. Again there is clear evidence for rising wealth inequality.

In the IMA, the total liabilities of non-financial corporations include the market value of corporate equity (and in fact, the IMA measures firm net worth as we have in this paper). The q-ratio is total liabilities divided by total assets. There is a clear increase in the valuation ratio between the two eras. This is consistent with the view of Duménil and Lévy (2013) that a variety of managerial capitalism prevailed during the Golden Age of the 1950s and 1960s, and that neoliberalism has realigned corporate governance structures and elevated financial management functions within them. It is also consistent with the predictions of the QQ-GG-ΦΦ model as the consequence of a rise in the profit share.

The last row uses data from the IMA to calculate the consumption-income ratio for the whole economy, and the penultimate row uses a chain-type quantity index for private nonresidential fixed assets to approximate the rate of accumulation. We can see no evidence here of profit-led growth and in fact the rate of accumulation has declined by this measure, as it has by most other estimates. The consumption rate has shown a fairly dramatic increase.

Interpreting these patterns as expressions of a rising profit share through the QQ-GG-ΦΦ model specialized to something close to managerial capitalism explains the rising q-ratio and the rising consumption ratio. But it misses

the decline in accumulation. A more promising interpretation would emphasize that the same historical and institutional changes, broadly financialization and globalization, that have driven the search for profit-share by the corporate enterprises have simultaneously disincentivized investment through a variety of mechanisms. As Hein and van Treeck (2010) explain, financialization has simultaneously re-oriented managerial preferences toward profit share (i.e., away from investment) and tightened the financial constraints imposed on them by shareholders and creditors. The former mechanism would show up here as a shift in animal spirits in the investment equation while the latter mechanism would require adding in more structure (and, alas, complexity) to the model to give the financial policies of the managers an enhanced role.

Moreover, the prominent rise in the consumption ratio has been the subject of an emergent and persuasive literature (Cynamon and Fazzari, 2014) emphasizing the role of the housing bubble in the first decade of the twenty-first century, the increasing importance of consumer debt, and Veblenesque consumption cascades that have reduced worker household saving. The life-cycle theory in the model, in other words, needs to be emended by the insights of the relative income hypothesis to get a complete picture. To this research effort the QQ-GG-ΦΦ model suggests adding the complementary role of a rising q-ratio stimulating an increase in capitalist household consumption, an hypothesis that receives some empirical support (Maki and Palumbo, 2001). Finally, we should not rule out the possibility that financialization and neoliberalism in general may have shifted the saving behavior of rentier households, increasing their propensity to consume out of wealth. The number and magnitude of forces driving the polarization of wealth raise the question whether the capitalist wealth share has increased enough or whether a decline in the capitalist saving propensity has not in fact attenuated its rise. This point is reinforced by a comparison between the sharp rise in the top one percent income share and the less dramatic rise in the top wealth share.

11 Comments

One main message of the QQ-GG-ΦΦ model of corporate capitalism presented here is that even under conditions that make wage-led growth impossible, profit-led growth is not the only theoretical possibility. A regressive distribution toward the profit share can express itself as profit-led growth in stock prices that promotes the consumption of the wealthy rentier households. The condition for this outcome is a weak response by managers to the rise in the q-ratio. This result goes a long way toward resolving the paradox that neoliberal capitalism is characterized by rising profits but stagnant or falling accumulation, but it probably needs to be supplemented with other mechanisms such as the tendency of financialization to disincentivize investment. Another message of the QQ-GG-ΦΦ model is that there really is room for a syncretic (and not in the pejorative sense) resolution to some of the discord in the marriage of classical and Keynesian economics that defines modern heterodox macroeconomics.

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