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*Accumulation Regimes, Endogenous Desired Rate of Capacity Utilization and Income Distribution**

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INTRODUCTION

The principle of effective demand in its Kaleckian version has been constantly invoked as the theoretical foundation of what was named in economic literature as "cooperative capitalism"; *i.e.* the idea that capitalists and workers could both benefit from a redistribution of income toward wages. The main argument is that an increase in the share of wages would produce an increase in aggregate demand —since the propensity to consume for workers is higher than capitalists— and in the degree of capacity utilization. Thus, this change in income distribution would be compatible

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with the stability (even an increase) of the profit rate. On the other hand, due to the existence of the accelerator effect, this increase in the degree of capacity utilization would induce firms to increase investment in fixed capital, stimulating growth. Therefore, according to this line of reasoning, the principle of effective demand would be the theoretical foundation of "cooperative capitalism" and also of the wage-led growth regime.

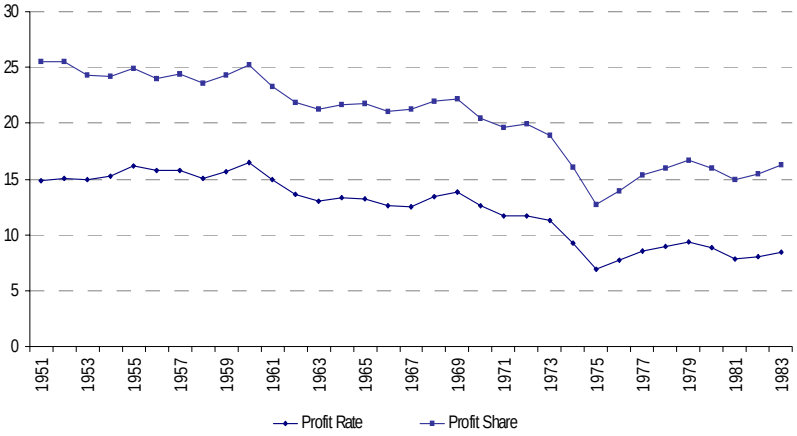
However, some authors —for example, Marglin and Bhaduri (1990)— have questioned the hypothesis of wage-led growth at empirical and theoretical levels. According to these authors, the empirical evidence of the European economies in the 1960's and 1970's is incompatible with the hypothesis of a positive relationship between the share of wages and the degree of capacity utilization. In fact, as figure 1 illustrates, a great reduction in the profit share can be observed in the economies of the United Kingdom, Germany, France and Italy during this period. This reduction is also followed by a reduction in the degree of capacity utilization.

At the theoretical level, the wage-led growth hypothesis does not take in account the effect of profit share on a firm's investment decisions. More specifically, a reduction in profit share may be a signal for entrepreneurs of a future reduction in the profit obtained by each unit of product that firms will be able to sell with the additional productive capacity resulting from their investment decisions (*cf.* Marglin, S; Bhaduri, 1990, p. 173). In this case, entrepreneurs may then decide to reduce their investment spending. This reduction of the investment —if strong enough— will produce a reduction in aggregate demand, in the degree of capacity utilization and in the growth rate of capital stock. In other words, an increase in the share of wages will result in a profit squeeze which will reduce economic growth. According to this line of reasoning, the accumulation regime will be a profit-led type. I other words, economic growth will be stimulated by an increase in profits, instead of "being pulled" by increase in wages.

Thus, the relationship between income distribution, the degree of capacity utilization and economic growth will be dependent on the macroeconomic structure, *i.e.* the set of structural relations between the main

macroeconomic variables.[1] If investment is very sensitive to changes in the degree of capacity utilization but not as sensitive to changes in the profit share, the accumulation regime will be the wage-led type. If, on the other hand, investment is very sensitive to changes in the share of profits and not so sensitive to changes in the degree of capacity utilization, the accumulation regime will be the profit-led type.

FIGURE **1**
Profit Rate and Profit Share in Four European Economies (1951-1983)



Source: Marglin and Bhaduri (1990).

[1] Marglin (1990) defines a macroeconomic structure as the set of mechanisms that determine the global level of economic performance (p. 6). This definition, however, is not very precise because it does not specify the set of mechanisms that will determine economic performance nor how economic performance is determined. In the present article, however, we will define the concept of macroeconomic structure as the set of relations between the main macroeconomic variables, and this set will be represented by structural equations between the variables in the model. For example, a macroeconomic structure can be represented by relations of the type $I=f(u)$ or $I=f(u, m)$, where I is the volume of investment, u is the degree of capacity utilization and m is profit share.

However, the Kaleckian view and the most recent approach by Marglin and Bhaduri had both ignored an important element of the macroeconomic structure: the relationship between planned investment by firms and planned (desired) degrees of capacity utilization. In fact, these approaches consider investment a function of the effective degree of capacity utilization (*cf.* Rowthorn, 1981; Dutt, 1984; Taylor, 1985) or consider the desired degree of capacity utilization an exogenous variable of the model (*cf*. Amadeo, 1986) so that a change in the profit share cannot produce a change in the planned degree of capacity utilization.

Thus, the objective of the present article is to introduce the desired degree of capacity utilization as an *endogenous* variable in the macroeconomic structure of a Post-Keynesian growth model and evaluate the impact of this change in the macroeconomic relationship of income distribution, effective degrees of capacity utilization and economic growth. In order to do that, we will assume —like Skott (1989)— that the planned degree of capacity utilization is a decreasing function of the profit share. The economic basis of this assumption is the idea that *excess capacity* may be used by established firms as a device to increase the level of "entry barriers" to new competitors in the industry. The desired level of excess capacity is an increasing function of the economic profits obtained by established firms since the bigger the profit, the greater the incentive will be for new firms to enter the market.

This change in the macroeconomic structure will produce a short run equilibrium configuration of the economy in which there are two equilibrium levels of productive capacity utilization and two equilibrium growth rates. In other words, in our model economy, multiple equilibrium points exist. In this situation, an increase in the share of wages can produce either an increase or a decrease in the effective level of capacity utilization, depending on its initial value. If capacity utilization is initially high, then an increase in the wage share will generate an increase in the effective degree of capacity utilization and the economy will be in a "stagnationist regime". However, if capacity utilization is initially low, then an increase in the wage share will produce a reduction in the effective level of capacity utilization and

the economy will be in an "exhilarationist regime". Therefore, the relationship between income distribution and capacity utilization is non-linear as Bhaduri and Marglin have suggested in their 1990 article.

However, for the long run equilibrium configuration of the economy, the endogenous application of the planned degree of productive capacity utilization will produce a change in the causality between income distribution and economic growth. In the Marglin and Bhaduri model, a change in the distribution of wages and profits will produce a change in the profitability of investment on fixed capital and consequently, a change in the growth rate of capital stock. In our model, changes in functional income distribution do not affect the growth rate of capital stock. In the long run, the growth rate of capital stock is completely determined by the autonomous component of the investment function —more precisely, the "animal spirits" of the capitalists— and is independent of changes in the income distribution of wages and profits. The opposite of this, however, does not stand. Changes in the growth rate of capital stock will in fact produce changes in the distribution of income between wages and profits. If the economy is in the *upward sloping* region of the "no-entry-condition" curve, a reduction in the growth rate of capital stock will produce a reduction in both the profit share and in the long-run level of capacity utilization. Thus, a "profit squeeze" situation can be the result of an autonomous reduction in the propensity of capitalists to invest rather than the result of a class struggle between capitalists and workers.

This article is structured in five sections including the introduction. In the second section, we will present some theoretical arguments for the existence of a planned or desired level of excess capacity and examine the relationship between this variable and the investment decisions of the firms as well as the relationship between income distribution, capacity utilization and capital accumulation in the canonical Kalecki-Steindl growth model. In the third section, the basic structure of a Post-Keynesian growth model with an endogenous planned degree of capacity utilization will be presented as well as the short run equilibrium configuration of the economy. The fourth section presents the long run equilibrium configuration and analyses

the effect of a reduction in the *animal spirits* of the capitalists on income distribution and on the long run level of capacity utilization. The fifth section summarizes all the conclusions.

EXCESS CAPACITY, INCOME DISTRIBUTION AND INVESTMENT DECISION: THE CANONICAL KALECKI-STEINDL GROWTH MODEL

The growth models developed by Kaldor (1956, 1957) and Pasinetti (1961-1962) assume that in the long run, capitalist economies operate with full utilization of productive capacity. In these models, income distribution is the adjustment variable of saving and investment decisions.

The problem with these kinds of models is that they assume that *mark-ups* are completely flexible; *i.e.* firms will react to any situation of excess demand or supply of goods with changes in the profit margins (*cf.* Possas, 1987).

According to Kalecki, this type of behavior is a characteristic of the primary sector where supply is price inelastic. This means that changes in demand will be completely reflected in the prices of goods and, consequently, in their profit margins (1956, p. 7). The industrial sector, however, is characterized by the existence of an excess in productive capacity. In this context, changes in the demand for industrial products will be met only by changes in the level of production of these goods. Prices and profit margins will remain constant.

For Kalecki, the "rigidity" of the mark-up is a consequence, rather than the cause, of the existence of excess productive capacity. Thus, the following question arises: What then, is the reason for the existence of idle capacity?

Kalecki does not formally answer this question because he does not make a clear distinction between planned and effective excess capacity. This question was formally addressed by some authors interested in industrial organization such as Steindl, Sylos-Labini and Spence.

According to Spence (1977), firms in oligopolistic markets desire to have excess capacity as an entry barrier for new competitors in the

industry since this idle capacity can be used as a "retaliation device" against new competitors. More specifically, firms already established in the market can retaliate against new competitors with greater utilization of their productive capacity which will result in a reduction in the prices of the goods produced by the firms of this sector and therefore, in the profits of the new competitors. New firms, when facing this threat, may consider it more profitable to remain outside the market.

Other authors like Steindl (1976) affirm that planned excess capacity occurs because, most importantly, firms want to be ready to meet fluctuations in demand for their products and maintain a certain level of excess capacity as a way to increase or maintain their market-share in case that demand is above what was expected (*cf*. Steindl, 1976, p. 23). Secondly, excess capacity arises as a consequence of the indivisibilities of capital stock which induces firms to built productive capacity ahead of a growth in demand. This is what Steindl called "The law of the accumulation of clientele".

Thus, we can define a "planned" level of productive capacity utilization, which is certainly lower than the maximum level and is determined by structural factors like the level of barriers to entry. This level of productive capacity utilization will serve as a reference point for the investment decisions of firms. If the effective level of capacity utilization is bigger than the "desired" degree, firms will then invest with the objective of increasing productive capacity and reducing the effective degree of capacity utilization to the "planned" level. Thus, we can represent the investment decision by the following equation, where u^d and u^e represent planned and effective degrees of capacity utilization, g^i represents the growth rate of the capital stock and f represents *animal spirits*.

$$g^i = f + h(u^e - u^d); \qquad [1]^2$$

[2] The importance of investment function specification in post Keynesian growth models should not be overlooked. For instance, in Bhaduri and Marglin 1990 model,

In *The General Theory* (1936), Keynes defines *animal spirits* as the "spontaneous urge to action rather inaction" (p. 161). According to Carvalho (1992), the importance of *animal spirits* in the investment decision is to determine the extension by which agents want to carry an irreversible commitment of resources in a situation where their expectations about future market conditions have little or no informational-basis (1992, p. 122). In this case, the term *f* in equation [1] represents the *autonomous* part of the investment decision. This is the share of investment spending that is independent of the current level of capacity utilization.

In equation [1], we are implicitly assuming that established firms have little or no information regarding potential entrants into the "industry". For example, these firms can be unaware of the cost structure of potential entrants and, therefore, of the level of excess capacity below which outside firms might decide to enter into the sector. Thus, animal spirits represent the disposition of established firms to face this uncertainty; *i.e.* willingness to invest despite the uncertainty. Thus, the greater this disposition is, the higher the animal spirits will be and the higher the capital stock growth rate will be.

The existence of excess capacity makes it impossible for profit share to be used as an adjustment variable between saving and investment decisions. But in this case, the distribution of income between profits and wages becomes undetermined. In order to determine the share of income that will be appropriated by workers and capitalists, we must consider the determination of the *mark-up*.

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investment is considered a separate function of profit margin and capacity utilization, in the form of $I=I(z, h)$, where z is the degree of capacity utilization and h is the profit share. This particular specification of the investment function is crucial for the existence of a profit-led accumulation regime in their model. In the Rowthorn (1981) model, investment is taken as a function of the profit rate and the level of capacity utilization in the form of: $I=I(r, u)$, where r is the profit rate and u is the degree of capacity utilization. For this specification of an investment function, the only possible accumulation regime is of the wage-led type. Alternative specifications of investment functions in Post-Keynesian growth models should be seen in Lima (1998) and Ros (2003).

It can be shown that the functional distribution of income will be determined after the determination of the *mark-up*. For example, consider that firms in the industrial sector of this sample economy determine the prices for their products on the basis of the following equation:

$$p = (1+ \tau)\, w\, q \qquad [2]$$

Where: p is the level of prices in the industrial sector, w is the nominal wage rate, τ is the mark-up and q is the inverse of labor productivity.

The profit share ($\pi = P/Y$) is given by:

$$\pi = \frac{P}{Y} = \frac{pX - wqX}{pX} = \frac{\tau wqX}{(1+\tau)wqX} = \frac{\tau}{1+\tau} \qquad [3]$$

It can be observed in equation [3] that the profit share is an increasing function of the *mark-up*. That is, if firms as a whole increase the rate charged for each unit cost of production, there will be an increase in the share of aggregate income that is appropriated by capitalists.

In this case however, we must question what factors limit the ability of firms to add a high enough *mark-up* rate that makes capitalists appropriate all income generated.

According to Kalecki, the market power —*i.e.*— the capability of raising prices over unit costs —of firms in the industrial sector is considerable, but it is not unlimited. The magnitude of the mark-up is conditional to the monopoly power of the firms established in the sector. This, in turn, depends on: i) the degree of market concentration in this sector, ii) the degree in which "marketing" is able to substitute price-competition as a device of sales promotion and iii) the degree of organization of unions. All these factors are *structural features* of a market economy and must be taken as given in an analysis that emphasizes only how the growth rate of capital stock is determined.

Assuming that all income is divided into wages and profits and that the propensity to save from profits is bigger than the propensity to save from wages (which is equal to zero), it can be easily demonstrated that:

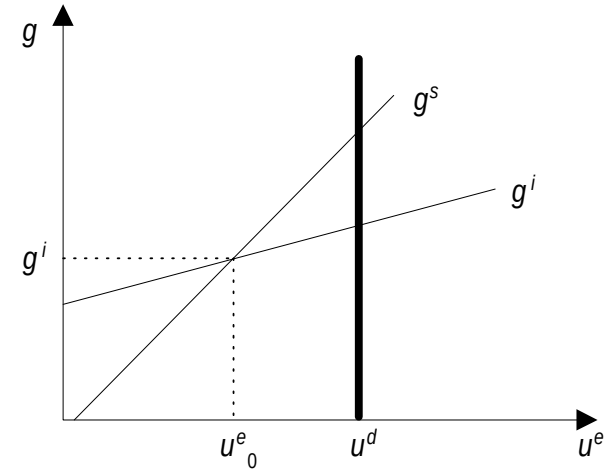
$$g^s = \frac{S}{K} = s_p \pi u^e \sigma^{-1} \qquad [4]$$

Where: σ is the capital-output relation and g^s is the growth rate of capital stock permitted by available savings.

The equilibrium in the goods market occurs when $g^i = g^s$. This equality, in turn, arises through changes in the degree of capacity utilization. If $g^i > g^s$, there will be an excess of demand in the goods market which will induce firms to increase the utilization of productive capacity. If $g^i < g^s$ there will be an excess supply of goods which will make firms reduce the production level and consequently, the degree of capacity utilization.

The following figure demonstrates the degree of productive capacity utilization and the capital stock growth rate:

FIGURE **2**



In figure 2 the equilibrium level of the effective degree of productive capacity utilization is lower than the "planned" or desired degree of capacity utilization.

A very interesting result of this Kalecki-Steindl model is that changes in the functional distribution of income have a significant impact on both the degree of capacity utilization and on the growth rate of capital stock. In particular, it can be shown that an increase in the wage share induced by a reduction in the mark-up can produce an increase in the rate of capital accumulation and an increase in the degree capacity utilization.

Let us consider that for whatever reason, an increase in wage share has occurred. Since the propensity to save out of wages is lower than the propensity to save out of profits, there will be a reduction in aggregate saving (that is, curve g^s will shift clockwise). For the initial level of capacity utilization there will be an excess proportion of investment relative to saving. In other words, there will be excess demand in the goods market. Firms will respond to this excess of demand through an increase in the effective level of capacity utilization. This will increase the savings rate and reestablish the equilibrium in the goods market.

This is not the end of the story. The increase in the effective degree of capacity utilization will reduce the difference between the latter and the planned degree of capacity utilization. In order to keep the level of barriers of entry constant, established firms will increase investment and the growth rate of capital stock.

Through the preceding reasoning we conclude that in this economy, the accumulation of capital is of the wage-led type; *i.e.* it is stimulated by increases in the wage share. This occurs because an increase in the wage share will produce an increase in consumption which will induce greater capital accumulation due to the effect of the latter over the degree of capacity utilization.

On the other hand, it is not true that an increase in the real wage rate necessarily results in a reduction in the profit rate. According to equation [2], we know that a reduction in the mark-up will produce an increase in the level of the real wage (w/p). We also know that profit share is an increasing

function of the mark-up. Thus, an increase in the real wage will produce a reduction in the profit share.

However, the profit rate is a function of the profit share, degree of capacity utilization and the inverse of the capital-output relation. Although it is true that an increase in the real wage rate produces a reduction in the profit share; it is also true that in accordance with previous analysis, such increases in the wage rate will produce a higher degree of capacity utilization. Thus, the relationship between the real wage and the profit rate is *indefinite* in the Kalecki-Steindl growth model. It is equally possible to have an inverse relationship between wages and profits or a direct relationship between these variables. Everything will depend on the sensitivity of the degree of capacity utilization to changes in the mark-up rate. In other words, the idea that a "profit squeeze" can occur through the growth of the wage-share is not true in the context of the Kalecki-Steindl growth model.[3]

A MODEL WITH AN ENDOGENOUS PLANNED DEGREE OF CAPACITY UTILIZATION

The Basic Structure of the Model

In the Kalecki-Steindl canonical model presented in section 2, the planned degree of capacity utilization is an exogenous variable to the model. In this context, an increase in the wage share would produce: i) an increase in the effective degree of productive capacity utilization and ii) an increase in the growth rate of capital stock.

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[3] In the words of Marglin and Bhaduri: " [...] the Keynesian objection to this view of profit squeeze is that a higher wage should increase aggregate demand, at least under the assumption that the propensity to save out of wages is less than the propensity to save out of profits. Although higher wages may diminish the profit per unit of output, business will make up this difference by an increased volume of production and sales. If investment demand increases with the rate of capacity utilization, there will be even greater aggregate demand, and both aggregate profits and the profit rate will be higher even as the profit share is lower" (1991, p. 154).

However, it is perfectly possible to make endogenous the determination of the planned degree of capacity utilization. In section 2 we saw that one reason for the existence of excess capacity is that established firms use idle capacity as a way to prevent the entrance of new competitors into the industry. Nevertheless, the excess capacity that is necessary to prevent the entrance of new firms will depend directly on the profit margin of established firms; since, the higher profit margins are, the greater the incentive will be for the entrance of new competitors. Therefore, the excess capacity that is necessary to discourage the entrance of new firms has to be higher. In this case, the planned degree of capacity utilization is given by:

$$u^d = 1 - k\left[1 - \frac{ATC}{p}\right]; \quad k > 0 \qquad [5]^4$$

Where: ATC is defined as average total costs.

We will assume, like Kalecki, that oligopolist firms follow a mark-up pricing rule for determining the prices of their products based on a set mark-up over the direct costs of production. This mark-up depends on the "monopoly power" of the firm which in turn is determined by structural factors like the level of barriers of entry, product differentiation, etc. We must take this rate as given in situations where no structural change has ocurred. If aggregate demand is not enough to guarantee the equality between planned and effective capacity utilization, then firms will reduce the degree of capacity utilization below planned and keep prices unchanged.

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[4] In equation [5] we see that desired degree of capacity utilization in an inverse function of profit margin, which is defined as:

$$\left[\frac{p - ATC}{p}\right]$$

The production costs of established firms are given by the following equation:

$$TC = wL + (i + \delta)\, pK \qquad [6]$$

Where w is the nominal wage rate, L represents the quantity of labor employed, i is the nominal interest rate and δ represents the depreciation of the stock of fixed capital.

Dividing the above equation by the total production of the established firms we get:

$$ATC = wq + \left(\frac{(i+\delta)\sigma}{u^e} \right) p \qquad [7]$$

Inserting [7] in [5][5], we get:

$$u^d = 1 - k\left[\pi - \frac{(i+\delta)\sigma}{u^e} \right] \qquad [8]$$

The profit rate [r] can be defined as

$$r = \frac{P}{Y}\, \frac{Y}{Y^K}\, \frac{Y^K}{K},$$

[5] From [7] we get:

$$\frac{ATC}{p} = \frac{w}{p} q + \frac{(i+\delta)\sigma}{u^e}$$

But $(w/p)q$ is the wage-share which is given by $(1-\pi)$. Putting this expression in [5], we get equation [8].

where P/Y, Y/Y^K and Y^K/K represent the profit margin, the effective degree of capacity utilization and the capital-output relation respectively. We can rewrite the rate of profit as:

$$r = \frac{\pi u^e}{\sigma} \qquad [9]$$

Inserting [9] into [4], we get the following equation:

$$g^s = s_p\, r \qquad [4a]$$

Investment, saving and pricing decisions are given by equations [1], [2] and [4a]. So equation [8] is the only real difference between our model and the canonical Kalecki-Steindl growth model.

Short Run Equilibrium Solution of the Model

In the short run, firms operate with a degree of capacity utilization that can be different from the planned degree. In other words, there might be divergences between the effective and the planned degree of capacity utilization. We will assume, however, that in the short run firms are able to sell everything they produce so that there is no involuntary accumulation of stock. This creates equality between planned investment and planned saving:

$$g^s = g^i \qquad [10]$$

Therefore, the model can be summarized by the following system of equations:

$$u^d = 1 - k\left[\pi - \frac{(i+\delta)\sigma}{u^e}\right] \qquad [8]$$

$$r = \frac{\pi u^e}{\sigma} \qquad [9]$$

$$g^i = f + h(u^e - u^d) \qquad [1]$$

$$g^s = s_p\, r \qquad [4]$$

$$g^s = g^i \qquad [10]$$

The endogenous variables of the system are: g^i, g^s, r, u^d *and* u^e. There are five variables to be determined by five independent linear equations. In this case, the above system of equations has at least one solution.

In order to solve this model for the short run equilibrium configuration, we must first substitute equation [8] into equation [1] in order to obtain the following expression:

$$g^i = f + h\left[\frac{u_e^2 - (1 - k\pi q)u^e - (i + \delta)\sigma}{u^e}\right] \qquad [11]$$

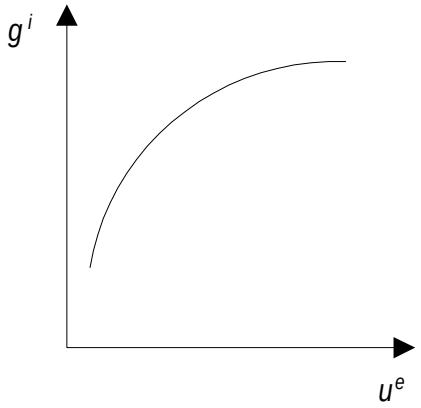
Equation [11] presents the growth rate of capital stock as a function of the effective degree of capacity utilization. Taking the first derivative of this expression relative to u^e and g^i, we get:

$$\frac{\partial g_i}{\partial u_e} = \left[h + \frac{h(i + \delta)\sigma}{u_e^2}\right] > 0 \qquad [11a]$$

As a result, an increase in the effective level of capacity utilization will produce an increase in investment and in the growth rate of capital stock. This is the so-called "accelerator effect" of changes in the production levels of firms over their investment decisions. However, it must be observed that each increase in capacity utilization will produce a smaller

increase in the capital stock growth rate. In this context, the relationship between capacity utilization and the growth rate of capital stock can be shown by the following figure:

FIGURE **3**



Substituting [11] and [4] into [10], we get:

$$u_e^2 + \left[\frac{f - h(1-k\pi q)}{h - s_p\pi\sigma^{-1}}\right]u_e - \left[\frac{h(i+\delta)\sigma}{h - s_p\pi\sigma^{-1}}\right] = 0 \qquad [12]$$

This equation will have two real roots if the following condition is satisfied:

$$[f - h(1-k\pi q)]^2 - 4h(i+\delta)\sigma(h - s_p\pi\sigma^{-1}) > 0 \qquad [12a]$$

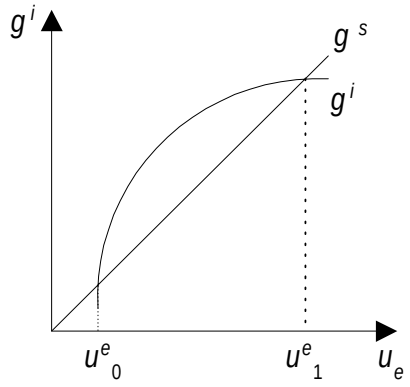
These roots will be positive if these conditions are met:

$$h < s_p\pi\sigma^{-1} \qquad [12b]$$

$$f > h(1-k\pi q) \qquad [12c]$$

Equation [12b] is the traditional stability assumption of Keynesian growth models that is supported by the idea that the propensity to save is larger than the propensity to invest. We must observe that if conditions [12b] and [12c] are imposed in the model, then condition [12a] will always be satisfied. In this case, equation [12] will have two distinct real positive roots. This means that our economy has two equilibrium levels for the degree of capacity utilization, as we can see in figure 4.

FIGURE **4**



It can be easily shown that the equilibrium point with a high degree of capacity utilization is stable and the equilibrium with a low degree of capacity utilization is unstable.

Profit-share is an exogenous variable determined by the rate of the mark-up in the short run equilibrium configuration of this economy. Since the structure of the industry —determined by the number of established firms— is given, the degree of monopoly is constant. This means that the ability of firms to fix prices above unitary costs is also given. In this context, we can do some comparative static experiments with profit share. In other words, we can analyze the effect of an exogenous change in the profit share —due to a change in mark-up rate— over the "high" equilibrium level of capacity utilization.

An increase in the profit share will produce an increase in the equilibrium level of capacity utilization if

$$\frac{\partial g^i}{\partial \pi} > \frac{\partial g^s}{\partial \pi}.$$

This condition will be met if

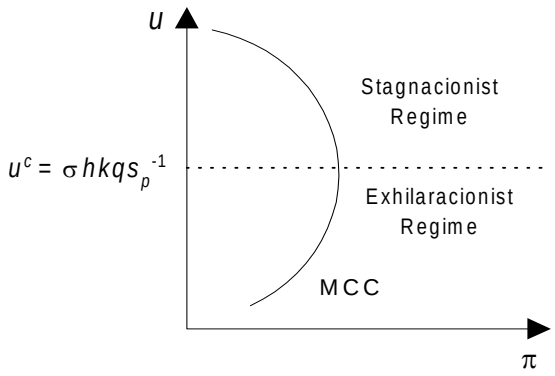
$$u_e < \frac{\sigma hkq}{s_p}.$$

However, if

$$u_e > \frac{\sigma hkq}{s_p}$$

an increase in the profit share will produce a reduction in the equilibrium level of capacity utilization. Hence, an increase in the profit share can result in either an increase or a decrease in the degree of capacity utilization; depending on the initial value of this variable. Consequently, the relationship between the profit margin and the effective degree of capacity utilization is *no-linear*, given by an inverted "C" curve represented in figure 5.

FIGURE **5**



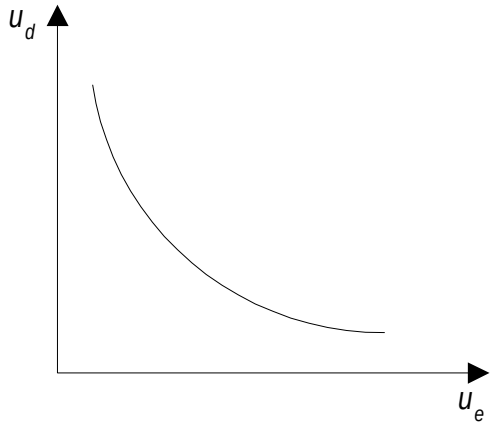
In figure 5 we can observe the existence of two macroeconomic regimes: a "stagnacionist regime" in which an increase in profit share produces a reduction in the effective level of capacity utilization and an "exhilaracionist regime" in which an increase in the profit share will result in an increase in the degree of capacity utilization.

The relationship between the effective and the desired degree of capacity utilization is given by equation [8]. By evaluating the impact of a change in u^d *and* u^e we obtain:

$$\frac{\partial u_d}{\partial u_e} = -\frac{k(1+\delta)\sigma}{u_e^2} < 0 \qquad [13]$$

Equation [13] shows the existence of an inverse relationship between the effective and the planned degree of capacity utilization. An increase in the effective degree of capacity utilization will produce a reduction in the average production costs of established firms which in turn will increase economic profits given the rate of the mark-up. In order to deter the entry of new competitors, established firms have to increase their excess capacity. This will cause a reduction in the planned degree of capacity utilization. The relationship between these two variables is shown in figure 6.

FIGURE **6**



It must be noted that in the short run equilibrium configuration of this economy, the equilibrium level of the effective degree of capacity utilization can be lower or greater than the desired degree of capacity utilization. In the short run, this situation will not trigger the entrance of new firms into the industry. Therefore, the mark-up can remain constant. In this case, the equilibrium level of capacity utilization will be determined by equation [12]. Once this variable is determined, the planned degree of capacity utilization will be determined by equation [8]. It is quite obvious, that except for a "lucky coincidence", the effective and planned levels of capacity utilization will be different.

THE LONG RUN EQUILIBRIUM SOLUTION OF THE MODEL

In the long run, the "degree of monopoly" is *endogenous*. If established firms persistently operate with a degree of capacity utilization higher than the planned degree, the entrance of new competitors will occur which will reduce the "degree of monopoly" of established firms as well as the profit share. This means that the profit share will change according to the following differential equation:

$$\dot{\pi} = \theta(u_d - u_e);\ \theta > 0 \qquad [14]$$

Substituting [8] in [14] we get:

$$\dot{\pi} = \theta\left[1 - k\left(\pi - \frac{(i+\delta)\sigma}{u_e}\right) - u_e\right] \qquad [15]$$

Income distribution between wages and profits will be constant through time if and only if desired and planned levels of capacity utilization are equal. That is, if the following condition is met:

$$u = 1 - k\left(\pi - \frac{(i+\delta)\sigma}{u}\right) \qquad [16]$$

Equation [16] is the "no-entry-condition", *i.e.* the condition that must be met in order to avoid the entry of new competitors into the industry. Taking the first derivative of this equation in relation to u and π, we get:

$$\frac{\partial u}{\partial \pi} = -\frac{kqu^2}{u^2 - (i+\delta)\sigma k} \qquad [16a]$$

The numerator of [16a] is always positive. Therefore, the sign of this expression depends entirely on the sign of the denominator.

If $u^2 - (i+\delta)\sigma k > 0$, then $\frac{\partial u}{\partial \pi} < 0$.

But, if $u^2 - (i+\delta)\sigma k < 0$, then $\frac{\partial u}{\partial \pi} > 0$.

This means that a critical value of u exists —equal to $[(i+\delta)\sigma k]^{-\frac{1}{2}}$— above which u and π are negatively related and below which these variables are positively related. This can be shown by the "no-entry-condition" curve (NEC) in figure 7.

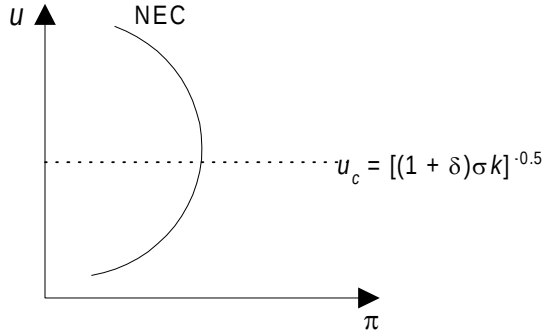
The effective degree of capacity utilization will be changing through time according to the following differential equation:

$$\dot{u} = \lambda(g^i - g^s); \lambda > 0 \qquad [17]$$

Substituting [4] and [11] in [17] we get:

$$\dot{u} = \lambda\left\{\left[h - \frac{S_p \pi}{\sigma}\right]u^2 + \left[f - h(1 - k\pi q)\right]u - h(i+\delta)\sigma\right\} \qquad [18]$$

FIGURE **7**



In "steady-state", the effective degree of capacity utilization will be constant so that $g^i = g^s$. This equality will hold if equation [12] is satisfied. In this case, the relationship between u and π for which the goods market is in equilibrium is given by figure 5.

The long-run equilibrium configuration of this economy is such that: $\dot{u} = \dot{\pi} = 0$. This will occur at the intersection of the "no-entry-condition" curve (NCE) and the "market-clearing-condition" curve (MCC). Since both curves are backward-bending, there are several possible equilibrium configurations as we can see in figures 8a, 8b and 8c:

FIGURE **8a**

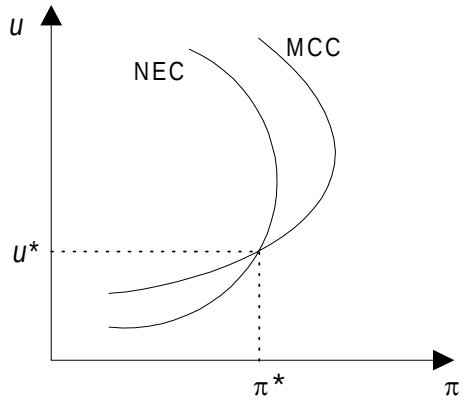


FIGURE **8b**

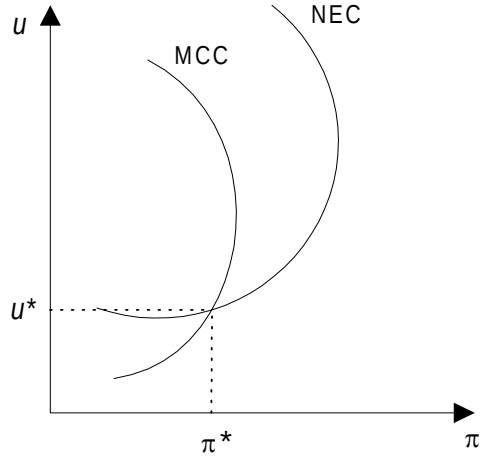
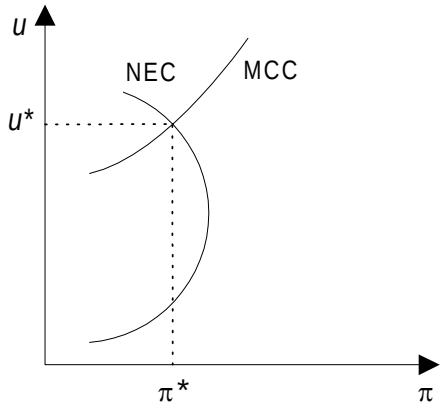


FIGURE **8c**



In order to analyze the stability of the long-run equilibrium position of this economy we will assume —following Dutt (1984)— that at each point in time, the economy is in equilibrium for the goods market so that it must always be on the MCC curve. In this case, the dynamics of the system is entirely determined by equation [15]. According to this equation, all points located to the left of the NCE curve are such that the monopoly power of established firms

and the profit share are decreasing due to the entrance of new firms into the industry and all points located to the right of this curve are such that monopoly power of established firms and the profit share are increasing. Given these dynamics for the profit share, it can be easily shown that the equilibrium configurations of figures 8a and 8c are *stable*, but the equilibrium configuration represented by figure 8b is *unstable*.

Since in the long run equilibrium configuration for this economy the effective degree of capacity utilization is equal to the planned or desired degree of capacity utilization, the growth rate of capital stock will be given by $g^i = f$. In other words, investment is completely determined by capitalists' *animal spirits* and is completely independent of changes in capacity utilization or changes in income distribution between wages and profits. This means that there is no such a thing as wage-led or profit-led growth in the long run.

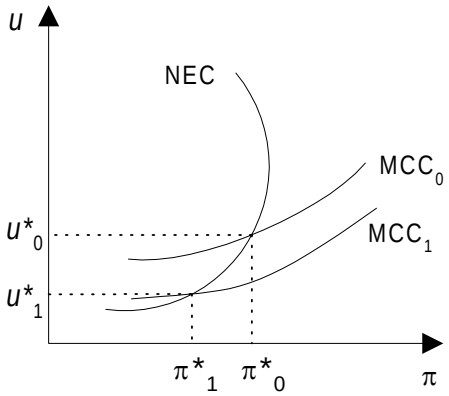
However, changes in capitalists' animal spirits can change long run equilibrium values of capacity utilization and the profit share. In fact, let us consider that —for whatever reason— there had been a reduction in *animal spirits*. In this case, the MCC curve will shift down in figures 8a and 8c which will result in the new equilibrium configurations represented in figures 9a and 9b.

In Figure 9a, the initial equilibrium position is in the upward sloping region of the NCE curve. In this case, a reduction in *animal spirits* will produce a reduction in capacity utilization and in the profit share. Since the rate of profit is a product of the profit share and the degree of capacity utilization, a *profit squeeze* situation will occur as a result of a reduction in the rate of capital accumulation. Although this result seems similar to the *profit squeeze* story of Marglin and Bhaduri, the causality of growth and distribution is reversed. In the Marglin and Bhaduri model, an increase in the profit share may reduce investment which will reduce the rate of economic growth. However, in our model, an exogenous reduction in the rate of economic growth will produce both a reduction in the profit margin and in capacity utilization.

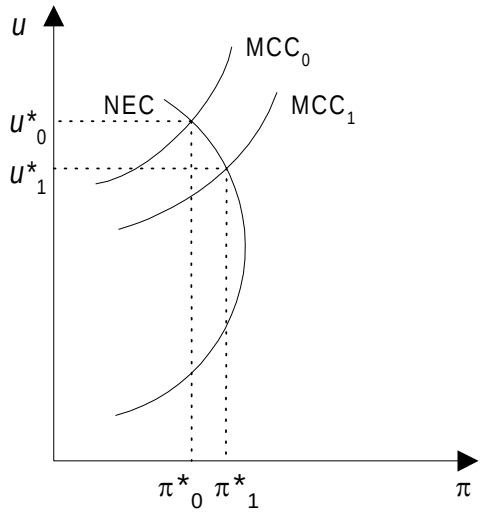
FIGURE **9a**

FIGURE **9b**

In figure 9b, however, a reduction in the *animal spirits* of the capitalists will



produce a reduction in capacity utilization but an increase in the profit share.



This result appears similar to the "stagnation" story in which an increase in the mark-up rate, due to an increase in monopoly power of established firms, will produce a reduction in the wage share and a reduction in the effective degree

of capacity utilization (due to a reduction in consumption expenditures). It is important to note; that the increase in profit share and the reduction in capacity utilization are in our model, both the result of an exogenous reduction in the rate of economic growth.[6]

CONCLUSION

In this article, we argued that the impact of an increase in the wage share over capacity utilization and the growth rate of capital stock depends on the way in which the planned degree of productive capacity utilization is represented in Post-Keynesian growth models. If the planned degree of productive capacity utilization is *exogenous*, then an increase in the wage share will result in a reduction of excess capacity and an increase in the growth rate of capital stock.

On the other hand, if the planned degree of capacity utilization is *endogenous*, then an increase in the wage share can produce either an increase or a reduction of capacity utilization in the short run, depending on the effect that changes in income distribution have on planned excess capacity. In the long run, however, the capital stock growth rate is independent of the distribution of income between wages and profits. Therefore, *accumulation regimes* do not exist in the long run. In the long run, the capital stock growth rate depends only on capitalists' *animal spirits*.

However, changes in the rate of capital accumulation will produce changes in income distribution and capacity utilization. If the initial long-run equilibrium

[6] A reader may ask what would happen if, instead of a reduction, an increase in animal spirits occurs. In both cases —figures 9a and 9b— the economy will register an increase in long-run capacity utilization. However, this increase will not produce destabilizing effects over the long-run equilibrium position as in Harrod´s growth model. In fact, the long-run equilibrium positions described by figures 8a and 8c are *stable,* as we have already seen. The stability of these equilibrium positions makes the occurrence of a process of cumulative divergence between warranted and effective rates of growth impossible, as it occurs in Harrod (1939).

position of the economy is in the upward region of the "no-entry-condition" curve, then a reduction in the growth rate of capital stock will reduce both profit share and capacity utilization. This result is similar to the *profit squeeze* story of Marglin and Bhaduri but has a completely different causality between growth and distribution. Instead of changes in income distribution causing changes in the rate of economic growth, the reverse occurs; changes in economic growth produce —through changes in monopoly power of established firms— changes in income distribution. If the initial long-run equilibrium position of the economy is in the downward sloping region of the "no-entry-condition" curve, a reduction in the rate of capital accumulation will produce an increase in the profit share but a reduction in the level of capacity utilization. This is similar to the "stagnation" story but with an inverse relationship between growth and distribution.

As a corollary to these conclusions, it may be argued that a *profit squeeze* situation is not the result of an increase in the power of labor unions, which will produce increases in real wages ahead of productivity growth; but rather the result of a reduction in the animal spirits of the capitalists which reduce the rate of economic growth. Therefore, it can be concluded that a reduction in profitability is the outcome rather than the cause of stagnant growth.

REFERENCES

Amadeo, E.J., *Expectativas, Demanda Efetiva e Centros de Gravitação in Ensaios de Economia Pós-Keynesiana*, Lopes, C (org.), Imprensa Universitária, Universidade Federal do Ceará, 1987.

Bhaduri, A. and S. Marglin, "Unemployment and the Real Wage: the economic basis for contesting political ideologies", *Cambridge Journal of Economics*, 14(4), 1990.

Carvalho, F.C., *Mr. Keynes and the Post Keynesians: principles of macroeconomics for a monetary production economy*, Edward Elgar, Aldershot, 1992.

Dutt, A., "Stagnation, Income Distribution and Monopoly Power", *Cambridge Journal of Economics*, 8, 1984.

———, "Growth, Distribution and Uneven Development", Cambridge, Cambridge University Press, 1990.

Harcourt, G., *Post Keynesian Thought*, mimeo, IE/UFRJ, 1999.

Harrod, R., *An Essay in Dynamic Theory in Growth Economics*, in A. Sen (org.), Middlesex, Penguin Books, 1939.

Kaldor, N., "A Model of Economic Growth", *Economic Journal*, 67, 1957.

———, "Capital Accumulation and Economic Growth", in *Further Essays on Economic Theory*, Nova Iorque, Holmes & Meier Publishers, 1958.

Keynes, J.M., *The General Theory of Employment, Interest and Money*, Cambridge, Macmillan Press, 1936.

Lima, G.T., "Endogenous Technological Innovation, Capital Accumulation and Distributional Dynamics", *Papers and Proceedings of V International Workshop in Post Keynesian Economics*, Knoxville, 1998.

Marglin, S.A. and A. Bhaduri, "Profit Squeeze and Keynesian Theory", in S.A. Marglin and J.B. Schor (org.), *The Golden Age of Capitalism*, Oxford, Clarendom Press, 1990.

Oreiro, J.L., "A Decisão de Investir da Firma: uma abordagem a partir da teoria das barreiras à entrada", *Papers and Proceedings of XXV Meeting of Brazilian Economic Association-ANPEC,* Recife, 1997.

———, *Incerteza, Instabilidade Macroeconômica e Crescimento Endógeno : ensaios em teoria pós-keynesiana,* Unpublished PhD. Thesis, IE/UFRJ, 2000.

Oreiro, J.L. and D. Gottlieb, "Acumulação de Capital, Distribuição de Renda e Utilização da Capacidade Produtiva: um modelo pós-keynesiano de crescimento com grau desejado de utilização endógeno", *Papers and Proceedings of VI Meeting of Brazilian Society of Political Economy-SEP*, São Paulo, 2001.

Panico, C. and N. Salvadori, *Post Keynesian Theory of Growth and Distribution*, Aldershot, Edward Elgar, 1993.

Pasinetti, L., "Rate of Profit and Income Distribution in Relation to the Rate of Economic Growth", *The Review of Economic Studies,* vol. XXIV, no. 4, 1961-1962.

Possas, M.L., *Dinâmica da Economia Capitalista: uma abordagem teórica*, São Paulo Brasiliense, 1987.

———, *Estruturas de Mercado em Oligopólio*, Campinas, Hucitec, 1990.

Robinson, J., "A Model of Accumulation", in A. Sen (org.), *Growth Economics*, Middlesex, Penguin Books, 1962.

Rowthorn, R., "Demand, Real Wages and Economic Growth", *Thames Papers in Political Economy*, Autumn, 1981.

Ros, J., "Inflation, Stabilization and Growth: multiple equilibria in a structuralist model", in A. Dutt and J. Ros, (eds.), *Development Economics and Structuralist Macroeconomics*, Aldershot, Edward Elgar, 2003.

Skott, P., *Conflict and Effective Demand in Economic Growth*, Cambridge, Cambridge University Press, 1989.

Spence, M., "Entry, Capacity, Investment and Oligopolistic Pricing", in *Bell Journal of Economics*, 8(2), 1977.

Steindl, J., *Maturidade e Estagnação no Capitalismo Americano*, São Paulo, Nova Cultural, 1983 [original edition, 1976].

Taylor, L., "A Stagnationist Model of Economic Growth", *Cambridge Journal of Economics*, 1985.

You, J., "Macroeconomic Structure, Endogenous Technical Change and Growth", *Cambridge Journal of Economics*, 18, 1994.