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Income Distribution, Inflation and Economic Growth: A Post-Keynesian Approach

Summary: The dispute between social classes for fractions of income was a central theme for economic analysis at least since David Ricardo and Karl Marx. Its importance as an interpretative key declined with the marginalist revolution of the late nineteenth century and did not regain its central role in the conventional economic approach ever since. However, its relevance was maintained among heterodox economists such as Michal Kalecki and reinvigorated by post-Keynesian thinking. This paper seeks to offer three analytical contributions to the post-Keynesian literature: (1) it presents an integrated framework on the relationship between distributive conflict, inflation and economic growth in an open economy with government; (2) it proposes the use of a general framework, based on liquid preference, assets own interest rates, currency hierarchy and productivity differentials to understand the determinants of the spot exchange rate; and (3) it suggests a distinct monetary rule to take into account the role of interest rates on distributive conflict inflation and demand and growth regimes.

Key words: Income distribution conflict, Exchange rate, Inflation, Economic growth.

JEL: E12, E25, E31, O41.

"Conflict is endemic in the capitalist system and concerns all aspects of economic life: the technics of production to be used, the length and intensity of the working day, and the distribution of income. Naturally, these are all interconnected and what happens in one sphere influences what happens in the rest, and all in some way affect the behavior of wages and prices" (Robert E. Rowthorn 1977, p. 215).

"… inflation is the symptom of deep-rooted social and economic contradiction and conflict. There is no real equilibrium path. The major economic groups are claiming pieces of pie that together exceed the whole pie. Inflation is the way that their claims, so far as they are expressed in nominal terms, are temporarily reconciled. But it will continue and indeed accelerate so long as the basic conflicts of real claims and real power continue" (James Tobin 1981, p. 28).

"In economic theories that allow for aggregate demand to influence long-run growth, a crucial and unresolved question is how the distribution of income between wages and profits affects aggregate demand and the growth rate. A long tradition of 'underconsumptionist' thinking dating back to the early nineteenth century … asserted that low wages (and high profits) would lead to chronically depressed consumer

demand, which in turn would tend to cause overall economic stagnation unless offset by some other factors. However, another strand of thinking dating back to Ricardo and Marx recognizes that a high rate of profit can be a stimulus to capital accumulation or, in more modern terms, demand for investment. These alternative views have led to different perspectives about whether demand-determined growth is more likely to be wage-led or profit-led, and thus whether there is a conflict between growth and equity objectives in the formulation of economic policy" (Robert A. Blecker 2002, p. 129).

Inflation and growth are central themes in economics and have been the subject of intense debate and controversy ever since. Nevertheless, the relationship between them is not always clear. One of the most interesting aspects of the contemporary debate regarding this connection concerns to the role that the dispute over the appropriation of fractions of national income can have in determining these two variables.

In this sense, the purpose of this paper is to analyze the possible links between income distribution, inflation and economic growth in open economies and with government. To that end, we have developed a post-Keynesian model that seeks to illustrate the way in which income distribution conditions, on the one hand, inflation and, on the other, economic growth. In addition, we will try to show that the characterization of the economy as wage-led or profit-led has implications on the relationship between price variations and economic growth.

This paper seeks to offer three analytical contributions to the post-Keynesian literature: (i) it presents an integrated framework on the relationship between distributive conflict, inflation and economic growth in an open economy with government; (ii) it proposes the use of a general framework, based on liquid preference, assets own interest rates, currency hierarchy and productivity differentials to understand the determinants of the spot exchange rate; and (iii) it suggests a distinct monetary rule to take into account the role of interest rates on distributive conflict inflation and demand and growth regimes.

The paper is divided into four sections, beyond this introduction. In the first section, we briefly discuss the post-Keynesian debate on inflation and distributive conflict, and present a model of inflation and conflict. In the second section, we develop a demand-driven growth model and in Section 3 we established the connections between inflation and growth. The last section is devoted to the main conclusions of the paper.

1. Inflation and Distributive Conflict

Since Rowthorn's seminal work (1977) the connection between inflation and the dispute over national income has become a key part of post-Keynesian thought. Rowthorn's work sought to give more precise form to the theoretical elements developed by Kalecki, but which were already present in Keynes's "Fundamental Equations" (John Maynard Keynes 1930a, b) and, much earlier, by Karl Marx (1986, 1996).

In the post-Keynesian tradition, inflation is not generally related to the existence of excess demand due to monetary expansion. This is because the money supply is endogenous, so that its growth stems only from the increased demand for money. In this sense, the supply of money can at most be sanctioning an inflationary process, which origin lies elsewhere. But what place?

According to Marc Lavoie (1992): "Post-Keynesians argue that the 'economy is primarily a money-wage system' (Sidney Weintraub 1978, p. 66) (…). This is so, firstly because money enters the circuit when firms distribute wages and salaries to their employees, the stock of money resulting basically from this influx of money wages not having yet flowed back to firms and been repaid to the banks. Secondly, the economy is a money-wage system because, in a vertically-integrated system, costs are the determinant of the general price level, the main element of cost being the (exogenous determined) wage rate" (p. 373).

Although the idea that inflation is primarily a result of cost variations may seem reasonable, the assertion that wages account for the largest share of costs may sound like blaming workers for inflation. However, as Lavoie himself points out, inflation has its origins in the conflict between the various agents who appropriate the income generated in the productive process.

The oligopoly pricing equation for a closed economy without government helps to illuminate the idea. If prices (p) can be defined by applying a mark-up (σ) over unit direct costs (w'/q), then we have $p = (1 + \sigma)(w'/q)$, where w' is the average nominal wage, q is the labor productivity (y/L), y is the aggregate real product and L is the labor stock. The immediate implication of this price formation process is that the inflation rate positively depends on the mark-up and wage growth rates and, negatively, on the increase in productivity.

The inspiration for this type of approach is, as Thomas I. Palley (1996) well observes, the cost-push inflation theory developed in the 1950s. However, rather than mapping the channels that lead to price increases, the theory intends to identify the conflicts between different groups in society by the appropriation of fractions of the surplus generated.

Thus, in its simplified version, inflation presents itself both as a result of wage pressure (*wage inflation*) from workers and by the desire for greater profit margins from capitalists (profits inflation), clarifying the notion of distributive conflict (Amitava Krishna Dutt 1990; Lance Taylor 1991; Lavoie 1992, 2014).

The increase in mark-ups may be related to a series of factors such as the compatibility between the current profit margin and the historical profitability of capital assets (Lavoie 2002), the reduction in competition in the product market or, even and ultimately, to demand pressures[1].

It is important to note that demand is an element, if not marginal, with at least indirect and moderate impacts on the inflationary process[2], largely because of the hypothesis, or even the fact that: (a) capacity utilization is, in general, below the maximum; and (b) there is an excess of labor supply. These hypotheses/evidences imply, above all, that the productive sectors, as a rule, are not subject to decreasing marginal

[1] The post-Keynesian tradition obviously does not disregard the fact that prices in some markets are determined by demand, which brings us to the old dichotomy between fix and flex prices so well analyzed by Hicks and Kalecki (Antonio Carlos Macedo e Silva 1999). However, due to the preponderance of the "fix price" markets and by way of simplification, prices will be assumed to be determined by the mark-up equation.

[2] Nevertheless, several authors develop post-Keynesian models in which demand can play an important role in determining inflation (see in this regard Palley 1996).

incomes and that increases in prices cannot be related to the phenomena of scarcity of products or factors.

In short, inflation has its origin and its repercussions in the dispute over the share of national income. However, as will be seen, the confrontation takes place, more precisely, between what the agents consider (fair pay) and what they actually receive (current pay). According to Lavoie: "[t]here are aspirations gaps between what is expected and necessary on the one hand, and what is actually being obtained on the other" (1992, p. 378). This gap between desired and received payment can be associated with both, the purchasing power of wages (wage-price spiral) and the relative wage between the different workers groups (wage-wage spiral).

One of the aspects most emphasized by post-Keynesian authors regarding inflation is related to the institutional characteristics of the phenomenon. These institutional features can be called inductive and permissive factors for the inflationary process.

Among the inductive factors, it is necessary to emphasize, firstly, the normative considerations made by workers and capitalists about their respective incomes. According to Lavoie: "[i]n post Keynesian theory inflation is explained by normative values, that is pay norms, customs, equity and justice. These norms have an impact on the perception of what is a fair relative wage, a fair real wage, and a fair profit share" (1992, p. 379).

The definition of fair profits and wages is obviously difficult to determine. In any case, its meaning is related to the historical context and social practices in which agents are involved.

Another important element inducing inflation is the diffusion and access to information. This is because the perception of justice is relative and depends on the agents' ability to access comparable information (Lavoie 1992).

Regarding the permissive factors of inflation, three elements emerge as the most important: (1) the existence of administered prices; (2) the existence of collective bargaining; and (3) economic policies to get full employment.

The term "administered price" aims to oppose the notion of market price, evidencing the resilience that firms have in face of changes in demand and, therefore, the low variability of prices in the face of market conditions. It is important to note that this resistance results not only from the oligopoly conditions in several goods markets, but also from the existence of inequality of power between producers and consumers. It can be said that, at least in part, this inequality is related to asymmetric information (or some kind of uncertainty) about the quality of products.

The existence of collective bargaining can be described as another permissive element of inflation, insofar as it is capable of causing wage increases. This is due to the great bargaining power that workers' unions have achieved throughout the 20th century. This power (reduced in the last thirty of forty years) comes from the legal protection to workers' movements (labor legislation), as well as from the financial power of these unions.

The main characteristic of macroeconomic policies is to sanction or veto complaints for higher wages and mark-up increases. When aimed at full employment, macroeconomic policies tend to be permissive to inflation, stemmed from distributive conflict.

In this sense, it is important to emphasize that the inflationary process is distinguished, above all, as a phenomenon whose determination is strictly associated with the institutional characteristics of each type of society.

1.1 Inflation, Exchange Rate and Income Distribution: Preliminary Issues from the Price Equation

In this section, it will be developed a model of inflation and distributive conflict, seeking to highlight the institutional aspects that affect the evolution of prices in a given economy.

The starting point of any post-Keynesian model of inflation is the formation price rule, as postulated originally by Kalecki. In an open economy with government, this rule means a mark-up over direct unit costs which, in this case, includes in addition to wages, taxes and the value of imported inputs in national currency[3], so that:

$$p = (1+\sigma)\left(\frac{w}{q} + t + m\right), \tag{1}$$

$$m = \frac{ep_f b}{y} = \frac{M}{y}, \tag{2}$$

in which σ is the *mark-up*, w is the mean net nominal wage, which is the difference between the total wages (W) and total taxes (T) divided by the number of workers (L), q is the productivity, that is, the product (y) per worker (L), t represents the total taxes divided by the aggregate real product, (e) is equivalent to the nominal exchange rate, p_f refers to imported input prices measured in foreign currency[4], b is the quantum of imported inputs, so that the product of the last three components divided by the actual product reflects the unit cost of these inputs (m).

If $\tau = \frac{t}{w/q}$ and $\mu = \frac{m}{w/q}$, we get: $p = (1+\sigma)(1+\tau+\mu)\frac{w}{q}$. Taking their growth rates, we get $\hat{p} = \hat{w} - \hat{q} + \hat{\Theta} + \hat{\jmath}$, in which $\hat{\Theta} = \widehat{(1+\sigma)}$ and $\hat{\jmath} = \widehat{(1+\tau+\mu)}$.

The first aspect to be emphasized about this equation is that it allows to evaluate the positive effects of wages changes and the negative ones of productivity on price variations. Secondly, it allows assessing the positive impacts not only of nominal exchange rate devaluations, but also of international prices and the weight of imported inputs in the cost structure on domestic prices. Finally, the equation reveals the possible positive influences of changes in the tax rates on prices.

We know that the value added is:

$$VA = py - m = W + \Pi + T, \tag{3}$$

in which:

$$W = wL, \tag{4}$$

[3] Obviously, in economies with relatively high inflation, one should consider some rule of price indexation as in Taylor (1991, Chapter 4). However, as the purpose of this paper is not to analyze the impact of indexation mechanisms, we will omit this aspect of the analysis.

[4] We will denote the net real average wage by ω, so that $\omega = w/p$ and the real exchange rate by e_r, so that $e_r = e(p_f/p)$.

$$T = ty. \tag{5}$$

So, from (3), we have:

$$VA = py - M = W + \Pi + T \Rightarrow \Pi = py - (W + T + M). \tag{6}$$

Substituting (3), (4) and (5) into (6), follows:

$$\begin{aligned} \Pi = py - (wL + ty + my) = py - (wL + ty + my) \cdot \frac{w/q}{w/q} \\ = py - \left(wL \cdot \frac{w/q}{w/(y/L)} + \tau y \cdot \frac{w}{q} + \mu y \cdot \frac{w}{q}\right) \\ = py - \left(\frac{w}{q} \cdot y + \tau \frac{w}{q} \cdot y + \mu \frac{w}{q} \cdot y\right) = py - \left[(1 + \tau + \mu) \cdot \frac{w}{q}\right] y \\ = \left[(1 + \sigma)(1 + \tau + \mu) \cdot \frac{w}{q}\right] y - \left[(1 + \tau + \mu) \cdot \frac{w}{q}\right] y \\ = \left[(1 + \tau + \mu) \cdot \frac{w}{q}\right] y(1 + \sigma - 1). \end{aligned} \tag{7}$$

Then, we can define the total profits as:

$$\Pi = \sigma y(1 + \tau + \mu) \cdot \frac{w}{q}. \tag{8}$$

In turn, the share of profits in national income in an open economy with government will be given by:

$$\Pi = \frac{\sigma(1 + \tau + \mu)}{1 + \tau + \sigma(1 + \tau + \mu)}. \tag{9}$$

In an open economy with government, the share of profits in national income depends not only on mark-up, but also on the tax burden, as well as on the weight of inputs imported into the cost structure. Therefore, the dynamics of the functional distribution of income is much more complex than in closed-economy models make us believe (Eckhard Hein 2014; Lavoie 2014). The above equation reveals that when mark-up goes up it increases profit share, as expected. In the same vein, the increase in the weight of imported inputs in the cost structure has the same effect, be it promoted by nominal exchange rate devaluation, by the rise in external prices or by the growth of imported inputs volume. In turn, raising tax rates has a negative impact on the part of the surplus appropriated by profits, as well as the increase in nominal wages, or in the wage share, as might be expected.

$$\frac{\partial \pi}{\partial \sigma} = \frac{(1+\tau+\mu)(1+\tau)}{[1+\tau+\sigma(1+\tau+\mu)]^2} > 0; \tag{10}$$

$$\frac{\partial \pi}{\partial \mu} = \frac{\sigma(1+\tau)}{[1+\tau+\sigma(1+\tau+\mu)]^2} > 0; \tag{11}$$

$$\frac{\partial \pi}{\partial \tau} = -\frac{\sigma\mu}{[1+\tau+\sigma(1+\tau+\mu)]^2} < 0; \tag{12}$$

$$\frac{\partial \pi}{\partial w/q} = -\frac{\frac{(\sigma\mu)w}{q}}{\left\{\frac{[1+\tau+\sigma(1+\tau+\mu)]w}{q}\right\}^2} < 0. \tag{13}$$

An important aspect of this distributive dynamics concerns to the movements in the real exchange rate and its relation with the trajectory of the functional income distribution. By definition, the real exchange rate (e_r) corresponds to the product of the nominal exchange rate by the international prices divided by the domestic prices. If we assume that international prices and, for a while, the nominal exchange rate are given and we replace domestic prices by:

$$\mu = \frac{m}{w/q}, \tag{14}$$

we will get:

$$e_r = \frac{ep_f}{p} = \frac{ep_f}{\frac{(1+\sigma)(1+\tau+\mu)w}{q}}. \tag{15}$$

When we evaluate the impacts of mark-ups variations, the weight of imported inputs on the cost structure, the tax rates, as well as the wage share, it is possible to perceive that all affect negatively the real exchange rate and, consequently, competitiveness of the economy.

$$\frac{\partial e_r}{\partial \sigma} = -\frac{\frac{ep_f(1+\tau+\mu)w}{q}}{\left[\frac{(1+\sigma)(1+\tau+\mu)w}{q}\right]^2} < 0; \tag{16}$$

$$\frac{\partial e_r}{\partial \mu} = -\frac{\frac{ep_f(1+\sigma)w}{q}}{\left[\frac{(1+\sigma)(1+\tau+\mu)w}{q}\right]^2} < 0; \tag{17}$$

$$\frac{\partial e_r}{\partial \tau} = -\frac{\frac{ep_f(1+\sigma)w}{q}}{\left[\frac{(1+\sigma)(1+\tau+\mu)w}{q}\right]^2} < 0; \tag{18}$$

$$\frac{\partial e_r}{\partial w/q} = -\frac{(1+\sigma)ep_f}{\left[\frac{(1+\sigma)(1+\tau+\mu)w}{q}\right]^2} < 0. \tag{19}$$

These results correspond to what intuition suggests and, by themselves, reveal nothing new. However, they explain something much more important, namely the co-movements between the real exchange rate and the functional distribution of income. On the one hand, real exchange rate appreciations (reductions of real exchange rate) stemming from increases in mark-ups and the weight of imported inputs in the cost structure are associated with increases in profit share. On the other hand, the reduction of the real exchange rate resulting from the increase in the tax rates and the wage share is related to its decrease.

Therefore, it is possible to say that, while in the first two cases there is an inverse relationship between the share of profits and the real exchange rate, in the latter two cases this relationship is direct.

The only variable that positively affects both the profit share and the real exchange rate is the nominal exchange rate, as can be seen from the following partial derivatives:

$$\frac{\partial \pi}{\partial e} = \frac{\frac{\sigma p_f b(1+\tau)w}{q}}{\left\{\frac{[1+\tau+\sigma(1+\tau+\mu)]w}{q}\right\}^2} > 0; \tag{20}$$

$$\frac{\partial e_r}{\partial e} = \frac{p_f(1+\tau)}{\frac{(1+\sigma)(1+\tau+\mu)^2 w}{q}} > 0. \tag{21}$$

However, the direct relationship between profit share and the real exchange rate has a positive effect on the competitiveness of the economy, a situation quite different from the ones previously verified.

Hein (2014) and Lavoie (2014) point out correctly that the price equation and its consequences cannot be considered as the ultimate explanation for the phenomenon of inflation. As in the Quantitative Theory equation, the relations in there are an identity that reveals "... an interesting way to put things but one that requires to be backed by a theory" (Lavoie 2014, p. 542).

In this sense, two theoretical elements call attention. The first one is that, from a post-Keynesian point of view, inflation is a phenomenon linked to the conditions of supply in which demand plays a secondary and indirect role. Second, the inflationary process is the result of conflicting views about how adequate is the share of national income appropriated by each social group or class, as well as the actions that each one undertakes in order to broaden this share.

The challenge, therefore, is to apprehend the main features of distributive conflict. In this case, history and institutional configuration of each economy in terms of wage bargaining and competitive conditions in goods and services markets are central.

1.2 A Post-Keynesian Model of Inflation and Distributive Conflict

In this section a model of inflation and distributive conflict will be developed, in which the institutional aspects that affect the evolution of prices in a given economy will be evidenced. We are particularly interested in investigating the process of determining nominal wages and prices.

As mentioned earlier, normative considerations from workers and capitalists about how fair their respective remunerations are at the center of the inflationary process. The contemporary literature on this theme seeks to model the rate of inflation as "... a function of the size of the inconsistency between the mark-up that firms wish to target and the real-wage rate that the leading key labour bargain units consider to be fair" (Lavoie 2014, p. 549). In general, the modeling strategy consists in establishing different desired real wages for workers and capitalists. However, as pointed out by Lavoie: "[a]s is clear from the mark-up pricing equation (...), a target set in terms of real wages can always be made equivalent to a target set in terms of a mark-up" (2014, p. 549).

Therefore, we can assume that nominal wage variations are associated with workers' attempts to keep their share of income. This corresponds to say that workers have a "desired" mark-up or a share of profits in the "desired" income that is considered fair or normal. In this way, unions will react to the differences between the actual and desired share of profits through nominal wage increases.

In inflationary contexts and organized wage bargaining, workers will seek, on the one hand, to maintain their real income through some mechanism of indexation to past inflation and, on the other hand, keep their current share in the income generated, incorporating the observed productivity gains.

In order to simplify the mathematical treatment, we can neglect these two mechanisms of indexation (inflation and productivity) and define an equation for the nominal wage growth rate, so that:

$$\widehat{w} = \theta_w(\pi - \pi_w), \tag{22}$$

where π is the actual profit share, π_w is the workers' desired profit share and θ_w represents the ability of workers in adjusting the actual to the desired.

The desired profit share by workers is associated with their power in wage bargaining. In contemporary economic literature on wage bargaining (for example Wendy Carlin and David Soskice 1990, 2006, 2015; Mario Cassetti 2002, 2003, 2012), one of the elements that most positively influences the bargaining power of trade unions is the labor market situation. In this sense, the higher the level of employment, the greater the bargaining power. In this paper we will follow Hein (2008, 2014), Hein and Engelbert Stockhammer (2011) and we will use capacity utilization as a proxy of the labor market situation.

The workers' desired profit share will be given by:

$$\pi_w = v_0 - v_1 u, \tag{23}$$

where v_0 and v_1 are parameters of the equation and u is capacity utilization.

In turn, the capitalists also seek to maintain their share of income, so that they will adjust prices according to the difference between the desired and the actual share of profit. Like workers, they will also take into account past inflation, as well as productivity. However, in the face of competitive pressures, increases in productivity will result in a reduction in the price rate of growth. However, as a simplification, and as in the previous case, we will leave aside these additional elements of the inflationary process, so that π_p is the capitalists' desired profit share; π is the actual profit share; and θ_p is the capacity of capitalists to adjust the actual to the desired.

Then, the rate of growth of prices can be expressed by the following equation:

$$\hat{p} = \theta_p(\pi_p - \pi). \tag{24}$$

The capitalists' desired profit share is given by:

$$\pi_P = \pi_0 + \pi_1 u + \pi_2 e_r. \tag{25}$$

Combining Equations (22) and (23) as well as (24) and (25), the rate of growth of nominal wages and the rate of growth of prices will be:

$$\widehat{w} = -\theta_w v_0 + \theta_w v_1 u + \theta_w \pi, \tag{26}$$

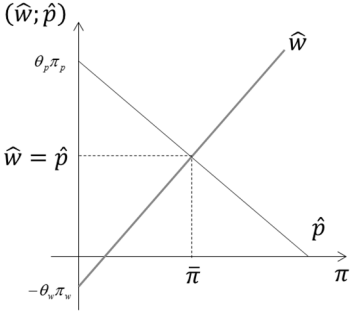
$$\hat{p} = \theta_p \pi_0 + \theta_p(\pi_1 u + \pi_2 e_r) - \theta_p \pi. \tag{27}$$

When nominal wages and prices grow at the same rate, the distributive conflict stabilizes and the rate of inflation is stable.

So, if $\hat{w} = \hat{p}$, then $\theta_w(\pi - \pi_w) = \theta_\pi(\pi_p - \pi)$. Solving this equation to π, we get:

$$\bar{\pi} = \frac{\theta_p\pi_0+\theta_w v_0}{\theta_w+\theta_p} + \frac{\theta_p\pi_1-\theta_w v_1}{\theta_w+\theta_p}u + \frac{\theta_p\pi_2}{\theta_w+\theta_p}e_r. \quad (28)$$

In a very simple form, $\bar{\pi} = \phi_0 + \phi_1 u + \phi_2 e_r$, in which $(\bar{\pi})$ can be defined as a "Non-Accelerating Inflation Profits Share" (NAIPS)[5]. This is because, for this share, the rates of growth of prices and wages are equal and constant, as noticed in Figure 1. The upward sloping curve is based in Equation (26), while the downward sloping is deducted from Equation (27). The point in both are equal, gives us Equation (28).



Source: Authors' sketch.

Figure 1 Distributive Conflict and Inflation

According to the equation above, it is possible to say that:

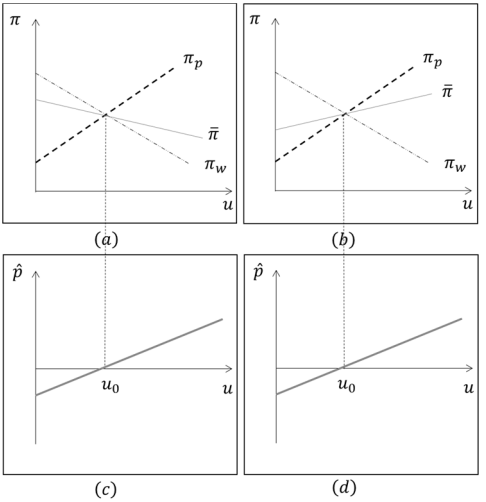
$$\phi_0 = \frac{\theta_p\pi_0+\theta_w v_0}{(\theta_w+\theta_p)} > 0; \quad (29)$$

$$\phi_1 = \frac{(\theta_p\pi_1-\theta_w v_1)}{(\theta_w+\theta_p)} \gtreqless 0; \quad (30)$$

$$\phi_2 = \frac{\theta_p\pi_2}{(\theta_w+\theta_p)} > 0. \quad (31)$$

The relationship between distributive conflict, inflation, and degree of utilization of productive capacity can be described graphically as in Figure 2.

[5] Cassetti (2002, 2003) defines NAIPS as an allusion to NAIRU. His expression seems very appropriate, since it shows the role of distributive conflict in the determination of inflation, as well as suggests a prominent role to the profits in its determination.



Source: Authors' sketch, prepared from Cassetti (2002).

Figure 2 Distributive Conflict, Inflation and Capacity Utilization

Note that if $\theta_p\pi_1 > \theta_w v_1$, then $\phi_1 > 0$, which means that the bargaining power of firms is greater than that of workers. Thus, when the capacity utilization rises, the Non-Accelerating Inflation Profits Share $(\bar{\pi})$ also increases. This can be seen in Figure 2(b), where $(\bar{\pi})$ has a positive slope. Alternatively, if $\theta_p\pi_1 < \theta_w v_1$, then $\phi_1 < 0$, which means that the bargaining power of workers is greater than that of firms. Therefore, when the capacity utilization level rises, the Non-Accelerating Inflation Profits Share has to decrease, which can be seen by the negative slope of $(\bar{\pi})$, in Figure 2(a).

In this sense, it is possible to establish a precise relationship between inflation, capacity utilization and income distribution according to the previous equations. Let $\hat{p}^*$ be a constant rate of inflation and $\hat{w}^*$ a constant nominal wage growth rate. Recalling that $\bar{\pi}$ holds when $\hat{w} = \hat{p}$, if we replace $\bar{\pi}$ in π in Equation (24), we have that:

$$\hat{w}^* = \hat{p}^* = \theta_p(\pi_p - \bar{\pi}). \tag{32}$$

Substituting Equations (25) and (28) into Equation (32) and doing the necessary algebraic manipulations, we get:

$$\hat{p} = \frac{\theta_w\theta_p(\pi_0 - v_0)}{(\theta_w + \theta_p)} + \frac{\theta_w\theta_p(\pi_1 - v_1)}{(\theta_w + \theta_p)}u + \frac{\theta_w\theta_p\pi_2}{(\theta_w + \theta_p)}e_r. \tag{33}$$

Note that the degree of utilization of productive capacity that makes the inflation rate equal to zero $(\hat{p} = 0)$ corresponds to:

$$u = \frac{v_0 - \pi_0}{\pi_1 - v_1} - \frac{\pi_2}{\pi_1 - v_1}e_r. \tag{34}$$

The similarities between the results obtained by this model and those observed by New-Keynesian tradition, as in Carlin and Soskice (2006, 2015), are evident. Nevertheless, while the NAIRU is an explanatory theory for unemployment and it is a strong attractor for the unemployment rate, in the post-Keynesian models the

distributive conflict and the bargaining mechanism are considered as explanatory elements of inflation. In these models the "non-accelerating inflation rate of unemployment" appears as a weak attractor (Malcolm Sawyer 2002; Hein 2008, 2014; Stockhammer 2008), insofar as the rate of growth and the unemployment rate are endogenous (Miguel León-Ledesma and Anthony Philip Thirlwall 2007).

A relevant aspect to be considered is that the presented model is capable of accepting elements related to the impact of economic policies in general and of monetary policy, in particular, on the rate of inflation. The post-Keynesian model presented here is compatible both with the impacts of monetary policy and with those derived from fiscal policy and the type of welfare.

Monetary policy can affect inflation through two channels. The first is capacity utilization, insofar as it conditions the desired profit share, by both workers and capitalists. A contractionary monetary policy simultaneously reduces the desired profit and wage shares. In addition, it is possible to suppose that the interaction between Unions and the Central Bank causes agents to incorporate in their expectations and, consequently, in their negotiations, the reaction of the monetary authority to collective bargaining and *vice versa*. This fact can be interpreted as the second transmission channel of monetary policy (Robert J. Franzese 2001, 2004), captured in the model presented, respectively, by the parameters π_0 and v_0 (Claudio Roberto Amitrano 2010)[6].

In turn, fiscal policy and the type of Welfare State Regime can play similar roles to those described above. While public spending and taxation affect inflation through its impacts on the capacity utilization, the type of welfare can affect inflation through its impacts on the autonomous component of wage bargaining. In this sense, in countries where the social security system is precarious, in the style of liberal democracies, welfare tends to generate high values for v_0 and high for π_0, whereas in countries where the social security system is more comprehensive, in the style of central democracies and northern Europe, the opposite would be true. In addition, one can assume that the expectation of reducing welfare benefits has negative impacts, for example, on the bargaining power of workers, represented here by an increase in v_0. In the same vein, it can reduce capacity utilization, as workers reduce their spending and increase private savings to cope with possible costs of reducing social benefits and unemployment insurance[7].

In short, it can be said that the post-Keynesian model presented above is capable of retaining the fact that the inflationary process is conditioned by the interaction between agents and by institutional factors that fundamentally affect the bargaining power of both workers and capitalists and, therefore, the price trend over time.

Another important aspect of the distributive conflict model is that it allows us to evaluate the relationship between the exchange rate and the functional distribution of income. According to Blecker (2011) and Lavoie (2014), if we look closely at the NAIPS equation, it can be seen that it allows us to establish a relationship between real exchange rate and profit share, so that $\bar{\pi} = \Phi_0 + \Phi_1 u + \Phi_2 e_r$. In turn, by the definition of the real exchange rate, we know that:

[6] See also Peter A. Hall and Franzese (1998), Soskice and Torben Iversen (2000), Soskice (2008).

[7] Note that all the results obtained from the model of inflation and distributive conflict are independent of any use of game theory, nor do they require the use of rational expectations.

$$e_r = \frac{ep_f}{p}. \tag{35}$$

Applying the neperian logarithm and deriving the previous equation with respect to time, we have that the real exchange rate growth will be given by the difference between, on the one hand, the sum of the rates of growth of the nominal exchange rate and of the external prices and, on the other, of domestic inflation, so that:

$$\hat{e}_r = \hat{e} + \hat{p}_f - \hat{p}. \tag{36}$$

In the previous section we evaluated some of the relations between exchange rate, inflation and income distribution. Now we need to establish a precise relationship between exchange rate and profit share.

In order to do so, we need to discuss in more depth the determinants of nominal and real exchange rates and their relationship with monetary and financial issues, as well as trade and current account.

1.3 The Post-Keynesian Debate on Determinants of Exchange Rates

Post-Keynesian economics has a short tradition regarding the debates on the determinants of exchange rates. As pointed out by many authors (Rogerio P. Andrade and Daniela Magalhães Prates 2013; Lavoie 2014; Annina Kaltenbrunner 2015; Lúcio O. S. Barbosa, Frederico G. Jayme Jr., and Fabricio Missio 2018), John T. Harvey (1991, 1996, 2001, 2005, 2007, 2009, 2012), along with Paul Davidson (1998, 2007) and Sheila C. Dow (1999), is probably the one who most developed the field.

According to this author, the starting point of the post-Keynesian analysis is the way in which expectations regarding the value of exchange rate are formed in world marked by fundamental uncertainty and in which agents take their strategic decisions regarding portfolio choices, looking at social conventions in financial markets.

Harvey asserts that, on the contrary of mainstream economics, there are no real relevant fundamentals which determines exchange rate, nor in the short-run, neither in the long-run.

Following Stephan Schulmeister (1988), who emphasizes the role of transactions of dealers in exchange rate markets (Andrade and Prates 2013), Harvey suggests that movements in exchange rates are determined by two types of expectations: (i) medium-term expectation, or what Lavoie (2014) called fundamentalist view; and (ii) short-term, or the chartist view (Lavoie 2014). The distinction between them can be asserted as the difference in their time-horizons.

Lavoie (2014) showed that while the chartist view could be described as the difference equation $de^e_{c,t} = \emptyset_c(de_{t-m})$ – the fundamentalist can be viewed as $de^e_{f,t} = \emptyset_f(de_{t-n} - \bar{e})$ in which de^e means the variation in the expected exchange rate, the subscripts $c, f, t-m$ and $t-n$ are the identification of chartist, fundamentalist, the distincts time-horizons and $\bar{e}$ is the fundamental exchange rate. The change in expected exchange rate by the market is a weight average of this two patterns of expectations.

Albeit interesting this approach has, at least, three important shortcomings. The first one is that it puts too little emphasis on the fact that, in the period of global finance,

exchange rates themselves became assets. Which means that to properly access exchange rate variations one needs to have an approach to the total return of these assets (Andrade and Prates 2013; Kaltenbrunner 2015; Barbosa, Jayme Jr., and Missio 2018)! Second, in order to get a general approach is important to take into account the structure of the International Monetary System (IMS) and, mainly, the very fact that countries' moneys play different roles in this system and just a few accomplish the three functions of an international money, i.e. be a medium of exchange, a unit of account (and denomination of contracts) and a store of value. It means that there is a monetary hierarchy in the IMS (Andrade and Prates 2013; Bruno Martarello Conti, Prates, and Dominique Plihon 2014; Kaltenbrunner 2015; Barbara Fritz, Luiz F. de Paula, and Prates 2018). Third, Harvey's approach does not take into account properly the impact of current account in determining the value of spot exchange rate.

Keynes and post-Keynesian tradition assert that in a monetary economy – the one in which money's function as a store of value becomes fundamental because it is the most liquid asset and thereby the refuge from fundamental uncertainty (Davidson 1994) – portfolio choices are based on specific attributes that every asset has, including money. These attributes, according to (Keynes 1936, Chapter 17; Fernando Cardim de Carvalho 1992, Chapter 5) are: (a) the expected quasi-rent, q; (b) the carrying cost, c; (c) the liquidity premium, l; and (d) the expected appreciation, a.

Putting together all these attributes yields an asset's own interest rate or its total expected return (r_a), so that: $r_a = i + a - c + l$. Adapting the asset's own interest rate to an open economy and applied to the exchange rate means that agents have to compare domestic and foreign total expected returns of different currencies or assets based on these currencies.

Considering that domestic and foreign currencies have different own rates of interest and liquidity premiums and that "a" must be described as $(-\hat{e})$, the variation of exchange rate (BR$/US$, for instance), portfolio is said in equilibrium when Equation (37):

$$r_e = i_e - \hat{e} - c_e + l_e, \tag{37}$$

is equal to Equation (38):

$$r_e^* = i_e^* - c_e^* + l_e^*, \tag{38}$$

where subscript "e" is exchange rate and the variable *i* is, now, the Central Bank interest rate.

Supposing that the carrying costs c_e and c_e^* are negelible and rearranging Equations (37) and (38) we have that:

$$i_e - \hat{e} + l_e = i_e^* + l_e^* \ \therefore \hat{e} = (i_e - i_e^*) + (l_e - l_e^*). \tag{39}$$

This equation, which resembles the Uncovered Interest Rate Parity (UIP), has an important difference in as much as it takes into account differences in liquidity premiums between currencies. According to Andrade and Prates (2013), Kaltenbrunner (2015) and Barbosa, Jayme Jr., and Missio (2018), the differences in quasi-rents, liquidity premium and the variation of expected exchange rate can be understood as a function of the role of each currency has in the IMS or their position in the monetary hierarchy.

It seems quite evident that Equation (39) still do not take into consideration current account effects on the exchange rate. Notwithstanding, differences in productivity and prices between countries and their impact on current accounts and exchange rates are quite relevant to be ignored.

Many streams of heterodox literature have dealt with these effects, as in the deterioration of the terms of trade, from the Latin American Structuralism, or the Balance of Payment Constrained models *á la* Thirlwall, in post-Keynesian tradition.

Recently, there has been many interesting ways to do that, like in the Stock-Flow Consistent (SFC) model presented in Wynne Godley and Lavoie (2007) or through the introduction of Balassa-Samuelson (BS) effect in a post-Keynesian model like the one presented by Barbosa, Jayme Jr., and Missio (2018). In this paper we took another way. In order to take into account these effects we choose to consider, on one hand, differences in productivity and in prices incorporated in real exchange rates. On the other hand, we followed Harvey (1991) and used the relationship between expected and spot exchange rate to handle these issues.

Let us assume that the changes in the nominal exchange rate are a function, on the one hand, of the differential between internal (i) and external interest (i_f), of the differences between liquidity premiums among currencies – own rat of interest approach – and, on the other hand, the difference between the expected real exchange rate (e_r^e) by the agents and the current real exchange rate, so that:

$$\hat{e} = \rho(e_r^e - e_r) - (i - i_f) - (l - l_f). \tag{40}$$

Equation (40) shows that not only portfolio decisions, based on interest rates and liquidity premiums differentials, but also productivity differentials, as expressed by real expected and spot exchange rates play important roles in determining changes in spot nominal exchange rate.

In order to fully understand the relationship between exchange rate, distributive conflict and inflation it is needed to go through one step further, taking into account the monetary policy and its rules. It is what we do in the next section.

1.4 Monetary Rules: A Very Brief Appreciation

The debate on monetary policy is large and complex and we do not intend to fully cover it. But to connect exchange rate determination to distributive conflict and inflation it is important to, at least, take into account the way in which monetary policy is practiced nowadays. So, let us now turn to the interest rate determination.

The Taylor rules are monetary policy rules that suggest how a Central Bank should adjust its interest rate systematically in response to changes in inflation and economic activity. According to proponents of the adoption of a monetary rule, the commitment to follow it allows monetary authority to avoid the inefficiency associated with the problem of temporal inconsistency that would arise when policy is formulated in a discretionary manner. According to this view, well-understood rule-based policies improve the central bank's accountability and raise the credibility of future policies (Anthanasios Orphanides 2018).

The Brookings Institution's policy regime project was a milestone in the development of these rules. When analyzing rules that set deviations from the nominal short-

term interest rate (i) with reference to some base trajectory (i^*) proportional to the deviations of the variables of interest (z) from their targets (z^*), two alternatives were considered the most promising. The first, in which nominal income would be the variable of interest; the second, in which the variables of interest would be inflation and real output.

$$i - i^* = \theta_\pi(\pi - \pi^*) + \theta_q(q - q^*). \tag{41}$$

John B. Taylor (1993) used the sum of the natural interest rate (r^*) and inflation (π) as the base trajectory of the short-term nominal interest rate (i^*), and established that the target inflation and the natural interest rate were equal to 2, while the parameters were considered equal to ½, arriving at what became known as the classic Taylor rule:

$$i = 2 + \pi + 0{,}5(\pi - 2) + 0{,}5(q - q^*). \tag{42}$$

This proposal generated great interest and profoundly influenced research and teaching in monetary economics, advancing this research agenda to the generalized Taylor rule:

$$i = (1 - \theta_i)(r^* + \pi^*) + \theta_i i_{-1} + \theta_\pi(\pi - \pi^*) + \theta_q(q - q^*) + \theta_{\Delta q}(\Delta q - \Delta q^*), \tag{43}$$

which allows inertial behavior in the establishment of the interest rate ($\theta_i > 0$) and opens the possibility that the monetary policy response to changes in economic activity occurs in two ways: one in relation to the level of the output gap and another concerning the difference between the growth of the product and its potential (Orphanides 2018).

Several heterodox economists criticize various aspects of this type of rules. First, they do not take into account the problems of financial instability. Second, the concept of a "natural" interest rate is dubious, as it is based on a dichotomous view of the functioning of the economic system, where the "real" and "monetary" sides are perfectly independent one of another, where money is neutral. On the "real" side, the equilibrium would come from the equality between saving and investment, determining the "natural" interest rate. On the "financial" side the supply and demand for money (considered independent) will determine the market interest rate, which may differ from the "natural" rate, generating inflation or deflationary pressure in the economy. Third, the Taylor rule ignores the fact that the interest rate affects distributions of income and wealth, which are important points for the financial and macroeconomic stability of the system (Louis-Philippe Rochon and Sergio Rossi 2016). The work of Gilberto Tadeu Lima and Mark Setterfield (2008) concludes that orthodox policy regimes do not lead to a mix of appropriate policies and the more orthodox the political region becomes, the less viable is the inflation targeting regime. Philip Arestis and Sawyer (2008) argue that inflation targeting policy has not been instrumental in ensuring low inflation. In addition, they note that the interest rate will have effects on a series of variables, notably the exchange rate and the prices of the assets and that, in fact, these variables are part of the channels through which changes in the interest rate influence the level of demand and therefore the rate of inflation.

Our objective is not to make a normative analysis of the monetary policy rule, that is, to expose what we consider to be the most appropriate monetary policy. Instead, we adopt a positive approach, seeking to make explicit the practice of monetary policy adopted in some central banks.

In a small open economy, however, the "natural interest rate" can be replaced by the international interest rate added to the sovereign and exchange risk premiums (Fernando de Holanda Barbosa, Felipe Diogo Camêlo, and Igor Custodio João 2016). In the specification chosen in this work, we adopted the international interest rate, as can be seen in the following equation:

$$i = \psi_1 i_f + \psi_2 \hat{p} + \psi_3 u + \psi_4 e_r. \tag{44}$$

Substituting Equation (44) into Equation (40) and its result into Equation (36), we have:

$$\hat{e}_r = \rho e_r^e - (\psi_4 + \rho) e_r - (\psi_1 - 1) i_f - \psi_3 u + \hat{p}_f - (\psi_2 + 1)\hat{p} - \left(l - l_f\right). \tag{45}$$

Substituting Equations (24) and (25) into Equation (45), we have:

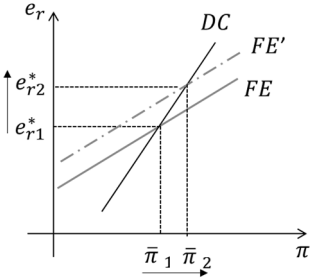
$$\begin{aligned} \hat{e}_r = \rho e_r^e - \left(\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2\right) e_r - (\psi_1 - 1) i_f \\ -\left(\psi_3 + \psi_2 \theta_p \pi_1 + \theta_p \pi_1\right) u + \hat{p}_f - \theta_p \pi_0 (\psi_2 + 1) \\ +\theta_p (\psi_2 + 1)\pi - \left(l - l_f\right). \end{aligned} \tag{46}$$

Note that, when $\hat{e}_r = 0$:

$$\begin{aligned} e_r = \frac{\rho}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} e_r^e - \frac{\psi_1 - 1}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} i_f \\ - \frac{1}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} \left(l - l_f\right) + \frac{1}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} \hat{p}_f \\ - \frac{\theta_p \pi_0 (\psi_2 + 1)}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} - \frac{\psi_3 + \psi_2 \theta_p \pi_1 + \theta_p \pi_1}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} u \\ + \frac{\theta_p (\psi_2 + 1)}{\psi_4 + \rho + \psi_2 \theta_p \pi_2 + \theta_p \pi_2} \pi. \end{aligned} \tag{47}$$

So, we have two equations, one that relates the profit with the real exchange rate ($\bar{\pi} = \phi_0 + \phi_1 u + \phi_2 e_r$) that Blecker (2011) called "Distributive Curve - DC" (which is nothing more than an alternative way of interpreting NAIPS) and another that relates the real exchange rate to the share of profits in income ($e_r = \Omega_0\left(e_r^e; i_f; l; l_f \hat{p}_f; u\right) + \Omega_1 \pi$), which Blecker (2011) called the "Foreign Exchange Curve - FE"[8]. The figure below explains the interaction between the two curves.

[8] In the models of Blecker (2011) and Lavoie (2014) the relationship is between wages share (not profits share) and real exchange rate.



Source: Authors' sketch, prepared from Blecker (2011).

Figure 3 Interaction between Distrbutive Curve and Foreign Exchange Curve

The dynamic stability of this relationship depends on that the DC curve be always steeper than the FE curve[9].

Note that an increase in the real exchange rate expected by the agents or a reduction in the domestic nominal interest rate shifts the FE curve upward and to the left simultaneously promoting an increase in the current real exchange rate and the profit share.

Thus, real exchange rate devaluations not only cause increases in inflation but also have relevant implications for the functional distribution of income, since they promote an increase in the profit share.

Obviously, the effects of changes in real exchange rate are not restricted to inflation. As it is known, the exchange rate can affect both the balance of trade and the growth rate, in both cases, due to the direct effect it exerts, at least in the medium-run[10], on the increase of exports and the reduction of imports.

However, we must consider the indirect effects, in particular those related to the impact of the exchange rate on the functional distribution of income, which leads us to growth models with income distribution of post-Keynesian tradition.

2. Growth and Income Distribution

The relationship between growth and income distribution is at the origin of the post-Keynesian tradition. An important part of the studies of this tradition is related to the works of Bob Rowthorn (1981), Dutt (1984) and Taylor (1985) whom, inspired by Kalecki and Steindl, elaborated growth models in which capacity utilization is endogenous, determined, above all, by investment and the distribution of income[11].

Two characteristics stand out in this type of approach: (a) functional income distribution is exogenous and depends, in general, on mark-ups on direct unit costs;

[9] Blecker (2011) notes that the DC curve can be both positively and negatively sloped. However, the author concludes that assuming it negatively sloped would mean imagining that a currency devaluation increases the wage share or, alternatively, decreases the profit share, which is hardly possible.

[10] This term is referred here in the sense of Victoria Chick and Maurizio Caserta (1997).

[11] Good reviews of this literature can be found in Duncan K. Foley and Thomas R. Michl (1999), Stockhammer (1999), Blecker (2002) and Hein (2014).

(b) investment has as its main determinant capacity utilization. From the work of Amit Bhaduri and Stephen A. Marglin (1990) and Marglin and Bhaduri (1990), the more contemporary versions of these models (post-Kaleckians, to use Lavoie's appropriate expression – Lavoie 2014) reflect the differential impacts of the profit margin and capacity utilization on the investment decision.

In this paper, we will follow Bhaduri and Marglin approach, for whom demand and growth regimes can be profit-led or wage-led, depending on the relative importance of profit share impacts (profit-led regime) and capacity utilization (wage-led regime) on investment decision, respectively.

2.1 Demand Regime and Short-Run Equilibrium

The demand regime expresses, on the one hand, the way in which the functional income distribution conditions the consumption of households. On the other hand, reveals the elements that motivate investment decisions, as well as indicate the way the government acts. Finally, it reflects the type of productive specialization and the pattern of international trade, which, coupled with the evolution of external demand, condition the trade balance.

Taking the macroeconomic equilibrium as a starting point, the demand regime specifies the determinants of each component of aggregate demand, determine capacity utilization and then the equilibrium growth rate.

Consumption will be divided between workers' consumption and capitalist consumption, so that:

$$C = \frac{\omega}{q} y + \pi(1 - s)y - ty, \tag{48}$$

in which (ω) is the average real wage. The parameter (s) corresponds to the propensity to save out of profits. Note that, while workers consumption is represented by the expression $[(w/q) \cdot y]$, capitalist consumption is represented by $\pi(1 - s) \cdot y$.

Normalizing by the capital stock, we have:

$$c = \frac{\omega}{q} u + \pi(1 - s)u - tu. \tag{49}$$

Government spending (G) is considered as discretionary, and it is therefore the object of political intervention. So we have:

$$G = \bar{G}. \tag{50}$$

Normalizing by the capital stock, we have:

$$\frac{\bar{G}}{pk} = \delta. \tag{51}$$

The specification of the investment function is one of the most important elements of the post-Keynesian model. In this paper, we will adopt an investment function *á la* Bhaduri and Marglin (1990), due to the fact that the separation of the effects of the profit margin and the capacity utilization on the investment allows the emergence of different growth regimes, wage-led or profit-led.

Let $g^i = I/K$ be the growth rate of capital stock. Let us also assume that this rate is a positive function of the animal spirits (τ_0), of the expected profitability (or

expected profit rate) of capital assets (r^e). At the same time, let us suppose that investment reacts negatively to the interest rate (i), so that:

$$g^i = \tau_0 + \tau_1(r^e - i). \tag{52}$$

The expected profitability can be divided into two parts[12]: one related to the profit margin effect or profit share effect, the other concerning the impact of volumes sold or the capacity utilization effect[13], so that:

$$r^e = \gamma_1\pi + \gamma_2 u. \tag{53}$$

In this way, we can rewrite the investment function as:

$$g^i = \tau_0 + \tau_1(\gamma_1\pi + \gamma_2 u - i). \tag{54}$$

Taking into account Equation (27) and the monetary rule presented in Equation (44), then:

$$g^i = (\tau_0 - \alpha_0) + \alpha_1\pi + (\alpha_2 - \alpha_3)u - \alpha_4 i_f - \alpha_5 e_r, \tag{55}$$

where $\alpha_0 = \tau_1\psi_2\theta_p\pi_0$; $\alpha_1 = \tau_1\gamma_1 + \tau_1\psi_2\theta_p$; $\alpha_2 = \tau_1\gamma_2$; $\alpha_3 = \tau_1(\psi_2\theta_p\pi_1 + \psi_3)$; $\alpha_4 = \tau_1\psi_1$ and $\alpha_5 = \tau_1\psi_4 + \tau_1\psi_2\theta_p\pi_2$.

Three issues emerge from this type of investment function. The first one is that the magnitude of investment elasticity to changes in profit margins *versus* capacity utilization will define whether the economy is wage-led or profit-led. The second is that the interest rate and, consequently, monetary policy plays an important role in the evolution of the capital stock. Third, due to the combination between the monetary policy rule and the uncovered interest rate parity, the model presents two unexpected results. Firstly, the capacity utilization might have positive or negative impact on investment. This happens because a rise in capacity utilization makes interest rate goes up, according to the monetary rule. Secondly, because we assume that monetary rulers are worried with real exchange rate level and due to the negative relationship between interest and exchange rates in UIP, investment will reduce when real exchange rate increases and *vice versa*.

Finally, net exports or trade balance[14] will be defined here in a very simple way, as a positive function of the real exchange rate (e_r) – assuming the Marshall-Lerner condition holds[15] – and capacity utilization in the rest of the world (u_f), as well as a negative function of domestic capacity utilization (u). In its normalized version by the capital stock, net exports can be defined as:

[12] By definition, the rate of profit corresponds to the ratio between total profits to the value of the capital stock. Let Π be the total profits, y be the output value, K be the capital stock and $\bar{y}$ the productive capacity. Then, the profit rate can be defined as $r = \Pi/K$. Multiplying the second member of the equation by y/y and by $\bar{y}/\bar{y}$, we get $r = (\Pi/K)\cdot(y/y)\cdot(\bar{y}/\bar{y})$. This equation gives us the profit rate equation: $r = (\Pi/y)\cdot(y/\bar{y})\cdot(\bar{y}/K)$, where$(\Pi/y)$ is the profit share, which, according to Equation (9), depends on the profit margin. Notice that $(y/\bar{y})$ is the capacity utilization and $(\bar{y}/K)$ corresponds to the potential-capital product ratio. One of the stylized facts of economic growth, so well described by Kaldor, is that $(\bar{y}/K)$ is relatively constant. So, a good proxy for capacity utilization (u) is $u = \bar{y}/K$.

[13] It is important to note that capacity utilization corresponds to a static version of the acceleration effect.

[14] The terms net exports and trade balance are understood herein as synonyms.

[15] See Carlos F. Diaz-Alejandro (1963) and Paul Krugman and Taylor (1978).

$$N_x = \frac{X-M}{pK} = \beta_0 e_r - \beta_1 u + \beta_2 u_f. \tag{56}$$

The demand regime starts from the macroeconomic equilibrium condition between supply and aggregate demand:

$$y = C + I + G + (X - M). \tag{57}$$

From the specification of the aggregate demand components we can rewrite Equation (57), so that:

$$y = \frac{\omega}{q} y + \pi(1-s)y - ty + G + I + (X - M). \tag{58}$$

Normalizing Equation (58) by the capital stock, we have an equation for capacity utilization, in which:

$$\begin{aligned} u = \frac{\omega}{q} u + \pi(1-s)u - tu + (\tau_0 - \alpha_0) + \alpha_1 \pi + (\alpha_2 - \alpha_3)u \\ -\alpha_4 i_f - \alpha_5 e_r + \beta_0 e_r - \beta_1 u + \beta_2 u_f + \delta, \end{aligned} \tag{59}$$

whose equilibrium value is given by:

$$u^* = \frac{(\tau_0-\alpha_0)+\alpha_1\pi-\alpha_4 i_f+(\beta_0-\alpha_5)e_r+\beta_2 u_f+\delta}{s\pi-\alpha_2+\alpha_3+\beta_1+t}. \tag{60}$$

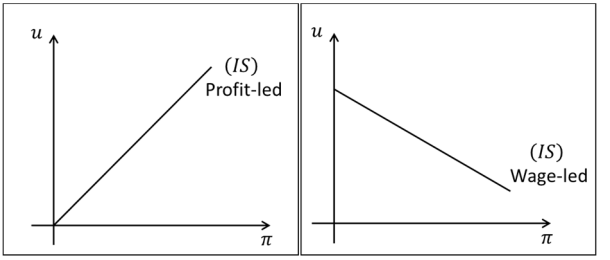
This equation reveals that capacity utilization depends on functional income distribution, as well as domestic and external demand.

It is important to note that, due to the functional specification used, the impact of profit share on capacity utilization can be both positive and negative, as shown by the following partial derivative.

$$\frac{\partial u}{\partial \pi} = \frac{\alpha_1 - s u^*}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0. \tag{61}$$

The central idea behind this result is that investment decisions are institutionally conditioned, so that depending, for example, on the type of corporate governance of each economy, this can be profit-led or wage-led. In terms of our model, we could say that when $\alpha_1 > s u^* > 0$ we would be in a profit-led regime. This may be related to the financing pattern of the economy, either *via* the capital market (shareholder value governance) or *via* loans. In both cases, the greater the use of external financing, the greater the value for the parameter (α_1). On the other hand, when $\alpha_1 < s u^* < 0$, the elasticity of the investment to the profit margin variations would be relatively low, due to the existence of the so-called patient capital (corporate governance of the type stakeholder value), characterizing this type of economy as wage-led.

The results for the other variables are those expected by the functional specifications, so that while external demand, government spending and the real exchange rate have positive effects on capacity utilization, average tax rate and the interest rate have negative ones, according to the respective partial derivatives.



Source: Authors' sketch.

Figure 4 Relationship between Capacity Utilization and Profit Share

$$\frac{\partial u}{\partial i_f} = -\frac{\alpha_4}{s\pi-\alpha_2+\alpha_3+\beta_1+t} < 0; \tag{62}$$

$$\frac{\partial u}{\partial e_r} = \frac{\beta_0-\alpha_5}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0; \tag{63}$$

$$\frac{\partial u}{\partial u_f} = \frac{\beta_2}{s\pi-\alpha_2+\alpha_3+\beta_1+t} > 0; \tag{64}$$

$$\frac{\partial u}{\partial \delta} = \frac{1}{s\pi-\alpha_2+\alpha_3+\beta_1+t} > 0; \tag{65}$$

$$\frac{\partial u}{\partial s} = -\frac{\pi u^*}{s\pi-\alpha_2+\alpha_3+\beta_1+t} < 0; \tag{66}$$

$$\frac{\partial u}{\partial t} = -\frac{u^*}{s\pi-\alpha_2+\alpha_3+\beta_1+t} < 0. \tag{67}$$

Considering that the equilibrium profit rate is $r^* = \pi u^*$ and substituting $\alpha_1 = \tau_1\gamma_1 + \tau_1\psi_2\theta_p$ into Equation (59), we have:

$$r^* = \pi\frac{(\tau_0-\alpha_0)+\alpha_1\pi-\alpha_4 i_f+(\beta_0-\alpha_5)e_r+\beta_2 u_f+\delta}{s\pi-\alpha_2+\alpha_3+\beta_1+t}. \tag{68}$$

The partial derivatives from Equation (60) are given below:

$$\frac{\partial r}{\partial \pi} = \frac{\alpha_1\pi+(\beta_1+t-\alpha_2+\alpha_3)u^*}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0; \tag{69}$$

$$\frac{\partial r}{\partial i_f} = -\frac{\alpha_4\pi}{s\pi-\alpha_2+\alpha_3+\beta_1+t} < 0; \tag{70}$$

$$\frac{\partial r}{\partial e_r} = \frac{(\beta_0-\alpha_5)\pi}{s\pi-\alpha_2+\alpha_3+\beta_1+t} > 0; \tag{71}$$

$$\frac{\partial r}{\partial u_f} = \frac{\beta_2\pi}{s\pi-\alpha_2+\alpha_3+\beta_1+t} > 0; \tag{72}$$

$$\frac{\partial r}{\partial \delta} = \frac{\pi}{s\pi-\alpha_2+\alpha_3+\beta_1+t} > 0; \tag{73}$$

$$\frac{\partial r}{\partial s} = -\frac{\pi^2 u^*}{s\pi-\alpha_2+\alpha_3+\beta_1+t} < 0; \tag{74}$$

$$\frac{\partial r}{\partial t} = -\frac{\pi u^*}{s\pi-\alpha_2+\alpha_3+\beta_1+t} < 0. \tag{75}$$

However, more important than the determination of capacity is the equilibrium growth rate of the economy, defined from the condition of equality between saving and investment, such that:

$$g_i = g_s = s\pi u^* - N_x - \delta + tu^*. \tag{76}$$

Substituting $r^e = \gamma_1\pi + \gamma_2 u$ and $\alpha_1 = \tau_1\gamma_1 + \tau_1\psi_2\theta_p$ into $r^* = \pi u^*$, the equilibrium growth rate can be defined as:

$$g^* = \frac{(s\pi + \beta_1 + t)\left(\tau_0 - \alpha_0 + \alpha_1\pi - \alpha_4 i_f - \alpha_5 e_r\right) + (\alpha_3 - \alpha_2)\left(\beta_0 e_r + \beta_2 u_f + \delta\right)}{s\pi - \alpha_2 + \alpha_3 + \beta_1 + t}. \tag{77}$$

The partial derivatives from Equation (68) are given below:

$$\frac{\partial g^*}{\partial s} = \frac{\pi(\alpha_3-\alpha_2)[\tau_0-\alpha_0+\alpha_1\pi-\alpha_4 i_f+(\beta_0-\alpha_5)e_r+\beta_2 u_f+\delta]}{(s\pi-\alpha_2+\alpha_3+\beta_1+t)^2} \gtreqless 0; \tag{78}$$

$$\frac{\partial g^*}{\partial \pi} = \frac{s[\pi\alpha_1(s\pi+\beta_1+t)+(\alpha_3-\alpha_2)(\tau_0-\alpha_0+2\alpha_1\pi-\alpha_4 i_f-(\alpha_5+\beta_0)e_r-\beta_2 u_f-\delta)]}{(s\pi-\alpha_2+\alpha_3+\beta_1+t)^2} \gtreqless 0; \tag{79}$$

$$\frac{\partial g^*}{\partial t} = \frac{(\alpha_3-\alpha_2)[\tau_0-\alpha_0+\alpha_1\pi-\alpha_4 i_f-(\alpha_5+\beta_0)e_r-\beta_2 u_f-\delta]}{(s\pi-\alpha_2+\alpha_3+\beta_1+t)^2} \gtreqless 0; \tag{80}$$

$$\frac{\partial g^*}{\partial i_f} = -\frac{\alpha_4(s\pi+\beta_1+t)}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0; \tag{81}$$

$$\frac{\partial g^*}{\partial e_r} = \frac{\beta_0(\alpha_3-\alpha_2)-\alpha_5(s\pi+\beta_1+t)}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0; \tag{82}$$

$$\frac{\partial g^*}{\partial u_f} = \frac{\beta_2(\alpha_3-\alpha_2)}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0; \tag{83}$$

$$\frac{\partial g^*}{\partial \delta} = \frac{\alpha_3-\alpha_2}{s\pi-\alpha_2+\alpha_3+\beta_1+t} \gtreqless 0. \tag{84}$$

3. Inflation and Growth

In the previous sections, it was possible to demonstrate that the functional income distribution plays an essential role in determining three central aspects of economic dynamics.

In the case of inflation, distributive conflict conditions the evolution of prices and wages, in order to establish Non-Accelerating Inflation Profits Share (NAIPS). Among the main determinants of NAIPS (or, alternatively, Distributive Curve - DC) are the institutional conditions of wage bargaining, capacity utilization, and the real exchange rate, as explained in the equation $\bar{\pi} = \phi_0 + \phi_1 u + \phi_2 e_r$.

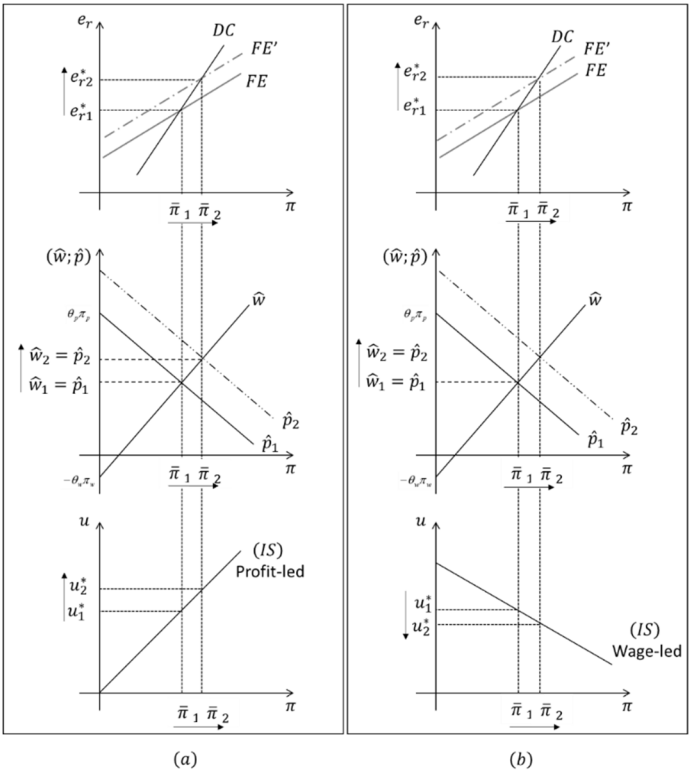
The impact of distributive conflict on price formation, as well as the existence of a monetary policy rule, also highlights the connection between real exchange rates, expectations, interest and international prices, capacity utilization and profit share, all of them synthetized in equation $e_r = \Omega_0\left(e_r^e; i_f; \hat{p}_f; u\right) + \Omega_1\pi$, relative to the Foreign Exchange Curve - FE.

Finally, distributive conflict also affects capacity utilization through the interaction between multiplier and accelerator effects. In establishing a kind of IS curve, the level of economic activity can be positively or negatively related to the profit share.

The slope of this curve indicates the type of demand regime, whether wage-led or profit-led, as in Equation (60).

$$u^* = \frac{(\tau_0 - \alpha_0) + \alpha_1 \pi - \alpha_4 i_f + (\beta_0 - \alpha_5) e_r + \beta_2 u_f + \delta}{s\pi - \alpha_2 + \alpha_3 + \beta_1 + t}. \tag{85}$$

Substituting π for $\bar{\pi}$ into Equations (22), (24) and (43), one can see the integrated process of determining inflation, the real exchange rate and capacity utilization, as in the following figure.



Source: Authors' sketch.

Figure 5 Real Exchange, Income Distribution, Inflation and Capacity Utilization

It is possible to notice clearly that changes in the real exchange rate, whether due to an increase in expectations of exchange rate, international interest rates or even international prices, will lead to a shift of the FE curve up and to the left.

From a distributive point of view, such devaluation represents an increase in the bargaining power of capitalists and a shift of the price formation curve up and to the right, increasing the equilibrium profit share.

The impact on capacity utilization will depend on the relative elasticity of investment between profit share and capacity utilization. The demand regime, whether

wage-led or profit-led, will say whether there will be expansion or contraction of the economy.

Considering the connection between capacity utilization and economic growth rate (see Equation 68), it is possible to say that the obtained results might be confirmed in the medium-run economic growth.

4. Conclusion

In this paper, we intended to clarify some issues regarding the connections between distributive conflict, inflation and economic growth in the short-run from a post-Keynesian point of view. In order to do so, we briefly reviewed two strands of the literature. The first one related to the debate on inflation and income distribution. The second, regarding the relationship between growth and distribution. Additionally, the paper used recent developments in the literature in three distinctive aspects. First, the paper tried to describe the impacts of income distribution in an open economy, specially concerning to its effects on real exchange rate and its interaction with inflation and growth, in a fully integrated model. Second, it used a new approach to the determination of exchange rate based on portfolio decisions, in which interest rates and liquidity premiums differentials, but also productivity differentials, as expressed by real expected and spot exchange rates play important roles. Third, it incorporates a simplified monetary policy rule to identify the relationship between monetary policy, inflation and growth.

The main conclusions are that distributive conflict is quite relevant in determining prices and wages variations, which depend mainly on the institutional conditions of wage bargaining, capacity utilization, and the real exchange rate. It was also possible to show that distributive conflict seems to be strongly associated with real exchange rates and it is in the heart of movements of capacity utilization and economic growth through the interaction between multiplier and accelerator effects. Finally, the outcomes of the interaction between real exchange rate, inflation and growth are all dependent of the relative strength of bargainers in their dispute over income distribution and the elasticity of investment to profit share.

In sum, the institutional structure of the economy, its income distribution and the type of demand regime, whether wage-led or profit-led, are central to the comprehension about patterns and trends in the economy.

References

Amitrano, Claudio Roberto. 2010. "Instituições e Desenvolvimento: Críticas e Alternativas à Abordagem de Variedades de Capitalismo." http://pct.capes.gov.br/teses/2010/33003017020P7/TES.PDF.

Andrade, Rogerio P., and Daniela Magalhães Prates. 2013. "Exchange Rate Dynamics in a Peripheral Monetary Economy." *Journal of Post Keynesian Economics*, 35(3): 399-416. http://dx.doi.org/10.2753/PKE0160-3477350304

Arestis, Philip, and Malcolm Sawyer. 2008. "New Consensus Macroeconomics and Inflation Targeting: Keynesian Critique." *Economia e Sociedade*, 17(SPE): 629-653. http://dx.doi.org/10.1590/S0104-06182008000400006

Barbosa, Fernando de Holanda, Felipe Diogo Camêlo, and Igor Custodio João. 2016. "A taxa de jurosnatural e a regra de Taylor no Brasil: 2003-2015." *Revista Brasileira de Economia*, 70(4): 399-417. http://dx.doi.org/10.5935/0034-7140.20160021

Barbosa, Lúcio O. S., Frederico G. Jayme Jr., and Fabricio José Missio. 2018. "Determinants of the Real Exchange Rate in the Long-Run for Developing and Emerging Countries: A Theoretical and Empirical Approach." *International Review of Applied Economics*, 32(1): 62-83. http://dx.doi.org/10.1080/02692171.2017.1332017

Bhaduri, Amit, and Stephen Marglin. 1990. "Unemployment and the Real Wage: The Economic Basis for Contesting Political Ideologies." *Cambridge Journal of Economics*, 14(4): 375-393. http://dx.doi.org/10.1093/oxfordjournals.cje.a035141

Blecker, Robert A. 2002. "Distribution, Demand and Growth in Neo-Kaleckian Macro-Models." In *The Economics of Demand-Led Growth: Challenging the Supply-Side Vision of the Long Run*, ed. Mark Setterfield. Cheltenham: Edward Elgar Publishing. http://dx.doi.org/10.4337/9781843765325

Blecker, Robert A. 2011. "Open Economy Models of Distribution and Growth." In *A Modern Guide to Keynesian Macroeconomics and Economic Policies*, ed. Eckard Hein and Engelbert Stockhammer, 215-239. Cheltenham: Edward Elgar Publishing.

Cardim de Carvalho, Fernando. 1992. *Mr Keynes and the Post Keynesians*. Aldershot: Edward Elgar Publishing.

Carlin, Wendy, and David Soskice. 1990. *Macroeconomics and the Wage Bargain: A Modern Approach to Employment, Inflation, and the Exchange Rate*. Oxford: Oxford University Press.

Carlin, Wendy, and David Soskice. 2006. *Macroeconomics: Imperfections, Institutions, and Policies*. Oxford: Oxford University Press.

Carlin, Wendy, and David Soskice. 2015. *Macroeconomics: Institutions, Instability, and the Financial System*. Oxford: Oxford University Press.

Cassetti, Mario. 2002. "Conflict, Inflation, Distribution and Terms of Trade in the Kaleckian Model." In *The Economics of Demand-Led Growth: Challenging the Supply-Side Vision of the Long Run*, ed. Mark Setterfield. Cheltenham: Edward Elgar Publishing. http://dx.doi.org/10.4337/9781843765325

Cassetti, Mario. 2003. "Bargaining Power, Effective Demand and Technical Progress: A Kaleckian Model of Growth." *Cambridge Journal of Economics*, 27(3): 449-464. http://dx.doi.org/10.1093/cje/27.3.449

Cassetti, Mario. 2012. "Macroeconomic Outcomes of Changing Social Bargains. The Feasibility of a Wage-Led Open Economy Reconsidered." *Metroeconomica*, 63(1): 64-91. http://dx.doi.org/10.1111/j.1467-999X.2011.04129.x

Chick, Victoria, and Maurizio Caserta. 1997. "Provisional Equilibrium and Macroeconomic Theory." In *Markets, Unemployment and Economic Policy: Essays in Honour of Geoff Harcourt. Volume 2*, ed. Philip Arestis, Gabriel Palma, and Malcolm Sawyer. London: Routledge. http://dx.doi.org/10.4324/9780203982518

Conti, Bruno Martarello, Daniela Magalhães Prates, and Dominique Plihon. 2014. "A hierarquia monetária e suasimplicações para as taxas de câmbio e de juros e a política econômica dos países periféricos." *Economia e Sociedade*, 23(2): 341-372.

Davidson, Paul. 1994. *Post Keynesian Macroeconomic Theory*. Cheltenham: Edward Elgar Publishing.

Davidson, Paul. 1998. "Volatile Financial Markets and the Speculator." *Economic Issues*, 3(2): 1-18. http://dx.doi.org/10.1007/978-1-349-14991-9_21

Davidson, Paul. 2007. "Liquidity vs. Efficiency in Liberalized International Financial Markets: A Warning to Developing Economies." In *Interpreting Keynes for the 21st Century: Volume 4: The Collected Writings of Paul Davidson*, ed. Paul Davidson, 106-125. New York: Palgrave Macmillan.

Diaz-Alejandro, Carlos F. 1963. "A Note on the Impact of Devaluation and the Redistributive Effects." *Journal of Political Economy*, 71(6): 577-580.

Dow, Sheila C. 1999. "International Liquidity Preference and Endogenous Credit." In *Foundations of International Economics: Post Keynesian Perspectives*, ed. Johan Deprez and John T. Harvey. London: Routledge.

Dutt, Amitava Krishna. 1984. "Stagnation, Income Distribution and Monopoly Power." *Cambridge Journal of Economics*, 8(1): 25-40. http://dx.doi.org/10.1093/oxfordjournals.cje.a035533

Dutt, Amitava Krishna. 1990. *Growth, Distribution and Uneven Development*. Cambridge, MA: Cambridge University Press.

Foley, Duncan K., and Thomas R. Michl. 1999. *Growth and Distribution*. Cambridge, MA: Harvard University Press.

Franzese, Robert J. 2001. "Institutional and Sectoral Interactions in Monetary Policy and Wage/Price-Bargaining." In *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*, ed. Peter A. Hall and David Soskice, 104-145. Oxford: Oxford University Press.

Franzese, Robert J. 2004. "Strategic Interactions of the ECB, Wage Bargainers, and Governments." In *Institutional Conflicts and Complementarities: Monetary Policy and Wage Bargaining Institutions in EMU*, ed. Robert J. Franzese, Peter Mooslechner, and Martin Schürz, 5-42. Boston: Kluwer Academic Press. http://dx.doi.org/10.1007/978-1-4757-4062-2

Fritz, Barbara, Luiz F. de Paula, and Daniela Magalhães Prates. 2018. "Global Currency Hierarchy and National Policy Space: A Framework for Peripheral Economies." *European Journal of Economics and Economic Policies: Intervention*, 15(2): 208-218.

Godley, Wynne, and Marc Lavoie. 2007. *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth*. London: Palgrave Macmillan. http://dx.doi.org/10.1007/978-1-137-08599-3

Hall, Peter A., and Robert J. Franzese. 1998. "Mixed Signals: Central Bank Independence, Coordinated Wage-Bargaining, and European Monetary Union." *International Organization*, 52(3): 505-536.

Harvey, John T. 1991. "A Post Keynesian View of Exchange Rate Determination." *Journal of Post Keynesian Economics*, 14(1): 61-71.

Harvey, John T. 1996. "Orthodox Approaches to Exchange Rate Determination: A Survey." *Journal of Post Keynesian Economics*, 18(4): 567-583. http://dx.doi.org/10.1080/01603477.1996.11490087

Harvey, John T. 2001. "Exchange Rate Theory and 'the Fundamentals'." *Journal of Post Keynesian Economics*, 24(1): 3-15. http://dx.doi.org/10.1080/01603477.2001.11490311

Harvey, John T. 2005. "Post Keynesian versus Neoclassical Explanations of Exchange Rate Movements: A Short Look at the Long Run." *Journal of Post Keynesian Economics*, 28(2): 161-179. http://dx.doi.org/10.2753/PKE0160-3477280201

Harvey, John T. 2007. "Teaching Post Keynesian Exchange Rate Theory." *Journal of Post Keynesian Economics*, 30(2): 147-168. http://dx.doi.org/0.2753/PKE0160-3477300201

Harvey, John T. 2009. "Currency Market Participants' Mental Model and the Collapse of the Dollar: 2001-2008." *Journal of Economic Issues*, 43(4): 931-949. http://dx.doi.org/10.2753/JEI0021-3624430406

Harvey, John T. 2012. "Exchange Rate Behavior During the Great Recession." *Journal of Economic Issues*, 46(2): 313-322. http://dx.doi.org/10.2753/JEI0021-3624460206

Hein, Eckhard. 2008. *Money, Distribution Conflict and Capital Accumulation: Contributions to "Monetary Analysis"*. London: Palgrave Macmillan.

Hein, Eckhard, and Engelbert Stockhammer. 2011. *A Modern Guide to Keynesian Macroeconomics and Economic Policies*. Cheltenham: Edward Elgar Publishing.

Hein, Eckhard. 2014. *Distribution and Growth after Keynes: A Post-Keynesian Guide*. Cheltenham: Edward Elgar Publishing.

Kaltenbrunner, Annina. 2015. "A Post Keynesian Framework of Exchange Rate Determination: A Minskyan Approach." *Journal of Post Keynesian Economics*, 38(3): 426-448. http://dx.doi.org/10.1080/01603477.2015.1065678

Keynes, John Maynard. 1930a. *A Treatise on Money: The Pure Theory of Money*. Vol. 1. London: Macmillan.

Keynes, John Maynard. 1930b. *A Treatise on Money: The Applied Theory of Money*. Vol. 2. London: Macmillan.

Keynes, John Maynard. 1936. *The General Theory of Employment, Interestand Money*. London: Macmillan.

Krugman, Paul, and Lance Taylor. 1978. "Contractionary Effects of Devaluation." *Journal of International Economics*, 8(3): 445-456. http://dx.doi.org/10.1016/0022-1996(78)90007-7

Lavoie, Marc. 1992. *Foundations of Post-Keynesian Economic Analysis*. Cheltenham: Edward Elgar Publishing.

Lavoie, Marc. 2002. "The Kaleckian Growth Model with Target Return Pricing and Conflict Inflation." In *The Economics of Demand-Led Growth: Challenging the Supply-Side Vision of the Long Run*, ed. Mark Setterfield. Cheltenham: Edward Elgar Publishing. http://dx.doi.org/10.4337/9781843765325

Lavoie, Marc. 2014. *Post-Keynesian Economics: New Foundations*. Cheltenham: Edward Elgar Publishing.

León-Ledesma, Miguel, and Anthony Philip Thirlwall. 2007. "Is the Natural Rate of Growth Exogenous?" In *Economic Growth: New Directions in Theory and Policy*, ed. Phillip Arestis, Michelle Baddeley, and John S. L. McCombie. Cheltenham: Edward Elgar Publishing. http://dx.doi.org/10.4337/9781847205216

Lima, Gilberto Tadeu, and Mark Setterfield. 2008. "Inflation Targeting and Macroeconomic Stability in a Post Keynesian Economy." *Journal of Post Keynesian Economics*, 30(3): 435-461. http://dx.doi.org/10.2753/PKE0160-3477300307

Macedo e Silva, Antonio Carlos. 1999. *Macroeconomia Sem Equilíbrio*. Petrópolis: Vozes.

Marglin, Stephen A., and Amit Bhaduri. 1990. "Profit Squeeze and Keynesian Theory." In *The Golden Age of Capitalism: Reinterpreting the Postwar Experience*, ed. Stephen A. Marglin and Juliet B. Schor. Oxford: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780198287414.001.0001

Marx, Karl. 1986. *O capital: Crítica da Economia Política. Volume VI. Livro Terceiro.* São Paulo: Nova Cultural.

Marx, Karl. 1996. *O capital: Crítica da Economia Política. Volume I. Livro Primeiro.* São Paulo: Nova Cultural.

Orphanides, Athanasios. 2018. "Taylor Rules." In *The New Palgrave Dictionary of Economics*, ed. Steven N. Durlauf and Lawrence E. Blume, 6556-6560. London: Palgrave Macmillan.

Palley, Thomas I. 1996. *Post Keynesian Economics: Debt, Distribution, and the Macro Economy*. London: Palgrave Macmillan.

Rochon, Louis-Philippe, and Sergio Rossi. 2016. "The Central Bank and Monetary Policy." In *An Introduction to Macroeconomics: A Heterodox Approach to Economic Analysis*, ed. Louis-Philippe Rochon and Sergio Rossi, 134-151. Cheltenham: Edward Elgar Publishing.

Rowthorn, Bob. 1981. *Demand, Real Wages and Economic Growth*. London: Thames Polytechnic.

Rowthorn, Robert E. 1977. "Conflict, Inflationand Money." *Cambridge Journal of Economics*, 1(3): 215-239. http://dx.doi.org/10.1093/oxfordjournals.cje.a035360

Sawyer, Malcolm. 2002. "The NAIRU, Aggregate Demand and Investment." *Metroeconomica*, 53(1): 66-94. http://dx.doi.org/10.1111/1467-999X.00137

Schulmeister, Stephan. 1988. "Currency Speculation and Dollar Fuctuations." *PSL Quarterly Review*, 41(167): 343-365.

Soskice, David, and Torben Iversen. 2000. "The Non-Neutrality of Monetary Policy with Large Wage and Price Setters." *Quarterly Journal of Economics*, 115(1): 265-284. http://dx.doi.org/10.1162/003355300554737

Soskice, David. 2008. "Varieties of Capitalism and Macroeconomic Institutions." In *Beyond Varieties of Capitalism: Conflict, Contradictions, and Complementarities in the European Economy*, ed. Bob Hancké, Martin Rhodes, and Mark Thache. Oxford: Oxford University Press. http://dx.doi.org/10.1093/acprof:oso/9780199206483.001.0001

Stockhammer, Engelbert. 1999. "Robinsonian and Kaleckian Growth: An Update on Post-Keynesian Growth Theories." Vienna University of Economics and Business Administration, Department of Economics Working Paper 67.

Stockhammer, Engelbert. 2008. "Is the NAIRU Theory a Monetarist, New Keynesian, Post Keynesian or a Marxist Theory?" *Metroeconomica*, 59(3): 479-510. http://dx.doi.org/10.1111/j.1467-999X.2008.00314.x

Taylor, John B. 1993. "Discretion versus Policy Rules in Practice." *Carnegie-Rochester Conference Series on Public Policy*, 39(1): 195-214. http://dx.doi.org/10.1016/0167-2231(93)90009-L

Taylor, Lance. 1985. "A Stagnationist Model of Economic Growth." *Cambridge Journal of Economics*, 9(4): 383-403. http://dx.doi.org/10.1093/oxfordjournals.cje.a035588

Taylor, Lance. 1991. *Income Distribution, Inflation, and Growth: Lectures on Structuralist Macroeconomics Theory*. Cambridge, MA: MIT Press.

Tobin, James. 1981. "Diagnosing Inflation: A Taxonomy." In *Development in an Inflationary World*, ed. M. June Flanders and Assaf Razin, 19-30. Cambridge, MA: Academic Press.

Weintraub, Sidney. 1978. *Capitalism's Inflation and Unemployment Crisis: Beyond Monetarism and Keynesianism*. Boston, MA: Addison-Wesley.