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April 2013, Revised December 2013

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1 Introduction: the missing middle class

The Great Stagnation that has followed the Great Recession of 2007-09 has generated increased interest in the macroeconomic effects of income distribution (Palley, 2012a; van Treek and Sturn, 2012). Hand-in-hand with this new interest in income distribution has come a new political rhetoric and interest in the middle class which is now repeatedly referred to as the "engine" of economic growth. For instance, on August

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1, 2012, the well-connected Center for American Progress in Washington DC held a conference titled "300 million engines of growth: The middle class and the US economy". However, this interest in the middle class is not matched by economic theory which is eerily quiet on the subject of class. Thus, within mainstream theory class is excluded either via adoption of the concept of the representative consumer or via theories of consumption that treat households as having the same propensity to consume.

This paper aims to begin the process of filling the gap in theory by developing a three class neo-Kaleckian - Goodwin model of growth and distribution. The three classes consist of workers, middle management that is identified with the middle class, and "top" management which is identified with the capitalist or upper class. The paper builds upon an earlier paper by Palley (2013a) that is a two class model with workers and a composite capitalist-manager class.

An important contribution of the paper is the political economy that results from a three class world. A two class world generates simplistic class conflict. A three class world is characterized by more complicated political conditions in which the middle class is pulled between siding with workers and siding with top management-capitalists, and the middle class has conflicts with both. By starting with a better description of sociological reality, the model delivers better macroeconomic and political insight. Indeed, the middle class, which is currently politically celebrated, can be the cause of problems.

For purposes of connecting to the real world, the top manager class is identified with the top one percent; the middle manager class is identified with the next nineteen percent; and the worker class is identified with the bottom eighty percent. This is a

narrower definition of the middle class than is used in political conversation, but it has economic salience. Table 1 shows a decomposition of U.S. private sector employment in September 2012. Just over eighty percent of workers were classified as production and non-supervisory. Table 2 provides a decomposition of income and wealth shares, and both are heavily concentrated in the top twenty percent, and especially the top one percent. Income and wealth fall off rapidly beyond the top twentieth percentile.

Table 1. Composition of U.S. private sector employment, September 2012.

Total private sector employment	111.5 million	100%
Production & non-supervisory workers	92.1	82.6
Managerial employees	19.4	17.4

Source: Bureau of Labor Statistics, Employment Report, September 2012, Tables B-1 and B-6.

Table 2. Distribution of income and wealth in the U.S.

	Bottom 80%	Top 20%	Top 1%
Income share in 2007[1]	40%	60%	21%
Wealth share in 2010[2]	19.5%	80.5%	30.4%

Sources: 1 = Trends in the Distribution of Household Income Between 1979 and 2007, Congressional Budget Office Study, Washington DC, October 201. 2 = Table 6.6, State of Working America, Economic Policy Institute, Washington DC, September 2012.

The above definition of the middle class gives renewed meaning to the term which current popular discourse has rendered almost meaningless by claiming "we are all

middle class". This meaninglessness is reflected in the recent (2013) U.S. fiscal cliff debate in which Republicans defined middle class as people with incomes less than one million dollars, and Democrats defined it as incomes less than two hundred and fifty thousand dollars. Current usage is life-style focused, whereas the paper proposes a capital ownership perspective. This generates a much smaller middle class that is best conceptualized in terms of a pyramid. As shown in Figure 1, at the top is a small triangle representing the capitalist class; below that is a layer representing the middle class; and below that is a larger layer representing the working class. Class sizes are very unequal and the middle class is sandwiched between the capitalist and working class. However, contrary to the conventional representation, the middle class is not the largest class and nor does it even contain the median income household.

Figure 1. Class structure of capitalist economies.

2. Relation to existing literature

The model that is presented in the next section builds on five different strands of research. The core first strand is the neo-Kaleckian growth model developed by authors such as Rowthorn (1981), Taylor (1983), Dutt (1984), and Lavoie (1995). Growth is

driven by capital accumulation which in turn depends positively on the rate of profit and the rate of capacity utilization. The distribution of income is therefore critical for growth, as is the level of economic activity.

The second strand of research concerns the supply-side and the endogeneity of technical progress function. This line of research originates with the ideas of Verdoorn (1949) and Kaldor (1957) which have become the foundation stone of Keynesian endogenous growth theory.[2]

The third strand of research comes from Dutt (2006) and Palley (2012b) who introduce labor markets. In steady state, employment and the labor force must grow at the same rate to ensure a constant unemployment rate. Moreover, labor market conditions exert critical growth effects on both the demand and supply sides of the economy.[3]

The fourth strand of literature concerns the role of wealth distribution (Dutt, 1990; Palley, 2012c). Wealth ownership is a critical factor for AD as it determines the distribution of profit income across household classes, which in turn affects demand because of differences in the propensity to consume across classes. In two class models in which workers consume all their income, wealth is entirely owned by the capitalists class, thereby finessing the wealth distribution issue. In three class models in which two classes save, wealth distribution cannot be finessed and needs to be endogenously determined.

The fifth strand of research concerns the wage bill and managerial pay. Kalecki (1970) noted the importance of managers and treated their pay as an exogenously given

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[2] An early contribution was Palley (1996, 1997) who models technical progress as depending on capacity utilization, the rate of accumulation, and the capital stock. More recent applications include Naastepad (2006), Naastepad and Storm (2007) and Hein and Tarassow (2010) who have technical progress depend on capacity utilization and income distribution. Rada (2007) models a two sector developing economy in which technical progress is impacted by ouput growth, wage growth and employment growth.

[3] Dutt (2006) has a model in which the employment rate is indeterminate, whereas the employment rate is determined in Palley (2012b). This difference reflects different specifications of the impact of labor market conditions on induced technical progress.

deduction from surplus. Palley (2013a) presents a two class model with workers and a manager-capitalist class in which managerial pay is part of the wage bill, and the division of the wage bill between workers and manager-capitalists depends on employment conditions. The current paper expands that earlier model to have three classes. It uses Kalecki's mechanism to determine top manager pay, and wage bill division conflict to determine middle manager pay.[4] The outcome of the wage bill division conflict is impacted by the state of the labor market, which is what warrants the link to Goodwin (1967).[5]

The structure of the proposed model is illustrated in Figure 2. The top half of the figure represents the conventional neo-Kaleckian growth model which embodies a causal loop between aggregate demand (AD), capacity utilization, income distribution, and capital accumulation. Now, there is the addition of a distribution of wealth channel running from the functional distribution of income to aggregate demand. Capital accumulation affects the rate of productivity growth, reflecting the impact of endogenous technical progress based on Kaldor's (1957) concept of the technical progress function. The rate of capital accumulation and technical progress impact the employment rate, and employment conditions feedback to impact the character of innovation and the pace of labor productivity growth. This is the labor market balancing mechanism identified by Dutt (2006) and Palley (2012b). Finally, the employment rate impacts wage bill division

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[4] Managerial pay has long been an issue of interest for Post-Keynesians but it has been treated as exogenously determined. Palley (2005) emphasizes the significance of the division of managerial pay for AD. Lavoie (2009) also examines the issue of managerial pay, but his focus is the cyclical behavior of the mark-up given target return pricing and fixed managerial costs. The current paper endogenizes the division of the wage bill and focuses on the AD implications of wage bill division.

[5] Goodwin's (1967) model is a cyclical model, whereas the current model is not. Additionally, Goodwin emphasizes profit share conflict and full employment profit-squeeze drives cyclical growth. That mechanism can be included in the current model by making the profit share a function of the employment rate. However, for purposes of simplicity it is excluded in the current paper.

between middle managers and workers (Palley, 2013a), thereby impacting AD. This impact on AD provides a point of entry for labor market conflict and bargaining power into the neo-Kaleckian model, thereby adding traditional Goodwin (1967) – Marx class conflict over income distribution centered on the labor market. However, though the division of the wage bill involves traditional labor market conflict, the functional distribution of income remains determined by firms' monopoly power in accordance with standard neo-Kaleckian theory.
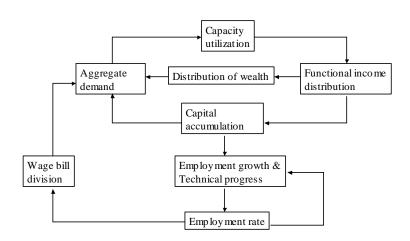
Figure 2. Structure of the model.

3. The model

The model economy consists of six segments describing the production side; the determination of prices and the functional distribution of income; the division of the wage bill; the goods market and the determination of AD; the labor market and the determination of the employment rate; and the determination of the distribution of wealth.

Segment one is the production side of the economy which is described as follows:

(1) $Y = h\,Min[\kappa K,\ A\lambda N,\ A\lambda M/\alpha,\ A\lambda T/\alpha\gamma\ ]$ $0 < h < h^{\,Max}$

(2) $M = \alpha N$ $\alpha > 0$

(3) $T = \gamma M$ $\gamma > 0$

(4) $g_Y = g_K$

(5) $g_K = g_N + g_a$

(6) $g_a = a(g_K, h, e, \chi)$ $a_{gK} > 0,\ a_h > 0,\ a_e > 0,\ a_\chi > 0$

(7) $g_N = g_M = g_T$

Y = output, h = hours worked by workers, K = capital stock, N = employed workers, M = middle managers, T = top managers, A = state of technology, κ = productivity of capital (output-capital ratio), λ = worker productivity (output-worker ratio), γ = manger-worker ratio, g_Y = output growth, g_K = rate of capital accumulation, g_N = worker employment growth, g_a = rate of labor saving technical progress, e = employment rate, χ = exogenous shift factor affecting technical progress, and g_M = managerial employment growth.

Equation (1) is the production function in which output depends on hours of utilization and inputs are capital, workers (measured in effective units), and managers. Equation (2) determines the middle manager-worker ratio. Equation (3) determines the top manager - middle manager ratio. Note production is done by workers who supply hours. Managers are a necessary overhead and are employed in fixed proportions. Equation (4) determines the rate of growth of output which is equal to the rate of capital accumulation. Equation (5) has the rate of capital accumulation equal to the rate of worker employment growth plus the rate of technical progress. Technical progress is labor augmenting as only this is consistent with steady-state balanced growth (Uzawa,

1961). Equation (6) determines the rate of technical progress via an augmented Kaldor-Verdoorn technical progress function. Technical progress is a positive function of the rate of accumulation, hours (i.e. capacity utilization), the employment rate, and an exogenous shift factor.[6] Lastly, equation (7) determines the relationship between growth of worker, middle manager, and top manager employment.

The production structure is the same as Palley (2012b) subject to the addition of two types of managerial employment. In addition to the distinction between production and supervisory labor (i.e. workers and managers), an important feature of the production structure is that capacity utilization is modeled in terms of hours per employed worker. Firms can therefore increase output by increasing hours while holding employment constant. The capital stock is always in use but hours of utilization vary, with variation of hours serving as a form of analogue inventory enabling firms to meet changes in demand. This contrasts with the conventional treatment in which low capacity utilization is implicitly identified with having idle capital on hand for use by additional workers.

The analytic significance of introducing hours as the metric of capacity utilization is that it cuts the link between capacity utilization and employment, enabling output to vary while treating employment as a state variable. That in turn means the economy can have the same rate of capacity utilization for different unemployment rates, reflecting the fact that capacity utilization concerns excess supply within firms whereas the unemployment rate concerns excess supply within the labor market. This separation

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[6] A positive effect of h on a is included for maximum generality. If tighter labor market conditions (e) increase productivity growth, increased hours of utilization (h) might be expected to have similar directional effects.

contrasts with the conventional model in which output can only increase if employment increases with output.[7]

The operation of the economy is as follows. Firms produce to meet demand, which is accomplished by variation of hours worked. From a modeling perspective, output and hours are jump variables determined by short run forces. Employment, the capital stock, and the state of technology are state variables that evolve slowly.

The second segment of the model concerns pricing and determination of the functional distribution of income. This is done in accordance with Kaleckian mark-up pricing theory based on the following relations:

(8) $p = [1 + m]W/A\lambda N$

(9) $m = m(\psi)$ $\qquad\qquad$ $m_\psi > 0$

(10) $\sigma_\omega = 1/[1 + m] = \omega(m)$ $\qquad$ $\omega_m < 0$

(11) $\sigma_\pi = m/[1 + m] = v(m)$ $\qquad$ $v_m > 0$

(12) $\sigma_\omega + \sigma_\pi = 1$

(13) $W_T = \mu\sigma_\pi$ $\qquad\qquad$ $0 < \mu < 1$

(14) $\pi = [1 - \mu]\sigma_\pi h\kappa$

p = price level, m = mark-up, W = nominal wage bill, ψ = firms' monopoly power, σ_ω = wage share, σ_π = profit share, W_T = wage compensation paid to top managers as a share of profits, π = profit rate after payments to top managers.

Equation (8) is the mark-up pricing formula whereby firms set price as a mark-up over average total unit labor costs. Those costs include worker and middle manager pay but not top management pay. Equation (9) determines firms' mark-up which is a positive

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[7] As noted in Palley (2012b, footnote 6), effort variation can perform a role similar to variation of hours in separating output from employment.

function of firms' exogenously given market power Equations (10) and (11) determine the wage and profit shares as a function of the mark-up, while equation (12) is an accounting identity requiring the wage and profit shares sum to unity. Equation (13) determines top managers' salaries as a share of profits. This is in accordance with Kalecki's (1970) treatment that specified top management pay as a deduction from surplus. It contrasts with the treatment of middle managers pay (see below) which is treated as a cost of production and included in the cost structure that enters into firms' mark-up pricing rule. Equation (14) defines the profit rate which is reduced by the proportion of profits paid over to top management as remuneration.[8]

The third segment of the model concerns the division of the wage bill between workers and middle managers which is as follows:

(15) $W = W_W + W_M$

(16) $W_W = w_W h N_W$

(17) $W_M = w_M M$

(18) $W_W/[W_W + W_M] = \theta$

(19) $W_M/[W_W + W_M] = 1 - \theta$

(20) $\theta = \theta(e, h, x)$ $0 < \theta(e, h, x) < 1, \theta_e > 0, \theta_h > 0, \theta_x > 0$

W_W = worker nominal wage bill, W_M = middle manager nominal wage bill, w_W = worker hourly nominal wage, w_M = manager salary, θ = worker share of the wage bill, e = employment rate, x = exogenous institutional variable impacting worker bargaining power.

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[8] Mohun (2006) treats top manager salaries as part of the profit share rather than the wage share and provides both a conceptual justification for this treatment and empirical data on its implications for calculations of the profit share.

Equation (15) defines the total nominal wage bill which is split between payments to workers and middle managers. Equation (16) defines payments to workers, while equation (17) defines wage payments to middle managers. Workers are paid an hourly wage whereas middle managers are paid a salary. Equation (18) defines the worker share of the wage bill, while equation (19) defines middle managers' share of the wage bill. Equation (20) determines workers' share of the wage bill. This share is positively related to employment rate (e), hours (h), and an institutional variable (x) affecting worker labor market bargaining power.[9] The bargaining power variable is a catch-all that reflects features such as unionization, minimum wages, employee protections, and social insurance arrangements. It also reflects political characteristics such as the degree of class consciousness and worker solidarity.

Equation (20) is a wage share curve and it has a relation to the wage curve analysis of Blanchflower and Oswald (1990, 1994) who argue real wages are a negative function of the unemployment rate (i.e. are a positive function of the employment rate). The current model is a growth model so that wage bill division is cast in terms of a wage share curve, reflecting the fact that the absolute level of wages rises with productivity growth.

An important feature of the model is that equations (11) and (20) clearly distinguish between firms' goods market monopoly power and worker bargaining power. Equation (11) determines the wage share of income in accordance with Kaleckian mark-up pricing theory of income distribution. Goods market monopoly power is therefore the

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[9] Again, the positive effect of h on θ is included for maximum generality. If tighter labor market conditions (*e*) increase workers' share of the wage bill, increased hours of utilization (*h*) might be expected to have similar directional effects.

determinant of the functional distribution of income. Equation (20) determines the division of the wage bill between workers and middle managers, with workers' share being a positive function of the employment rate, hours, and their labor market bargaining power.

The fourth segment of the model goods market is described as follows:

(21) $Y = D$

(22) $I/K = S/K$

(23) $I/K = g_k = i(\pi, h)$ $\qquad$ $i_\pi > 0, i_h > 0$

(24) $S/K = S_M/K + S_T/K$

(25) $S_M/K = s_M = [1 - \beta_M]\{[1 - \theta]\sigma_\omega + z_M[1 - \mu]\sigma_\pi\}Y/K$

(26) $S_T/K = s_T = [1 - \beta_T]\{\mu\sigma_\pi + z_T[1 - \mu]\sigma_\pi\}Y/K$ $\qquad$ $0 < \beta_T < \beta_M < 1$

$\qquad = T(h, \sigma_\pi, \mu, \beta_T, z_T, \kappa)$ $\qquad$ $T_h > 0, T_{\sigma\pi} > 0, T_{\beta T} < 0, T_\mu > 0, T_{zT} > 0, T_\kappa > 0$

(27) $z_M + z_T = 1$

β_M = middle managers' propensity to consume, β_T = top managers' propensity to consume.

Equation (21) is firms' production rule whereby firms produce to demand with variations in demand being accommodated by variations in hours of utilization. Equation (22) is the goods market clearing condition which holds at all times and has the rate of accumulation equal to the saving rate. Equation (23) determines the rate of accumulation which is a positive function of the profit rate and hours of utilization. Equation (24) is the definition of aggregate saving which is made up of saving by middle and top managers. Workers are assumed to consume all of their wage income and have a zero propensity to save. Two important implications follow from this assumption. First, redistributions of

income from either middle or top managers to workers increases consumption since workers have a zero propensity to save. Second, ownership of the capital stock is held entirely by middle and top managers.

Equation (25) determines middle managers' saving rate which is a positive function of their wage income and their ownership share of profits after payments to top management. Equation (26) determines top managers' saving rate which is a positive function of their remuneration out of profits and their ownership share of profits attributable to firms. The propensity to save of top managers is assumed to exceed that of middle managers. That means redistributions of income from top to middle managers increases consumption spending. Lastly, equation (27) is the ownership share adding up constraint that has the ownership shares of middle and top managers sum to unity.

The fifth segment of the model is the labor market which is described by the following two equations:

(28) $e = N/L$

(29) $g_e = g_N - g_L$

L = labor force, g_e = rate of change of the employment rate, g_L = labor force growth rate. Equation (28) defines the employment rate, while equation (29) determines the rate of change of the employment rate. The employment rate is a state variable and its evolution is driven by the growth of employment and labor supply. In steady state the employment rate must be constant so that $g_N = g_L$. Absent satisfaction of this condition, over time there would be exploding excess demand for or excess supply of labor.

The sixth and final segment of the model concerns the distribution of ownership, which connects to Pasinetti's (1962) famous article. The Pasinetti condition is often

misinterpreted as an IS goods market equilibrium condition, but it is in fact an ownership equilibrium condition (Dutt, 1990; Palley, 2012c). As discussed earlier, the distribution of ownership is critically important for AD as it determines the distribution of profits across households. Ownership shares are a slow evolving state variable. In the current model ownership is restricted to middle managers and top managers as workers have no saving. As shown in Palley (2012c), in a two class model ownership shares will be in equilibrium when either class' share is constant. In an n class ownership economy, ownership shares will be in equilibrium when n-1 class shares are constant.

The evolution of top managers' ownership share is given by

(30) $g_{zT} = Z(s_T - z_T g_k)$ $\qquad\qquad$ $Z' > 0, Z(0) = 0$

Equation (30) states that top managers' ownership share is increasing when their saving exceeds the share of investment that top managers must finance to maintain their ownership share. Since there are two classes, ownership shares are in equilibrium when top managers' share is constant, which implies the following steady-state ownership condition:

(31) $s_T = z_T g_k$

4. Short-run equilibrium

The model has a short-run equilibrium and a long-run steady state equilibrium. The short run equilibrium determines the instantaneous level of output (Y), hours of utilization (h), profit share (σ_π), the profit rate (π), the rate of capital accumulation and growth (g_K), and the saving rate (S/K).

Appropriate substitution enables the short run model to be reduced to two equations given by

(32) $\sigma_\pi = \pi(m(\psi))$

(33) $i([1 - \mu]v(m(\psi))h\kappa, h) = s(h, v(m(\psi)), \mu, \theta(e, h, x), z_T, \beta_T, \beta_M, \kappa)$

    $i(h, \psi, \mu, \kappa) = s(h, e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$

$i_h = i_\pi\pi_h + i_h > 0, \ i_\psi = i_\pi\pi_\psi > 0$

$s_h = s_h + s_\theta\theta_h > 0, \ s_\psi = s_v v_m m_\psi > 0, \ s_e = s_\theta\theta_e < 0, \ s_x = s_\theta\theta_x < 0, \ s_{zT} > 0, \ s_{\beta T} < 0, \ s_{\beta M} < 0$

    The two endogenous variables are σ_π and h. Figure 3 provides a graphical determination of short-run equilibrium outcomes. The PP schedule in the northeast quadrant corresponds to equation (32) and determines the profit share. In the current model the PP schedule is horizontal and independent of hours.[10] The IS schedule represents equation (33) and its slope depends on the type of regime.

    As is well-known, according to neo-Kaleckian theory economies can be wage-led, profit-led, or conflictive (Bhaduri and Marglin, 1990). In a wage-led economy an exogenous increase in the profit share lowers hours (utilization) and growth. Growth falls because the utilization effect dominates any profit share benefit. Conflictive economies are a sub-set of wage-led economies, but now an exogenous increase in the profit share lowers utilization but increases growth. Growth increases because the profit share effect dominates the utilization effect. In a profit-led economy an exogenous increase in the profit share raises both utilization and growth because the utilization and profit share effects work in the same direction. The conditions for a wage-led economy are shown in Table 3.

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[10] Other specifications of the mark-up are possible. The mark-up can be a positive function of utilization (h) reflecting simple factors of demand pressure. Alternatively, it can be a negative function of utilization for reasons of either profit squeeze by insider workers or for strategic price setting reasons (Rotemberg and Saloner, 1986).

Table 3. Conditions describing profit-led, wage-led and
conflictive regimes.

	Capacity utilization	Investment rate
Profit-led	$h_\psi > 0$	$i_\pi \pi_\psi + i_h h_\psi > 0$
Wage-led	$h_\psi < 0$	$i_\pi \pi_\psi + i_h h_\psi < 0$
Conflictive	$h_\psi < 0$	$i_\pi \pi_\psi + i_h h_\psi > 0$

The slope of the IS is given by

$d\sigma_\pi/d\text{h} = [s_h - i_h]/[i_{\sigma\pi} - s_{\sigma\pi}]$

The numerator is positive, reflecting the Keynesian expenditure multiplier condition, but the sign of the denominator is ambiguous. In a wage-led economy the denominator is negative, rendering the IS slope negative. This is because an increase in the profit share lowers AD and has a larger absolute effect on saving than investment. The same holds for a conflictive economy. In a profit-led economy the denominator is positive, making the slope of the IS positive. That is because an increase in the profit share increases AD and increases investment relative to saving.

Figure 3 shows the IS as negatively sloped, reflecting the case of a wage-led economy.[11] Hours and the profit share are determined by the intersection of the IS and PP schedules in the northeast quadrant. That intersection corresponds to a combination of hours and profit share consistent with both goods market equilibrium and firms' mark-up

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[11] As an economy becomes less wage-led the IS steepens and rotates clockwise. A vertical IS corresponds to an economy that is neither wage-led nor profit-led. Given this transition pattern, the IS schedule for profit-led economies is assumed to be steeper than the PP schedule.

pricing behavior. The southwest quadrant shows the rate of capital accumulation as a function of hours, and the rate of capital accumulation determines the growth rate.
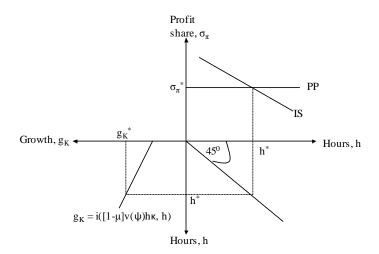
Figure 3. Determination of short run equilibrium in the wage-led case.

Table 4 shows the comparative statics for the response of the short-run endogenous variables (σ_π, h, g_K) to changes in the exogenous variables (ψ, x, μ, β_T, β_M, e, z_T) in different regimes. These comparative statics can be derived by appropriately shifting the growth function and the IS and PP schedules in Figure 2. The effect of an increase in firms' monopoly power is shown in the first column of Table 4 and varies according to whether the economy is wage-led, profit-led, or conflictive. The increase in the profit share shifts the PP function up and shifts the growth function left in the south west quadrant. In wage-led regimes the net effect is to lower hours and growth. In profit-led regimes it raises hours and growth, and in conflictive regimes it lowers hours but increases growth.

Table 4. Signing of short run comparative statics.

		$d\psi$	dx	$d\mu$	$d\beta_T$	$d\beta_M$	de	dz_T
Wage-led	$d\sigma$	+	0	0	0	0	0	0
	dh	-	+	-	+	+	+	-
	dg_K	-	+	-	+	+	+	-
Profit-led	$d\sigma$	+	0	0	0	0	0	0
	dh	+	+	-	+	+	+	-
	dg_K	+	+	-	+	+	+	-
Conflictive	$d\sigma$	+	0	0	0	0	0	0
	dh	-	+	-	+	+	+	-
	dg_K	+	+	-	+	+	+	-

In all regimes increases in the worker bargaining power vis-à-vis middle managers raises hours and growth. It does so by increasing workers' share of the wage bill, which lifts AD and shifts the IS right.

Increases in top manager pay reduce hours and growth in all regimes. The logic is as follows. As a deduction from surplus, increased top manager pay reduces the profit rate, which tends to reduce accumulation and growth. The increase in top manager pay also reduces middle manager income by reducing the latter's ownership income and aggregate saving increases because top managers have a lower MPC than do middle managers. These negative effects on AD shift the IS left. At the same time, the lower profit rate shifts the growth function right.

Increased propensity to consume of middle and top managers raises hours and growth in all regimes. This is because they increase AD, shifting the IS right. Increases in the employment rate raise hours and growth in all regimes. A higher employment rate raises workers share of the wage bill, increasing AD and shifting the IS right. Finally,

increases in top managers' ownership share lowers hours and growth in all regimes. That is because it shifts profit income from middle managers to top managers, reducing AD and shifting the IS left.

The reduced form solutions for the endogenous variables in the profit-led regime are:

(34.a) $h = h(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$ $h_e > 0, h_{zT} < 0, h_\psi > 0, h_\mu < 0, h_x > 0, h_{\beta T} > 0, h_{\beta M} > 0$

(34.b) $g_K = i(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$ $i_e > 0, i_{zT} < 0, i_\psi > 0, i_\mu < 0, i_x > 0, i_{\beta T} > 0, i_{\beta M} > 0$

The solutions for the wage-led regime are

(35.a) $h = h(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$ $h_e > 0, h_{zT} < 0, h_\psi < 0, h_\mu < 0, h_x > 0, h_{\beta T} > 0, h_{\beta M} > 0$

(35.b) $g_K = i(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$ $i_e > 0, i_{zT} < 0, i_\psi < 0, i_\mu < 0, i_x > 0, i_{\beta T} > 0, i_{\beta M} > 0$

The solutions for the conflictive regime are:

(36.a) $h = h(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$ $h_e > 0, h_{zT} < 0, h_\psi < 0, h_\mu < 0, h_x > 0, h_{\beta T} > 0, h_{\beta M} > 0$

(36.b) $g_K = i(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$ $i_e > 0, i_{zT} < 0, i_\psi > 0, i_\mu < 0, i_x > 0, i_{\beta T} > 0, i_{\beta M} > 0$

Finally, as noted in Palley (2005) introducing a wage bill division channel means the economy can simultaneously display both profit-led and wage-led characteristics. Thus, the economy can be profit-led with respect to monopoly power ($d h/d\psi > 0$ and $d g_K/d\psi > 0$), but increases in the worker share of the wage bill due to increased worker bargaining power stimulate economic activity and growth ($d h/d x > 0$ and $d g_K/d x > 0$).

5. Steady state equilibrium and comparative statics

The short run model determines the profit share, hours, and the instantaneous rate of growth. Within the model there are two state variables; the employment rate (e) and top managers' ownership share (z_T). These two variables are driven respectively by equations (29) and (30).

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Substituting the solutions for the short-run endogenous variables this yields two equations of motion given by:

(37) $g_e = g_K - a(g_K, h, e, \chi) - g_L$ $\qquad\qquad\qquad$ $a_{gK} > 0,\ a_h > 0,\ a_e > 0,\ a_\chi > 0$

$= i(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa) - a(i(e, z_T, \psi, \mu, x, \beta_T,\beta_M,\kappa), h(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa),e,\chi) - g_L$
$\quad + \ - \qquad\ + + \ - \qquad\ + \ + \ - \qquad\ + +$

$= i(e, z_T,..) - a(i(e, z_T,\ldots), h(e, z_T,\ldots),e,\chi) - g_L$

$= G(e, z_T, ..)$

(38) $g_{zT} = Z(s_T - z_T g_k)$
$\qquad\quad + + \ + \qquad\qquad\qquad\quad\ + \ -$
$\qquad\quad = Z(s(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa) - z_T i(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa))$

$\qquad\quad = Z(e, z_T,\ldots)$

Equations (37) and (38) constitute a system of simultaneous differential equations in e and z_T. Linearizing around the steady state equilibrium of e^* and $z_T{}^*$ yields

$\qquad\qquad\quad ?/+ \qquad ?/\ -$
(39.a) $g_e \quad = |G_e \qquad G_{zT}|\,|\,e - e^*\,|$
$\qquad\qquad\quad + \qquad\qquad -$
(39.b) $g_{zT} = |Z_e \qquad Z_{zT}|\,|z_T - z_T{}^*|$
$\qquad\quad ?/+ \ + \quad + + \quad + \qquad\qquad\quad ?/+ \ - \qquad + \ -$
$G_e = [1 - a_i]i_e - a_h h_e - a_e \underset{<}{>} 0, \quad G_{zT} = [1 - a_i]i_{zT} - a_h h_{zT} \underset{<}{>} 0$

$Z_e = Z'[s_e - z_T i_e] > 0, \quad Z_{zT} = Z'[s_{zT} - i - z_T i_{zT}] < 0$

Z_e is positive reflecting the Keynesian multiplier stability condition whereby an increase in income, due to increased employment, generates a larger increase in saving than investment. Z_{zT} is negative because an increase in capitalists' ownership share increases their obligation to invest to maintain their ownership share by more than it increases their saving. That stops capitalists saving their way to total ownership of the capital stock.

G_e is ambiguous. It is positive if the induced innovation effects of investment (a_i), hours (a_h) and employment (a_e) are zero. G_e will tend to be positive if these effects are

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weak, but it may be negative if they are strong. G_{zT} is also ambiguous. It too will be positive if induced innovation effects are zero but may be negative if they are strong.[12]

Phase plane analysis can help understand the model. Setting equations (37) and (38) equal to zero, differentiating totally with respect to e and z_T, and rearranging gives the slopes of the equilibrium isoclines:

$$dz_T/de|_{ee} = - G_e/G_{zT} = -\{[1 - a_i]i_e - a_h h_e - a_e\}/\{\{i_{zT}[1 - a_i] - a_h h_{zT}\}= ?$$

$$dz_T/de|_{zz} = - Z_e/Z_{zT} = - [s_e - z_T i_e]/[s_{zT} - i - z_T i_{zT}] = -/- > 0$$

The zz isocline tracks combinations of the employment rate (e) and capitalists' ownership shares (z_T) along which ownership shares are constant. It is positively sloped. As the employment rate increases, middle managers' share of the wage bill and total saving falls, increasing capitalists' ownership share.

The ee isocline tracks combinations of the employment rate and capitalists' ownership shares along which the employment rate is constant. Its slope is ambiguous. There are three cases to consider. First, if induced innovation effects are very strong (a_i, a_h and a_e are large) then $G_{zT} > 0$ and $-G_e > 0$ so that the ee isocline is positively sloped. This is the optimistic Post-Keynesian endogenous growth case. Second, if induced innovation effects are small, then $G_{zT} < 0$ and $-G_e < 0$ so that the ee isocline is again positive. This is the pessimistic endogenous growth case. Third, there is the intermediate case where $G_{zT} < 0$ but $-G_e > 0$ because of the additional term $a_e > 0$. In this case the ee isocline will be negatively sloped.[13] Lastly, it should be noted that if $a_h = 0$ and $a_i < 1$, the

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[12] Jones (1999) and Taylor (2004, p.188-189) show that the existence of steady state stability in standard supply-driven growth models requires that the endogenous innovation effect from investment be less than unity so that $1 - a_i > 0$.
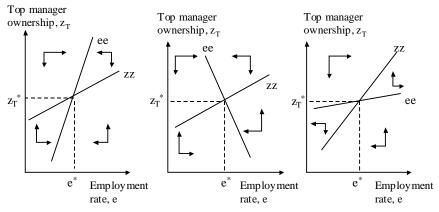
[13] The slope of the ee schedule rotates counter-clockwise as the strength of induced innovation falls.

optimistic case disappears and the model reduces to just the intermediate (stable) case and the pessimistic (unstable) case.

The analysis below explores both the intermediate and optimistic cases. In the "golden age" (1945 – 1970) era after World War II when productivity growth was rapid, the optimistic case may have prevailed. Given the productivity slowdown that began in the 1970s, the economy likely transitioned to the intermediate case. The IT-led revival of productivity growth may now have reversed that.

Figure 4 shows the isoclines for the three cases of intermediate, optimistic, and pessimistic productivity growth. The model economy is unstable with very weak productivity growth (the pessimistic case) because as the employment rate increases the growth of employment increases. However, since there is minimal endogenous productivity growth to increase effective labor supply growth, the economy confronts a growing labor supply shortage as employment growth exceeds labor supply growth.

Figure 4. Determination of steady state employment rate and
capitalist ownership share for the intermediate, optimistic, and
pessimistic cases of endogenous productivity growth.

(a) Optimistic case: stable   (b) Intermediate case: stable   (c) Pessimistic case: unstable

Table 5 presents the comparative static effects for the intermediate case. An increase in firms' monopoly power (ψ) increases top manager saving, shifting the zz up. If the economy is wage-led the ee shifts left so that e^* falls while the change in z_T^* is formally ambiguous. If the shift of the ee dominates, top managers' ownership share falls. That is because middle managers receive a double benefit from the increased profit share and from an increased share of the wage bill due to lower e, which increases their share of total saving. If the economy is profit-led the ee shifts right. Now, z_T^* increases unambiguously and the change in e^* is ambiguous.

Table 5. Comparative statics for the intermediate case.

	$d\psi$ wage-led	$d\psi$ profit-led	$d\mathbf{x}$	$d\mu$	$d\beta_T$	$d\beta_M$	$d\chi_M$
$d\mathbf{e}^*$	-	?/+	?/+	-	+	?/+	-
$d\mathbf{z_T}^*$	?/+	+	+	?/-	?/+	+	-

An increase in worker bargaining power (x) lowers middle managers' wage share and increases AD. This increases top managers' share of saving and shifts the zz up. It also raises AD and investment, which shifts the ee right. z_T^* therefore increases but the direction of change of e^* is ambiguous.

An increase in top manager pay (μ) shifts the zz up and the ee left so that e^* falls but the change in z_T^* is ambiguous. Once again, if the shift of the ee dominates, top managers' ownership share can fall. This apparent paradox is because the fall in the

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employment rate increases middle managers' share of the wage bill, which may increase their share of total saving.

An increase in top managers' propensity to consume (β_T) shifts the zz down and the ee right so that e^* rises but the change in z_T^* is ambiguous. If the shift of the ee dominates top managers' ownership share increases. Again, the reason is a higher employment rate lowers middle managers' share of the wage bill, decreasing their share of total saving and wealth.

An increase in middle managers' propensity to consume (β_M) shifts the zz up because it reduces relative saving of middle managers and it shifts the ee right. z_T^* rises but the change in e^* is ambiguous. e^* increases if the shift of the ee dominates.

Lastly, an exogenous increase in productivity growth (χ) shifts the ee isocline left, causing a fall in both e^* and z_T^*. The increase in effective labor supply growth decreases the employment rate. That causes an increase in middle managers' share of the wage bill, which increases their share of total saving and wealth, thereby reducing capitalists' ownership share.

The ambiguous outcomes in Table 5 are accompanied by signings that assume the shift of the ee dominates the shift of the zz. If the shift of the ee dominates the change in the employment rate is the same as that predicted by the conventional neo-Kaleckian model. The reason for the ambiguity in the current model is wealth distribution effects. Increases in the employment rate increase workers' share of the wage bill. However, that generates an offsetting effect by reducing middle managers' share of the wage bill, which reduces their ownership share and increases top managers' share of profits. This opposing wealth redistribution effect is absent in the conventional neo-Kaleckian model which

assumes capitalists own everything, and it shows the importance of accounting for wealth distribution. Lastly, the macroeconomic effect of changes in ownership will depend on the size of the profit share. When the profit share is high (as it is now), the distribution of ownership becomes more significant as changes in ownership distribution have larger effects on AD.

Table 6 shows the comparative statics outcomes for the optimistic case. An increase in firms' monopoly power (ψ) increases the profit share and top manager saving, shifting the zz locus up. If the economy is wage-led the ee locus shifts left. The effect on both z_T^* and e^* is ambiguous and depends on whether the shift of the ee or zz is dominant. The ambiguity with regard to e^* is due to the strong induced innovation effect in the optimistic case. The higher profit share lowers the employment rate because the economy is wage-led, which reduces induced innovation and effective labor supply growth. That may ultimately generate a tighter labor market after wealth ownership has adjusted. If the economy is profit-led the ee locus shifts right instead of left and both z_T^* and e^* increase.

Table 6. Comparative statics for the optimistic case.

	$d\psi$ wage-led	$d\psi$ profit-led	dx	$d\mu$	$d\beta_T$	$d\beta_M$	$d\chi_M$
de^*	?/-	+	+	?/-	?/+	+	-
dz_T^*	+/?	+	+	+/?	-/?	+	-

An increase in worker bargaining power (x) lowers middle managers' wage share, which increases top managers' relative saving and shifts the zz up. It also raises AD and investment, which shifts the ee right. z_T^* and e^* both increase unambiguously.

An increase in top manager pay (μ) shifts the zz up. It also shifts the ee left because a lower profit rate lowers capital accumulation, as well as redistributing profit income from middle managers to capitalists who have a higher propensity to save. Once again the effect on both capitalists' ownership share (z_T^*) and the employment rate (e^*) is ambiguous, and the ambiguity is again due to the strong induced innovation effect. The lower profit rate lowers accumulation which lowers the employment rate, reducing induced innovation and effective labor supply growth which may ultimately generate a tighter labor market after wealth ownership has adjusted.

An increase in top managers' propensity to consume (β_T) shifts the zz down and the ee right so that the effect on both z_T^* and e^* is ambiguous. An increase in middle managers' propensity to consume (β_M) shifts the ee right. The zz shifts up as the induced increase in income from less middle class saving raises capitalist saving by more than their share of investment. Thus, z_T^* and e^* both increase.

Lastly, an exogenous increase in productivity growth (χ) shifts the ee isocline left, causing a fall in both e^* and z_T^*. The logic of these outcomes is the same as in the intermediate case. Increased effective labor supply growth decreases the employment rate, increasing in middle managers' share of the wage bill and total saving, thereby reducing capitalists' ownership share.

Table 6 shows that the comparative statics for the employment rate in the optimistic case, and they are the same as the conventional neo-Kaleckian model if the

shift of the ee locus dominates. In the optimistic endogenous productivity case there are two sources of ambiguity compared to the standard neo-Kaleckian model. The first concerns wealth redistribution. Induced increases in the employment rate reduce middle managers' wage share, which reduces their share of saving and wealth, thereby redistributing profit income to top managers. The second concerns the strong endogenous productivity effect. Induced increases in the employment rate generate a strong productivity growth effect that increases effective labor supply growth which impacts the employment rate. These wealth redistribution and productivity growth effects interact to generate ambiguous outcomes. Both are important and they complicate analysis of steady-state employment rate determination in the neo-Kaleckian model in ways that are counter to simple Keynesian intuitions.

Steady-state growth is determined by the rate of capital accumulation as follows:

(40) $g_Y = g_K = i(e, z_T, \psi, \mu, x, \beta_T, \beta_M, \kappa)$

The comparative static signings for the intermediate case in Table 5 can then be used to identify the effect of changes in exogenous variables on steady-state growth. These effects are shown in Table 7. Increased firm monopoly power tends to lower growth in the wage-led economies and raise it in profit-led economies. Increased worker bargaining power regarding wage bill division tends to raise growth. Increased top manager pay lowers growth. Increased top manager propensity to consume raises growth, while increased middle manager propensity to consume tends to also raise growth. A exogenous shock to productivity growth has an ambiguous effect on growth. On one hand, it lowers the employment rate which is bad for growth: on the other, it lowers capitalists' ownership share and share of profit income which is good for growth. A

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similar exercise can be done for the comparative static effects on steady-state growth in the optimistic case.

Table 7. Comparative statics for steady state growth in the intermediate case.

$di/d\psi =$ (wage-led)	$i_e e_\psi = +-$	$i_{zT} z_{T\psi} = -+$	$i_\psi = -$	$\Sigma = -$
$di/d\psi =$ (profit-led)	$i_e e_\psi = ++$	$i_{zT} z_{T\psi} = -+$	$i_\psi = +$	$\Sigma = +/?$
$di/dx =$	$i_e e_x = ++$	$i_{zT} z_{Tx} = -+$	$i_x = +$	$\Sigma = +/?$
$di/d\mu =$	$i_e e_\mu = +-$	$i_{zT} z_{T\mu} = -+$	$i_\mu = -$	$\Sigma = -$
$di/d\beta_T =$	$i_e e_{\beta T} = ++$	$i_{zT} z_{T\beta T} = --$	$i_{\beta T} = +$	$\Sigma = +$
$di/d\beta_M =$	$i_e e_{\beta M} = ++$	$i_{zT} z_{T\beta M} = -+$	$i_{\beta M} = +$	$\Sigma = +/?$
$di/d\chi_M =$	$i_e e_\chi = +-$	$i_{zT} z_{T\chi} = --$	$i_\chi = 0$	$\Sigma = ?$

The main theoretical take-away from Table 7 is accounting for the endogeneity of wealth distribution complicates the analysis relative to the conventional neo-Kaleckian analysis in which it is assumed capitalists own all the wealth. Theoretically, it can lead to non-standard growth outcomes because the second column of partial derivatives in Table 7 has opposing signs to the first and third columns. This possibility for non-standard effects is because changes in wealth distribution impact the division of profits across capitalist and middle class households, which impacts AD and the rate of accumulation. Historically, these wealth distribution effects have been overlooked.

6. Personal income distribution and the endogeneity of wage- and profit-led regimes

As discussed in section 4, a key feature of the neo-Kaleckian model is the distinction between wage-led and profit-led growth. Introducing wage bill division changes the picture substantially. First, it provides a means of introducing the effects of

personal income distribution into the analysis. Second, it makes the wage- or profit-led

character of the economy endogenous.

Palley (2005) shows that redistributing the wage bill from managers to workers result in positive wage-led growth effects. Carvahlo and Rezai (2013) show that reductions in the inequality of personal income distribution can shift the economy from a profit-led regime to a wage-led regime. This same effect is present in models with wage bill division as the division of the wage bill determines the personal distribution of income. The effect arises because increases in the worker share of the wage bill (θ) increase the equality of personal income distribution and they also increases the average propensity to consume out of wage income. Thus, the weighted average propensity to consume out of wages is given by[14]

(41) $\beta = \theta/[1 + \alpha] + \alpha[1 - \theta]\beta_M/[1 + \alpha]$

β = weighted average propensity to consume out of wages, α = middle manager – worker ratio. Differentiating with respect to θ yields $d\beta/d\theta = [1 - \alpha\beta_M]/[1 +\alpha] > 0$. An increase in the worker share of the wage bill, which is analogous to increased equality of personal income distribution, can therefore transform the economy from a profit-led to a wage-led regime because it increases the response of consumption to an increase in the wage share.

A second feature of equation (41) is that the average propensity to consume out of wages depends on the production structure. An increase in the proportion of middle managers relative to workers lowers the average propensity to consume out of wages since $d\beta/d\alpha < 0$. If the wage share is unchanged, an increase in the relative size of the middle class relative to the working class can shift the economy from being wage-led to

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[14] The weights to the average propensity to consume are obtained as follows. Total employment (E) of workers and managers is given by $E = N + M$. The number of middle managers is given by $M = \alpha N$. Algebraic manipulation then yields $N/E = 1/[1 + \alpha]$ and $M/E = \alpha/[1 + \alpha]$.

profit-led. The logic is that it shifts the fixed wage bill toward middle managers who have a lower propensity consume. This shows how the supply-side affects the demand-side. It also shows how an expansion of the middle class can be contractionary.

A third feature of the model is the economy can shift endogenously from being profit-led to being wage led and vice-versa. That is because the division of the wage bill is endogenous. Thus, substituting for θ in equation (.) yields

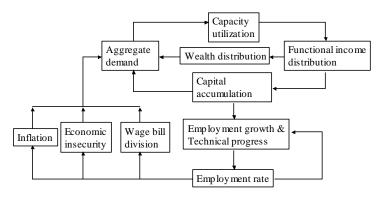(42) $\beta = \theta(e)/[1 + \alpha] + \alpha[1 – \theta(e)]\beta_M/[1 + \alpha]$

Differentiating with respect to e yields $d\beta/de = \theta_e[1 - \alpha\beta_M]/[1 + \alpha] > 0$. Increases in the employment rate (e) increase workers' share of the wage bill, which increases the weighted average propensity to consume out of wages and may shift the shift the economy from a wage-led to a profit-led regime.[15] This endogenous regime shift effect is in addition to endogenous regime shift effects that may arise because of non-linearity in investment and saving behavior (Palley, 1913b).

7. Theoretical extensions

Before concluding with an analysis of the political economy of the model, it is worth noting some extensions of the model that can be easily incorporated. As noted at the beginning, this paper is a refinement of the two class model with managerial pay presented in Palley (2013a). The model in that paper also included additional channels allowing the employment rate to affect AD via its impact on inflation and via household sentiments about economic security. Those same channels can be incorporated in the current model as shown in Figure 5 which is an augmented version of Figure 2.

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[15] A similar endogenous regime shift effect can be generated in the simpler standard neo-Kaleckian model by making the distribution of the wage bill a function of the rate of capacity utilization.

Figure 5. Extending the model to incorporate inflation and
economic insecurity channels.

8. Political economy and conclusions

The above model provides a rich, coherent, and plausible description of capitalist economies with three classes. The model yields important economic insights. It also yields fresh political economy insights which are the subject of this concluding section.

The top manager class has an economic interest in increasing both the profit share (σ_π) and the share of profits paid top manager pay (μ). From a macroeconomic perspective, top managers are parasitic as their pay reduces business profitability, thereby reducing capital accumulation and growth. However, top managers may have a microeconomic control function, acting as a magnet for the aspirations of middle managers (i.e. the middle class) who would like to join them. Those aspirations can serve to get the middle class to politically align itself with the top manager class.

The middle class occupies a position that is politically the most interesting, and it can be drawn into political alliances with either the top manager class or workers. The middle class benefits from a higher profit share via its ownership of capital, which places it in alliance with top managers. However, the middle class bears part of the cost of top

manager pay which reduces the profit income it receives, and that places it in opposition to the top manager class.

The middle class has a common interest with workers in that it benefits from an increased wage share (σ_ω) which increases the amount for wage bill division. However, it is in conflict with workers over the division of the wage bill (θ). A critical issue is whether the middle class sees the wage bill share or profit share as more important for its prosperity. If it sees the wage bill share as more important it will be more likely to ally politically with workers: if it sees the profit share as more important it will be more likely to ally politically with capitalist-top managers.

Workers are opposed to top managers because they suffer from both an increase in the profit share and an increase in the share of profits paid to managers. The former directly harms workers by reducing the wage share, while the latter indirectly harms workers by reducing employment and growth. The one exception is if the economy is profit-led in which a higher profit share may indirectly benefit workers by generating a higher employment rate and growth. However, that same outcome can be achieved by reducing the share of profits paid to top managers, a policy that benefits workers at no cost to them in the form of a reduced wage share.

Workers are aligned with the middle manager class in the desire for a higher wage share, but are in conflict with the middle class over the division of the wage bill.

Today's political discourse presents the middle class as heroic. However, viewed through a three class economic model that is not necessarily the case. There are several reasons to believe the middle manager class will tend to ally with the top manager class. First, there is the issue of aspirations, with middle managers aspiring to join the top

manager class. Second, there are two power variables in the model: monopoly power which increases the profit share, and worker bargaining power that increases workers' share of the wage bill. In the real world, it seems likely that institutions and policies that increase firms' monopoly power also decrease worker bargaining power. Consequently, this tends to give reason for the middle class reason to ally politically with the top manager class. That would seem to be the lesson of the thirty year attack on unions and corporate globalization. The middle class will only defect from this political alliance with the top manager class when the squeeze on the wage bill becomes so severe that it outweighs middle class gains from an increased share of the wage bill and increased profit income.

The working class may also choose to ally politically with the top manager class. However, in the current model that can only happen because of aspirational false consciousness whereby individual workers see themselves as becoming part of the top manager class. Such worker false consciousness is either a form of "Lake Wobegon" effect whereby everybody views themselves as above average and therefore likely to make the class leap, or a form of lottery purchase behavior where making the class leap is like winning the lottery.

That suggests two extensions of the model. One extension is to introduce a second class of workers analogous to a distinction between skilled and unskilled labor.[16] At the macroeconomic level there is little change because skilled and unskilled workers have no saving so that there are no AD effects from wage redistributions between skilled and unskilled workers. However, at the microeconomic and political level there can be

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[16] Divisions related to race and gender can play the same role as a skilled versus unskilled division.

significant effects. Suppose skilled wages are an institutionally determined multiple of unskilled wages given by:

(39) $w_S = \varphi(p)w_U \quad \varphi > 1, \varphi_p > 0$

w_S = skilled wage, w_U = unskilled wage, p = policy variable. If the skilled wage multiple is a positive function of the same institutional arrangements and policies as those increasing the profit share and middle managers' wage share, skilled workers may defect from an alliance with unskilled workers and seek an alliance with middle and top managers.

A second extension is to give workers a small claim on capital. Giving workers an ownership share enormously complicates the model by introducing a third class of owners. Rather than going that route, suppose workers are given a small share of profits after top manager pay as follows:

(40) $v = \varphi[1 - \mu]\sigma_\pi \qquad 0 < \varphi < 1$

v = payment to workers out of profits. In this case, workers may identify with politics and policies that increase the profit share at the expense of the wage share. This type of policy corresponds to 401(k) capitalism pushed by Democrats and Republicans over the past thirty years which has directed worker pension funds away from traditional defined benefit plans into individual retirement accounts. Such accounts do not make capitalists of workers but they may contribute to creating a false economic consciousness that has workers support policies and politics that are against their real economic interest.[17]

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[17] Lima (2012) explores the implications of profit-sharing in the neo-Kaleckian growth model. He reports that increases in the profit sharing coefficient increase capacity utilization by increasing worker remuneration and aggregate effective demand. The result will reverse if the increase in the worker profit share comes at the expense of the wage payment, lowering total worker remuneration.

In sum, a three class neo-Kaleckian growth model provides a rich framework for analyzing the economics and political economy of contemporary capitalism. Focusing on purely economic characteristics, the model represents the middle class as much smaller than standard political conversation. That is because the middle class is identified with middle management and having an ownership share of the capital stock. Given that narrower definition, the middle class can be a political force for increased income inequality and slower growth.

Current liberal discourse praising the middle class and claiming "we are all middle class" obscures the reality of the political economy of the middle class. There are good reasons to believe the middle class is not a force for more egalitarian outcomes and faster growth. The "we are all middle class" claim promotes false consciousness among the working class and enables the capitalist class to misrepresent itself as middle class. These features have a political function and consequence. The false identity of workers likely encourages them to support policies counter to their interest, while the misrepresentation of the upper class helps sustain worker false consciousness and defuse class conflict. Developing a new political dialogue that reflects better the reality of class economic interests is a critical political challenge. Distinguishing between upper, middle, and working class within economic analysis is a critical necessary step. The current model provides a frame for doing so.

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