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 are hired by capitalists to supervise workers, but supervision results in surplus extraction and wage inequality. 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 is both wage–led and inequality–led; and a high investment–response regime, where demand is profit–led. In accordance with recent empirical evidence for the US, we then introduce distributive 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, an equilibrium in the high investment–response regime is saddle–path stable. The main distributional implication of the wage squeeze produced by 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 character of the equilibrium overcomes the stagnationist or exhilarationist features 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: E12, E22, E25.

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1 Introduction

The recent economic trajectory of the US economy has been characterized by rising 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 (2011a, b) 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 with 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, 2011a, b). 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, compensation paid to the upper end of the corporate hierarchy has 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 wages in the earnings of 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. This tradition has its roots in the surplus based approach of Classical–Marxian analysis, 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 goods markets. Studying the impact of redistribution on effective demand (capacity) allows the characterization of capitalist economies as either wage–led —where redistribution toward wages stimulates demand and investment— or profit–led —where redistribution toward wages dampens effective demand and investment (Bhaduri and Marglin, 1990). The analysis in terms of two classes has also been fruitful in investigating the cyclical dynamics of distributive 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 the macroeconomic effect of the additional dimension of distributional conflict generated

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).
by the growing importance of executive and managerial labor.

In this paper, we 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. 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. Despite its narrow focus, we argue that the present analysis has some interestingly insights to offer in order to better understand the relation between growing inequality and macroeconomic outcomes. The basic fact we exploit in order to carry our analysis is that the overall constancy of the aggregate wage share hides the upward redistribution occurring within different types of labor. Grounded in the evidence presented by Piketty and Saez (2003, 2006); Duménil and Lévy (2011a,b), a constant share of wages in the economy coupled with stagnant wages for the bottom 95% of workers and increasing labor productivity can only be the result of rising inequality. For such reason, 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 as a measure of aggregate demand, in a Kaleckian-type model.

Our first finding is that the stability of the savings and investment process at the source of effective demand in the economy 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 Goodwin (1967) and 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 investment–profitability 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. The effect of a redistribution toward wages in the high inequality–high responsiveness regime is instead 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. 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 expense of workers’ wages also seems to be increasing, as the existing empirical evidence for the US points towards a negative effect of inequality onto the growth rate of workers’ wages. The magnitude of such feedback effect matters not only for dynamic stability, but also for the effect of a redistribution towards workers’ wages on effective demand: even with stagnationist effective demand, a positive feedback effect of inequality can be enough to determine a decrease in capacity utilization as a consequence of an increase in the share of workers in national income. Such a result points to the importance of the rise of a managerial class for the ultimate effects of redistributive policies on effective demand.

The remainder of the paper goes as follows. First, we report some well-known facts about the rise of income inequality favoring the top percentiles of the wage distribution at the expenses of the remaining workers, as well as trends in the ratio of productive to
supervisory labor in the US. Then, we address the problem of effective demand in a closed economy with three classes. We then look at the dynamics of inequality in relation to capacity utilization, qualitatively study the dynamical system describing the utilization-distribution dynamics, and look at the effect of a redistribution toward workers’ wages in the economy. Section 6 concludes. To avoid cluttering the narrative with too much algebra, proofs of our basic results are provided in Appendix A.

2 Some Stylized Facts

At least since Kaldor (1961), a well-known fact of economic growth in advanced capitalist economies is the relative constancy of the aggregate share of wages in national income, at least in the long run. A roughly constant share of wages is found also when disaggregating wage compensations in order to exclude the public sector: as highlighted by Duménil and Lévy (2011a), and illustrated in Figure 1, the share of wages in income of the corporate sector in the US has hovered around 72%. The relative constancy of the overall US corporate labor share obscures a fundamental restructuring that has been taking place in the private sector, namely the remarkable rise in wage earnings at the upper end of the wage distribution. Figure 2 below 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 1960s. It then more than doubled from around 5.2% in the sixties to around 12% in 2008. Duménil and Lévy (2011a) 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 the share of this group 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 benefited from the increase in its wages relative to other workers (Duménil and Lévy, 2011b). 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. To this extent, it has been widely

![Figure 1: Share of Wages in Value Added of the Corporate Business Sector in the US. Source: NIPA Table 1.14.](image-url)
documented in the literature (Kotz, 2009; Shaikh, 2010; Duménil and Lévy, 2011d) that the growth in real wages of non-supervisory workers has not been high enough to keep up with the overall growth rate of labor productivity in the past four decades. Figure 3 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 two trajectories reflects the weakening capacity of workers to seize productivity gains. A roughly constant overall labor (and its complement, profit) share coupled with increasing inequality in a growing economy means that it is the top percentiles of the income distribution that receives most of the productivity gains. This observation is also important for the three class analysis.

The Classical - Marxian literature traditionally distinguishes between productive labor (that creates wealth and surplus) and unproductive labor (that consumes wealth). Shaikh (2010), as well as Mohun (2005), Mohun (2012) and Paitaridis and Tsoulfidis (2011) have estimated the rising share of unproductive labor in the US economy. Unpro-

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**Figure 2:** Shares of the top 1 and top 5 percentiles of the wage distribution, 1929-2008. Source: Piketty and Saez (2006, Table B.2).

**Figure 3:** Non-supervisory annual growth rate of labor productivity vs annual growth rate of real wages (1970-2010, 1970=100). Source:Bureau of Labor Statistics.
ductive labor is a broad category, however. For our purpose, what is of relevance is the proportion of labor engaged in direct production to that of managerial, administrative and supervisory labor. In Figure 4, we present the trends for this ratio for three sectors: Manufacturing, Construction and Trade, Transportation and Public Utilities. This ratio declines till about the 1980s for all sectors and then stays relatively stable. The decline, which is sharpest in construction, indicates that these sectors are becoming more top-heavy: more managerial, supervisory and administrative workers are being employed to ‘manage’ workers actually engaged in production. The most top-heavy sector appears to be manufacturing. 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 wage share of productive workers (Mohun (2012). Gordon (1996) has argued that such ‘corporate bloat’ and the wage squeeze are related in that a stagnant wage share fosters the rise of an 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. In what follows, we will provide a simple framework that accounts for potentially unstable macroeconomic outcomes associated with rising income inequality.

Figure 4: Ratio of productive to non-productive labor in Manufacturing, Construction, and Trade and Transportation in the US, 1960-2010. Source: Bureau of Labor Statistics.

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 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, we have:

\[
Y(t) = w_L(t)L(t) + w_M(t)M(t) + r(t)K(t)
\]

(1)
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:

$$Y(t) = \min \{ a(t)L(t), b(t)M(t), \sigma u(t)K(t) \}$$

(2)

From (1) and (2), and omitting the time dependence, the share of profits in output $\pi$ satisfies:

$$\pi = 1 - \frac{w_L}{a} - \frac{w_M}{b}$$

(3)

where $u\pi = r$.\(^3\)

Managerial labor is supervisory in nature. The capitalist-owner’s main goal (profits) is distinct and in conflict with the goal of workers (wages). Thus, the capitalist-owner will try to extract as much product $(aL)$ from labor $(L)$ as possible, while managerial—supervisory labor is delegated the task of organizing production and extracting productivity gains from workers. While it has been argued that supervisory activities by the managerial class are intrinsically unproductive (Marglin, 1974; Bowles, 2004), such labor does play a role in profit maximization and extraction of productivity gains (Duménil and Lévy, 2011c). Recognizing this effect, we postulate a relation between workers’ productivity and output per unit of supervisory labor. Such an assumption allows to keep the analysis tractable in a fixed-coefficient framework without undermining the distributional aspects of an economy with a managerial class. Specifically, if we denote the ratio of employed workers $(L)$ to employed managers $(M)$ by $\theta > 1$, then $b$, the proxy for the capacity of managers to increase productivity can be decomposed into the effect of increasing labor productivity, $a$, and the effect of 'managerial efficiency' - deployment of fewer managerial inputs per unit of labor $(b = a\theta)$.\(^4\) In an economy with a fixed-proportions technology, the parameter $\theta$ then expresses the ratio of non-supervisory to supervisory labor. Since as seen above $\theta = \frac{b}{a}$, it also captures in a stylized way the effectiveness of managerial supervision of workers and accounts for the managers’ ability to extract surplus from production.

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 productivity-adjusted wage premium $\eta/\theta$ denotes the ratio of income share of managers to income share of workers. Equation (4) makes it clear why managerial labor is valuable for capitalists: even though compensation payments to managers reduce profits, the profit share increases (although at a decreasing rate) with managers’ surplus extraction-ability, as it is easily checked by differentiating (4) with respect to $\theta$. The reason is simple: a higher $\theta$ means higher productivity of workers in production, which in turn lowers unit labor costs, thus increasing the share of profits.

\(^3\)To avoid cluttering the notation, from now on we remove the time dependence unless otherwise specified, with the understanding that all economic variables of interest that are not mere parameters do have a time dimension.

\(^4\)Profit maximization with a Leontief production function requires that inputs are used in fixed proportions. Hence, $aL = bM = \sigma K$. Since $\theta u = b$, then profit-maximizing firms will demand $L = \theta M$. Imposing $\theta > 1$ ensures that the number of employed workers is larger than the number of employed managers, thus avoiding counterfactual (and paradoxical) results.
On the other hand, denoting the share of workers’ wages in output by \( \omega \equiv wL/a \), we have:

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

(5)

An increase in the workers to managers ratio \( \theta \) has also the effect of increasing the share of workers in national income. These features speak to the dual role of a managerial class in income distribution: on the one hand, as seen above, the supervisory role of managers serves the purpose of eventually lowering unit labor costs; on the other hand, managers provide labor services to firms just as workers do.

3.2 Wage inequality, investment, and effective demand

We now turn to capital accumulation, ruling out depreciation of capital stock for simplicity. A key feature of Kaleckian frameworks is an independent investment demand \( I \), as a function of (a measure of) profitability and utilization. Suppose that the desired growth rate of capital stock \( g \equiv \frac{I}{K} \) is linearly related to the profit rate and to capacity utilization:

\[
g_i = g_0 + \sigma \lambda + \beta u = g_0 + \sigma(\alpha \pi + \lambda)u, \quad \lambda \equiv \beta/\sigma
\]

so that substituting from (4) we obtain:

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

(6)

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 \( s_M \), and for now assume that \( s_M \) takes values between zero and one. Under these behavioral assumptions, the supply of savings normalized by the size of capital stock \( g_s \) 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 \( g_i = g_s \). We assume that capacity utilization increases (decreases) to accommodate excess demand (supply) in the goods market, or in other words that the change over time in utilization fulfills:

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

(8)

Thus, we obtain after rearranging:

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

(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

\[\text{Introducing a saving propensity for capitalists would add one parameter to the model without however changing any of its qualitative implications.}\]

\[\text{Interestingly enough, Duménil and Lévy (2011b) have argued that, with managerial income income being mostly determined by capital gains, the average propensity to save by managers might very well turn negative. In fact, the savings rate of the top quintile declined from 8.5% of income to a dissaving of 2.1% of income in 2000, even as the bottom quintile increased their savings rate from 3.8% to 7.1% of income in the same period (Maki and Palumbo, 2001). While we recognize the importance of such considerations, our formulation abstracts from financial dynamics, and therefore we will keep } s_M \text{ as a non-negative parameter, taking values between zero and one.}\]
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 \( \frac{\partial \dot{u}}{\partial u} = 0 \), that is when wage inequality fulfills:

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

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 \( 1 - \frac{1}{1 - s_M} > \alpha \), 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.\(^7\)

2. \( \alpha > 1 - s_M \) and \( \alpha > 1 - \frac{1}{1 - s_M} \), 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. \(^8\)

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 inequality. In fact, \( \eta \) must fulfill:

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

For the high investment response regime however the condition for savings investment stability imposes a lower bound on inequality. The condition is

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

We now turn to an investigation of the comparative statics of utilization in response to the share of workers.\(^9\) First, we rewrite the the capacity adjustment equation as follows:

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

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

\[
\frac{du}{d\eta} = \frac{u}{\bar{\eta} - \eta}
\]

\(^7\)Note that \( \frac{\partial g_s}{\partial \eta} > \frac{\partial g_i}{\partial \eta} \). See the Appendix for a full exposition.

\(^8\)In order to rule out unrealistic cases in which managerial wages fall below the wages of workers, we also impose

\[
\omega < \theta \left( \frac{1 - \alpha - \lambda}{(1 - \alpha)(1 + \theta) - s_M} \right)
\]

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

\(^9\)The comparative statics results regarding \( \bar{\eta} \) are provided in the Appendix.
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

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

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

$$(1 - \alpha) \left( \frac{\eta + \theta}{\theta} \right) > s_M > 1 - \alpha$$

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 wage bill results in an increase in aggregate consumption that compensates for the impact of declining profitability on investment in this regime. Borrowing from traditional PK jargon, we can define effective demand as *inequality–led*, but also *stagnationist*, because both 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 managers and the lower end of workers. It is also now clear that with capacity utilization being inequality–led, stable adjustments of capacity utilization would require inequality to lie below a certain threshold. The positive impact of rising capacity utilization on savings and investment will be dwarfed by the dampening effect impact of inequality at higher levels of inequality. Since the dampening effect of rising inequality on savings exceeds the dampening effect of inequality on investment, savings will tend to rise more slowly than investment at higher levels of inequality. Hence the role of $\eta$ as an upper bound.

Let us now focus on a high 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. Effective demand is therefore *exhilarationist*. 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 involved than 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

Let us consider the total share of wages in production $1 - \pi$ as defined above. In recent work, Duménil and Lévy (2011b); Piketty and Saez (2003, 2006) have shown that, while aggregate distributive shares (wage share, profit share) remained roughly constant over the past three decades, the share of the top quintile of wage income earners has been steadily growing at the expense of the share of the bottom 95% of workers. Further, while real wages for 95% of workers have remained stagnant or have been slightly decreasing, labor productivity has shown an upward trend in the period considered, and this explains the decline in the workers’ share in GDP. This fact is illustrated in Figure 3 above.

We argue that these findings are very well in accordance with our basic story about the rise of the managerial class in the economy and its repercussions in terms of increasing inequality, because a constant wage share coupled with rising inequality can occur only if the benefit of productivity gains accrue to top income earners only, as it seems to be confirmed by looking at Figure 3. This fact, tracing its roots since the early 1980s in the United States and widely documented in the literature analyzing the growing gap between workers’ wage earnings and productivity growth (Kotz, 2009; Shaikh, 2010; Duménil and Lévy, 2011d), motivates a reconsideration of the Kaleckian framework by looking at the dynamics of wage inequality, as opposed to the overall labor share. Hence, we proceed in keeping the overall wage share as a whole constant over time, and focus our attention to changes regarding the ratio of managerial wages over workers’ wage in the economy.

Assuming exogenous, purely labor-augmenting technological change, let the parameter $\gamma$ denotes labor productivity growth ($\dot{a}/a \equiv \gamma > 0$). Then, totally differentiate (4) imposing a constant labor share —or equivalently, a constant markup over average costs, as shown in the Appendix— to obtain:

$$\dot{\eta} = (\eta + \theta) \left( \gamma - \frac{\dot{w}_L}{w_L} \right)$$

which makes it clear that the growth of wage inequality in this model is inversely proportional to the growth of the share of workers’ wages in output $\frac{\dot{w}_L}{w_L} - \gamma$. This is obvious: if the total share of labor remains constant, the reason for an increase in inequality has to be found in workers’ wages not growing fast enough to keep up with labor productivity growth.

To move forward with the analysis, we need to specify a law of motion for workers’ real wage. One of the key features of the growth cycle by Goodwin (1967) is the idea, grounded in the Phillips curve, that wage inflation occurs in response to labor market tightness, as measured by the employment rate. Here, we have two types of labor, but demand for workers and demand for managers are related through the surplus extraction parameter $\theta$. In thinking about wage growth, it seems natural to relate the growth of workers’ wage to the employment of workers in the economy $L/N = \frac{\theta}{1+\theta} v$, where $v = \frac{L+M}{N}$.

On the other hand, the simple stylized facts outlined above point toward considering workers’ wage growth as inversely proportional to current wage inequality. This is an institutionally driven response reflecting the dominance of the managerial class. Managers are able to push for a higher portion of the wage bill independent on any economic fundamentals. Regarding US data, Mohun (2012) has pointed to the pattern of a rising share supervisory workers in total wages despite a relatively stable share in employment.
So it seems plausible to expect rate of growth of wages to increase with rising rates of employment of workers and decrease with rising levels of inequality. Following the linear specification in Goodwin (1967), we can define

\[ \frac{\dot{w}}{w_L} = -\xi \eta + \rho \frac{\theta}{1+\theta} v, \]

so that (10) becomes:

\[ \dot{\eta} = (\eta + \theta) \left( \gamma + \xi \eta - \rho \frac{\theta}{1+\theta} v \right). \]

The institutional parameter \( \xi \) is very important in our analysis, and it is meant to capture the effect of inequality in squeezing workers’ wages. Its negative effect has to do with the recent institutional features of labor markets in the US, and in particular with the growing distributional conflict within the labor force. If such conflict were not to be relevant, \( \xi \) would be equal to zero. As power shifts in favor of managers, their ability to squeeze wages also increases. 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 wages on effective demand.

The final step is to convert the expression above in a relation involving capacity utilization in place of the employment rate. In order to do so, we can appeal to Okun’s law considerations. A simplified version of Okun’s law can be expressed as \( u = \delta v \),\(^{10}\) and allows us to obtain a dynamic equation relating changes in wage inequality with capacity utilization:

\[ \dot{\eta} = (\eta + \theta) \left( \gamma + \xi \eta - \phi u \right) \] (I)

where \( \phi \equiv \rho \frac{\theta}{1+\theta} \delta. \)

\section{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– 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 \textit{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

\(^{10}\)For a similar application of the so-called gap version of Okun’s law, see Tavani et al. (2011). The evidence presented in Foley and Michl (1999, Chapter 11) provides support for \( \delta = 1 \).
State capacity and utilization are inversely related. In both cases, Keynesian stability will be satisfied.

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 diagram in Figure 5 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.

Figure 5: Phase Diagram: low investment–responsiveness (left), high investment–responsiveness (right)

The steady state equilibrium for the low investment response regime, indicated by point A in Figure 5, lies below the inequality threshold and adjustment displays clockwise dynamics. In the high investment response regime, indicated by E in Figure 5, lies above the inequality threshold, and an anticlockwise 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:

Consider the high responsiveness regime first. We immediately see that the determinant is negative, so that the equilibrium is saddle path stable. However, because

\[11\text{In other words, and as shown in Section 3.2, the term } (1 - \alpha - s_M) \text{ and the term } (\bar{\eta} - \eta) \text{ are of the same sign. This feature also guarantees that equilibrium capacity is always positive.}\]
there are no forward–looking (jump) variables in this model, we have to view the high responsiveness regime as 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 effect of inequality on its own change $\xi$ were zero, the trace would be negative and the determinant positive: this low responsiveness regime would be stable. As the own feedback effect of inequality $\xi$—the wage squeeze effect of inequality—becomes stronger, the likelihood of the equilibrium becoming locally unstable increases everything else equal. Thus, we find the interesting result that local stability in the low responsiveness regime depends on the wage squeeze effect of inequality being relatively small.

All these features can be ascribed to the upward slope of the distribution isocline (DIST). This positive own feedback effect has also important consequences for the outcome of redistribution towards wages.

## 5 Redistributio toward workers

We now look at the effect of a redistribution aimed at increasing the workers’ share in national income on inequality and capacity utilization. In both regimes of responsiveness of investment to profitability, the effect of such a redistributive policy is to lower equilibrium inequality, but also the equilibrium rate of capacity utilization. In both regimes, demand and inequality move together. However, while in the high investment–response regime we see a typical profit–led scenario at work, in the low investment–responsiveness regime, the decline in utilization occurs despite a rightward shift of the demand isocline DEM: even if demand is wage–led, the interaction with distributional dynamics results in lower utilization after a redistribution toward workers. This is, in a sense, the path of demand driven by the consumption of the high earning managerial class. We already argued that this has been the pattern of the recent decades in US (and UK). As pointed before, this pattern is driven by the positive feedback effect of inequality on itself—the wage squeeze effect. With a negative feedback effect, and a downward sloping distribution isocline reflecting the outcome of rising wage shares in both investment regimes would have in fact been declining inequality and increasing capacity—a classic stagnationist scenario. It is the distributive dynamics of an economy characterized by a dominant managerial class that has imposed an inequality–led path in both investment regimes. However, as argued earlier, the stronger the inequality feedback
effect the more the resulting dynamics tend to an unstable outcome.

Figure 6: The effect of redistribution towards workers in the two investment-responsiveness scenarios: inequality-led regime (left), profit-led regime (right).

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 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 (2011d) where capacity utilization adjusts to deviations from a normal or target level of capacity and inventory accumulation. Their formulation suggests that tightening control of managers by increasing the responsiveness to disequilibrium can exacerbate the tendency to instability in dimension. The focus in the present model is effective demand and the specification of the investment function follows the standard post-Keynesian formulation. The implications of managerial ascendancy on investment behavior is, however, a critical issue and further work is necessary to calibrate the specification of the investment function to take into account this impact.

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: a low investment response regime that is broadly stagnationist/wage led in demand and a high investment response regime that is broadly exhilarationist/profit led. When distributive dynamics are introduced (based on a constant profit share and a wage–squeeze effect of inequality) we find that the low investment regime is stable if the wage–squeeze effect of inequality is relatively small. The high investment response regime displays saddle–path dynamics (provided the wage–squeeze effect is small), but in the absence of a forward looking variable we must consider the equilibrium to be 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. Thus, in
our framework, managers and capitalists have a basis for common cause in squeezing workers. If the incentives of managers are such that investment responsiveness is eroded, the quest for higher earnings can lead to rising inequality as the means of 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.

A Appendix

Savings and Investment propensities From the investment function $g_i$ we have

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

From the savings function $g_s$ we have

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

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

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

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:

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

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 $\alpha < 1 - (1 - \omega) \lambda < 1 - \lambda$ In a high investment responsiveness regime, however, $\alpha > 1 - s_M$ and $\alpha > 1 - (1 - \lambda) \omega$ must hold. Hence, the $\frac{\partial \bar{\eta}}{\partial \omega} < 0$ 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 a rise in the wage share. Note that in this case it must also be true that $s_M > 1 - \alpha > \lambda$.

Goodwin dynamics and the dynamics of markup pricing Suppose that the aggregate price level $P$ is a constant markup $\tau$ over unit labor costs:

$$P = (1 + \tau) \left( \frac{\bar{w}_L}{a} + \frac{\bar{w}_M}{b} \right)$$

where $\bar{w}_M, \bar{w}_L$ are nominal wages of workers and managers respectively. Then, dividing both sides by the price level, we have:

$$1 = (1 + \tau) \frac{\bar{w}_L}{a} \left( 1 + \frac{\eta}{\theta} \right)$$
where all variables are as in the text. Totally differentiating with respect to time, imposing a constant markup, yields equation (I).

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

\[
J(u, \eta) = \begin{pmatrix}
\frac{\partial \dot{u}}{\partial u} & \frac{\partial \dot{u}}{\partial \eta} \\
\frac{\partial \dot{\eta}}{\partial u} & \frac{\partial \dot{\eta}}{\partial \eta}
\end{pmatrix}
= \begin{pmatrix}
\chi_{u,s} & \sigma \frac{\phi}{\eta_{ss}}(1 - \alpha - s_M) \\
\phi(\eta_{ss} + \theta) & \xi(\eta_{ss} + \theta)
\end{pmatrix}
\]

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).

**References**


