Capitalists, Workers, and Managers: Wage Inequality and Effective Demand

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Abstract

We present a simple three-class model in the Kaleckian tradition to investigate the implications of a dominant managerial class for the dynamics of demand and distribution. Managers play a peculiar role in the economy, both because of their supervisory function—which results in surplus extraction and wage inequality—and because of their saving behavior. The adjustment of capacity utilization to accommodate goods market disequilibrium produces two distinct regimes with respect to the responsiveness of investment demand to profitability: a low investment–response regime, where effective demand appears to be both wage–led and inequality–led; and a high investment–response regime, where demand looks profit–led. In accordance with recent empirical evidence for the US, we introduce distributional dynamics that hinge on inequality squeezing workers’ wage growth. We find that the low investment–responsiveness regime produces a stable demand–distribution equilibrium only if the wage squeeze effect is relatively small. On the other hand, the equilibrium in the high investment–response regime is saddle–path stable. The main distributional implication of the wage squeeze and inequality is that the effect of redistribution toward workers in both the low-investment response regime and and the high investment response regime leads to declining inequality and capacity utilization. Hence, in both regimes, the inequality–led features of the equilibrium dominate the wage–led or profit–led nature of effective demand. These findings imply that distributive dynamics lead to a stronger basis for cohesion in the interests of managers and capitalists compared to workers and managers.

Keywords: Effective Demand, Capacity Utilization, Wage Inequality, Stability.

JEL Classification Codes: B5, E12, E22, E25.
1. Introduction

The recent economic trajectory of the US economy has been characterized by an increase in income inequality, and in particular the disproportionate and rising share of the top 1% of income earners (Piketty and Saez, 2003, 2006). Duménil and Lévy (2004a, 2010) trace the roots of this trend to the rise of the managerial, executive class following what they call the “coup of finance” after the Volcker disinflation of 1980-1984. The rise of the managerial class in the past three decades found fertile soil in the so-called neoliberal revolution, characterized by globalization of goods and factor markets and the growing importance of the financial sector in most advanced economies (Duménil and Lévy, 2004a, 2010). Financial and non-financial corporate executives and managers now comprise about two-fifths of the top 1% of the income distribution in the US, together explaining about 60% of the increase in the share of this group (Bakija et al., 2011) in the past two decades. While wages for the average production worker have remained relatively stagnant, compensations at the upper end of the corporate hierarchy have grown: the ratio between average CEO compensation and average worker wage increased from 40:1 in 1980, to nearly 300:1 in 2000, before declining to 240:1 in 2008 (EPI, 2011). As a result, the share of wage earnings by the top 1% households has increased from about 40% of the overall labor share in the 1950s and 1960s to around 60% in the 1990s (Piketty and Saez, 2003). The widening gap between compensation paid to managerial executives on the one hand, and production workers on the other, is thus a defining feature of the contemporary US (and UK) economy. These facts suggest that a careful analysis of contemporary Western capitalism should take into account the growing importance of the managerial class as an additional dimension of the conflict over the distribution of income, and address the resulting implications for economic growth.

Economic research falling within non-mainstream traditions has made a great deal of progress in understanding the linkages between income distribution and macroeconomic outcomes. Post-Keynesian (PK) macro-models concerned with effective demand stemming from the work of Kaldor and Kalecki have been conventionally set up in terms of two classes: the capitalist class and the working class, thus dealing with the so-called functional income distribution. This tradition has its roots in the surplus-based approach of Classical–Marxian analyses, and incorporates Keynesian elements through the inclusion of an independent investment function, as well as the role played by capacity utilization in determining macroeconomic adjustments in the goods market. Studying the impact of redistribution on effective demand (a commonly utilized proxy for which is the rate of capacity utilization) allows the characterization of capitalist economies as either wage-led —where redistribution toward wages stimulates demand—or profit-led —where redistribution toward wages dampens effective demand (Bhaduri and Marglin, 1990). The analysis in terms of two classes has also been fruitful in investigating the cyclical dynamics of distributive

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1 Atkinson and Voitchovski (2011) show similar trends occurring in the UK after World War II.
2 An excellent summary of the many issues analyzed in the literature can be found in Setterfield (2010).
3 Bhaduri and Marglin (1990) also look at the effect of redistribution on the growth rate of capital stock, classifying economies as either stagnationist—if redistribution toward wages induces higher accumulation—or exhilarationist—if the opposite is true.
shares and employment growth: although not dealing with effective demand problems, the cyclical growth model of the class struggle by Goodwin (1967) is still a solid foundation of most analyses on growth and distribution that broadly fall within heterodox traditions. With employment being procyclical, similarities can be found between PK models and the Goodwin cyclical growth framework, a recent example being the contribution by Barbosa-Filho and Taylor (2006). However, since the managerial class is subsumed under the broader label ‘labor’, neither the PK literature nor the literature falling within the Goodwin tradition are suited to address changes in the size, or personal distribution of income, and the macroeconomic effect of the additional dimension of distributional conflict generated by growing wage inequality coupled with a growing importance of executive and managerial labor. An exception is a recent paper by de Carvalho and Rezai (2012), in which a role for the size distribution of income is introduced in the Kaleckian model. They look at an overall measure of inequality (the Gini coefficient) as influencing the propensity to save of different percentiles of wage earners, while keeping the traditional two-class distinction that is typical in the literature.

This paper also deals with the size income distribution, in that it focuses on income inequality among wage–earners. Differently from de Carvalho and Rezai (2012), however, we treat managerial labor as a separate class characterized by: (i) a distinct function in the production process —that of disciplining workers and coordinating activities on behalf of the capitalists, and (ii) a different saving behavior relative to both workers and capitalists. We then investigate the impact of the rise of the managerial class for macroeconomic adjustment and its linkages to income distribution.

As a first pass at unraveling the implications of this added dimension of class conflict, the schematic model developed here abstracts from financial flows. Certainly, a more complete understanding of the implications of a three class structure would require addressing the impact of growth of the financial sector and the financial orientation of managerial behavior. Yet, we argue that the present analysis has some interestingly insights to offer into the relation between growing inequality and macroeconomic outcomes. Our focus is on the interplay between wage inequality —defined as the ratio of managerial wages to workers’ wages— and the rate of capacity utilization, in a simple Kaleckian–type model of demand and distribution. On the one hand, adjustments in aggregate demand are affected by wage inequality, because of its effect on both the demand for investment and the supply of savings. Accordingly, the demand side of the economy is represented by a dynamic equation in which changes in utilization depend on wage inequality. On the other hand, effective demand affects the evolution of wage inequality: in his recent book, Galbraith (2012) documents a strong, positive correlation between levels of inequality and unemployment. In Kaleckian models, employment is demand–determined and proxied by the rate of capacity utilization.

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4 de Carvalho and Rezai (2012) document that the propensity to save of different income groups correlates positively with earned income. Our framework, in which workers do not save, managers save a fraction of their income, and capitalists save all of their profits, is consistent with their findings.

5 Galbraith (2012), for instance, shows the remarkable correlation between wage inequality and stock-market price indices, suggesting that stock market trends are an important determinant of the compensation paid to the top managers. The rise of shareholder value ideology also reoriented managerial goals with perverse effects for investment behavior (Lazonick and Sullivan 2000).
Accordingly, the distribution side of the economy is represented by a dynamic equation linking changes in wage inequality to the rate of utilization. In particular, higher rates of capacity utilization signal a tightening of the labor market and thus lead to a slowdown in the pace of growth of inequality.

We are then set to address the dynamic interaction between utilization and inequality. Our first finding is that the stability of the savings and investment process in the adjustment dynamics depends on the extent of wage inequality, the intuition being that inequality has an effect on the average propensity to save in the economy. The second element at work in our framework is the responsiveness of investment demand to changes in profitability. The interaction between inequality and investment–responsiveness identifies two different regimes: (i) a low inequality–low responsiveness regime, in which demand–inequality cycles displaying similarities with those analyzed by Barbosa-Filho and Taylor (2006) arise; and (ii) a high inequality–high responsiveness regime, where the stability of the macroeconomic equilibrium is called into question, locally as well as globally. Further, we investigate the effect of a redistribution toward wages in both regimes. In the low inequality–low responsiveness regime, a redistribution toward wages has a negative effect on equilibrium capacity and inequality, thus determining an inequality–led equilibrium. Conversely, the effect of a redistribution toward wages in the high inequality–high responsiveness regime is related to the saving behavior of the managerial class. If, despite high earnings, the managerial propensity to save is small, inequality–led results will prevail.

The driving force behind these results is the dynamics of inequality, with its underlying political economy implications. As the share of executive and supervisory labor over national income increases, the ability of the managerial class to appropriate larger amounts of productivity growth at the expenses of workers’ wages also appears to be increasing, especially after the passage of the Tax Reform Act (Duménil and Lévy, 2004b). Even though we do not explore the drivers of the distinct trajectories or the process of structural change that lead to the recent trend of a growing divergence between top wages and that of the rest of the working population, we take this empirical evidence as suggesting a positive feedback effect of wage inequality on its own dynamics. Our results on dynamic stability and the ultimate effect of redistribution crucially depend on this feedback effect.

The remainder of the paper goes as follows. Section 2 reports some well-known facts about the rise of income inequality, as well as trends in the ratio of production to supervisory labor in the US. Section 3 outlines the structure of the model. In Section 4, we present a qualitative study of the dynamical system describing the utilization-distribution dynamics, and Section 5 looks at the effect of a redistribution toward workers’ wages in the economy. Section 6 concludes. To avoid cluttering the narrative with too much algebra, the analytical aspects of our basic results are provided in Appendix A.

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As pointed out by Galbraith (2012), part of the sharp rise after 1986 is due to changes in the tax code affecting the way certain kinds of income are reported for tax purposes, which slightly biases the top income shares in the Piketty and Saez (2003, 2006) datasets upwards. Despite this qualification, however, the underlying trend is clearly an upward one.

Even though we do not explicitly consider the opposite case, it is easy to show that a negative feedback effect of inequality onto itself would ensure stability and an increase in utilization following redistribution towards workers.
2. Some Stylized Facts

Recent decades have witnessed a fundamental restructuring in the US private sector, namely the remarkable rise in wage earnings at the upper end of the wage distribution. Figure 1 illustrates the pattern followed by the share of total wages received by the top fifth percentile of the income distribution between 1929 and 2008. The share of top 1% in wage income displayed a downward trend until the end of the 1960s, and then a rising trend thereafter. The upward trend is sharper after 1986, which marked the passage of the Tax Reform Act. Eventually, the share of top 1% income earners more than doubled from around 5.2% in the sixties to around 12% in 2008. Thus, the post war US experience can be quite clearly demarcated into two periods: the period 1929–1969 is marked by a reduction in wage inequality and a declining share of the top 1%. The period 1970–2010, conversely, sees a reversal of this trend. Duménil and Lévy (2004a) observe that high wages were an important instrument in the concentration of income in the hands of the top 1%. Looking at the 95-99 percentiles, it is apparent that this group also experienced a decline in its income share through the war years, although in the post-war decades its income share has displayed an upward trend which persists through the neoliberal period. While the years following 1999 do not witness significant concentration in favor of this group, the historical evolution of income shares suggests that the top 5% still benefitted from the increase in its wages relative to other workers (Duménil and Lévy, 2010).

Our starting observation is that rising wage inequality is a key factor conditioning capitalist macroeconomic dynamics in its recent unfolding, and therefore needs to be incorporated into the analysis of the the interplay between economic growth and income distribution. It has been widely documented in the literature (Kotz 2009; Shaikh 2010; Duménil and Lévy 2011b) that the growth in real wages of non-supervisory production workers has lagged behind growth rate of labor productivity in the past four decades. Figure 2 provides a stylized illustration of the argument. It shows the cumulative impact of the annual growth rate of labor productivity and real hourly earnings of production workers in the non-farm business sector in the period 1970-2010. The growing divergence in the the two trajectories reflects the weakening capacity of workers to seize productivity gains.

The Classical - Marxian literature traditionally distinguishes between productive labor
Figure 2: Cumulated annual growth rate of labor productivity vs annual growth rate of real wages (1970-2010, 1970=100) for non-supervisory labor. Source: Bureau of Labor Statistics.

(that creates wealth and surplus) and unproductive labor (that consumes wealth). Recently, Shaikh (2010), as well as Mohun (2005, 2014), and Paitaridis and Tsoulfidis (2011) have estimated the rising share of unproductive labor in the US economy. Unproductive labor is a broad category, however. For our purposes, more relevant is the ratio of labor engaged in direct production to that of managerial and supervisory labor. In Figure 3, we present trends for the ratio of production workers to non-production workers for three sectors in the US: Manufacturing, Construction and Trade, Transportation and Public Utilities. This ratio is used as a broad proxy for the the ratio of managerial, administrative and supervisory workers to production workers in the absence of a direct measure of ‘supervisory and managerial labor’. The category of non-production workers is calculated as a residual —total workers less production workers (which include working supervisors and non-supervisory labor). In these three sectors, workers other than those directly involved in managing or supervising production workers would be captured by the residual calculated as such. It must be noted that the measure is coarse: for instance, it includes workers involved in activities related to finance, marketing, sales and advertising. Yet, and for illustrative purposes, using this ratio as a proxy for that of workers directly engaged in production to managerial and supervisory workers is a reasonable first approximation. The ratio of production to non-production workers declines until about the 1980s for all three sectors and then stays relatively stable. The decline, which is sharpest in construction, indicates that non-production workers are becoming more numerically significant in these sectors. In general, a rising ratio of non-production workers to actual production workers together with the growing gap in the earnings of the two categories of workers, imply a squeeze in the wage share of production workers (Mohun 2014). We can take this as broadly indicative of the increasingly top-heavy character of these sectors with the rising significance of managerial and supervisory workers.

We are grateful to an anonymous referee for pointing this out. Mohun (2006) also treats non-production workers who are above working supervisor level as engaged in the process of managing the activities of production workers.
Figure 3: Ratio of production workers to non-production workers in Manufacturing, Construction, and Trade and Transportation in the US, 1960-2010. Source: Bureau of Labor Statistics.

Gordon (1996) has argued that such ‘corporate bloat’ and the wage squeeze are related in that a stagnant wage share fosters the rise of a managerial bureaucracy, and that top-heavy bureaucracies dampen production workers’ earnings. Duménil and Lévy (1993) associate the progress of managerialism with an accentuation of the tendency towards greater ‘instability in dimensions’—the increase in volatility affecting levels of macroeconomic aggregates. The analysis that follows provides a simple framework that accounts for potentially unstable macroeconomic outcomes associated with rising income inequality.

3. The Model

3.1. Production and income shares

Consider the following simple closed economy setup. At each moment in time, total output $Y$ is distributed as flow payments to workers, managers and owners of capital assets (capitalists). Denoting workers labor by $L$, managers by $M$, and homogeneous capital by $K$; letting $w_L$ denote the real wage paid to workers, while $w_M$ denotes the real managerial compensation and $r$ the rate of profit on anticipated fixed capital stock, at each moment in time $t$ we have:

$$Y = w_L L + w_M M + rK$$

In this paper, the evolution of the profit share remains in the back of the picture. Regarding empirical studies of the dynamics of the profit share, Ellis and Smith (2007) using economy-wide data for 20 OECD countries for the period 1960-2005, show an upward trend (of around 2%) after the mid-eighties. On the other hand, Harvie (2000) finds profit shares of around 30% on average over the 1951-94 period for 10 OECD countries.

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The model is set in continuous time. The final good $Y$ is produced with fixed proportions of labor, managerial workers, and homogeneous capital. If we denote labor productivity by $a$, the ratio of output to managerial inputs by $b$, and the constant output/capital ratio at full capacity by $\sigma$, and the utilization rate of capital by $u$, the production function can be represented as:

$$ Y = \min \{ aL, bM, \sigma uK \} $$

(2)

From (1) and (2), the share of profits $\pi \equiv rK$ satisfies:

$$ \pi = 1 - \frac{wL}{a} - \frac{wM}{b} $$

(3)

where $\sigma u \pi = r$. The profit share claimed by the owners of capital is in the Classical–Marxian tradition determined as a residual after managers and workers have been paid out of value added.

In order to analyze the role played by a managerial class in a demand–distribution model, we first need to answer the question: “what do managers do”. Managers participate in the basic distributional conflict as a distinct claimant of the value-added in the production process. Capitalist–owners seek to extract as much product ($aL$) from labor ($L$), and delegate the tasks of organizing production and disciplining workers to managerial–supervisory labor. In this respect, the managerial class fulfills certain functions of the capitalist and becomes responsible for extracting productivity gains from workers: managers represent the capitalist in the workplace. Their labor is supervisory in nature, thus distinct from workers’ labor. Managers also play a crucial role in profit maximization and the extraction of productivity gains from workers [Duménil and Lévy 2011a].

A simple way of capturing the supervisory role played by managers in production is to link worker’s productivity $a$ to output per unit of supervisory labor $b$. This is, in a sense, similar to the link between worker’s productivity and the capital/labor ratio. Specifically, we assume that $a = b/\theta$, where $\theta > 1$ denotes the ratio of employed workers ($L$) to employed managers ($M$). While it might appear unnecessarily crude, this assumption keeps the analysis tractable in a fixed–proportion framework while highlighting: (i) the fact that labor productivity is related to supervision (if $b = 0$, then $a = 0$); (ii) the concern with ‘managerial efficiency’ — deployment of fewer managerial inputs per unit of labor — in production ($b = a\theta$, which ensures that the ratio of supervisory to non–supervisory labor is less than one).

Obviously, simple assumptions like these have the potential cost of not doing justice to the complex relationships occurring in the production process. First, it has been argued
that supervisory activities by the managerial class are intrinsically unproductive per se, but they are valuable to capitalists because of their indirect influence on labor productivity (Marglin [1974] Bowles [2004]). Here, instead, output per unit of managerial labor is directly measured by the parameter \( b \). However, the same argument can be applied to capital stock. In the Classical–Marxian tradition capital is not treated as as a ‘productive’ input, even though output per unit of capital stock is, in fact, measurable. Rather, endowing workers with more capital stock allows capitalists to foster labor productivity, which is proportional to the capital/labor ratio, and thus makes capital a required input in production. In similar fashion, linking output per worker to ‘output per manager’ captures in a simple way the fact that managers are, in fact, perceived as indispensable in the production process by the capitalists who employ them, whether or not they are actually productive. Second, and related, one might argue that what matters is not really ‘output per manager’, but rather the ability of managers to extract surplus from workers. The fact that \( b = \theta a \) (so that if \( a = 0, b = 0 \)), however, highlights the fact that workers are also indispensable to the production process, and that managers are, in fact, agents of surplus–extraction. Third, we recognize that deploying more managerial labor in production implies lower profits, everything else equal, since profits are determined as a residual after managerial and workers wages have been paid out. However, we show immediately below that the share of profits increases with ‘managerial efficiency’ \( \theta \).

In fact, the implication of the link between the productivity of the two types of labor inputs for the profit share (3) is:

\[
\pi = 1 - \frac{w_L}{a} \left( 1 + \frac{\eta}{\theta} \right)
\]

(4)

where \( \eta \equiv w_M/w_L \) is the premium paid to managerial inputs over the workers’ wage —our measure of wage inequality. Further, the managerial effectiveness-adjusted wage premium \( \eta/\theta \) makes it clear why managerial labor is useful for capitalists: even though compensation payments to managers reduce profits, the profit share increases (although at a decreasing rate) with managers’ surplus extraction-ability (managerial effectiveness), as it is easily checked by differentiating (4) with respect to \( \theta \). An increase in managerial effectiveness in extracting labor productivity reduces unit costs by reducing managerial wage costs. On the other hand, denoting the share of workers’ wages in output by \( \omega \equiv w_L/a \), we have:

\[
\omega = \frac{1 - \pi}{1 + \frac{b}{\theta}} = \frac{\theta}{\eta + \theta} (1 - \pi)
\]

(5)

An increase in the workers to managers ratio \( \theta \) also has the effect of increasing the share of workers in national income. However, it is not difficult to show that it is always true \( d\pi/d\theta > d\omega/d\theta \), so that an increase in the ability of managers to extract surplus has a stronger effect on the share of profits than on the share of workers’ wages.

Summing up, we argue that the simple link between labor productivity and output per unit of supervisory labor that we propose is a fruitful way of thinking about the relationship between workers and managers in the production process, as well as a useful device to understand that, while costly, the employment of managerial labor makes sense from the standpoint of a capitalist seeking to extract greater surplus from workers.
Managers, however, also have a peculiar function in the distributional conflict as they affect profit share, capital accumulation and aggregate demand. Our focus is on the additional dimension added by the distributional conflict between workers and managers, as reflected in movements in wage inequality. As noted above, managers enforce productivity gains through their supervision and disciplining of workers, and claim a share of the surplus produced by workers as their managerial income. The wage premium is a measure of their ability to claim a larger share of these productivity gains. We turn next to describing the role played by wage inequality in savings and investment.

3.2. Wage inequality, investment, and effective demand

A key feature of Kaleckian frameworks is an independent investment demand $I$, as a function of (a measure of) profitability and utilization. Suppose that $g_i \equiv I/K$ (that is investment demand in units of capital stock), is linearly related to the profit rate and to capacity utilization:

$$g_i = g_0 + \alpha \pi + \beta u$$

so that substituting from (4) we obtain:

$$g_i = g_0 + \sigma\left(\alpha\pi + \lambda\right)u$$

Note that $g_i$, investment demand in units of capital stock, is equivalent to the rate of growth of capital stock if we abstract from depreciation.

Next, we turn to the supply of savings in the economy. In line with the Classical and Kaleckian tradition, we assume that all profits are saved by capitalists, whereas workers do not save. Managers, however, save part of their income. Denote their propensity to save by $s_M$, assumed to take values between zero and one. These behavioral assumptions are consistent with the empirical evidence for the US presented in de Carvalho and Rezai (2012), who documented propensities to save increasing with wage income. Differences in savings behavior of capitalists, managers and workers play a critical role in the adjustment dynamics of the model. In fact, managers perceive wage income like workers, but their savings fund the accumulation process like capitalists: managerial savings and capitalist savings together finance investment and accumulation. Accordingly, the supply of savings

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13Introducing a saving propensity for capitalists would add one parameter to the model without however changing any of its qualitative implications.

14Interestingly enough, Duménil and Lévy (2010) have argued on the contrary that, with managerial income being mostly determined by capital gains, the average propensity to save by managers might very well turn negative. In fact, the savings rate of the top quintile declined from 8.5% of income to a dissaving of 2.1% of income in 2000, even as the bottom quintile increased their savings rate from 3.8 % to 7.1% of income in the same period (Maki and Palumbo, 2001). While we recognize the importance of such considerations, our formulation abstracts from financial dynamics, and therefore we will keep $s_M$ as a non-negative parameter, taking values between zero and one.

15However, since we do not incorporate financial assets in our model, there is no separate stream of investment income flowing to managers. In this sense the treatment of managerial savings is not different from the treatment of workers savings in Kaleckian models that incorporate savings by workers.
in units of capital stock \( g_s \equiv S/K \) obeys:

\[
g_s = \sigma \left\{ 1 - \omega \left[ 1 + \frac{\eta}{\theta}(1 - s_M) \right] \right\} u
\]  

(7)

A saving-investment (goods market) equilibrium occurs when savings are equal to investment demand, \( g_i = g_s \). The normalization of the savings and investment flows by capital stocks allows us to investigate the ratios \( g_i \) and \( g_s \) in a manner that is stock–flow consistent. We postulate in standard fashion that capacity utilization increases (decreases) to accommodate excess demand (supply) in the goods market (see Chapter 5 in Taylor, 2004), so that the change over time in utilization fulfills:

\[
\dot{u} = \chi (g_i - g_s),
\]  

(8)

Thus, we obtain after rearranging:

\[
\dot{u} = \chi \left\{ g_0 - \sigma u \left[ (1 - \alpha)(1 - \omega) - \lambda - \omega \frac{\eta}{\theta} (1 - \alpha - s_M) \right] \right\}
\]  

(9)

and the goods market equilibrium will be stable (self-correcting) if \( \frac{\partial \dot{u}}{\partial u} < 0 \), that is if savings are more responsive than investment to changes in capacity utilization. We need to characterize conditions under which this so-called Keynesian stability condition (KSC) holds. In order to do so, consider that singular points of the time change in utilization occur when \( \frac{\partial u}{\partial u} = 0 \), that is when wage inequality fulfills:

\[
\eta = \frac{\theta}{\omega} \left[ (1 - \alpha)(1 - \omega) - \lambda \right] \equiv \bar{\eta}
\]  

(\( \bar{\eta} \))

The value \( \bar{\eta} \) can be viewed as a threshold level of inequality. Obviously, such threshold ought to be positive, and a necessary and sufficient condition for positivity is that both the numerator and the denominator of the term in square brackets in \( \bar{\eta} \) be of the same sign.

This requirement identifies two investment–profitability regimes:

1. \( 1 - s_M > \alpha \) and \( 1 - \frac{\lambda}{1 - \omega} > \alpha \), or low responsiveness of investment to profitability; in this case, \( (1 - \alpha)(1 - \omega) - \lambda > 0 \) in \( \bar{\eta} \) implies \( 1 - \alpha - \lambda > 0 \) for any value of share of workers between zero and one. More specifically, this regime is characterized by a stronger response of savings to inequality compared to that of investment to inequality.\(^{17}\)

\[^{16}\text{In particular, given an initial value of capital stock } K(0), \text{ at a saving–investment equilibrium the evolution of capital stock can be tracked at any moment in time as } K(t) = K(0) e^{\int_0^t \sigma \left\{ 1 - \omega \left[ 1 + \frac{\eta(t)}{\theta}(1 - s_M) \right] \right\} u(t) dt} \text{ at time } t. \]

\[^{17}\text{Note that } \frac{\partial g_i}{\partial \eta} > \frac{\partial g_s}{\partial \eta}. \text{ See the Appendix for a full exposition.} \]
2. $\alpha > 1 - s_M$ and $\alpha > 1 - \frac{1}{1 - \alpha}$, that is a high responsiveness of investment to profitability; in this case $(1 - \alpha)(1 - \omega) - \lambda > 0$ in (\[\bar{\eta}\]) implies $1 - \alpha - \lambda > 0$ for any value of share of workers between zero and one. The response of investment to changes in inequality is stronger than the response of savings.\(^{18}\)

We can investigate the condition for the KSC to hold in each of these two regimes separately. In the low investment–response regime, we find that the threshold inequality level acts as an upper bound on wage inequality. In fact, $\eta$ must fulfill:

$$\eta < \bar{\eta} \equiv \frac{\theta}{\omega} \left[\frac{(1 - \alpha)(1 - \omega) - \lambda}{1 - \alpha - s_M}\right] \quad \text{(LIR)}$$

For the high investment response regime, however, the condition for goods market stability imposes a lower bound on wage inequality. The condition is:

$$\eta > \bar{\eta} \equiv \frac{\theta}{\omega} \left[\frac{(1 - \alpha)(1 - \omega) - \lambda}{1 - \alpha - s_M}\right] \quad \text{(HIR)}$$

We now turn to an investigation of the comparative statics of utilization in response to the share of workers.\(^{19}\) First, we rewrite the the capacity adjustment equation as follows:

$$\dot{u} = \chi \left\{g_0 - \sigma \omega \theta u (1 - \alpha - s_M) (\bar{\eta} - \eta)\right\} \quad \text{(U)}$$

Then, totally differentiating (U) at a goods market equilibrium and simplifying we obtain:

$$\frac{du}{d\eta} = \frac{u}{\bar{\eta} - \eta}$$

which is positive in the low investment–responsiveness regime and negative in the high investment–responsiveness regime.

Proceeding in similar fashion with respect to the share of workers, we have that

$$\frac{du}{d\omega} = \frac{(1 - \alpha) + \frac{\eta}{\theta} (1 - \alpha - s_M)}{(1 - \alpha)(1 - \omega) - \lambda - \frac{\eta}{\theta} (1 - \alpha - s_M)}$$

which is always positive in the low investment–responsiveness regime, and negative in the high responsiveness regime provided that the managerial propensity to save satisfies $(1 - \alpha) \left(\frac{\eta + \theta}{\eta}\right) > s_M > 1 - \alpha$.

The economic intuition is straightforward but instructive. Consider the low investment–responsiveness regime first. As a result of both a higher labor share or higher wage inequality, unit labor costs have increased, and profitability is reduced. However, a higher

\(^{18}\)In order to rule out unrealistic cases in which managerial wages fall below the wages of workers, we also impose

$$\omega < \theta \frac{1 - \alpha - \lambda}{(1 - \alpha)(1 + \theta) - s_M}$$

which guarantees that the threshold wage inequality is greater than one.

\(^{19}\)The comparative statics results regarding $\bar{\eta}$ are provided in the Appendix.
wage bill results in an increase in aggregate consumption that compensates for the impact of declining profitability on investment. Borrowing from traditional PK jargon, we can say that effective demand is wage–led, but also inequality–led, because a redistribution toward either type of workers increases aggregate demand. The wrinkle is that redistribution away from profits can occur both at the top end of the wage bill (managerial compensation) and the lower end (workers’ wages). It is also now clear that, with demand being inequality–led, stable adjustments in capacity utilization require wage inequality to lie below a certain threshold. As utilization increases, both savings and investment rise; however, as shown in the Appendix, the negative effect of rising inequality on savings exceeds the negative effect of inequality on investment, and the difference increases with capacity. Hence, the role of $\bar{\eta}$ as an upper bound.

Let us now focus on a high investment–responsiveness scenario. When inequality increases, the decline in the profit share leads to a comparatively greater fall in investment. Here, the decline in investment demand due to declining profitability dominates, and the additional sales (consumption) with redistribution to managers is not enough to generate an increase in utilization. Regarding an increase in workers’ share, on the other hand, if the managerial propensity to save is, loosely speaking, not too large, then a redistribution toward wages would have a negative effect on utilization, with the consequence that effective demand looks like it is profit–led. In this regime increasing inequality dampens demand and capacity utilization. Now, declining inequality and increasing capacity will both act to raise savings and investment. However, the increase in investment will now exceed that of savings because of the higher investment response. Therefore, in this regime, stability in the savings investment process requires that inequality does not fall below a certain threshold level.

These conclusions notwithstanding, the explicit consideration of a managerial class in an effective demand framework points to two words of caution in thinking along simple wage–led/stagnationist or profit–led/exhilarationist categories. On the one hand, the increase in utilization can very well arise from higher inequality, and not necessarily from an increase in the share of workers in national income. On the other hand, distributional changes are determined endogenously within the model, so that the equilibrium implications may be more complicated than what can be concluded from the features of the demand regime alone. Here in particular, what matters is determining how income inequality evolves in relation to the rate of capacity utilization, a task to which we turn next.

3.3. Dynamics of wage inequality

The empirical evidence presented in Section appears in accordance with our basic story about the rise of the managerial class in the economy and its repercussions in terms of increasing inequality. Further, from a political economy standpoint, an increasing share of top earners in national income translates into an ability to further push for appropriating even

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20 As the right panel in Figure makes it clear, a redistribution toward workers in the high–responsiveness scenario determines a lower rate of utilization for any level of inequality—a downward shift of the demand regime.
larger shares of value–added. It appears that, depending on institutional circumstances, managers can appropriate a higher portion of the wage bill no matter the economic fundamentals. On this regard, and regarding US data, Mohun (2014) has pointed to the pattern of a rising share supervisory workers in total wages despite a relatively stable share in employment. Thus, we postulate a positive feedback effect of inequality on itself. This is an institutionally driven response reflecting the dominance of the managerial class. We also take the findings by Galbraith (2012) regarding the correlation of inequality and unemployment as suggesting a negative relationship between the change in income inequality and the rate of capacity utilization. An increase in capacity utilization tightens labor markets reducing unemployment. This dampens the pace of growth of inequality.

In light of these considerations, we specify the following dynamic equation for inequality:

$$\dot{\eta} = \gamma - \phi u + \xi \eta$$

The institutional parameter $\xi$ is crucial to our analysis, and captures the role played by inequality in feeding back onto itself, thus squeezing workers’ wages. The positive feedback effect has to do with institutionally determined characteristics of the labor markets in the US in recent decades (discussed above), and in particular with the growing distributional conflict within the labor force where managers are able to claim larger shares of the gains in productivity. If such conflict was irrelevant to the evolution of wage inequality, $\xi$ would be zero. If institutional norms were such that inequality was actively redressed then $\xi$ would be negative. It seems reasonable to argue that as power shifts in favor of managers, their ability to squeeze wages also increases: thus, the spiral of inequality feeding into itself prevails so that $\xi$ is positive. We will see that this added, dynamic dimension of distributional conflict affects both the overall stability of the demand–distribution equilibrium and the ultimate effect of a redistribution toward workers’ wages on effective demand.

4. The dynamical system

The capacity adjustment equation (U), together with the equation describing the evolution of wage inequality (I), form the dynamical system describing the economy under consideration. We focus on a qualitative analysis, given that the system is of low dimension and therefore can be studied graphically through the inspection of the phase diagram. As it is customary, we will illustrate the ‘quantity’ variable –capacity utilization– on the horizontal axis, and the ‘price’ variable –inequality– on the vertical axis.

In order to determine the steady state of the system, consider first equation (U). By imposing no change in capacity utilization over time, we obtain the so-called IS curve (Bhaduri and Marglin 1990), or demand regime (Taylor 2004) of the economy. In our framework, the demand regime describes how effective demand is related to wage inequality. Since the interaction between distributive shares and capacity utilization in the investment function is non-linear, the utilization isocline will be non-linear, too. In fact, solving equation (U) for the utilization rate evaluated at $\dot{u} = 0$, we have the following:

$$u(\eta) = \frac{\theta g_0}{\sigma \omega (1 - \alpha - s_M)(\bar{\eta} - \eta)}$$

(DEM)
It is clear from (DEM) that the slope of the demand regime of the economy depends on the responsiveness of investment to profitability. In the low responsiveness regime, inequality is below the threshold $\bar{\eta}$. Hence, steady state capacity increases with inequality. Conversely, if responsiveness is high, inequality is above the threshold $\bar{\eta}$, and steady state capacity and utilization are inversely related.

In both cases, Keynesian stability will hold.

Symmetrically, the steady state value of wage inequality in relation to capacity utilization will be determined from equation (I), which gives the upward–sloping, linear wage inequality isocline:

$$\eta(u) = -\frac{\gamma}{\xi} + \frac{\phi}{\xi} u$$

Equation (DIST) plays here the same role of the so-called distributive curve (Taylor, 2004, Chapter 7) in two-class models. Using the IS curve and the distributive curve, we can investigate the distinct dynamics for the two regimes identified earlier: the low and high investment response regimes. These two regimes are shown graphically in the phase diagrams in Figure 4, where the two isoclines are drawn together. The slope of the isocline for capacity utilization in each regime depends on the responsiveness of investment to profitability. When responsiveness is low, inequality increases with capacity, and the rate of capacity utilization tends asymptotically to infinity as inequality rises towards the threshold level. Conversely, when responsiveness is high, inequality and capacity move in opposite directions: capacity utilization tends asymptotically to infinity when inequality falls towards the threshold level.

The steady state equilibrium for the low investment response regime, indicated by point $A$ in Figure 4, lies below the inequality threshold and adjustment displays clockwise dynamics. In the high investment response regime, the steady state equilibrium, indicated by $E$

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21 In other words, and as shown in Section 3.2, the term $(1 - \alpha - s_M)$ and the term $(\bar{\eta} - \eta)$ are of the same sign. This feature also guarantees that equilibrium capacity is always positive.
in Figure 4, lies above the inequality threshold, and saddle path adjustment dynamics will be observed. The behavior of the system around its equilibrium can be analyzed using a standard Jacobian analysis. The mathematical details are provided in the Appendix. Here, it is enough to report the sign structure of the Jacobian matrix evaluated at the steady state:

<table>
<thead>
<tr>
<th>Low investment–responsiveness</th>
<th>High investment–responsiveness</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\text{Sign } J(u_{ss}, \eta_{ss}) = \begin{pmatrix} - &amp; + \ - &amp; + \end{pmatrix}$</td>
<td>$\text{Sign } J(u_{ss}, \eta_{ss}) = \begin{pmatrix} - &amp; - \ - &amp; + \end{pmatrix}$</td>
</tr>
</tbody>
</table>

Table 1: Stability analysis.

Consider the high responsiveness regime first. We immediately see that the determinant is negative, so that the equilibrium is saddle path stable. However, because there are no forward–looking (jump) variables in this model, we have to view the high responsiveness regime as producing an equilibrium that is basically unstable.

Then, consider the low responsiveness regime. Stability requires a positive determinant and a negative trace. As a matter of fact, both the determinant and the trace can have any sign, depending on actual parameter values. However, it is easily seen that, if the wage squeeze parameter $\xi$ were zero (or negative), the trace would be negative and the determinant positive: in this case, the equilibrium in a low responsiveness regime would be stable. As the wage squeeze effect of inequality becomes stronger, the equilibrium might turn out to be unstable.\footnote{Some analytical details are provided in the Appendix.} Thus, we find the interesting result that \textit{local stability in the low responsiveness regime depends on the wage squeeze effect of inequality being relatively small}. Since this feedback effect in turn depends on the institutionally driven parameter $\xi$, our analysis suggests that an economic environment where such feedback effect is large and managerial salaries have a strong tendency to ratchet upwards, will also tend toward instability. Even when local instability were to be found, however, the dynamics of inequality are bounded by the threshold $\bar{\eta}$. Thus, depending on higher–order effects on the dynamics of utilization, the possibility of endogenous limit cycles arises.

All these features can be ascribed to the upward slope of the distribution isocline $\text{DIST}$. The positive own feedback effect $\xi > 0$ on inequality has also important consequences for the outcome of redistribution towards workers’ wages.

5. Redistribution toward workers

We now look at the effect of a redistribution, that is an increase in the workers’ share in national income, on inequality and capacity utilization. In both investment–responsiveness regimes, the effect of such a redistributive policy is to lower equilibrium inequality, but also the equilibrium rate of capacity utilization. In other words, demand and inequality
Figure 5: The effect of redistribution towards workers in the two investment-responsiveness scenarios: inequality-led regime (left), profit-led regime (right).

move together in both regimes —the equilibrium appears inequality-led— but for different reasons. On the one hand, in the high investment–response regime (right panel in Figure 5) we see a typical profit-led scenario at work: redistribution toward workers results in lower utilization for any level of inequality, so that the (DEM) isocline shifts to the left. The movement along the (DIST) isocline ensures that inequality also declines. In the low investment–responsiveness regime (left panel in Figure 5), on the other hand, the demand isocline shifts to the right after redistribution so that, taken alone, demand is wage-led: an increase in workers’ share in national income results in higher utilization at any given level of inequality. Still, being upward sloping, the movement along the distribution isocline, (DIST), is such that the equilibrium utilization decreases as a result of redistribution. This is, in a sense, the path of demand driven by the consumption of the high earning managerial class and, as we already argued, this appears to be the pattern followed in recent decades by the US (and UK) economy. Our argument is that at the heart of such growth and distribution dynamics lies the positive feedback effect of inequality on itself —the wage squeeze effect. Hence, a dominant managerial class in the economy imposes an inequality-led path in both investment regimes. However, the stronger the inequality feedback effect the more the resulting dynamics tend to unstable outcomes.

6. Conclusion

This paper presented a first pass at an analytical macroeconomic framework to understand a three class economy featuring capitalists, managers and workers. The model is rudimentary in that it ignores the complications of the financial sphere that are an integral

\[23\] As noted in the Introduction, with a negative feedback effect and a downward sloping distribution isocline (DIST), the outcome of rising wage shares in both investment regimes would have in fact have been declining inequality and increasing capacity —a classic stagnationist scenario.
part of the managerial revolution and the separation of ownership and control that such revolution entailed. The focus is also distinct from the formulation of Duménil and Lévy (2011b), where capacity utilization adjusts to deviations from a normal or target level of capacity and inventory accumulation. In their framework, tightening control of managers by increasing the responsiveness to disequilibrium can exacerbate the tendency to instability in dimensions. The focus of our analysis is effective demand, and the specification of the investment function follows standard Kaleckian modeling. The implications of managerial ascendancy on investment behavior is, however, a critical issue and further work is necessary to refine the specification of the investment function to take these implications into account.

Even at this level of abstraction, the model offers some interesting insights into the current conjuncture in the US economy. It points to two different regimes with regard to the response of investment demand to profitability: a low investment–responsiveness regime, where effective demand is broadly stagnationist/wage led, and a high investment–responsiveness regime where demand is broadly exhilarationist/profit led. When distributive dynamics are introduced, and given the positive own feedback of inequality, we find that the low investment regime is stable if the wage–squeeze effect of inequality is relatively small. The high investment–responsiveness regime displays saddle–path dynamics (also provided the wage–squeeze effect is small), but in the absence of forward looking variables we must consider the equilibrium as basically unstable.

Both regimes, however, are found to be inequality–led, in that a redistribution towards workers would lead to lower capacity utilization as well as lower inequality. We argued that this feature of the equilibrium depends crucially on the institutionally–driven ability of top earners to capture larger shares of productivity gains by squeezing wage growth. Thus, in our framework, managers and capitalists have a basis for common cause in the distributional conflict with workers. If the incentives of managers are such that investment responsiveness is eroded, the quest for higher earnings can lead to rising inequality as a means toward stimulating demand. The stronger this impetus, the larger would be the positive feedback effect of inequality on itself. In such a situation, the problem of effective demand would become increasingly intractable due to unstable adjustment dynamics.

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Appendix A. Analytical Results

1. Savings and Investment propensities From the investment function \( g_i \) we have

\[
\frac{\partial g_i}{\partial \eta} = -\frac{\sigma \omega}{\theta} (1 - s_M)u < 0; \\
\frac{\partial g_i}{\partial u} = \sigma \left\{ \alpha [1 - \omega (1 + \frac{\eta}{\theta})] + \lambda \right\} > 0
\]

From the savings function \( g_s \) we have

\[
\frac{\partial g_s}{\partial \eta} = -\frac{\sigma \omega}{\theta} \alpha u < 0; \\
\frac{\partial g_s}{\partial u} = \sigma \left\{ 1 - \omega \left[ 1 + \eta \theta (1 - s_M) \right] \right\} > 0
\]

2. Comparative statics of \( \bar{\eta} \)
   (i) The positive dependence of the threshold inequality \( \bar{\eta} \) on the surplus extraction parameter is obvious:

\[
\frac{\partial \bar{\eta}}{\partial \theta} = \frac{1}{\omega} \left[ (1 - \alpha)(1 - \omega) - \lambda \right] \frac{1 - \alpha - s_M}{1 - \alpha - s_M}
\]

Since the term in square brackets in equation \( \bar{\eta} \) is positive, the relation will always be positive. (ii) The response of threshold inequality, \( \bar{\eta} \) to changing wage share, \( \omega \) can be seen by investigating the following simplified expression:

\[
\frac{\partial \bar{\eta}}{\partial \omega} = -\frac{\theta}{\omega} \left( 1 - \alpha - \lambda \right) \frac{1 - \alpha - s_M}{1 - \alpha - s_M}
\]

Since \( 1 - \alpha - s_M < 0 \), an inverse relation between \( \bar{\eta} \) and the labor share requires \( 1 - \alpha > \lambda \). In a low investment response regime, both the numerator and the denominator will always be positive since \( \alpha < 1 - s_M \) and \( \alpha < 1 - \frac{\lambda}{1 - \omega} < 1 - \lambda \). In a high investment responsiveness regime, however, \( \alpha > 1 - s_M \) and \( \alpha > 1 - \frac{\lambda}{1 - \omega} \) must hold. Hence, \( \frac{\partial \bar{\eta}}{\partial \omega} < 0 \) only if \( \alpha > 1 - \lambda \). A sufficient condition for this in this regime is that \( \lambda > s_M \).

If on the other hand \( 1 - \lambda > \alpha > 1 - \frac{\lambda}{1 - \omega} \), then the threshold inequality will rise with an increase in the wage share. Note that in this case it must also be true that \( s_M > 1 - \alpha > \lambda \).

3. Jacobian Analysis Linearizing the dynamical system around its steady state position, we obtain:

\[
J(u_{ss}, \eta_{ss}) = \left( \begin{array}{cc}
\frac{\partial \bar{u}}{\partial u} & \frac{\partial \bar{u}}{\partial \eta} \\
\frac{\partial \bar{\eta}}{\partial u} & \frac{\partial \bar{\eta}}{\partial \eta}
\end{array} \right)_{u_{ss}, \eta_{ss}}
\]

\[
= \left( \begin{array}{cc}
-\chi & \sigma \frac{\omega}{\theta} (1 - \alpha - s_M) \\
-\phi & \xi (\eta_{ss} + \theta)
\end{array} \right)
\]

The sign of the top right entry depends on the investment–responsiveness regime. In the high (low) responsiveness regime, the entry will be negative (positive). Further, consider the stability of the equilibrium in the low responsiveness regime, which requires a positive determinant and a negative trace. This will certainly be the case.
if there is no wage–squeeze effect, that is if \( \xi \leq 0 \). But even if \( \xi > 0 \), as long as \( \xi < \tilde{\xi} \equiv \chi_{g0} u_{ss1} \eta_{ss1} + \theta \), local stability is ensured. If the wage squeeze parameter \( \xi = \tilde{\xi} \), then the equilibrium is unstable but the eigenvalues and purely imaginary, so that the dynamics generate closed orbits just like in the [Goodwin (1967)] model. As soon as \( \xi > \tilde{\xi} \), instability prevails. Thus, we can interpret \( \tilde{\xi} \) as a Hopf–bifurcation parameter in the dynamics.


