A Kaleckian model of growth and distribution with conflict-inflation and Post Keynesian nominal interest rate rules

Abstract: Post Keynesians advocate two distinct approaches to monetary and interest rate policy. The activist approach sees interest rates moved countercyclically to ensure strong growth and low employment. The parking-it approach, however, favors setting real or nominal rates at specific levels and changing them only sparingly. In this paper, the authors evaluate the impact on macroeconomic performance of three variants of this latter approach—the Smithin rule, the Kansas City rule, and the Pasinetti rule.

Key words: income distribution, inflation, interest rates, monetary policy, stabilization policy, unemployment.

The recent emphasis on monetary variables within Post Keynesian models of growth and distribution is a welcomed development. Indeed, as Lavoie (1995) indicates, the old Cambridge models did not consider the rate of interest in their theory of growth. Yet recent developments in the past 15 years by some Post Keynesians (see Hein, 2006, among others), among many others, have shown the relevance of including monetary variables in such models. Moreover, the exclusion of these variables in Kaldor and Robinson is certainly curious given that they both considered

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the importance of money and monetary policy, having each written on the subject.

The purpose of this paper is to contribute to this ongoing research program by integrating the rate of interest within an otherwise standard Kaleckian model of growth with conflict inflation. Moreover, we expand the analysis by also considering the impact of various Post Keynesian interest rate rules on macroeconomic performance, an approach that we developed in earlier papers. Indeed, in Rochon and Setterfield (2007, 2008), we argued that there were two emerging approaches to monetary policy within Post Keynesian theory, what we labeled the “activist” and the “parking-it” approaches. We defined the former as Post Keynesians who, while advocating the use of fiscal policy, also believe in the ability of central banks to fine-tune economic outcomes (output and unemployment, and perhaps even inflation) and regulate business cycles through changes in the rate of interest (see Fontana and Palacio-Vera, 2006; Moore, 1988; Palley, 1996, 2006, 2007). While critical of inflation targeting, activists believe that another, albeit real, target is acceptable, such as output, capacity utilization, investment, or growth (see Epstein, 2003), and that interest rates can be used to achieve this target.

For advocates of the parking-it view, however, the monetary policy dominance that has characterized central bank policy in the past 20 years or so has had some disturbing consequences for output and employment. In this view, the rate of interest is foremost a distributive variable operating on the distribution of income. Hence, monetary policy is not an appropriate tool for regulating aggregate output. They propose to “park” interest rates at a given level, and to rely instead on fiscal policy to achieve macroeconomic objectives related to the level of economic activity (see Lavoie and Seccareccia, 1999; Smithin, 2007; Wray, 2007) or even to achieve some control of inflation.¹

This view is well summarized by Godley and Lavoie: “Fiscal policy, in theory, capable of achieving full employment at some target inflation rate. It is not clear what advantage monetary policy has, besides the fact that target interest rates can be easily altered every month or even every week. Indeed, by bringing back fiscal policy as the main tool to affect aggregate demand, monetary policy would now have an additional degree of freedom to set the real interest rate, which is a key determinant of distribution policy” (2007, pp. 96–97).

¹ This does not imply, of course, that interest rates are fixed indefinitely. Rather, they are changed only infrequently. See Rochon and Setterfield (2007) for a discussion.
This said, there are a number of similarities between the two approaches, which we explored in Rochon and Setterfield (2007). For instance, both approaches are well-rooted in the endogenous money literature. Moreover, we would argue that both approaches largely reject the central bank focus on inflation targeting and the mainstream discussion of the transmission mechanism of inflation as the result of excess demand forces (Rochon and Setterfield, 2008). Indeed, both approaches accept the cost-push view of price dynamics, although the parking-it view is perhaps more explicit with respect to the conflict-driven nature of inflation. As such, both approaches question the validity of central bank policy in fighting inflation.

Despite these similarities, important differences exist concerning the specific nature of the transmission mechanism of monetary policy. These differences, which we analyze in more detail elsewhere (ibid.), shape the respective emphases on the use of monetary or interest rate policy for regulating the real economy in the activist and parking-it approaches.

The purpose of this paper is to further explore the three variants of the parking-it rules (the Smithin rule, the Kansas City rule, and the Pasinetti [or Fair Rate] rule) discussed in Rochon and Setterfield (2007, 2008). As we will see, the three different rules have different implications for the position of the rentier class in society. In this sense, the three rules have important and different distributional implications. In this paper, however, we are interested in exploring the implications of these rules for other macroeconomic outcomes, together with their effects on the capacity of the authorities to pursue nondistributional policy objectives using nonmonetary policy interventions. In other words, we introduce a new criteria by which to evaluate the relative merits of the three rules—an exercise that, in turn, will hopefully contribute to the process by which Post Keynesians make an informed choice between the three rules when confronting what we call the “Smithin question”: in the absence of a Wicksellian natural rate, exactly what, according to Post Keynesian theory, should the long-run/equilibrium rate of interest be?2

2 Needless to say, the model developed below by no means exhausts the process of evaluation. For example, it does not capture the potential impact of the three interest rate rules on corporate finance—in particular, the extent to which firms rely on either debt or new equity to finance investment and the effects of this on economic growth. We leave this and other extensions of the type of assessment exercise undertaken in this paper to future research.
A positive Post Keynesian contribution to monetary policy analysis

While proponents of the activist approach reject the wisdom of using interest rates to fight inflation, they nonetheless argue that interest rates remain a viable tool of stabilization policy provided another target is chosen. The problem with inflation targeting is that the costs associated with it in terms of unemployment and growth are too high. Indeed, as Epstein argues, “in many countries, inflation targeting has generated significant costs—slow growth, sluggish employment and high real interest rates—while, yielding, at most, minor benefits” (2003, p. 1). Instead, adherents to this approach would argue that central banks should replace inflation targets with other targets. For instance, Epstein (ibid.) argues that central banks should adopt a real target, such as employment, or even investment and real gross domestic product (GDP). Fontana and Palacio-Vera (2006), meanwhile, favor an asymmetrical approach to central banking, whereas Palley (2007) prefers targeting the minimum unemployment rate of inflation. Overall, these approaches are consistent with the belief that the rate of interest can and should be used to “fine-tune” real variables.

According to the parking-it view, while the costs of inflation targeting regimes are certainly high, given the imprecise nature of the transmission mechanism, the use of interest rate policy for macrostabilization—irrespective of the target at hand—is ill advised. In other words, monetary policy is an ineffectual tool for fighting not only inflation but unemployment as well. The basic argument is that the precise nature of the transmission mechanism is too complex to ensure that changes in the rate of interest always have their desired effects on unemployment, capacity utilization, or growth. In this way, monetary policy is best avoided as an instrument of stabilization policy. Proponents of the parking-it approach therefore favor downgrading monetary policy altogether in favor of fiscal policy.

Within the parking-it approach, however, there are three distinct views, what we called the Smithin rule, the Kansas City rule, and the Fair Rate or Pasinetti rule. As we have argued elsewhere, while there are some obvious differences between these rules, they all amount in part to an incomes policy, albeit an incomes policy for rentiers rather than for workers or entrepreneurs (see Rochon and Setterfield, 2008).

According to the Smithin rule, the central bank should keep real interest rates very low, close to zero. The Kansas City rule, meanwhile, recommends that the nominal rate be set at zero: “In the modern floating
exchange rate economy, this [the euthanasia of the rentier] is done by setting the overnight interest rate at zero, with other rates established above this to reward risk taking” (Wray, 2007). Both of these rules thus propose keeping real or nominal rates close to zero, which will redistribute real income away from rentiers, in the tradition of Keynes’s famous “euthanasia of the rentier.” The Fair Rate rule (also referred to as the Pasinetti rule or Horizontalist rule), however, recommends setting the real rate equal to the rate of growth of labor productivity, following Pasinetti (1981), seeing rentiers as a “necessary evil” (Lavoie, 1996, p. 537). In this case, monetary policy is essentially neutral with respect to the distribution of income. According to Pasinetti, the fair rate of interest “stems from the principle that all individuals, when they engage in debt/credit relations, should obtain, at any time, an amount of purchasing power that is constant in terms of labour (a labour theory of income distribution)” (1981, p. 174). For Lavoie, “The fair rate of interest thus maintains the purchasing power, in terms of command over labour hours, of funds that are borrowed or lent, and preserves the intertemporal distribution of income between borrowers and lenders. The fair rate of interest, in real terms, should be equal to the rate of increase in the productivity of the total amount of labour that is required, directly or indirectly, to produce consumption goods and to increase productive capacity. . . . In an economy where the rate of profit remains constant, this growth rate would simply equal the growth rate of real wages. With price inflation, the fair rate of interest would be equal to the average rate of wage inflation, i.e., the growth rate of overall productivity plus the rate of price inflation” (1999, p. 4).

Despite their differences, all three versions of the parking-it approach consider the rate of interest to be a distributive variable. As such, they characterize monetary policy as essentially an incomes policy for rentiers, with the monetary transmission mechanism acting through changes in the distribution of income, both in the short run and long run.

**A Post Keynesian monetary macroeconomic model**

In this section, we outline the four main components of the structural model that we will use (in the next section) to compare and contrast the macroeconomic consequences of the various Post Keynesian interest rate rules mentioned above. The model builds on, extends, and develops in greater detail some of the key features of the model in Rochon and Setterfield (2007).
Inflation and the distribution of income

We model inflation as a conflicting claims process. Specifically, we write:

\[ w = \mu \left[ (\omega_w - \omega) + q + p^e \right], \quad 0 < \mu < 1 \]  
\[ p = \varphi (\omega - \omega_f) + w - q, \quad 0 < \varphi < 1 \]  
\[ \omega_w = f(g), \quad f' > 0, \]

where \( w \) is the rate of growth of nominal wages, \( \omega_w \) is the target wage share of workers, \( \omega \) is the actual wage share, \( q \) is the rate of growth of labor productivity, \( p^e \) and \( p \) denote the expected and actual rates of inflation, respectively, \( \omega_f \) is the target wage share of firms, \( \mu \) denotes the relative power of workers in the wage bargain, \( g \) is the rate of growth, and \( \varphi \) is a reflection of the “monopoly power” of firms vis-à-vis the goods market (specifically, their ability to increase prices in excess of increases in unit labor costs).

Equation (1) describes the rate of growth of nominal wages as increasing in the rates of productivity growth and expected inflation, and the difference between workers’ target wage share and the actual wage share (the former representing the distributional aspirations of workers that, at any given level of productivity, can be associated with a perceived “fair” value of the real wage).\(^4\) Equation (2) states that inflation varies in equal proportion to the rate of growth of unit labor costs \((w - q)\), and is also influenced by any discrepancy between the actual wage share and firms’ target wage share. The assumption that \( 0 < \mu, \varphi < 1 \) means that there is an absence of full indexation in both wage- and price-setting behavior. This is consistent with the existence of limitations to both the bargaining power of workers vis-à-vis firms in the wage bargain and the “monopoly power” of firms in product markets. Finally, Equation (3) endogenizes workers’ target wage share, describing the latter as varying directly with the rate of growth.\(^5\)

Given the rates of growth of output and productivity, steady-state equilibrium requires that \( p = p^e \) and \( \omega = \bar{\omega} \), which, from the definition of the

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\(^3\) See Burdekin and Burkett (1996) and Lavoie (1992, ch. 7) for surveys of the conflicting claims approach to the analysis of inflation.

\(^4\) See Setterfield (2006) for further discussion of both this equation and other features of the specific conflicting claims model stated above.

\(^5\) Firms’ target wage share remains exogenous because as demonstrated below, it is determined by a target rate of return evaluated at normal rates of capacity utilization and interest—all of which are taken as given in the short run.
wage share, implies that \( p = w - q \). Using the second of these equilibrium conditions in conjunction with Equation (2), we arrive at

\[
\omega^* = \omega_F, \quad (4)
\]

where an asterisk (*) denotes an equilibrium value. Meanwhile, using both of our equilibrium conditions together with the result in Equation (4), and combining this information with Equation (1), we arrive at

\[
w^* = \frac{\mu}{1 - \mu} (\omega_w - \omega_F),
\]

Given Equation (3) and that \( p = w - q \), it follows that

\[
p^* = \Omega \left( f \left( g^* \right) - \omega_F \right) - q^*, \quad (5)
\]

where \( \Omega = \mu / (1 - \mu) \). Equations (4) and (5) state the equilibrium wage share and rate of inflation, respectively, based on the workings of the conflicting claims inflation process in Equations (1)–(3).

**Economic growth**

Our description of economic growth is based on a neo-Kaleckian model of the form:

\[
g = \gamma + \gamma_u \mu + \gamma_r \left( r - i \lambda \right), \quad (6)
\]

\[
g^* = s_k r, \quad (7)
\]

\[
r = \frac{(1 - \omega) u}{v}, \quad (8)
\]

where \( u \) is the rate of capacity utilization, \( r \) is the gross rate of profit, \( i \) is the nominal interest rate, \( \lambda \) is the ratio of corporate debt to the aggregate capital stock (assumed constant in the short run), \( g^* \) is the rate of growth of savings, \( v \) is the (fixed) capital-output ratio, and \( g \) is as previously defined. Equation (6) describes growth as increasing in the rates of capacity utilization and “enterprise” profits—that is, gross profits minus the amount paid by firms (to rentiers) to service outstanding debts.\(^7\) Hence, the notion that “interest rates matter” is captured here by their impact on

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\(^6\) See Blecker (2002) for a survey of neo-Kaleckian growth theory.

\(^7\) See Setterfield (2009b) for further discussion of Equation (6). Note that, given \( \lambda \), enterprise profits in Equation (6) are sensitive to variations in the gross rate of profit in real terms \( (r) \) and the nominal rate of interest \( (i) \). To see how this relationship arises, begin by writing

\[
\Pi_E = \Pi - \Pi_R,
\]
the distribution of gross profits between capitalist and rentiers (which is itself consistent with our conception of the interest rate as an intrinsically distributional variable) and hence investment behavior. Equation (7), meanwhile, is the familiar Cambridge equation, while Equation (8) is true by definition.8

Using the equilibrium condition $g = g^s$ to combine Equations (6)–(8), and recalling the result in Equation (4), we arrive at

$$u^s = \frac{(\gamma - \gamma_i i^u \lambda) v}{(s - \gamma_r)(1 - \omega_F) - \gamma_u v}.$$  

(9)

Note that an economically meaningful solution to Equation (9) (where $u^s > 0$) now requires both $s - \gamma_u v/\omega_F > 0$ (the familiar neo-Kaleckian condition) and $\gamma > \gamma_i i^u \lambda$. This second condition, which is specific to the

where $\Pi_E$ denotes enterprise profits, $\Pi$ denotes gross profits, and $\Pi_R$ denotes payments to rentiers (all in nominal terms). Suppose further that $\Pi_R = iD$, where $D$ is the nominal stock of debt. We can therefore write

$$\Pi_E = \Pi - iD.$$

Dividing through by the nominal value of the capital stock ($PK$) yields

$$\frac{\Pi_E}{PK} = \frac{\Pi}{PK} - \frac{iD}{PK}$$

or

$$\frac{\Pi_E}{PK} = \frac{\Pi}{PK} - \frac{iD}{PK},$$

which we can write as

$$r_E = r - \omega^E,$$

where $r_E$ denotes the real rate of enterprise profits, or what is better thought of as the “real cash flow rate.” (We are grateful to Marc Lavoie for drawing this last point to our attention.) What Equation (6) suggests is that increases in the nominal interest rate squeeze firms’ cash flows (by redistributing income toward rentiers) and hence impede their ability to accumulate—an intrinsically Keynesian result, since it involves a monetary variable affecting a real variable. Equation (6) is thus consistent with the empirical evidence of, inter alia, Fazzari et al. (1988), which demonstrates the impact of cash flow on investment expenditures.

On the basis of Equation (8) and the definition of $r^F$ in the previous footnote, it can be shown that

$$\omega_F = 1 - \frac{v(r^F + i_n \lambda)}{u_n},$$

where $r^F$ is the target real cash flow rate and $i_n$ and $u_n$ are normal rates of interest and capacity utilization, respectively. Note that $\omega_F$ is thus invariant not only to $g^s$ (as previously asserted) but also to changes in the actual value of the interest rate. There is, therefore, no “cost-push channel” of monetary policy in the model developed in this paper, whereby changes in the rate of interest affect the markup and hence prices. See Setterfield (2009b) for further discussion.
variant of the neo-Kaleckian growth model utilized here, arises by virtue of the distinction between gross and enterprise profits in the construction of the investment function in Equation (6).

Substituting Equation (9) into (6) and solving for the equilibrium rate of growth, we arrive at

\[ g^* = \frac{s_{\pi}(1 - \omega_F)(\gamma - \gamma_i \lambda^*)}{(s_{\pi} - \gamma_F)(1 - \omega_F) - \gamma_u \nu} . \]  

(10)

It should be noted that it follows from Equations (9) and (10) that

\[ \frac{\partial u^*}{\partial (1 - \omega_F)} = -v(\gamma - \gamma_i \lambda)(s_{\pi} - \gamma_F) \left[ (s_{\pi} - \gamma_F)(1 - \omega_F) - \gamma_u \nu \right] < 0 \]

and

\[ \frac{\partial g^*}{\partial (1 - \omega_F)} = -s_{\pi} \gamma_u \nu (\gamma - \gamma_i \lambda) \left[ (s_{\pi} - \gamma_F)(1 - \omega_F) - \gamma_u \nu \right] < 0 . \]

In other words, the growth regime is stagnationist and wage led. This implies that our modification of the investment function in Equation (6) in order to distinguish between gross and enterprise profits, and the consequent introduction of the interest rate into this investment function, does not alter the fundamental response of the neo-Kaleckian model to reductions in the wage share. Note that the comparative static results above are guaranteed as long as the conditions for an economically meaningful solution to Equation (9) hold—that is, as long as \( \gamma > \gamma_i \lambda \) and \( s_{\pi} > \gamma_u \nu / (1 - \omega_F) + \gamma_F \) (since it follows from this last condition that \( s_{\pi} > \gamma_F \) given \( \gamma_u \nu, (1 - \omega_F) > 0 \) by definition).

**Technical progress**

We model technical progress as

\[ q = q(g), \quad q' > 0, \]

where \( q' > 0 \) captures a Verdoorn effect: increased economic growth results in dynamic increasing returns and hence faster productivity growth.\(^9\)

Linearizing this technical progress function and evaluating the resulting expression at the equilibrium rate of growth, we arrive at

\[ q^* = \alpha \gamma g^*, \quad \alpha > 0. \]  

(11)

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9 See McCombie and Thirlwall (1994, ch. 2) for a discussion of the Verdoorn effect.
Note that

\[
\frac{\partial q^*}{\partial (1 - \omega_F)} = \alpha_g \frac{\partial g^*}{\partial (1 - \omega_F)} < 0
\]

since \(\frac{\partial g^*}{\partial (1 - \omega_F)} < 0\), as previously demonstrated. In other words, the dynamics of productivity growth are also wage led.\(^{10}\)

**Monetary policy**

Monetary policy is modeled in terms of the following interest rate operating procedure (IROP), which encompasses the three Post Keynesian “benchmark” interest rate rules discussed earlier:

\[
i = \beta_p p + \beta_q q,
\]

where

- Fair Rate (Pasinetti) rule: \(\beta_p = \beta_q = 1\)
- Smithin rule: \(\beta_p = 1\), \(\beta_q = 0\)
- Kansas City rule: \(\beta_p = \beta_q = 0\).

It follows that the equilibrium nominal interest rate can be written as

\[
i^* = \beta_p p^* + \beta_q q^*.
\]

**Model solution and comparative statics**

In order to proceed with the solution of the model outlined above, we first introduce the simplifying assumption that \(f' = 0\) in Equation (3). In other words, following Palley (1996), we work with a version of the conflicting claims inflation model in which both wage share targets \((\omega_w\)

\(^{10}\) A simple extension of Equation (11) would involve writing

\[
q^* = \alpha_{\omega} (1 - \omega_F) + \alpha_g g^*,
\]

where \(\alpha_{\omega} < 0\) captures a Marx effect, whereby increasing the wage share (and thus squeezing profits) induces labor-saving technical change by firms in an effort to restore profitability (see, e.g., Foley, 2003, ch. 2). The implications of this extension are not explored in what follows, but note that the expression above does imply that

\[
\frac{\partial q^*}{\partial (1 - \omega_F)} = \alpha_{\omega} + \alpha_g \frac{\partial g^*}{\partial (1 - \omega_F)} < \alpha_g \frac{\partial g^*}{\partial (1 - \omega_F)}.
\]

In other words, addition of a Marx effect would amplify the wage-led dynamics of technical change.
and $\omega_f$) are exogenous. Note that, absent this assumption, combining Equations (5) and (11) would yield

$$p^* = \Omega \left( f \left( g^* \right) - \omega_f \right) - \alpha_g g^*, \tag{5'}$$

from which it follows that

$$\frac{\partial p^*}{\partial g} = \Omega f' - \alpha_g.$$

The sign of this last expression is indeterminate. If $\Omega f' > \alpha_g$—that is, if faster growth causes a larger increase in wage inflation than in productivity growth—then the rate of growth of unit labor costs will rise and so will inflation. This can be considered a traditional Phillips curve result. However, if $\Omega f' < \alpha_g$, then faster growth will reduce the rate of growth of unit labor costs and hence inflation. Setting $f' = 0$ simply forces this latter result. As will be made clear in what follows, setting $f' = 0$ does affect some (although interestingly, by no means all) of the results derived in this paper. Nevertheless, we persist with the assumption in the interests of expediency and defer full exploration of the endogenous wage target case to further research (see, e.g., Setterfield, 2009a).

Bearing in mind the simplifying assumption introduced above, our complete model can now be summarized as follows:

$$p^* = \Omega \left( \omega_w - \omega_f \right) - q^* \tag{5'}$$

$$g^* = \frac{s \pi \left( 1 - \gamma_f \right) \left( \gamma - \gamma_f i^* \lambda \right)}{\left( s \pi - \gamma_r \right) \left( 1 - \omega_f \right) - \gamma_v v} \tag{10}$$

$$q^* = \alpha_g g^* \tag{11}$$

$$i^* = \beta_p p^* + \beta_q q^* \tag{13}$$

We can now find the general equilibrium rates of growth, inflation, and interest that emerge from the interaction of the equations listed above.

11 It does, of course, imply that it is impossible for the policy authorities to influence the equilibrium rate of inflation using the “traditional” lever of deflationary monetary policy. However, this, in and of itself, involves no loss of generality in what follows: as has already been made clear, we are not interested in specifying monetary policy reaction functions that aim to deflate the economy in the pursuit of lower inflation.

12 Recall that the equilibrium wage share, as determined in Equation (4), has already been incorporated into the equations restated here.
under various different assumptions about the size of the parameters $\beta_p$ and $\beta_q$. We begin by substituting Equation (13) into (10), which yields

$$g^* = \frac{s_\pi \left(1 - \omega_F\right) \left(\gamma - \gamma_r \lambda \left[\beta_p p^* + \beta_q q^*\right]\right)}{(s_\pi - \gamma_r \left(1 - \omega_F\right) - \gamma_u v)}.$$  \hspace{1cm} (14)

Substituting Equation (14) into (11) and solving for $q^*$ yields

$$q^* = \frac{\alpha_s s_\pi \left(1 - \omega_F\right) \left(\gamma - \gamma_r \lambda \beta_p p^*\right)}{\left(1 - \omega_F\right) \left(s_\pi \left[1 + \alpha_s \gamma_r \lambda \beta_q\right] - \gamma_r\right) - \gamma_u v}.$$  \hspace{1cm} (15)

We now have two Equations ((5′) and (15)) in two unknowns ($p^*$ and $q^*$). Note that, from Equation (15), we have

$$dq^* dp^* \leq 0$$

and

$$\frac{dq^*}{dp^*} > -1$$

In other words, $q^*$ is decreasing in $p^*$ at a constant rate (except when $\beta_p = 0$—as in the Kansas City rule—when $q^*$ is invariant with respect to $p^*$). The intuition for this (potentially) inverse relationship between $q^*$ and $p^*$ is straightforward: as inflation rises, the rate of interest in Equation (13) goes up, as a result of which the rate of growth in Equation (10) falls. This, in turn, reduces the rate of productivity growth in Equation (11).

Meanwhile, note that by rearranging Equation (5′), we can write

$$q^*_p = \Omega \left(\omega_w - \omega_F\right) - p^*,$$  \hspace{1cm} (5′′)

where $q^*_p$ denotes the rate of productivity growth consistent with the equilibrium rate of inflation in Equation (5′). We now assume that

$$\frac{dq^*_p}{dp^*} > -1 = \frac{dq^*_p}{dp^*}$$

and

$$\Omega \left(\omega_w - \omega_F\right) > \frac{\alpha_s s_\pi \left(1 - \omega_F\right) \gamma}{\left(1 - \omega_F\right) \left(s_\pi \left[1 + \alpha_s \gamma_r \lambda \beta_q\right] - \gamma_r\right) - \gamma_u v}.$$
These assumptions are sufficient to ensure the existence and stability of the general equilibrium values of $p$ and $q$ ($p'$ and $q'$, respectively) depicted in Figure 1. Utilizing the assumptions made above, Figure 1 plots the “growth frontier” in Equation (15) together with the “inflation frontier” in Equation (5'') to derive $p'$ and $q'$. It also utilizes Equation (13) to show the derivation of the general equilibrium interest rate $i'$. In this way, Figure 1 illustrates the derivation of the general equilibrium rates of growth, inflation, and interest from the structural model summarized at the start of this section.

Of course, Figure 1 does not faithfully represent any of the monetary policy regimes described in the previous section, all of which involve specific values of the parameters $\beta_p$ and $\beta_q$. But we are now in a position to introduce specific values of these parameters—which will modify the form of the growth frontier in Equation (15)—and thus compare the macroeconomic consequences of the various IROPs described in the previous section.$^{13}$

$^{13}$ As discussed by Rochon and Setterfield (2007), the three different IROPs described in the previous section have different implications for the position of the rentier class in society, with the Pasinetti rule defining a “fair” return for rentiers and the other two rules seeking the euthanasia of the rentier. Thus, we already know that the three rules have different distributional implications. We are now looking to see whether they have different effects on growth and inflation outcomes, and on the capacity of the authorities to pursue other policy objectives using nonmonetary policy
We begin with the Pasinetti rule, which stipulates that $\beta_p = \beta_q = 1$. Substituting this information into Equation (15) yields

$$q^*_H = \frac{\alpha_s s_\pi (1 - \omega_F) (\gamma - \gamma_r \lambda p^*)}{(1 - \omega_F) (s_\pi [1 + \alpha_s \gamma_r \lambda] - \gamma_r) - \gamma_u v}, \quad (15')$$

from which it follows that

$$\frac{dq^*_H}{dp^*} = \frac{-\alpha_s s_\pi (1 - \omega_F) \gamma_r \lambda}{(1 - \omega_F) (s_\pi - \gamma_r) - \gamma_u v}.$$

Having established these results, it is useful to proceed directly to the specification of the growth frontier consistent with the Smithin rule. The latter stipulates that $\beta_p = 1$ whereas $\beta_q = 0$. Substituting into Equation (15) now yields

$$q^*_S = \frac{\alpha_s s_\pi (1 - \omega_F) (\gamma - \gamma_r \lambda p^*)}{(1 - \omega_F) (s_\pi - \gamma_r) - \gamma_u v}, \quad (15'')$$

from which it follows that

$$\frac{dq^*_S}{dp^*} = \frac{-\alpha_s s_\pi (1 - \omega_F) \gamma_r \lambda}{(1 - \omega_F) (s_\pi - \gamma_r) - \gamma_u v} < 0.$$

Notice that the denominators of both Equation (15'') and its first derivative are smaller than those of Equation (15') and its derivative. This means that, compared with the Pasinetti growth frontier, the Smithin growth frontier is both steeper and has a larger intercept term. Formally, if we define the intercept term of the generic growth frontier in Equation (15) as

$$\Psi = \frac{\alpha_s s_\pi (1 - \omega_F) \gamma}{(1 - \omega_F) (s_\pi [1 + \alpha_s \gamma_r \lambda \beta_q] - \gamma_r) - \gamma_u v},$$

it follows that

$$\frac{d\Psi}{d\beta_q} = \frac{-[\alpha_s s_\pi (1 - \omega_F)]^2 \gamma \gamma_r \lambda}{\left\{(1 - \omega_F) (s_\pi [1 + \alpha_s \gamma_r \lambda \beta_q] - \gamma_r) - \gamma_u v\right\}^2} < 0.$$
At the same time, it follows from the first derivative of Equation (15) that

\[
\frac{d^2 q^*}{dp^* d\beta_q} = \frac{\left[ \alpha_s \pi (1 - \omega_F) \gamma_r \lambda \right]^2 \beta_p}{\left\{ (1 - \omega_F) \left[ \pi \left[ 1 + \alpha_s \gamma_r \lambda \beta_q \right] - \gamma_r \right] - \gamma_v \right\}^2} > 0
\]

for \( \beta_p \neq 0 \). On the basis of these results, Figure 2 depicts the comparative macroeconomic outcomes that result from the use of the Pasinetti and Smithin rules.

As is clear from Figure 2 (and Equation (13)), for any \( q^* > 0 \), the interest rate is always higher under the Pasinetti rule. Figure 2 also suggests that growth will be higher and inflation will be lower with the Smithin rule. This makes intuitive sense: since the Smithin rule involves a lower interest rate ceteris paribus, it will stimulate growth and, as a result, lower inflation.\(^{15}\) However, some caution is needed when interpreting the result shown in Figure 2. This is because as inflation and hence the interest rate rises, the rate of growth falls faster with the Smithin rule; with the Pasinetti rule, rising inflation pushes up the interest rate, depressing the rate of growth, which in turn ameliorates the increase in interest rates and their negative effect on the growth rate. This is the substance of the steeper growth frontier that arises in the case of the Smithin rule. The upshot of all this, as illustrated in Figure 3, is that for values of \( \psi \) sufficiently small, growth will be higher and inflation will be lower with the Pasinetti rule.\(^{16}\) From Equations (15’) and (15’’),

\(^{15}\) Recall that faster growth will unambiguously reduce inflation because of our earlier assumption that \( f' = 0 \). As demonstrated in footnote 10, were we to assume that the target wage share of workers varies directly with the rate of growth, it is possible that faster growth would ultimately lead to higher rather than lower inflation. Note that this would, in turn, lead to a partial crowding out of the growth bonus associated with a switch to the Smithin rule, since higher inflation would promote an increase in the interest rate, which would reduce the rate of growth. (This would necessarily be a partial crowding-out effect, of course, since the rise in the interest rate is predicated on a higher rate of inflation that requires an increase in the growth rate.) In short, relaxing the assumed exogeneity of workers’ target wage share has the capacity to modify the sign of the effect on inflation of switching from the Pasinetti to the Smithin interest rate rule. But it will only modify the size of the effect on growth of the same switch between interest rate rules.

\(^{16}\) Once again, relaxing the assumed exogeneity of workers’ target wage share may modify the sign of the effect on inflation but only the size of the effect on growth of switching from the Smithin to the Pasinetti interest rate rule in the economy depicted in Figure 3.
Figure 2 Macroeconomic outcomes under the Pasinetti and Smithin rules

Figure 3 The Pasinetti and Smithin rules in a recession
it can be shown that where the $q_H^*$ and $q_S^*$ growth frontiers intersect, we will observe

$$p^* = \frac{\gamma}{\gamma, \lambda}$$

and

$$q^* = 0.$$ 

In other words, both $q'$ and $q''$ in Figure 3 are negative, and the situation illustrated in this figure is that of an economy in recession.\(^{17}\)

In short, the Pasinetti rule is the “high growth, low inflation” monetary policy rule during a recession (as in Figure 3), whereas the Smithin rule plays the same role in a positive growth environment (as in Figure 2). This result suggests that we can have “cooperative” or “conflictive” monetary policy regimes over the course of the cycle, as a result of the choice between the Pasinetti and Smithin rules. For example, suppose that the economy is in recession, so that the Pasinetti rule is the “high growth, low inflation” monetary policy rule. If the distributional purpose of monetary policy is to maintain the rentier class, then we have a cooperative monetary policy regime: both the distributional purpose of monetary policy and the maintenance of high growth and low inflation require use of the Pasinetti rule. However, if the distributional purpose of monetary policy is to euthanize the rentier, then we have a conflictive monetary policy regime. This time, the various objectives of policymakers regarding the distribution of income and the rates of growth and inflation call for the use of different IROPs—the first purpose being better served by the Smithin rule, the second by the Pasinetti rule.\(^{18}\)

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\(^{17}\) The Kaleckian model of growth developed earlier can be used to produce a reasonable facsimile of conditions of recession if we allow for a fall in the value of $\gamma$ (which will cause a fall in the value of $\psi$, shifting both the $q_H^*$ and $q_S^*$ schedules down, as in Figure 3) such that $\gamma < \gamma, \lambda$, and if we also posit that this situation is reflected in $(1 - \omega_F) < 0$ in the short run (in other words, the wage bill exceeds total income so that firms are making losses). Under these conditions, we will observe $r^* < 0$ in Equation (8), $u^* > 0$ in Equation (9), and $g^* < 0$ in Equation (10). It follows from this last result that $q^* < 0$ in Equation (11). The latter result can be associated with labor hoarding as growth turns negative, rather than technical regress due to a “reverse” Verdoorn effect.

\(^{18}\) Of course, the same distinction between conflictive and cooperative monetary policy regimes can arise in the positive growth environment depicted in Figure 2.
We now turn to consider the Kansas City rule. This stipulates that $\beta_p = \beta_q = 0$, which, on substitution into Equation (15), yields

$$q_{KC}^* = \frac{\alpha_g s_\pi (1 - \omega_F) \gamma}{(1 - \omega_F)(s_\pi - \gamma_r) - \gamma_u \gamma}$$

(15‴″)

with

$$\frac{dq_{KC}^*}{dp} = 0.$$

With the Kansas City rule, then, the growth frontier becomes horizontal—equilibrium productivity growth is constant at the rate that would emerge from Equation (15‴″) with $p = 0$, regardless of the rate of inflation. As a result of this, the Kansas City rule always yields the highest rate of growth and the lowest rate of inflation, regardless of the value of $\psi$. The intuition behind this result is straightforward. By minimizing the value of the nominal interest rate, the Kansas City rule results in higher growth and hence lower inflation than either the Pasinetti or Smithin rules, both of which give rise to higher interest rate regimes. Formally, as long as $\Omega(\omega_W - \omega_F) > \Psi$ (as was assumed earlier) so that the general equilibrium rate of inflation is positive, the Kansas City rule will always be the “high growth, low inflation” interest rate rule for two reasons. First, $\Psi_{KC} = \Psi_S > \Psi_H$ always. Second, while the interest rate increases and the growth rate decreases with inflation under the Smithin and Pasinetti rules, the rates of interest and growth are invariant with respect to inflation under the Kansas City rule. The results described above are illustrated in Figure 4.

**Nonmonetary policy interventions**

We now consider how the models in the previous subsection, featuring the various different IROPs that can be derived from Equation (13), respond to nonmonetary policy interventions. It has been shown by Setterfield (2009a) that under the conditions contemplated in this paper (specifically, with $f' = 0$), the net marginal impact on growth of an expansion-
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ary fiscal policy is unambiguously greatest under the Smithin rule, with there being no determinate rank ordering of the results produced under the Pasinetti and Kansas City rules. In what follows, then, we focus on the impact on macroeconomic outcomes of an incomes policy designed to curb inflation.

Referring back to the structure of the inflation process summarized in Equation (5'), it is clear that an incomes policy designed to reduce the rate of inflation at any given rate growth can act on any (or some combination) of the parameters $\Omega$, $\omega_w$, or $\omega_F$. In what follows, we will consider an incomes policy of the form $d\Omega < 0$. Note that, although $\Omega$ varies directly with the relative power of labor in the wage bargain, this type of incomes policy need not involve “zapping labor.” Hence, although $d\Omega < 0$ could be achieved by essentially coercive means (by limiting the ability of workers to bargain collectively, for example, or by increasing workers sense of employment and income insecurity—on which, see Setterfield, 2006, 2007), it could also be achieved cooperatively. For example, workers might agree to deliberately forego the use of what then becomes a latent degree of bargaining power as a result of their participation in a “social bargain” or “limited capital-labor accord” of the type described by Bowles et al. (1990) and Cornwall (1990).
Consider, then, the impact of $d\Omega < 0$ on Equation (5″). It follows from (5″) that

$$\frac{dq^*_p}{d\Omega} = (\omega_w - \omega_F) > 0.$$  

Interpreted literally, this result states that an incomes policy that reduces $\Omega$ will decrease the rate of productivity growth necessary to achieve any given rate of inflation. Or, in other words, inflation will now be lower at any given rate of productivity growth: the incomes policy will shift the inflation frontier first depicted in Figure 1 to the left.

It is clear from Equation (15) that the growth frontier is invariant with respect to the value of $\Omega$, regardless of the precise form of the IROP. Intuitively, then, the effect of $d\Omega < 0$ will depend chiefly on the slope of the growth frontier, something that is dependent on the form of the IROP. This is illustrated in Figure 5.

Figure 5 illustrates the marginal impact of an incomes policy on growth and inflation outcomes for all three of the monetary policy regimes discussed above. As the inflation frontier shifts left, growth remains constant under the Kansas City rule (because of the constancy of the interest rate that this rule imposes), and inflation falls from $p_{KC}$ to $p'_{KC}$. With the Pasinetti rule, however, the same incomes policy raises growth (from $q_H$ to $q'_H$), because reducing inflation lowers the interest rate under this rule. At the same time, the increase in growth amplifies the reduction in inflation brought about by the original incomes policy by reducing the rate of growth of unit labor costs. As such, inflation falls (from $p_H$ to $q'_H$) by a greater amount than under the Kansas City rule. Finally, the incomes policy will stimulate growth by a greater amount under the Smithin rule (from $q_s$ to $q'_S$), since, as explained earlier, there is no partial crowding out of the growth-stimulating effects of a fall in inflation with the Smithin rule. At the same time, this means that the fall in inflation brought about under the Smithin rule (from $p_s$ to $p'_S$) is still greater than that observed under the Pasinetti rule. In sum, the exercise illustrated in Figure 5 designed to illustrate the marginal impact on macroeconomic performance of an incomes policy designed to reduce inflation produces a simple rank ordering of results: the beneficial impact of the policy on both inflation and growth increases monotonically as we move from the Kansas City to the Pasinetti to the Smithin interest rate rules.\(^{21}\)

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\(^{20}\) The impact on the interest rate is omitted for the sake of simplicity.

\(^{21}\) Note that relaxing the assumption that $f' = 0$ may reverse the ranking of inflation results reported above if it gives rise to a positively sloped inflation frontier.
Figure 5 also serves to illustrate two further salient points. First, it demonstrates that under some Post Keynesian IROPs (specifically, the Pasinetti and Smithin rules), a policy of inflation targeting can benefit real economic performance. This is because reducing inflation will automatically reduce the rate of interest under these rules, and thus boost growth. Per the results of the exercise in Figure 5, we can see that the growth-enhancing effects of inflation targeting will be greater under the Smithin rule than they will be under the Pasinetti rule. Second, a successful incomes policy can trigger a switch in the “high growth, low inflation” monetary policy rule. This is illustrated in Figure 5, wherein the Pasinetti rule is the “high growth, low inflation” rule initially, but the shift in the inflation frontier causes the Smithin rule to become the “high growth, low inflation” rule subsequently. This, in turn, means that an incomes policy such as that depicted in Figure 5 can transform a conflictive monetary policy into a cooperative monetary policy (or vice versa), depending on the (assumed given) distributional ambitions of the policy authorities.

It should be noted that by “inflation targeting,” we mean only the credible commitment of the policy authorities to achieving a clearly stated target rate of inflation. Our definition of inflation targeting is thus more general than that associated with authors such as Mishkin (2002, p. 361), for whom it also has specific implications for monetary policy and for the policy priorities of the central bank.
Conclusion

This paper examined the macroeconomic consequences of three Post Keynesian “benchmark” interest rate rules, according to which interest rates (real or nominal) are “parked” at some specific value and changed only infrequently. Each of these rules is consistent with an explicit distributional objective vis-à-vis the role of the rentier class in a capitalist society, and argues against what Rochon and Setterfield (2007) call the monetary policy dominance of macroeconomic policy.

The paper sheds light on the question as to which of the three rules “does best,” in terms of their capacities to promote desirable (high growth, low inflation) macroeconomic outcomes and to assist the growth and inflation targeting objectives of the policy authorities. As has been made clear at various junctures, some of the results derived may be sensitive to the assumed exogeneity of wage targets in the inflation process. Further exploration of this sensitivity is clearly warranted. Nevertheless, together with consideration of their distributional effects, the exercise in this paper represents a first step toward comparative evaluation of three prominent Post Keynesian interest rate rules. It is hoped that this will contribute to the process of choosing among these rules and, in so doing, providing an answer to the “Smithin question”: What is the appropriate benchmark rate of interest in a Post Keynesian economy in which there is no natural rate of interest?

REFERENCES


