Neo-Kaleckian Growth Dynamics and the State of Long-Run Expectations: Wage- versus Profit-Led Growth Reconsidered

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Abstract

Neo-Kaleckian growth theory purportedly analyses growth in an environment of historical time and uncertainty. Typically, however, no account is taken of the implications of variability in the state of long run expectations (SOLE) for either the adjustment dynamics of neo-Kaleckian models, or for the results of comparative dynamic exercises undertaken with these models. This paper shows how variability in the SOLE can transform the canonical neo-Kaleckian model into one of path dependent, cyclical growth, and modify its wage-led growth results. Specifically, it is demonstrated that when the SOLE is variable, it may be easier to reduce and harder to increase the rate of growth by means of income re-distribution than the canonical neo-Kaleckian model predicts.

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1. Introduction

The neo-Kaleckian model is an established framework for studying the determinants of long run macroeconomic outcomes in an environment in which effective demand matters. In neo-Kaleckian theory, growth is demand-led because the rates of accumulation, utilisation and profit are all influenced by an independent (of saving behaviour) investment function, even in the long run.

There exist numerous investigations of the structure of the neo-Kaleckian model, its properties and the results associated with it.[1] Little attention has been paid to the importance of historical time and uncertainty in neo-Kaleckian growth dynamics, however, despite explicit acknowledgement that both are part of the fabric of the economy that neo-Kaleckians are modelling (see, for example, Lavoie, 1992, pp.282-4). As a result, changes in the state of long run expectations (SOLE), and the influence that these may have on the rates of accumulation, utilisation and profits, are largely absent from the neo-Kaleckian growth literature.

The purpose of this paper, then, is twofold. First, variations in the SOLE are introduced into the adjustment dynamics of neo-Kaleckian growth theory. This transforms the canonical neo-Kaleckian model from a traditional equilibrium model (in which equilibrium outcomes are defined and reached independently of the path taken towards them) into one in which outcomes are path dependent and the rate of growth is conceived as being determined by sequential processes unfolding in historical time. It is shown that this model is capable of generating growth cycles rather than a steady state growth rate (as in the canonical model).

Second, one of the main results of neo-Kaleckian growth theory - the paradox of costs, according to which increases in wages raise the rates of accumulation, utilisation and profits - is re-

[1] See section 2 below for further details.

examined. The sensitivity of this result to the precise form of the investment function is well known (Bhaduri and Marglin, 1990; Marglin and Bhaduri, 1990; Lavoie, 1992; Blecker, 2001). The purpose here is to re-think the question as to whether growth is wage-led or profit-led in light of the assumed variability in firms' SOLE. In particular, it is shown that in the wage-led growth environment of the canonical neo-Kaleckian model, the potential for changes in the state of long run expectations makes it harder to generate faster growth by re-distributing income towards wages, but reinforces the negative growth consequences of re-distributions towards profits. This suggests that the variability of firms' SOLE makes it harder to increase and easier to decrease the growth rate through the re-distribution of income.

The remainder of the paper is organised as follows. Section 2 describes the canonical neo-Kaleckian model and its results. Section 3 introduces variability in the SOLE to the adjustment dynamics of this model, with the result that growth cycles can emerge. In section 4, the impact of changes in the SOLE on the wage-led growth result of the canonical model is investigated. Finally, section 5 offers some conclusions.

2. The Canonical Neo-Kaleckian Model

Modern neo-Kaleckian growth models share important characteristics with the Cambridge growth theory of the 1950s and 1960s (see especially Robinson 1956, 1962). However, a crucial difference between these strands of Post-Keynesian growth theory is their treatment of the rate of capacity utilisation. In neo-Kaleckian theory, the rate of capacity utilisation is treated as being variable even in the long run, and as exerting an influence on investment activity that operates independently of its influence on investment via the rate of profit.[2] The earliest formulations of models exhibiting these characteristics are usually attributed to Del Monte (1975), Rowthorn (1981) and Dutt (1984), from which the contemporary neo-Kaleckian growth literature has subsequently developed.[3] Discussion and debate within this literature revolves around what can be described (following Lavoie , 1992, chpt.6) as a canonical neo-Kaleckian growth model, of the form:

$$g^s = s_\Pi r \quad [1]$$

$$g^i = \gamma + g_u u^e + g_r r^e \quad [2]$$

$$r = \frac{\pi u}{v} \quad [3]$$

$$g^s = g^i \quad [4]$$

$$r_t^e = r_{t-1} \quad [5]$$

$$u_t^e = u_{t-1} \quad [6]$$

where g^s is the rate of growth of savings and g^i the rate of accumulation, s_Π is the propensity to save out of profits, $\gamma > 0$ is the rate of accumulation that occurs regardless of expected utilisation and

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[2] If the rate of profit influences investment behaviour - as it does in both Cambridge and neo-Kaleckian growth theory - then it necessarily follows that investment is sensitive to the rate of capacity utilisation, since by definition:

$$r = \frac{\Pi}{K} = \frac{\Pi}{Y}.\frac{Y}{Y_c}.\frac{Y_c}{K} = \frac{\pi u}{v}$$

where Π denotes profits, K is the capital stock, Y and Y_c are the actual and full capacity levels of output respectively, π is the profit share of income, u is the capacity utilisation rate, and v is the (full capacity) capital-output ratio.

[3] See Lavoie (1992, chpt.6) and Blecker (2001) for surveys of this literature and its antecedents.

profitability, r and r^e are the actual and expected rates of profit respectively, u and u^e are the actual and expected rates of capacity utilisation, π is the profit share of income and v is the full capacity capital-output ratio. Equation [1] is the Cambridge equation describing the rate of growth of savings as a function of the rate of profit and the propensity to save out of profits, while [2] describes the rate of accumulation as an increasing function of the expected rates of capacity utilisation and profits. Equation [3] is true by definition (on which, see footnote 2), while equation [4] insists that the realised rate of accumulation is determined by the planned rate.[4] Finally, equations [5] and [6] describe the adjustment of expectations between periods.[5]

The model above yields the following steady state solutions for the rates of growth and capacity utilisation respectively:

$$g^* = \frac{s_\Pi \pi \gamma}{\pi(s_\Pi - g_r) - g_u v} \qquad [7]$$

$$u* = \frac{v\gamma}{\pi(s_\Pi - g_r) - g_u v} \qquad [8]$$

These solutions are positive and stable as long as their common denominator is positive, or in other words, as long as $s_\Pi > g_u \frac{v}{\pi} + g_r$. Moreover, differentiating equations [7] and [8] with respect to π reveals two of the central results of the canonical neo-Kaleckian growth model:

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[4] As Lavoie (1992, p.287) notes, this is a strong assumption which rules out the possibility of a Harrodian discrepancy between the actual and warranted rates of growth.

[5] Any description of expectations formation that is consistent with the sequential decision making that we would expect to observe in an environment of historical time and uncertainty could be postulated here. For the sake of analytical convenience, the simplest form of the adaptive expectations mechanism has been utilised in equations [5] and [6].

$$\frac{\partial g^*}{\partial \pi} = \frac{-s_{\Pi}\gamma g_u v}{(\pi(s_{\Pi} - g_r) - g_u v)^2} < 0 \qquad [9]$$

$$\frac{\partial u^*}{\partial \pi} = \frac{-v\gamma(s_{\Pi} - g_r)}{(\pi(s_{\Pi} - g_r) - g_u v)^2} < 0 \qquad [10]$$

Equation [10] states that the canonical model is stagnationist: increases in the profit share (i.e., reductions in real wages) depress the utilisation rate.[6] Meanwhile, equation [9] demonstrates that the model displays wage-led growth: increases in the profit share (i.e., reductions in real wages) depress the rate of growth.

3. Neo-Kaleckian Growth Dynamics and the State of Long Run Expectations

A central feature of the canonical neo-Kaleckian growth model is the investment function in equation [2]. The precise form of this investment function has been the subject of considerable debate, not least since the claim of Bhaduri and Marglin (1990) and Marglin and Bhaduri (1990) that it overstates the influence of the rate of capacity utilisation on the rate of accumulation. Against this, neo-Kaleckians have responded that Bhaduri and Marglin's preferred investment function overstates the influence of the profit share (as opposed to the profit rate) on accumulation and yields results that are sensitive to the choice of functional form, while the canonical neo-Kaleckian investment function better fits the stylised facts of firm behaviour and macroeconomic outcomes (Lavoie, 1992, pp.332-44; Mott and Slattery, 1994; Blecker, 2001, pp.5-12).

[6] Note that [10] is strictly negative since the stability condition stated earlier ensures that $s_{\Pi} > g_r$.

The purpose of this and the following section is to draw attention to a different feature of equation [2] and its implications for neo-Kaleckian growth dynamics. As discussed by Robinson (1962), Asimakopulous (1991, chpt.8) and Lavoie (1992, p.286), the structure of this investment function is properly conceived as being influenced by the state of long-run expectations (SOLE), in an environment in which decisions are made sequentially in historical time and expectations are formed under conditions of fundamental uncertainty. However, the canonical neo-Kaleckian growth model is usually presented as a traditional equilibrium model, describing the existence and stability of equilibrium rates of accumulation, utilisation and profit determined by exogenously given data. But it is not obvious that this methodology is consistent with the view that the structure of the investment function in [2] is influenced by firms' SOLE, and that macrodynamic processes occur in historical time (Asimakopulous, 1991, chpt.8). Moreover, no account is taken of the potential variability of the SOLE and its impact on the structure of the investment function when comparative dynamic exercises are performed using the canonical neo-Kaleckian model.

It is important to note that these objections have been addressed (in part) by Lavoie (1992, pp.282-85). Following Kregel (1976), Lavoie argues that Post-Keynesians need reject neither the notion of equilibrium nor the techniques of equilibrium analysis when modelling economic outcomes, as long as the distinct (from both the Classical and neoclassical approaches) methodological features of Post-Keynesian economics, which advise both the use and interpretation of these concepts and techniques, are properly understood. This is precisely the position of the current author on this matter (Setterfield, 1997).[7] However, just as Post-Keynesians need not *dispense* altogether with equilibrium and equilibrium analysis, nor need they *confine* themselves to

[7] See also Chick and Caserta (1996) for a similar view.

this set of modelling techniques - and given the Post-Keynesian emphasis on the importance of historical time and uncertainty, it is hard to see why they should want to do so. Moreover, Lavoie's response does not address the neglect of variations in the SOLE and its impact on the structure of the investment function in neo-Kaleckian comparative dynamics. In sum, there is reason to believe that Post-Keynesians should seek to transcend the equilibrist methodology that advises the canonical neo-Kaleckian model, and take account of the potential variability of the SOLE in comparative dynamic exercises whenever an equilibrium framework is utilised.

To see how the first of these objectives might be realised, consider again the canonical neo-Kaleckian model in equations [1] - [6]. Suppose now that we re-write equation [2] as:

$$g^i = \gamma(\alpha_t) + g_u u^e + g_r r^e \qquad [2a]$$

In [2a], the first term in equation [2] has been re-written as $\gamma = \gamma(\alpha_t)$, where α_t denotes the SOLE. In other words, γ is now to be interpreted, not as a constant, but as a shift parameter which varies with the SOLE. Combining equations [1], [2a], [3], [5] and [6] yields the following reduced-form neo-Kaleckian model:

$$g_t^s = \frac{s_\Pi \pi}{v} u_t \qquad [11]$$

$$g_t^i = \gamma(\alpha_t) + g_u u_{t-1} + g_r \frac{\pi}{v} u_{t-1} \qquad [12]$$

By substituting [11] into [12] and using [4], the model can be summarised as the first order difference equation:

$$g_t^i = \gamma(\alpha_t) + \frac{1}{s_\Pi}\left(\frac{g_u v}{\pi} + g_r\right) g_{t-1}^i \qquad [13]$$

It is now obvious that the model is under-determined - nothing can be said about the behaviour of g_t^i in [13] without we first describe the behaviour of α_t. Suppose, then, that the behaviour of α_t is described as follows:

$$\alpha_t = \alpha_t(u_{t-1}, u_{t-1}^e) = \begin{cases} \alpha_{t-1} + \varepsilon_t \text{ if } u_{t-1} - u_{t-1}^e \geq c \vee (u_{t-1} - u_{t-1}^e > -c \wedge u_{t-2} - u_{t-2}^e \leq -c) \\ \alpha_{t-1} - \varepsilon_t \text{ if } u_{t-1} - u_{t-1}^e \leq -c \vee (u_{t-1} - u_{t-1}^e < c \wedge u_{t-2} - u_{t-2}^e \geq c) \\ \alpha_{t-1} \text{ otherwise} \end{cases} \qquad [14]$$

where $\varepsilon_t \sim (\mu_{\varepsilon t}, \sigma_{\varepsilon t}^2)$ and c is a conventional value that is assumed constant in what follows for purposes of analytical convenience. The rationale for a SOLE reaction function of this form and its relationship to the ontological and methodological precepts of Post-Keynesian economics is discussed in detail in Setterfield (2000). In the present context, the following comments on equation [14] suffice. First, the revision of the SOLE between periods is a function of the discrepancy between the actual and expected rate of capacity utilisation in the previous period (which, if non-zero, will also result in a discrepancy between the actual and expected rate of profit - see equation [3]). Second, the SOLE improves if the difference between the actual and expected utilisation rates equals or exceeds the conventional value c, or if this difference exceeds $-c$ having failed to exceed this value in the period before last. Similarly, the SOLE deteriorates if the difference between the actual and expected rates of capacity utilisation is equal to or less than $-c$, or if this difference falls below c

having equaled or exceeded this value in the period before last. Finally, any change in the SOLE between periods is based on a draw from a distribution with time-dependent moments. By hypothesis, changes in these moments cannot be described *a priori*. As such, the system summarised in equations [13] and [14] remains formally open.[8]

It is not possible to describe the growth outcomes arising from equations [13] and [14] in terms of a traditional, determinate equilibrium, which can be defined and reached independently of the path taken towards it. However, the recursive interaction of these equations can be used to describe path dependent growth outcomes. To see this, suppose that $u_1^e = u_0$ initially, and that the resulting rate of accumulation in equation [12], $g_1^i = \gamma(\alpha_1) + g_u u_0 + g_r \frac{\pi}{v} u_0$, gives rise to an actual rate of capacity utilisation u_1 in equation [11] such that $u_1 - u_0 = k_1 > c$. This is illustrated in Figure 1 below.

[FIGURE 1 GOES HERE]

In response to these initial conditions, two things will happen to the rate of accumulation. First, as the expected rate of capacity utilisation is revised upwards on the basis of equation [6], the rate of accumulation will increase as a result of "movement along" the g^i schedule in equation [12]. This is captured in Figure 1 by the increase in g from g_1 to g'. *Ceteris paribus*, repeated adjustments of this nature would result in convergence towards the sort of steady state outcome described in

[8] These features of the model are intended to capture the presence of real or effective choice, according to which choices can be novel, and a decision maker could, in any given set of circumstances that are subject to choice, always have chosen to act differently. See Setterfield (2000).

equation [7]. But other things are not equal: a second change in the rate of accumulation will result from a shift in the g^i schedule in [12] in response to a revision in the SOLE ($\alpha_2 = \alpha_1 + \varepsilon_2$) in [14]. This second adjustment is captured by the increase in g from g' to g_2 in Figure 1.

In order to further describe the behaviour of the rate of accumulation at this point, we need to know whether or not:

$$u_2 - u_1 \geq c = (u_1 - u_0) - k_1 + c$$

or:

$$\Delta u_2 - \Delta u_1 \geq -(k_1 - c) \qquad [15]$$

We know that $\Delta u_1 = k_0$ by hypothesis. Meanwhile, substituting [11] into [12] on the basis of [4] and evaluating the result, we arrive at:

$$u_2 = \frac{v\gamma(\alpha_2)}{s_\Pi \pi} + \frac{v}{s_\Pi \pi}\left(g_u - g_r \frac{\pi}{v}\right) u_1$$

from which it follows that:

$$\Delta u_2 = \frac{v}{s_\Pi \pi}\gamma' \varepsilon_2 + \frac{v}{s_\Pi \pi}\left(g_u - g_r \frac{\pi}{v}\right) k_1$$

where $\gamma' = d\gamma/d\alpha$ and $\varepsilon_2 = \alpha_2 - \alpha_1$ by hypothesis. Therefore:

$$\Delta u_2 - \Delta u_1 = \frac{v}{s_\Pi \pi}\gamma' \varepsilon_2 + \left[\frac{v}{s_\Pi \pi}\left(g_u - g_r \frac{\pi}{v}\right) - 1\right] k_1$$

Referring back to [15], it follows that, in order for the condition $u_2 - u_1 \geq c$ to be satisfied, we must observe $\varepsilon_2 \geq \varepsilon_{2\min}$, where:

$$\frac{v}{s_\Pi \pi}\gamma' \varepsilon_{2\min} + \left[\frac{v}{s_\Pi \pi}\left(g_u - g_r \frac{\pi}{v}\right) - 1\right] k_1 = -(k_1 - c)$$

Evaluating this expression for $\varepsilon_{2\min}$, we arrive at:

$$\varepsilon_{2\min} = \frac{s_\Pi \pi c - (v g_u + \pi g_r) k_1}{v\gamma'}$$

Finally, re-writing for any period t, we have the condition:

$$\varepsilon_{t\min} = \frac{s_\Pi \pi c - (v g_u + \pi g_r) k_{t-1}}{v\gamma'} \qquad [16]$$

Starting from the initial conditions stated earlier, then, and if $\varepsilon_t \geq \varepsilon_{t\min}$ for all $t > 1$, a cumulative expansion in the rate of accumulation will occur as a result of a series of adjustments of the type depicted in Figure 1, in which the rate of accumulation simultaneously moves towards, and re-defines the conditions and hence position of, its steady state equilibrium value over time.

These increases in the rate of accumulation need not continue indefinitely, however.[9] Hence suppose that in some period n, we have $\varepsilon_n < \varepsilon_{n\min}$. This means, of course, that we will observe $u_n - u_{n-1} = k_n < c$. Since $u_{n-1} - u_{n-2} = k_{n-1} \geq c$ by virtue of the cumulative expansion that has

[9] Indeed they cannot, since changes in the rate of accumulation are accompanied by changes in the rate of capacity utilisation and the latter is bounded above and below.

taken place in prior periods, we will now have $\alpha_{n+1} = \alpha_n - \varepsilon_{n+1}$ by [14]. The possibility now arises that we will observe:

$$u_{n+1} - u_n \leq -c = (u_n - u_{n-1}) - k_n - c$$

or:

$$\Delta u_{n+1} - \Delta u_n \leq -(k_n + c) \qquad [17]$$

which, by [14], will result in further deterioration in the SOLE and set up the possibility of a series of cumulative contractions in the rate of accumulation - a possibility that will materialise if $\varepsilon_t \geq \varepsilon_{t\min}$ for all $t > n + 1$. This situation is illustrated in Figure 2.

[FIGURE 2 GOES HERE]

Under what circumstances will the conditions in [17] materialise? Given that:

$$\Delta u_{n+1} - \Delta u_n = \frac{v}{s_\Pi \pi}\gamma' \varepsilon_{n+1} + \left[\frac{v}{s_\Pi \pi}\left(g_u - g_r \frac{\pi}{v}\right) - 1\right] k_n$$

we wish to find the value of ε^*_{n+1} such that:

$$\frac{v}{s_\Pi \pi}\gamma' \varepsilon^*_{n+1} + \left[\frac{v}{s_\Pi \pi}\left(g_u - g_r \frac{\pi}{v}\right) - 1\right] k_n = -(k_n + c)$$

solving for ε^*_{n+1} , we arrive at:

$$\varepsilon^*_{n+1} = \frac{s_\Pi \pi c + (v g_u + \pi g_r) k_n}{v \gamma'} \qquad [18]$$

Hence if $\varepsilon_{n+1} \geq \varepsilon^*_{n+1}$, we will observe an upper turning point in the cumulative expansion of the rate of accumulation, which, as noted above, may then be followed by a series of cumulative contractions in the growth rate. Since the reaction function in [14] is symmetrical, it is clear that an equation similar to [18] could be deduced which would provide the conditions necessary for a lower turning point followed by the onset of a cumulative expansion in the rate of accumulation. In other words, what has been demonstrated is that the model summarised in equations [13] and [14] is capable of generating growth cycles. Moreover, this cyclical growth is path dependent: neither the amplitude nor the period of the cycle, nor even the trend rate of growth, can be deduced *a priori*. Instead, they can only be observed *ex post*, as a product of the historical sequence of adjustments that results from the recursive interaction of [13] and [14].

4. Wage- Versus Profit-Led Growth Reconsidered

An important issue in neo-Kaleckian growth theory is the impact of income re-distribution on growth. As noted earlier, the canonical neo-Kaleckian model suggests that growth is wage-led. But this canonical model takes no account of the potential variability of the SOLE with respect to changes in income shares. The question therefore arises as to what the impact of re-distribution on growth is when the potential variability of the SOLE is taken into account.

According to Keynes (1936, p.264), a general reduction in nominal wages (and hence, *ceteris paribus*, a decrease in the real wage and increase in the profit share) may in and of itself produce a more optimistic tone in the minds of entrepreneurs (i.e., an improvement in the SOLE). The corollary of this is that an increase in nominal wages is presumably likely to create a more pessimistic tone. Moreover, Keynes warns that because a general decrease in nominal wages cannot be effected simultaneously (in the absence of a central planner), individual groups of wage earners are likely to resist nominal wage cuts, perceiving them to be a reduction in their *relative* nominal wages. Hence anticipations of conflict over reductions in nominal wages, involving losses to production and so forth, may mean that a *decline* in nominal wages will actually induce pessimism regarding expected future returns, rather than the "optimistic tone" noted earlier. In sum, following Keynes (1936), it is plausible to conceive that *either* an increase *or* a decrease in nominal wages (i.e., *any* re-distribution of income) may result in a deterioration in the SOLE. This is one of the reasons that ultimately lead Keynes to argue that:

> to suppose that a flexible wage policy is a right and proper adjunct of a system which on the whole is one of *laissez-faire*, is the opposite of the truth ... I am now of the opinion that the maintenance of a stable general level of money wages [and hence, *ceteris paribus*, prices and income shares] is, on a balance of considerations, the most advisable policy
>
> (Keynes, 1936, pp.269, 270)

One way of interpreting all this is to think of wages and prices, and hence income shares, as constituting *distributional regimes* that, together with other institutions such as the structure of the employment relationship, the industrial relations system more generally, the norms governing the conduct of macroeconomic policy and so forth, form the *macrofoundations* of a capitalist economy (Colander, 1996). These macrofoundations create a structural context within which decisions are made and executed. Furthermore, the structural stability of an economy's macrofoundations -

including the distributional regime - is conducive to its macroeconomic performance (Colander, 1999). Hence:

> many of the social conventions that current markets have, such as relatively fixed nominal wages and prices, play a role in ... extra market systemic coordination ... Wage flexibility can undermine the coordinating functions of existing markets
>
> (Colander, 1999, pp.217, 218)

Following Keynes and Colander, then, we may conclude that a distributional regime forms part of the macrofoundations or "operating system" of a capitalist economy (Colander, 1999, pp.213-14), in the context of which production, employment, investment and other decisions are made. Moreover, perturbations to this operating system - such as increases or decreases in the profit share - are generally inimical to the SOLE. Let us refer to this latter point as the Keynes-Colander effect, according to which:

$$\frac{d\alpha}{d\pi} < 0 \text{ if } d\pi > 0$$

and:

$$\frac{d\alpha}{d\pi} > 0 \text{ if } d\pi < 0$$

and re-examine the impact of income re-distribution on growth in neo-Kaleckian theory in light of this effect.

To begin with, assume that the economy is initially growing at an equilibrium rate, given by:

$$g_1^* = \frac{s_\Pi \pi \gamma(\alpha_1)}{\pi(s_\Pi - g_r) - g_u v} \qquad [19]$$

where α_1 denotes a particular SOLE and g_1^* is the equilibrium rate of growth corresponding to this SOLE. Using [19], we can now re-calculate the impact of re-distribution on growth taking into account the Keynes-Colander effect. Hence differentiating [18] with respect to π yields:

$$\frac{\partial g^*}{\partial \pi} = \frac{-s_\Pi \gamma g_u v}{(\pi(s_\Pi - g_r) - g_u v)^2} + \frac{s_\Pi \pi \gamma'(d\alpha/d\pi)}{\pi(s_\Pi - g_r) - g_u v} \qquad [20]$$

The first term on the right hand side (RHS) of [20] is identical to the solution to [9] and is, of course, negative. However, the sign of [20] also depends on the second term on the RHS, which captures the impact of the Keynes-Colander effect on growth. Hence if $d\pi > 0$ so that $\frac{d\alpha}{d\pi} < 0$, then [20] is unambiguously negative: a reduction in real wages lowers the rate of growth. In this case, the Keynes-Colander effect reinforces the impact of declining real wages on growth as captured by the canonical neo-Kaleckian model, and a result consistent with the notion of wage-led growth emerges. This is illustrated in Figure 3 below.[10]

[FIGURE 3 GOES HERE]

Suppose, however, that $d\pi < 0$ so that $\frac{d\alpha}{d\pi} > 0$. In this case, the second term on the RHS of [20]

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[10] Figure 3 - and Figure 4 below - illustrate the impact of income re-distribution on the position of the equilibrium rate of growth. Any such changes in the position of equilibrium will, of course, create initial conditions of disequilibrium, as a result of which the ensuing tendency for g to increase or decrease may be compounded by adjustment dynamics of the sort described in the previous section, where the SOLE - and hence the conditions and position of the equilibrium growth rate, and the behaviour of the actual growth rate - is sensitive to discrepancies between u^e and u along disequilibrium adjustment paths. This possibility is not pursued here for reasons of analytical convenience.

is positive, and the sign of [20] becomes ambiguous. It is possible that the first term on the RHS of [20] will dominate, in which case [20] will be negative. In this case, a rise in real wages boosts growth. Again, this is the traditional wage-led growth result associated with the canonical neo-Kaleckian model. But a second possibility is that the impact of the Keynes-Colander effect on growth - the second term on the RHS of [20] - will dominate. In this case, [20] is positive and a rise in real wages will actually lower the rate of growth. This situation is illustrated in Figure 4 below.[11]

[FIGURE 4 GOES HERE]

In sum, when the canonical neo-Kaleckian growth model is augmented by a Keynes-Colander effect, according to which any change in income shares is inimical to the SOLE, we find that a re-distribution of income away from wages always lowers the rate of growth (as in the canonical model), but a re-distribution of income towards wages only raises growth under certain circumstances. The significance of these findings is twofold. First, following Blecker (2001), they suggest that some of the results (in this case, the disappearance of unambiguously wage-led growth) associated with Marglin-Bhaduri type growth models, in which the investment function exhibits a "strong profit share effect", can be derived *without* departing from the treatment of the relationship between g, r and u in the canonical neo-Kaleckian investment function. Second, the findings above

[11] In Figure 4, the dominance of the Keynes-Colander effect on the RHS of [20] is associated with a decline in equilibrium u as well as g. It should be noted that this is a possible but not necessary result of the conditions postulated here. In other words, it is possible for an increase in real wages to raise the rate of capacity utilisation even as it lowers the growth rate. This raises the possibility of a "conflictive stagnationist" result, in which workers who prefer employment opportunities now rather than later find themselves at odds with firms who wish to maintain the rate of accumulation and hence profit.

suggest that the variability of firms' SOLE may make it harder to increase and easier to decrease the growth rate through the re-distribution of income. Just as Keynes (1936) warned against the inefficacy of flexible wages and prices as a means of achieving and maintaining full employment, so, it seems, neo-Kaleckians might have reason to warn against the inefficacy of re-distributing income as a means of boosting growth - even as they continue to warn against the ease with which income re-distribution can result in lower growth. If the SOLE really is variable in an environment of historical time and uncertainty, and if the Keynes-Colander effect captures the impact of re-distribution on the SOLE, then the result is that there are more reliable methods of raising the rate of growth that re-distributing income.[12]

5. Conclusion

Neo-Kaleckian theory seeks to model growth in an environment of historical time and uncertainty. Despite this, little or no account has been taken of the implications of variability in the state of long run expectations (SOLE) for either the adjustment dynamics of neo-Kaleckian growth models, or the results of comparative dynamic exercises undertaken with these models. The chief purpose of this paper has been to remedy this shortcoming. It has been demonstrated that when changes in the SOLE are modelled as a reaction to discrepancies between the actual and expected rates of capacity utilisation, the canonical neo-Kaleckian model (which is essentially a traditional equilibrium model) can be transformed into an open system with path dependent growth outcomes, which may exhibit growth cycles of indeterminate amplitude and period about an indeterminate

[12] At least from an analytical stand point - whether or not the impact of the Keynes-Colander effect on growth will dominate in the event of an actual raise in real wages is a matter for empirical investigation.

trend. Moreover, when account is taken of the potential sensitivity of the SOLE with respect to changes in income shares, the wage-led growth results of the canonical neo-Kaleckian model are modified. Specifically, if income shares form "distributional regimes" that are part of the institutional macrofoundations of a capitalist economy, and if any perturbations to these macrofoundations are inimical to the SOLE, a decrease in real wages will reduce the rate of growth by even more than the canonical neo-Kaleckian model predicts, while an increase in real wages will only boost growth under certain circumstances. This means that it may be easier to reduce and harder to increase the rate of growth by means of re-distributing income than the canonical neo-Kaleckian model suggests, and that efforts to raise the rate of growth might have more reliable results if they were directed towards policies other than income re-distribution.

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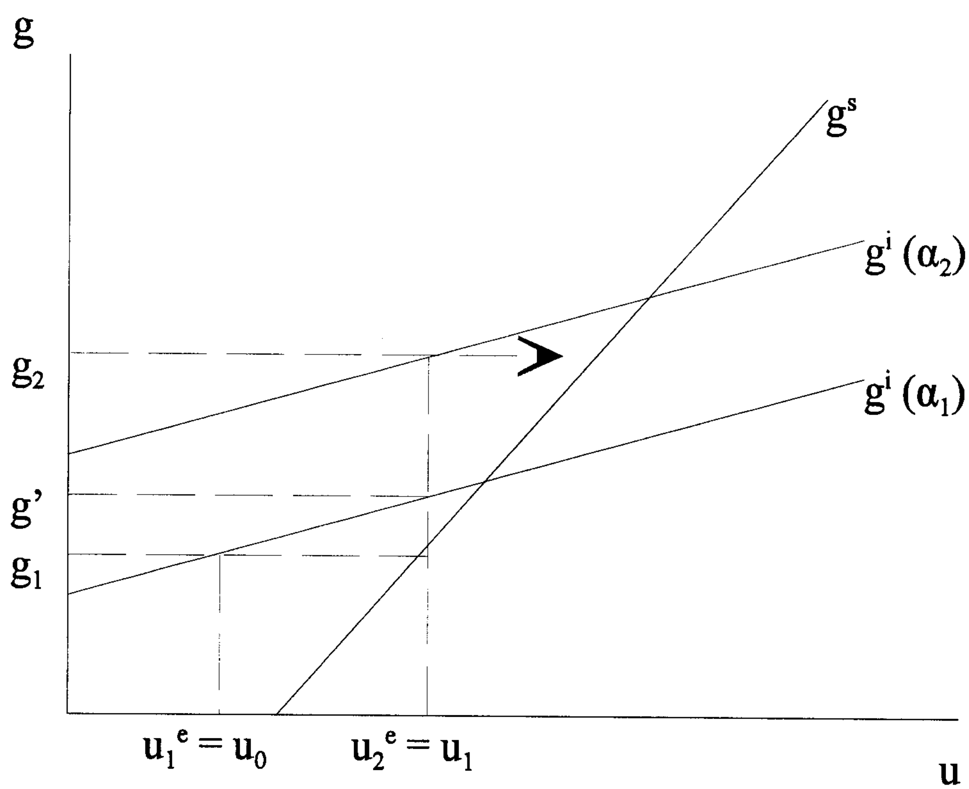
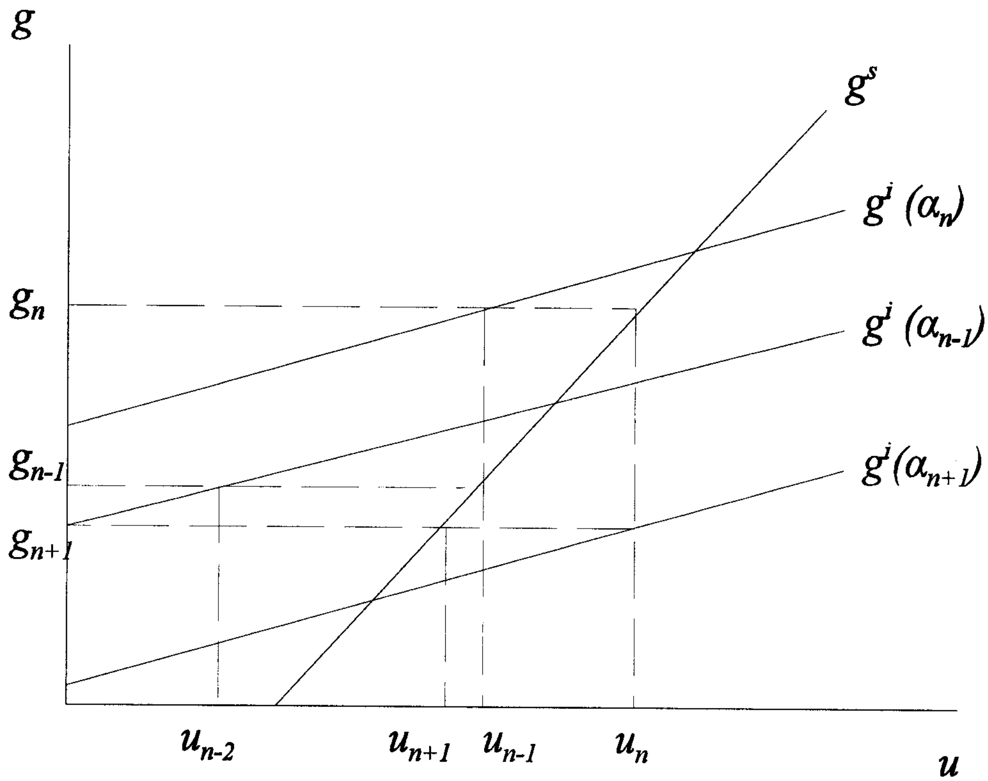
Figure 1: Adjustment dynamics in a neo-Kaleckian model in which the state of long run expectations is variable.



Note: $u_1 - u_0 = k_1 > c$

Figure 2: An upper turning point in the growth cycle.



Note: $u_{n-1} - u_{n-2} \geq c$

$u_n - u_{n-1} < c$

$u_{n+1} - u_n \leq -c$

Figure 3: The canonical wage-led growth result is reinforced when $d\pi > 0$.

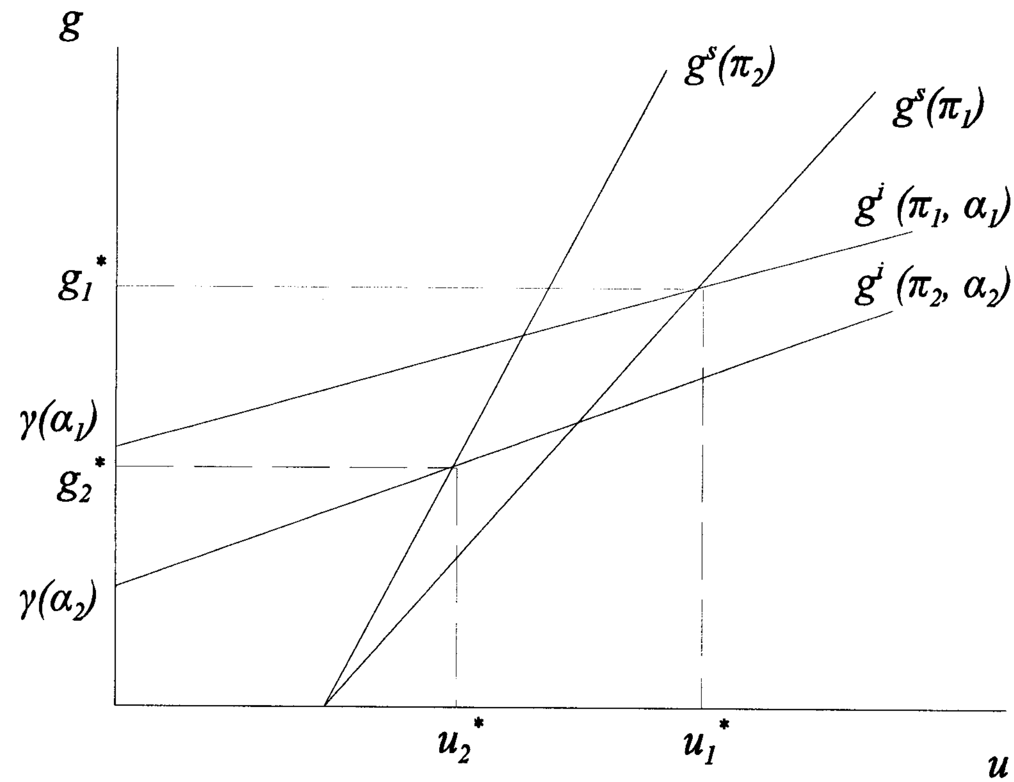


Figure 4: The canonical wage-led growth result can disappear when $d\pi < 0$.