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Paulo dos Santos

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Gordon Hall
418 North Pleasant Street
Amherst, MA 01002

Phone: 413.545.6355
Fax: 413.577.0261
peri@econs.umass.edu
www.peri.umass.edu

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Demand, Production, and the Determinants of Distribution: A Caveat on "Wage-Led Growth"

Paulo L dos Santos[1]

Department of Economics | SOAS, University of London

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Abstract

The incomes of workers and capitalists pertain to different moments of accumulation. Wages are shares of capital outlays sustaining production; profits are shares of commodity sales. If aggregate demand and the scale of productive undertakings are shaped with a measure of mutual autonomy, the class distribution of income and the measure of economic activity are jointly determined by the same processes. In those settings "wage-led growth" has neither analytical nor policy purchase as associations between wage shares and levels of output (or growth) are confounded *consequences of distinct effects on each measure of broader developments in the economy. A more appropriate dichotomy is that between "investment-led" and "consumption-led" growth, with the former resulting in comparatively higher wage shares. After advancing and illustrating these points, this paper motivates its approach to class income flows and the role of demand--which draw on the Circuit of Capital--in relation to the equivalent Kaleckian approaches sustaining arguments for "wage-led growth".*

Keywords: Income Distribution, Circuit of Capital , Marxian Analyses

JEL Classification:

Word count: 9,171

[1] The discussion offered in this paper arose from an ongoing conversation with Duncan Foley concerning the Circuit of Capital and its distinctive macroeconomic purchase. The paper has also directly benefitted from comments provided by Peter Skott and Jo Michell. The usual disclaimers apply.

> Now are the wages of the weaver a share of the cloth, of the twenty dollars, of the product of his work? By no means. Long before the cloth is sold, perhaps long before it is fully woven, the weaver has received his wages. The capitalist, then, does not pay his wages out of the money which he will obtain from the cloth, but out of money already on hand.... It is possible that the employer found no purchasers at all for his cloth. It is possible that he did not get even the amount of the wages by its sale. It is possible that he sells it very profitably in proportion to the weaver's wages. But all that does not concern the weaver.... Wages, therefore, are not a share of the worker in the commodities produced by himself.
>
> --K Marx, *Wage-Labour and Capital*, Chapter 2.

1. Introduction

The concept of "wage-led growth" has gained currency among heterodox economists in recent years. Put most simply, it consists of the contention that higher consumption propensities by wage earners may ensure that higher wage shares in total income result in net increases in aggregate demand and in higher equilibrium levels of output. The growing popularity of the concept is perhaps not surprising, as it supports positive, "common-sense" arguments in favour of measures seeking to reverse significant trends towards greater levels of income inequality and lower real wages evident across a range of economies over the past thirty years.

The fundamental idea behind "wage-led growth" is not new.[2] But its contemporary expressions are analytically supported and motivated by modern *under-consumptionist* contributions. Plurally understood, under-consumptionism refers to a wide range of appreciations of the centrality of aggregate demand in shaping the accumulation of capital. Most generally, it follows from the recognition of the relative autonomy under capitalist conditions of decisions to purchase commodities from the decisions to produce them. Capitalist reproduction is thus subject to recurrent disruptions driven or manifested in shortages of demand relative to produced commodities and acquired productive capacities. Inasmuch as this view amounts to a rejection of Say's Law over some time horizon, it enjoys broad support among heterodox currents.[3]

Under-consumptionist contributions take significant analytical steps beyond this first important insight. In their most comprehensive expressions, fundamental features of the accumulation of capital are understood to result in systematic demand shortages that contribute to chronic tendencies towards crisis, militarism and war, or to long-term stagnation. In different ways, this is

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[2] It is in fact old enough to have been dismissed by Marx, "It is purely a tautology to say that crises are caused by the scarcity of solvent consumers, or of a paying consumption.... If any commodities are unsaleable, it means that no solvent purchasers have been found for them.... But if one were to attempt to clothe this tautology with a semblance of a profounder justification by saying that the working class receive too small a portion of their own product, and the evil would be remedied by giving them a larger share of it, or raising their wages, we should reply that crises are precisely always preceded by a period in which wages rise generally and the working class actually get a larger share of the annual product intended for consumption. From the point of view of the advocates of 'simple'(!) common sense, such a period should rather remove a crisis." Marx (1893), 475-476.

[3] Going back to Malthus, Marx, and of course Keynes and Kalecki.

the broad structure of the arguments in Luxemburg's (1913) "problem of realisation", the monopolistic capitalisms of Hobson (1902) and Baran and Sweezy (1966), and in Steindl's (1952) Kaleckian-inspired stagnationism. Quite apart from the theoretical and empirical merits of these contributions, it should be recognised that they contained integrated theorisations of the secular development of capitalism, and of possible endogenous obstacles and contradictions it faces.

Contemporary contributions on "wage-led growth" have offered more partial discussions, seeking to establish either the analytical possibility or empirical purchase of positive associations between the wage share of aggregate income and the level of output or rate of growth. In this they have been broadly based on Kalecki (1971) and Steindl (1952). Dutt (1984) offers an early, explicit formalisation motivated by arguments concerning the role of income inequality in the stagnation of the Indian economy since the mid-1960s.[4] Del Monte (1975) and Rowthorn (1981) independently developed akin frameworks.[5] The broad outlines of these approaches are considered by Taylor (1985), who integrates them into a broader stagnationist growth model.[6]

But the most directly influential contribution to recent arguments for "wage-led growth" has been provided by Marglin and Bhaduri (1990). The paper sought to defend the idea of "wage-led growth" in the face of the unravelling of the post-War "Golden Age" of capitalism, a period of simultaneous high growth and rising real wages in the US and Western Europe. Their basic argumentation is straightforward. Whether or not an economy is following a "wage-led" regime is an empirical question. To the extent that savings rates of capitalists exceed those of workers, a shift in the distribution of income in favour of wage earners will boost demand. As long as this effect outweighs any possible decreases in investment arising from the redistribution of income in favour of wages, its net effect will be greater demand and higher levels of output. This simple idea has recently animated and supported a growing heterodox literature on the possible existence of "wage-led growth" or "wage-led demand regimes".[7]

This paper develops a critique of the concept of "wage-led growth" founded on the Circuit-of-Capital macroeconomic framework.[8] It applies the deliberate consideration of the outlay structure

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[4] The argument is Stendlian: Producers are oligopolistic and operate with permanent excess capacity, capitalists have lower consumption propensities than workers, and investment hinges positively on capacity utilisation rates, ensuring investment accelerator effects enhance the effect on output of greater wage shares in income.

[5] See Lavoie (1995).

[6] Incorporating explicit consideration of the evolution of prices and nominal wages in endogenously shaping cost mark ups and consequently the distribution of income. The relationship between the framework developed here and approaches highlighting the endogenous evolution of the real wage or rate of exploitation is taken up explicitly below.

[7] For good expositions of these arguments and comprehensive reviews of recent empirical work on "wage-led" demand regimes, see Stockhammer and Onaran (2012) and Onaran and Galanis (2012).

[8] As formally codified by Foley (1982, 1986) on the bases provided by of Marx (1885).

or monetary circuits of capitalist reproduction offered by that framework to analysis of the relationship between demand, the level or pace of economic activity, and the class distribution of income. The resulting approach offers a new perspective on the determinants of the distribution of aggregate income, and fundamentally challenges the analytical and policy purchase of "wage-led growth". It also embodies a broad treatment of demand determination, based on the concept of *turnover time*, that is distinct from and analytically broader than the treatments based only on rates of fixed-capital utilisation typically associated with "wage-led growth".

The critique results from the following considerations. Contributions variously motivating "wage-led growth" suppose that output is sold entirely upon production. Most immediately, this is at odds with the empirical evolution of inventories which, as shown in figures 1 and 2 for the US economy, exhibits important cyclical fluctuations as well as a notable falling trend over the past twenty years. While abstraction from such developments may assist the pursuit of many analytical goals, it hampers inquiry into the aggregate, class distribution of income. If sales follow immediately upon production, wages and profits appear as a simple division of total output. In such settings, the distribution of income is exhaustively given by the real wage and production techniques.

<Figures 1 and 2 Around Here>

In contrast, deliberate consideration of the structure of class outlays and revenues or monetary circuits in capitalist accumulation makes clear that wages and profits are not a sharing of output. In the Circuit of Capital, wage and profit flows represent fundamentally different moments of the process of accumulation. Wages are part of current capital outlays made by enterprises as they decide to undertake production. They are thus conditioned by the prospects of profits and the ability of enterprises to finance undertakings. Profits are a fraction of sales, corresponding to mark-ups made possible by the exploitation of labour power. They will be funded by current demand of enterprises for non-labour productive inputs, and as such also conditioned by productive decisions. But they are additionally conditioned by the consumption decisions of households of workers and capitalists. The aggregate distribution of income between wages and profits thus hinges on the relationship between decisions to purchase and decisions to produce. Notably, this is the same relationship ensuring that aggregate demand will, over some time horizons, independently condition the level or pace of economic activity.

This perspective poses critical consequences for "wage-led growth", which can only be defined in such settings of demand determination. The concept hinges on a non-existent causal relationship between two quantities that are jointly determined by the relative measure of aggregate demand and capital outlays. Associations between income distribution and the level or pace of economic activity are confounded, reflecting only the distinct effect of broader developments on each one of

the two measures. The direct, mutual dependence of the incomes of workers and capitalist enterprises on their obverse expenditures ensures the intuition and many of the mechanisms involved in "wage-led growth" are vitiated. To give but one of the examples pursued below, even along stable evolutions not only is it possible that increases in the real wage fail to boost growth, but they may also result in lower wage shares. Policy interventions grounded on the concept of "wage-led growth" may thus prove perversely self-defeating.

These limitations clearly beg analytical and policy alternatives. Analytically, the relationship between output (or rate of growth) and income distribution needs to be explicitly understood as confounded. While not conducive to the causal arguments based on "wage-led growth", this may result in the identification of changes in an economy's parameters that simultaneously boost levels or paces of economic activity and the wage share of aggregate income. Such an approach may help support positive policy arguments for measures and outcomes favourable to wage earners, without the analytical problems of "wage-led growth".

More broadly, the paper's discussion suggests that evolutions in which demand is supported by sustained, higher relative levels of investment will exhibit higher wage shares than otherwise comparable evolutions. Conversely, economies with comparably higher measures of aggregate demand relative to capital outlays will evolve with higher profit shares than otherwise comparable economies. As such the paper suggests recent consumption-led growth strategies pursued in the US, Britain, and a range of upper middle-income countries may have directly contributed to rising income inequality, over and above the effects of falling or stagnant real wages in many of those economies. Policy interventions may be formulated and advanced with reference to alternative, investment-led growth paths, which will generally result in comparably higher wage shares.

The paper develops, illustrates, and analytically situates these points as follows. Section two summarises the reference, comparative-static approach to distribution and output as summarised by Bhaduri (2009). The section contrasts to that approach an analogous Marxian framework of demand determination in the class distribution of income is endogenously shaped by the real wage, capital outlays, and aggregate demand. The following two sections develop and illustrate some of the consequences of the resulting approach with comparative-static exercises considering the impact on output and income distribution of changes to or shifts in the real wage, capital outlays, and consumption by workers. Their findings help motivate not only the problems with "wage-led growth", but also the analytical and policy purchase of arguments for investment-led growth.

Section five illustrates the paper's central points with reference to exponential-trend or steady-state evolutions in a generic dynamic macroeconomic model. On those bases it offers an alternative taxonomy concerning the relationship between demand, growth, and distribution, founded on the

identification of comparative-dynamic movements in the model's parameter space that yield positive associations between wage shares and trend rates of growth. Section six concludes by situating and motivating the distinctive analytical purchase of the paper's approach to income flows, distribution, and demand determination in relation to the equivalent approaches in the Kaleckian contributions analytically sustaining arguments in favour for "wage-led growth". The section also motivates the particular pertinence of the mechanisms it highlights for analysis of contemporary economies; particularly those in which "consumption-led growth" strategies have in effect been pursued in recent decades.

2. Two Different Approaches to Distribution

The most effective, summary statement of the mechanisms behind "wage-led" and "profit-led" growth was recently put forward by Badhuri (2009), based on the earlier influential contribution of Marglin and Badhuri (1990).[9] It is derived easily from the standard income-expenditure identity. All outlays are conceived statically, or during time lapses brief enough to ensure stocks and the economy's productive capacities do not change. As such, outlays may only be understood to hinge on other expenditure flows or parameters. Normalising the income-expenditure relation to the unchanging level of capacity output yields the income identity,

$$y = d^w[\omega] + d^c[\pi] + I[y,h] \tag{1}$$

Where $d^w[\omega]$ denotes workers' consumption as a function of wages, $d^c[\pi]$ denotes capitalist consumption as a function of profits, and $I[y,h]$ is the investment function. The aggregate distribution of income is taken as exogenous, with the parameter h measuring the profit share of total income, ensuring profits and wages are given respectively by $\pi = hy$, and $\omega = (1-h)y$. Total differentiation of (1) yields the slope of the IS curve,[10]

$$\frac{dy}{dh} = \frac{I_h[y,h] - y\left(d^w_\omega[\omega] - d^c_\pi[\pi]\right)}{\left(1 - d^w_\omega[\omega](1-h) - d^c_\pi[\pi]h\right) - I_y[y,h]} \tag{2}$$

Note that the denominator in (2) consists, respectively, of the marginal impact of increased income on savings and on investment. Ruling out unstable income-multiplier regimes, this denominator

[9] A more general framing of the possibility for "wage-led" or "profit-led" regimes is offered by Nikiforos and Foley (2012), which allow for endogenous co-determination of wage shares and capacity utilisation.

[10] Using the convention that for any variables x^a and y, x^a_i and y_i denote the derivatives of with respect to i.

will be positive. As a result, the sign of the derivative in (2) depends on the sign of the numerator. "Wage-led growth", understood as a setting in which falls in the exogenous profit share lead to higher levels of output relative to capacity, thus requires,

$$I_h[y,h] \leq y\left(d_\omega^w[\omega] - d_\pi^c[\pi]\right) \tag{3}$$

If the consumption functions are linear, the lower-bound condition in (3) will be expressed relative to the marginal propensity to consume of workers and that of capitalists. The condition for may be more generally expressed in relation to income elasticities,[11]

$$I_h[y,h] \leq \eta_\omega^{dw} d^w[\omega] - \eta_\pi^{dc} d^c[\pi] \tag{4}$$

The relationship between aggregate income distribution and the level of economic activity behind the "wage-led growth" defined in (4) is entirely demand centered. It arises exclusively as a function of the responsiveness of demand by workers relative to that of capitalists to changes in their respective incomes. If the former is sufficiently larger than the latter to outweigh the positive effect of higher profit shares on investment, higher wage shares boost demand and capacity utilisation.

The analytical observation upon which this paper is founded is that these results hinge on a limited, if conventional understanding of the aggregate distribution of income as an exogenous, *ex-post* sharing of output. Deliberate consideration of the actual sequence and structure of class income flows in capitalist reproduction quickly reveals that, as emphasised by Marxian political economy, wage and profit flows arise from fundamentally different moments of capitalist reproduction. Wages are a part of capital outlays by enterprises, which fund purchases of non-labour inputs and the income flows of wage earners. Profits are the realisation of mark-ups through sales supported by aggregate demand. Once this structure is imposed onto analysis of expenditures and incomes, a fundamentally different relationship between income distribution, the level of economic activity, and demand behaviour emerges.

In motivating its results, the paper will first make use of variations of the following static, demand-determined exercise, following along parallel lines to the example above. All flows are measured in relation to existing levels of productive and financial stocks. As above, suppose all flows are measured relative to the full-capacity level of output. In contrast to the approach above, the sequenced structure of outlays in capitalist reproduction is imposed, using the broad approach and nomenclature of Foley's (1982, 1986) formalisation of the Circuit of Capital. Wages are taken as a

[11] Where η_i^x measures the elasticity of x with respect to i, according to the explicit relationship in question.

fraction κ of capital outlays, termed the composition of capital. Profits are taken as the realisation of a mark-up q on the production cost r of commodities sold.

Along conventional Marxian lines, the mark-up is given by $q = \kappa\varepsilon$, where ε is the rate of exploitation, or ratio between paid and unpaid labour time, taken as determined through point-of-production and broader socio-political struggles. In this setting, profits will be given by qr. For simplicity, suppose capital outlays depend only on profit flows. In the present, static setting this may be interpreted as the simple supposition that the measure of capital outlays relative to productive capacities and to portfolio preferences will be conditioned by contemporaneous profitability. Supposing for now that the mark-up rate is constant, capital outlays may be simply depicted by $z[r]$. Wage flows will thus be given by $\kappa z[r]$.

It should be evident that both the scale of economic activity and the aggregate distribution of income will be endogenous to the outlay behaviour of enterprises, capitalist households, and workers in this setting. Aggregate demand D will fund sales at a mark-up $(1+q)$ on production costs, and will consist of capitalist demand for non-labour inputs plus demand for consumption goods by capitalists and workers. The latter are taken to depend only on their respective income flows, with all parameters for now implicit in the relevant consumption functions. All of this yields the static identity of aggregate demand and sales,

$$(1+q)r = (1-\kappa)z[r] + d^w[z[r]] + d^c[r] \tag{5a}$$

In this demand-determined exercise, the cost-accounted level of sales r provides the central measure of the scale of output or economic activity.

This framework poses a number of differences in relation to more conventional Kaleckian approaches. First, equation (5a) yields a distinctive version of the identity between investment and savings. Supposingall profits are paid to capitalist households, savings are given by $s^c[r] = qr - d^c[r]$, $s^w[z] = \kappa z - d^w[z]$, and (5a) may be stated as either,

$$(1+q)r - d^c[r] + s^w[z[r]] = z[r] \tag{5b}$$

or

$$s^c[r] + s^w[z[r]] = z[r] - r \tag{5c}$$

Equation (5b) is taken to show how capital outlays fund commensurate savings by workers and by the aggregate capitalist sector. Note that in the present framework this identity does not require aggregate commodity-market equilibrium. As (5c) makes clear, it follows directly from the accounting identity requiring the change in financial surpluses by all sectors to add up to zero.

Second, the condition defining stable evolutions in this setting will be different than the conventional Keynesian condition. Aggregate demand behaviour will only be stable relative to perturbations in the level of sales if the derivative of total demand as given in (5a) does not exceed the mark-up factor $(1+q)$. Formally, the demand regime will be stable when,

$$\rho_{nl}\eta_r^z + \rho_c\eta_r^{dc} + \rho_w\eta_z^{dw}\eta_r^z \leq 1 \tag{6}$$

Where ρ_{nl}, ρ_c, and ρ_w respectively denote the shares in total demand $(1+q)r$ of outlays for non-labour inputs, consumption by capitalists, and consumption by workers. Put differently, once the structure of outlays and incomes is considered, an evolution will be stable only when the income elasticities of outlays or demand, weighted by their shares in aggregate demand, average to no more than unity. Note that the condition does not preclude any single elasticity measure from exceeding unity, as long as the others are sufficiently low to ensure (6) holds. While the results motivated in what follows will typically generalise for non-stable evolutions, the exposition will for simplicity be carried on the assumption that condition (6) is true.

The aggregate distribution of income will also have a distinctive expression in this setting. It will be given by the ratio of profits to wages, and thus dependent on both capital-outlay and consumption decisions. Formally, it will be given by,[12]

$$h[r] \equiv \frac{qr}{\kappa z[r]} = \varepsilon \frac{r}{z[r]} \tag{7}$$

Alongside the accounting identity in (5), this expression for the profit share of output supports three broad conclusions.

First, the aggregate distribution of income may be understood to be most generally conditioned by the rate of exploitation, as emphasised by Marxian contributions. As such, it will be subject to all the productive, labour-market, and broader social conflicts determining the division of the working day between paid and unpaid labour. While some of these determinations will be socio-political

[12] Note the last step in this expression hinges on commodity values being given by the present reproduction labour time.

and arguably best understood as exogenous to the macroeconomic variables under consideration here, business-cycle variations in labour-market conditions may ensure this rate varies endogenously alongside capital outlays and other variables. Yet even if the rate of exploitation is taken as exogenous, the realised aggregate distribution of income faces an additional determination in the distinct demand, financial, and entrepreneurial mediations conditioning consumption and capital outlays.[13]

Second, as both the aggregate distribution of income and the level of output are endogenous to these outlays, both measures will have no mutual causal relationship. Changes to consumption and capital-outlay behaviour will separately effect changes on the level of output and on the balance of wage and profit income. The resulting associations between the two measures will be confounded effects arising from underlying changes to outlay behaviour. Different changes affecting consumption and capital outlays will generally result in very different associations between output and distribution. In this setting the concept of "wage-led growth" will have no analytical purchase.

Third and finally, in the approach articulated here, the relationship between consumption behaviour, income distribution, and output is fundamentally different from that underpinning the "wage-led growth" result in condition (4). The aggregate distribution of income is shaped by the relative measure of sales to capital outlays, each of which conditions the other. Consumption decisions mediate the effect of capital outlays on sales, so that for a given elasticity of capital outlays relative to sales η_r^z, the responsiveness of aggregate demand will be given by,

$$\eta_r^D = \rho_{nl}\eta_r^z + \rho_c\eta_r^c + \rho_w\eta_z^w\eta_r^z \tag{8}$$

As in conventional approaches, both income elasticities of consumption will be positively related with aggregate demand and thus with output. But two important differences should be noted. First, the contribution of workers' demand responsiveness to aggregate demand and output is weighted by the responsiveness of capital outlays. In the present, Marxian framework, the reproduction of workers is but a moment in the reproduction of capital. Their consumption cannot generally boost accumulation beyond the commitment of capital value to production that funds wage payments.[14] Second, greater responsiveness in consumption by workers and capitalists boosts sales relative to capital outlays, thus favouring profit shares in total income. As is illustrated in the next two sections, these observations yield results concerning the composition of demand, output, an distribution, that are unavailable on and oft counter to the bases of "wage-led growth".

[13] This is in fact implicit in Circuitist approaches to the monetary circuits of capitalist reproduction. See Graziani (2003) and Lavoie (1992) for the canonical expositions of Italian and French Circuitism.

[14] The impact of consumption credit, which partially relaxes this statement, is taken up explicitly in section four.

3. Exploitation, Real Wage, Output and Distribution

The distinctive mechanisms shaping the relationship between consumption, output, and distribution in the present framework may be illustrated with simple exercises along the same lines of those offered by the "wage-led growth" literature. This section does so by considering the impact on output and distribution of changes in the rate of exploitation, which provides a negative measure of the real wage. It also considers the impact on output of outright redistributions of profit incomes in favour of wage earners. These exercises yield results at significant variance from the "intuition" derived from conventional heterodox approaches. Notably, attempts to change distribution via increases in real wages or explicit income redistribution in favour of wage earners are shown possibly to lead to "perverse" results, including falls in output and even falls in the wage share of aggregate income.

Consider first the rate of exploitation as an exogenous parameter. As long as the composition of capital does not change, movements in that rate may be represented by proportionate movements in the mark-up rate. To consider the impact of such changes, it is necessary to make explicit the dependences of outlays on incomes, and of profits on the mark-up rate,

$$(1+q)r = (1-\kappa)z[\pi] + d^w[\omega] + d^c[\pi] \tag{9}$$

$$h[r,q] \equiv \frac{qr}{\kappa z[\pi]} \tag{10}$$

Where $\pi = \pi[r,q] = qr$, and $\omega = \omega[\kappa, z[\pi]] = \kappa z[\pi]$.

The relationship between the mark-up rate and the level of sales can be derived implicitly from (9),

$$\frac{dr}{dq} = \frac{r\left(-1 + (1-\kappa)z_\pi[\pi] + d^c_\pi[\pi] + \kappa d^w_\omega[\omega] z_\pi[\pi]\right)}{(1+q) - q\left((1-\kappa)z_\pi[\pi] + d^c_\pi[\pi] + \kappa d^w_\omega[\omega] z_\pi[\pi]\right)} \tag{11}$$

Along stable evolutions the denominator of (11) is positive, ensuring the numerator gives its sign to the entire derivative. The numerator thus illustrates the two distinct effects set into motion by changes in the rate of exploitation or in the mark-up rate. First, they increase the level of demand necessary to realise surplus value in produced output commodities. As such and *ceteris paribus*, they reduce the total value of output commodities realised for any given level of demand. Second, greater rates of exploitation may result in greater capital outlays, which fund greater wage and sales flows, boosting consumption by both capitalists and workers. The net effect on output of

increases in the rate of exploitation will follow from the balance of these two effects. The rate of exploitation will be positively associated with levels of output as long as,[15]

$$\frac{q}{(1+q)} \leq \rho_{nl}\eta_r^z + \rho_c\eta_r^{dc} + \rho_w\eta_z^{dw}\eta_r^z \tag{12}$$

As in the "wage-led growth" condition given by (4), the effect of greater rates of exploitation on output is ambiguous, and hinges on the income elasticities of consumption and capital outlays. In contrast to the demand mechanism underpinning "wage-led growth", the consumption elasticities of workers and capitalists, and that of capital outlays by capitalist enterprises, play parallel roles in the determination of the net resulting effect, with higher values for all of them making a positive association between the rate of exploitation and output more likely. Note that counter to condition (4), this implies that higher values for the income elasticity of demand for workers make it *less* likely, *ceteris paribus*, that the association between the rate of exploitation and output is negative.

A further, counterintuitive result arises when considering the impact of a change in the rate of exploitation on the endogenous measure of aggregate income distribution. This simple exercise points to the counterintuitive possibility that increases in the rate of exploitation lead to *improvements* in the wage share of total income. To see this, start from the total derivative of distribution with respect to the mark-up rate,

$$\frac{dh[r,q]}{dq} \equiv \frac{\partial h[r,q]}{\partial q} + \frac{\partial h[r,q]}{\partial r}\frac{dr}{dq} \tag{13}$$

Presented explicitly this yields,

$$\frac{dh}{dq} = \frac{r\left(z[\pi] - qrz_{\pi}[\pi]\right)}{z[\pi]^2\left((1+q) - q\left((1-\kappa)z_{\pi}[\pi] + d_{\pi}^{c}[\pi] + \kappa d_{\omega}^{w}[\omega]z_{\pi}[\pi]\right)\right)} \tag{14}$$

[15] Since $q(1+q)^{-1} < 1$ for all positive values for the mark-up rate, there are stable demand regimes, for which condition (12) holds.

Under stable demand regimes the denominator of (14) is positive, ensuring this derivative is negative whenever, $\eta_r^z > 1$. [16] This requirement is compatible with stable demand regimes as long as the income elasticities of demand for consumption goods are sufficiently low so that,

$$\frac{\rho_c \eta_\pi^{dc}}{1-\rho_{nl}+\rho_w \eta_\omega^{dw}} < \eta_r^z \tag{15}$$

In such settings, increases in rates of exploitation lead, paradoxically, to falls in the realised profit share of income. This may arise even when the increase in the mark-up rate results in an increase in aggregate demand and sales, as long as high responsiveness of capital outlays is compensated by a sufficiently low responsiveness of consumption outlays, ensuring both (15) and (12) hold.

Such counterintuitive results follow from the direct dependence of profit flows on aggregate demand, and from the dependence of wage flows on capital outlays. These dependences will also shape the effect on output of direct attempts to affect the realised distribution of income, including through outright redistributive taxation, also yielding results at variance with conventional "intuition". To see this, consider a direct, lump-sum tax on profits that is paid out *in toto* to wage earners. The net income of capitalists and workers will be respectively given by, $n_c = qr - \theta$, and $n_w = kz\left[n_c\right] + \theta$.

In this setting, the aggregate-demand condition becomes,

$$(1+q)r = (1-\kappa)z\left[n_c\right] + d^w\left[n_w\right] + d^c\left[n_c\right] \tag{16}$$

The aggregate distribution of income, accounting for the redistribution, becomes,

$$h\left[r,\theta\right] = \frac{n_c}{n_w} = \frac{qr-\theta}{\kappa z[n_c]+\theta} \tag{17}$$

The impact of changes in the level of lump-sum redistribution on the level of output is implicitly given by (16), from which it is possible to obtain,

[16] Note that if this elasticity is equal to unity the derivative in (14) is zero. This will always be the case in any setting where production responds commensurately and instantaneously to demand, as in the standard Kaleckian scenario. In such cases there is no practical distinction between purchasing and production decisions, and the determinations of distribution considered by this paper and leading to (14) do not arise.

$$\frac{dr}{d\theta} = \frac{d^w_{nw}\left[n_w\right]n^w_\theta - \left(d^c_{nc}\left[n_c\right] + (1-\kappa)z_{nc}\left[n_c\right]\right)}{(1+q) - q\left(d^c_{nc}\left[n_c\right] + (1-\kappa)z_{nc}\left[n_c\right] + \kappa d^w_{nw}\left[n_w\right]z_{nc}\left[n_c\right]\right)} \tag{18}$$

Where $n^w_\theta = 1 - \kappa z_{nc}[n_c]$ is the derivative of aggregate wage income with respect to θ.

Considering only stable demand regimes, under which the denominator of (18) will be positive, comparative-static increases in lump-sum redistribution result in greater levels of output when,

$$d^w_{nw}\left[n_w\right]n^w_\theta - d^c_{nc}\left[n_c\right] > (1-\kappa)z_{nc}\left[n_c\right] \tag{19}$$

Note that since $n^w_\theta \leq 1$, this is a much stronger requirement on the consumption propensities of wage earners than that imposed by the conventional "wage-led growth" requirement in (4). Inasmuch as the lump-sum tax on profits reduces private capital outlays, it will also reduce aggregate wage flows, *ceteris paribus*. This will undermine any positive effect on aggregate demand following from high consumption propensities by wage earners. It is even *conceivable* that high labour intensity and very responsive capital outlays may ensure $n^w_\theta < 0$, implying comparative-static lump-sum redistributions result in lower aggregate wage flows, and that (19) never holds. Discounting such cases and considering only settings where $n^w_\theta > 0$, increases in the lump-sum tax will result in greater levels of output when workers' income elasticity of demand is sufficiently strong to ensure,

$$\eta^{dw}_{nc} > \frac{\rho_{nl}\eta^z_{nc} + \rho_c\eta^{dc}_{nc}}{h\left[r,\theta\right]\rho_w n^w_\theta} \tag{20}$$

It is important to note explicitly that these results demonstrate how the framework advanced by the paper allows for integrated consideration of the two distinct processes typically highlighted by opposing sides in policy debates concerning the desirability of redistributions of income: The posited gains arising from greater consumption propensities of wage earners, and the posited losses arising from the negative effects of redistributive taxation on capital outlays, employment, and thus aggregate wages themselves. The paper returns to this and broader policy considerations after the consideration of the germane exercises offered in the next section.

4. Capital Outlays, Workers' Consumption and the Endogeneity of Distribution

This section turns to two additional exercises that help lay out the determination of income distribution the paper is emphasising, illustrate the confounded character of associations between distribution and output in any demand-determined setting, and establish the argument for investment-led growth as an alternative macroeconomic programme that meets the aims of proponents of "wage-led growth" while avoiding its analytical pitfalls. It does so by considering the impact on distribution of independent, exogenous increases to capital outlays and to consumption by workers. Under generally plausible conditions they each lead to opposing movements in the aggregate distribution of income, even while jointly boosting demand and the level of output.

Formally, consider a simple generalisation of the framework above. Let capital outlays and workers' consumption each depend positively on additional parameters λ and υ respectively. These two parameters may stand for anything autonomously boosting capital outlays and consumption by workers. Here they will be referred to as respective measures of leverage boosting those expenditure flows, but they may be, for instance, deficit government outlays initiating investment projects or financing sales of output. Total sales will then be given by,

$$(1+q)r = (1-\kappa)z[r,\lambda] + d^w[z[r,\lambda],\upsilon] + d^c[r] \tag{22}$$

This implicitly defines sales as an endogenous function of the leverage parameters and outlay functions, so that for a given specification of the latter, $r = r[\lambda,\upsilon]$. Income distribution will be,

$$h[\lambda,\upsilon] \equiv \frac{qr[\lambda,\upsilon]}{\kappa z[r,\lambda]} \tag{23}$$

Consider now movements in the leverage parameters. It should be obvious that greater leverage in outlays will boost sales and output, irrespective of the outlay in question. Yet they can be shown to have very different effects on the aggregate distribution of income under generally plausible conditions. Consumption credit will generally increase profit shares in aggregate income, while production credit will generally increase wage shares.[17] This is a significant finding concerning the macroeconomic content of different credit allocations in its own right. It also illustrates the determination of income distribution emphasised by the present paper, and attests to the difficulties posed when considering the relationship between two endogenous variables. Different

[17] A dynamic version of this finding, posed in the terms of the original, continuous-time formalisation of the Circuit of Capital offered by Foley (1982, 1986), is offered in dos Santos (2013).

parameter shifts, in this case in the measures of leverage supporting consumption by workers or capital outlays, lead to different associations between the profit-share and the level of output.

Formally, an increase in leverage in capital outlays would change distribution according to,

$$\frac{dh[\lambda,\upsilon]}{d\lambda} \equiv \frac{\partial h[\lambda,\upsilon]}{\partial \lambda} + \frac{\partial h[\lambda,\upsilon]}{\partial r}\frac{dr}{d\lambda} \tag{24}$$

Obtaining the necessary derivatives from (22) and (23) yields,

$$\frac{dh[\lambda,\upsilon]}{d\lambda} = \frac{qz_{\lambda}[r,\lambda]\Big(r\Big((1+q)-d_r^c[r]\Big)-z[r,\lambda]\Big((1-\kappa)+d_z^w\big[z[r,\lambda],\upsilon\big]\Big)\Big)}{-\kappa z[r,\lambda]^2\Big((1+q)-\Big(d_r^c[r]+z_r[r,\lambda]\Big((1-\kappa)+d_z^w\big[z[r,\lambda],\upsilon\big]\Big)\Big)\Big)} \tag{25}$$

The term inside the parentheses in the denominator of (25) is the derivative of the definition of aggregate sales given by (22), expressed as an excess supply, with respect to the level of sales. Stability requires that it be positive. Since by hypothesis $z_{\lambda}[r,\lambda]>0$, the sign of the derivative in (25) will be negative as long as,

$$(1+q)r-(1-\kappa)z[r,\lambda] > rd_r^c[r]+z[r,\lambda]d_z^w\big[z[r,\lambda],\upsilon\big] \tag{26}$$

Using the fact that the left-hand side in (26) is the demand for consumption goods, and expressing the relationship in terms of income elasticities of demand, it is evident that, the profit share will be falling on the measure of production credit whenever,

$$\eta_z^{dw}\frac{d^w\big[z[r,\lambda],\upsilon\big]}{d^w\big[z[r,\lambda],\upsilon\big]+d^c\big[r\big]}+\eta_r^{dc}\frac{d^c\big[r\big]}{d^w\big[z[r,\lambda],\upsilon\big]+d^c\big[r\big]}<1 \tag{27}$$

In words, the impact of production credit (or anything directly boosting only capital outlays) on income distribution depends on the weighted-average responsiveness of demand for consumption goods by all households. If the average income elasticity of demand is smaller than unity, greater paces of production credit will improve wage shares, as their impact on wages will proportionately exceed their impact on sales and profits. Condition (27) is plausible and met formally in any setting where marginal consumption propensities fall on income.

Consider along similar lines consumption credit. The corresponding derivative of distribution is,

$$\frac{dh[\lambda,\upsilon]}{d\upsilon}=\frac{qd_{\upsilon}^{w}\left[z[r,\lambda],\upsilon\right]\left(z[r,\lambda]-rz_{r}[r,\lambda]\right)}{\kappa z[r,\lambda]^{2}\left(\left(1+q\right)-\left(d_{r}^{c}[r]+z_{r}[r,\lambda]\left(\left(1-\kappa\right)+d_{z}^{w}\left[z[r,\lambda],\upsilon\right]\right)\right)\right)} \tag{28}$$

Following the same line of reasoning as above, consumption credit will improve the profit share as long as the numerator is positive. Expressed in relation to elasticities, the requirement is, simply,

$$\eta_{r}^{z}<1 \tag{29}$$

The impact of consumption credit on the aggregate distribution of income will hinge on the responsiveness of capital outlays to increases in sales consequent to the debt-supported increase in worker outlays. As long as increases in capital outlays are proportionately smaller than those in sales, consumption credit will increase the profit share of aggregate income.

Conditions (27) and (29) identify the settings in which production and consumption credit respectively increase and decrease the wage share in aggregate income. The limits on outlay responsiveness they contain will also ensure that the demand-stability requirement in (6) is met. In fact, it should be evident that under stable demand regimes, at least one of these two conditions must hold along any stable evolution. It should be reasonable to expect to find many instances in which both conditions hold, and where each credit allocation yields opposite effects on the aggregate distribution of income.

These results are interesting in their own right, especially in light of the significant recent reorientation of bank credit in favour of consumption and mortgage loans (which may indirectly support consumption) across a range of advanced and middle-income economies. They also illustrate well the difficulties posed when considering the relationship between two jointly-determined variables. Under conditions (27) and (29), the confounded relationship between output and income distribution has opposite signs. The issue of recasting analysis of the relationship between distribution and growth under this light is taken up in the next section, which offers an alternative taxonomy based on the the effects any given parameter movement in any dynamic model of accumulation has on each one of these two measures.

Before proceeding to that discussion, it should be noted that these findings also point to an alternative, broader macroeconomic policy agenda to that posed by “wage-led growth”. They evidently imply that any given development or policy intervention helps shape income distribution not only through its impact on the real wage, but also through its relative impact on capital and consumption outlays. In conjunction with the results in section three, this provides broader bases on which to assess the role of any given policy measure or broader development on growth and

distribution than an exclusive focus on real wages. For instance, consumption-led growth strategies, such as those recently pursued across a range of economies through the promotion of asset-price inflation, wealth effects, and consumption credit, will be expected to contribute to increases in profit shares, even if unaccompanied be falls in real wages.

Conversely, growth strategies focussed on boosting relative levels of investment undertakings should be expected to result in higher wage shares, as long as real wages are not simultaneously falling. Successful investment-led growth strategies along these lines may deliver the combination of improvements in the aggregate conditions of wage earners and improvements in positive measures of economic performance sought by proponents of "wage-led growth". Yet consideration of investment-led strategies begs broader and more ambitious macroeconomic policy agendas. It naturally poses questions of institutional and policy settings most conducive to the requisite high paces of investment. Particularly in settings of low responsiveness of private investment, or of high or rising real wages, this poses debates concerning the relative merits and possible roles of private and public enterprises in underpinning more equitable patterns of high economic growth.

5. A Few Pertinent Dynamic Considerations

The exercises above have been founded on a simple but static framework. While sufficient to motivate the analytical caveats outlined above, this offers no means to account for the evolution of stocks that are codetermined with the flows under consideration and that shape aggregate profitability: inventories, engaged inputs, fixed capital, financial assets and liabilities, existing and potential supplies of labour power, etc. Significantly, the relationship between capital outlays and aggregate demand shown above to shape the aggregate distribution of income also drives the evolution of the stock of total capital value committed by enterprises to the production of commodities. That stock, in turn, shapes aggregate profitability, and the relative measure of its components may shape enterprise behaviour.

Deliberate consideration of flows and the evolution of all stocks in the economy requires explicitly dynamic approaches, which also permit consideration of the determinants of *growth rates* proper. This section briefly frames the points developed above in relation to trend rates of growth for any dynamic macroeconomic model offering explicit consideration of the formation of aggregate demand and of aggregate capital outlays. It does so by considering the distinctly dynamic determinants of the aggregate distribution of income along the underlying exponential trend of any given economic evolution. On that basis it offers an alternative taxonomy for characterising the relationship between class income shares, outlays, and the rate of growth.

Consider a dynamic evolution for a capitalist economy's stocks and flows containing a real exponential trend. Suppose further that this trend mode of evolution is stable, and that its rate of growth is a continuous, differentiable function $g = g[\vec{x}]$ of the parameters of the system of equations modeling the economy.[18] Under any given normalisation, the extensive evolution of any stock or flow will be given by,[19]

$$Y_t = Y_0\left[\vec{x}, g[\vec{x}]\right] e^{g[\vec{x}]t} \tag{30}$$

In this setting, any weighted ratio between flows and stocks in the economy, such as the aggregate distribution of income or the rate of profit, may be understood as a function of the parameters and the rate of growth,

$$A\left[\vec{x}, g[\vec{x}]\right] = \Phi\left[\vec{x}\right] \frac{Y_0^i\left[\vec{x}, g[\vec{x}]\right]}{Y_0^j\left[\vec{x}, g[\vec{x}]\right]} \tag{31}$$

With minimal loss of generality, consider a ratio where the autonomous term is itself a parameter, independent of all others, such as the distribution of income, for constant rates of exploitation.

$$H\left[\vec{x}, g[\vec{x}]\right] = \varepsilon \frac{R_0\left[\vec{x}, g[\vec{x}]\right]}{Z_0\left[\vec{x}, g[\vec{x}]\right]} \tag{32}$$

The points developed in previous sections may may be restated and generalised on the basis of this identification. Both the trend rate of growth and any ratio like (32), including the aggregate distribution of income, are taken as endogenous to the parameters. Any comparative-dynamic change in the parameters will independently condition the growth rate and income distribution. In order to consider the consequent confounded association between both variables it is necessary to characterise the impact of parameter changes on this measure of aggregate distribution.

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[18] For extensive formulations of linear systems of differential equations, this amounts to consideration of the mode of evolution defined by a real eigenvalue of the system's Jacobian matrix, and by initial conditions given by the corresponding eigenvector. This evolution will be stable when this eigenvalue has the largest real part of all eigenvalues for the system. Both the eigenvalue and the elements of the corresponding eigenvector may be understood as functions of the parameters defining the Jacobian matrix. Linear systems of integral equations--such as those used in Foley (1982, 1986)--implicitly define unique exponential rates of growth as functions of their parameters, and eigenvectors of corresponding initial conditions.

[19] The explicit dependence of the trend exponential rate of growth is warranted for three reasons. First, under real exponential evolutions the rate of growth will appear in ratios between initial conditions whenever some variables depend directly on past variables. This is the case with stocks as well as any flows subject to lagged dependences on past flows. Second, it may not be possible to express explicitly the rate of growth as a function of parameters, as under even simple settings, the equations defining these relationships may involve transcendental functions, high-degree polynomials, or other nonlinearities. In such cases comparative-dynamic exercises may be pursued with the help of the Implicit Function Theorem. And third, these explicit dependences are necessary to consider the determinants of distribution and growth rates.

Consider a movement along a parameter x_i, which changes distribution according to,

$$\frac{dH\left[\vec{x},g[\vec{x}]\right]}{dx_i} = H_i\left[\vec{x},g[\vec{x}]\right] + \frac{dg\left[\vec{x}\right]}{dx_i} H_g\left[\vec{x},g[\vec{x}]\right] \tag{33}$$

Where the subscript *i* on any variable denotes its partial derivative with respect to x_i. This may be expressed in relation to elasticities,

$$\eta_i^H = \varepsilon\left\{\left(\eta_i^{R_0} - \eta_i^{Z_0}\right) + \eta_i^g\left(\eta_g^{R_0} - \eta_g^{Z_0}\right)\right\} \tag{34}$$

The first difference in (34) captures the static or contemporaneous effects of parameter changes on distribution, and is the broadest foundation for all the results motivated so far. The second difference captures a further, dynamic element in the reaction of income distribution. Inasmuch as parameter changes alter the steady-state rate of growth, any differences in the measure to which capital outlays and aggregate sales depend respectively on past flows will give rise to additional dynamic effects changing the distribution of income. Significantly, it is possible that exogenous shifts will have contemporaneous, static effects that are offset or reversed by their dynamic impact on capital outlays and sales via the rate of growth. This may be an additional source of counterintuitive or seemingly paradoxical dynamic effects along the lines discussed above.

It is now possible to turn to the confounded relationship between growth and aggregate income distribution for any arbitrary exogenous change to a model's parameters. Consider a movement along a (normalised) direction $\vec{\delta} = \left[\delta_1,\delta_2,...,\delta_n\right]$ in parameter space, corresponding to proportional parameter changes $\vec{\gamma}\left[\gamma_1,\gamma_2,...,\gamma_n\right]$. The confounded association between distribution and growth will be given by the total derivative of distribution along direction $\vec{\delta}$, divided by the same directional derivative for the rate of growth,

$$\left.\frac{dH\left[\vec{x},g[\vec{x}]\right]}{dg}\right|_{\vec{\delta}} = \frac{\vec{\delta}.\vec{\nabla}H\left[\vec{x},g[\vec{x}]\right]}{\vec{\delta}.\vec{\nabla}g\left[\vec{x}\right]} \tag{35}$$

This is more intuitively expressed as a relationship on the directional elasticity of distribution,

$$\eta_g^H\Big|_{\vec{\delta}} = \left(\eta_g^{R_0} - \eta_g^{Z_0}\right) + \frac{\sum\left(\eta_i^{R_0} - \eta_i^{Z_0}\right)\gamma_i}{\sum \eta_i^g \gamma_i} \tag{36}$$

Any observed association between distribution and growth in the present context arises from the balance of the distinct influences of parameter shifts on capital outlays and on aggregate demand. These include dynamic effects arising from the impact of parameter shifts on the rate of growth. It should be evident that different parameter-change vectors will result in a different confounded elasticity. There is no single relationship between distribution and growth in any given economy.

While the directional elasticity in (36) does not reflect a causal association between the aggregate distribution of income and the economy's rate of growth, it does provide the basis for specific statements considering the association between the two measures along any comparative dynamic movement in a given direction in parameter space. A movement along any such direction may be said to result in a *profit-share boosting acceleration* if the elasticity in (36) is unambiguously positive along steady-state evolutions. Conversely, *wage-share boosting accelerations* will result from movements along directions for which this elasticity is negative.

To illustrate these concepts, consider an exercise similar to that undertaken in section four. Suppose the system in question includes two parameters, λ and υ, which directly boost capital outlays and consumption by workers respectively. In any demand-constrained framework, both parameters will boost the steady-state rate of exponential growth. Application of (36) shows that an increase in λ will increase the wage share while supporting a growth acceleration when,

$$\eta_\lambda^g\left(\eta_g^{Z_0} - \eta_g^{R_0}\right) > \left(\eta_\lambda^{R_0} - \eta_\lambda^{Z_0}\right) \tag{37}$$

Conversely, an increase in υ will result in profit-share increases during an acceleration if,

$$\eta_\upsilon^g\left(\eta_g^{R_0} - \eta_g^{Z_0}\right) > \left(\eta_\upsilon^{Z_0} - \eta_\upsilon^{R_0}\right) \tag{38}$$

Inequalities (37) and (38) are dynamic generalisations of conditions (27) and (29).[20] The net effect on the aggregate distribution of income of either type of credit will depend on the relative, contemporaneous effect it has on capital outlays relative to sales. It will also depend, inasmuch as the determinations of capital outlays and sales are subject to time lags, on the dynamic effect

[20] In the absence of dynamic effects, the left-hand sides of (37) and (38) become zero, and the inequalities effectively resolve into statements of (27) and (29), which can be seen easily if the normalisations pursued below are followed.

greater lending has on the rate of growth. The conditions ensuring both inequalities hold may be broadly motivated.

In considering (37), suppose the steady-state solutions to the system are normalised to the level of capital outlays, ensuring its elasticities are zero and that sales are measured relative to it. Inasmuch as sales follow with some time lags from capital outlays, the left-hand side of that inequality will be positive, as greater growth reduces sales relative to contemporaneous capital outlays. Condition (37) will only fail to hold if production credit leads to increases in sales relative to capital outlays, and if the resulting elasticity is sufficiently large to outweigh dynamic effects arising from lags in sales relative to capital outlays. Conversely, consider (38) while normalising solutions to the level of sales. As above, the left hand side of the inequality will be positive as long as capital outlays have some dependence on lagged values of sales. The condition will only fail to hold if consumption credit has a positive impact on capital outlays relative to sales, and that impact is sufficiently large to outweigh dynamic effects reducing capital outlays relative to sales.

Given the strength of these requirements, one should expect to find many dynamic specifications under which both (37) and (38) hold. In those cases, production credit effects wage-share boosting accelerations, while consumption credit would effect profit-boosting growth accelerations. A new taxonomy along these lines is admittedly more cumbersome and less "intuitive" than conventional arguments in favour of better wage shares based on their putative impact on growth. But it is also less facile, and avoids the analytical problems associated with "wage-led growth".

6. By Way of Conclusion: Situating and Motivating the Framework

This paper has presented a distinctive and hitherto neglected determinant of the aggregate, class distribution of income, operating over any time horizon in which aggregate demand and the commitment of value to production are determined with a measure of mutual autonomy. This determinant operates as a consequence of the fact that wages and profits pertain to different moments in the reproduction of capital. Wages are a share of capital outlays. Profits represent a share of total commodity sales funded by aggregate demand. The class distribution of income is consequently shaped by the relationship between production and consumption decisions. In these settings, income distribution and levels of output are jointly determined by the same processes. This observation leads to a flat rejection of the analytical and policy purchase of "wage-led growth".

The deliberate consideration of the relationship between capital outlays and aggregate demand also gives rise to broader differences with the Kaleckian (or Steindlian) approaches to income distribution, profitability and growth sustaining arguments for "wage-led growth".[21] At the

[21] Such as those in Rowthorn (1981), Dutt (1984), Taylor (1985), and Lavoie (1995), for instance.

broadest level these differences follow from the manner in which the rejection of Say's Law is given operational form in those contributions: All output is taken to be sold upon production, but demand determines the rates at which existing productive capacities, taken as constant over the time horizons under consideration, are utilised. While manifestly useful across a range of analytical applications, this approach does not permit consideration of the interplay between production and consumption decisions that helps condition growth, distribution, and profitability, over at least some time horizons.

The assumption that all output is sold upon production is shared with neoclassical approaches. In any such setting the distribution of income between profits and wages will appear to be reducible to a sharing of the value of output. Distribution will consequently be understood to hinge only on technological considerations governing factor employment levels, and on the evolution of the real wage.[22] The exercises above can accommodate models offering endogenous accounts of technological change and of the evolution of the real wage,[23] and their impact on distribution. But they point to the additional role in shaping distribution played by the dynamic interaction between decisions to commit value to production and decisions to purchase inputs or consumption goods.

In any stock-flow consistent framework, recognition of the distinction between production and purchasing decisions necessarily implies that stocks capital value engaged as productive resources and inventories are dynamically evolving. Capital outlays add to stocks of engaged productive resources, while the completion of output drains them. Finished output commodities add to inventory stocks, while sales funded by aggregate demand drain them. Measuring inventories at production cost, and letting P_t denote output flows, these evolutions are given formally by,[24]

$$\dot{\Pi}_t = Z_t - P_t \tag{39}$$

$$\dot{N}_t = P_t - R_t \tag{40}$$

The stock of capital is given by the sum of engaged productive resources and inventories and obeys,

[22] Under neoclassical "perfect competition", in fact, if aggregate output is understood as given by a Cobb-Douglas production function, factor shares in the value of output will independent of factor prices and exclusively determined by "technology"; specifically, by the corresponding Cobb-Douglas exponent or factor-employment elasticity of output. In any labour-cost mark-up approach to price, the relevant technological consideration will be the labour-to-output ratio, given here by the composition of capital.

[23] Including along the lines of Taylor's (1985) specification of the evolution of wages and commodity prices, or, if broader consideration is given to the evolution of overall labour supply, along the lines of the Philips-Curve mechanism used by Goodwin (1967).

[24] In line with Foley (1982, 1986). See also dos Santos (2013).

$$\dot{K}_t = Z_t - R_t \tag{41}$$

The evolution of the aggregate stock of capital is thus determined by the entire history of capital outlays and aggregate demand.[25] As a result, the rate of profit on aggregate capital is shaped by the same productive and consumption decisions conditioning the distribution of income. In fact, along the trend, exponential evolutions considered in section five, profitability may be expressed in relation to the profit share, the rate of growth, and a model's parameters,

$$\rho\left[\vec{x}, g[\vec{x}]\right] = \kappa g[\vec{x}]\left\{\frac{1}{H\left[\vec{x}, g[\vec{x}]\right]} - \frac{1}{\varepsilon}\right\}^{-1} \tag{42}$$

In the present setting, the comparative-dynamic relationships between profitability, growth, and the profit share are also confounded. The relationship in (42) opens the possibility of parameter movements under which profitability may exhibit negative associations with either the rate of growth or the profit share. This may arise, for instance, when parameter movements not involving the rate of exploitation or the composition of capital result in negative associations between growth and profit shares.

This explicit account of the evolution of aggregate capital stocks points to the context in which rates of capacity utilisation condition profitability. If the rate of capacity utilisation is taken as proportional to the ratio of output flows to the total stock of mobilised productive resources, greater measures of utilisation will see comparatively smaller stocks of productive resources. Note however that as evident from (41), this will not be sufficient to ensure reductions in total stocks of capital value, which will only follow from the actual sale of commodities. As such, greater rates of capacity utilisation will not in themselves boost profitability. They will do so only when accompanied (or driven by) greater paces of demand.

These brief considerations help identify the distinctive analytical purchase of the framework sustaining the discussions presented by this paper. They also suggest directions in which Kaleckian models of income distribution, growth, and profitability in demand-determined settings may be developed so as to account for the processes shaping income distribution this paper has identified. This paper may be most usefully concluded with a motivation of why such an enterprise may have significant empirical and policy purchase in relation to contemporary capitalism.

At the broadest level the approach to income distribution developed here suggests that income shares are determined not only by the real wage and levels of employment, but also by the measure

[25] Assuming no difference between historical and replacement costs of mobilised productive resources.

of aggregate demand for inputs and consumption goods relative to the capital outlays of enterprises. This emphasis affords a distinct perspective on the impact of the "consumption-led growth" strategies that have been pursued in the US, British, and a range of upper-middle-income economies in recent years. States have pursued increases in the relative measure of consumption by wage earners through the promotion of asset-price appreciations associated with wealth-effects on expenditure, as well as through encouragement of outright borrowing by wage earners. Private financial intermediaries have helped the process along by developing profitable business segments in credit-card, broader consumption, and mortgage loans in this period.[26]

These developments resulted in dramatic falls in savings rates in the US and British economies in the years leading up to the 2008.[27] Absolute increases in consumption were manifestly not matched by increases in capital outlays, private or public. Consumption expenditures rose from accounting respectively for 63 and 53 percent of GDP in 1977, to 70 and 65 percent in 2009.[28] According to the framework advanced by this paper, the "consumption-led growth" strategies contributing to these developments will have directly contributed to increases in profit shares of aggregate income. The contribution put forward by this paper may be thus taken in support further work concerning the relationship between demand, investment, and growth in contemporary economies, and of policy arguments in favour of alternative, investment-led growth strategies that simultaneously boost growth and labour shares in aggregate income.

[26] See dos Santos (2009).

[27] Savings rates fell from about 10 and 14 percent in the US and Britain respectively in early 1980, to pre-crisis lows of 2 and 0.9 in late 2007/early 2008. Data is available from the US Federal Reserve and UK Office for National Statistics.

[28] Calculated from US Bureau of Economic Analysis and Bank of England Data.

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Figure 1 | US Manufacturing and Trade Inventories To Sales Ratio
January 1992 - January 2013, Source: US Census Bureau

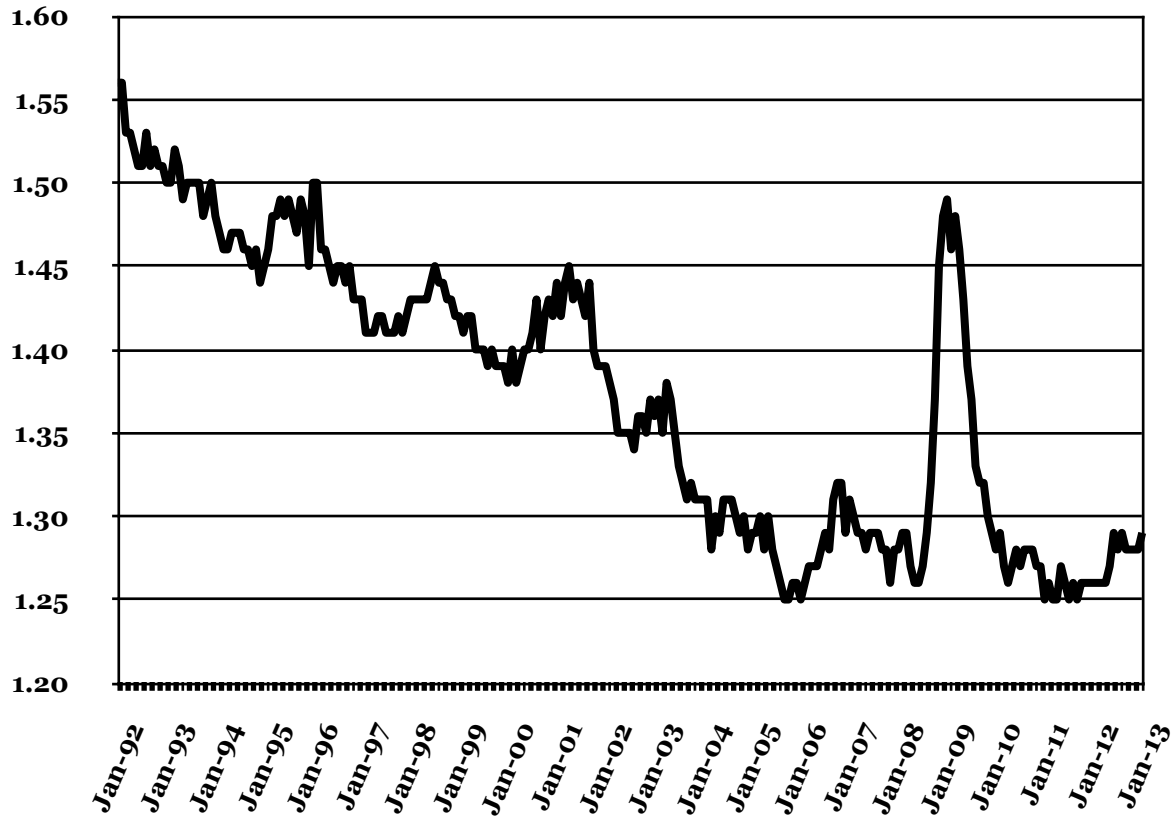
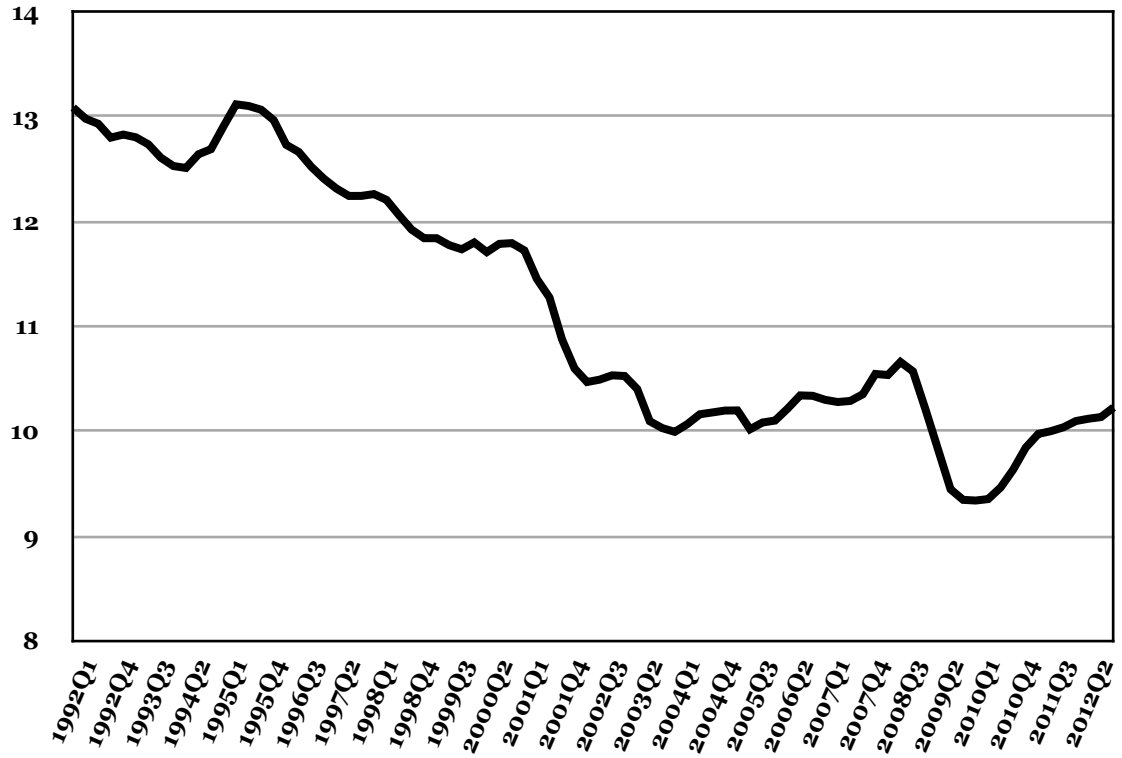


Figure 2 | US Manufacturing and Trade Inventories To GDP
1992Q1 - 2012Q4, Calculated from BEA and US Census Bureau Data[29]



[29] Census Bureau monthly data on inventories is averaged over the relevant quarter.