

Expectations and Stability in the Kaleckian Growth Model*

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Abstract

A central element in the canonical Kaleckian growth model is the demand-led output-adjustment stability condition known as the Keynesian stability condition. This condition requires that, all else constant, saving be more responsive to changes in capital capacity utilization than investment. This paper further explores the plausibility of the Keynesian stability condition by enriching the Kaleckian growth model with a more fully developed Keynesian theory of expectations formation. As a result, the responsiveness of investment to changes in capacity utilization is reduced, and through mechanisms that have clear and plausible behavioural underpinnings. It therefore becomes more likely (in principle) that the Keynesian stability condition will hold in practice. The paper also explores the consequences of such re-specification of investment behaviour for certain comparative static results associated with the canonical Kaleckian growth model.

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1. Introduction

It is well known that the Keynesian stability condition in the canonical Kaleckian growth model requires that saving be more responsive to variations in capacity utilization than investment (Duménil and Lévy, 1987, p.136; Hein et al, 2011, p.509; Hein et al, 2012, p.142; Lavoie, 2010, p.134; Skott, 2010, pp.109-110; Skott, 2012, pp. 113). According to some authors, an important problem with this condition is that it is too stringent and therefore unrealistic (Dallery, 2007; Skott, 2010, pp.110-12).¹ This objection is part of a more general critique of stability issues in the Kaleckian model, which focuses not only on the Keynesian stability condition but also the question as to whether or not the economy is characterized by Harroddian instability (see Hein et al, 2011, p.588; Hein et al, 2012, p.140; Lavoie, 2016).²

One response to criticism of the Keynesian stability condition has been empirical. Hence, for example, Hein et al (2011, p.593) argue that it is not sensible to expect a simple model with only a few endogenous variables to accurately reflect the complexities of real-world data.³ But this leaves open the question as to how the canonical Kaleckian model might be extended or amended so that it might (at least in principle) mimic such data. Moreover, it is well to remember that part of Skott's (2010, 2012) criticisms of the Kaleckian model – including his criticism of the Keynesian stability condition – concern the model's alleged lack of *behavioural foundations*. Hence according to Skott, while Harroddian dynamics have clear behavioural foundations, “the Kaleckian stability condition, by contrast, is usually introduced for instrumental reasons to ensure stability, stability being seen (implicitly but mistakenly) as imperative for the real-world relevance of the model” (Skott, 2010, p.108).

It is already well understood that the assumptions made about saving behaviour in the canonical Kaleckian model – specifically, that there is no saving from wage income – can be relaxed, and that this will affect the Keynesian stability condition. Specifically, introducing a positive rate of saving out of wage income makes saving more responsive to capacity utilization. This, in turn, increases the likelihood that the Keynesian stability condition will be satisfied, *ceteris paribus* (see Lavoie (2010) and Lima (2010) for demonstration and further discussion of this result). As noted by Franke (2015, p.7), saving behavior can also be modified by making it sensitive to financial variables (on which see also Skott and Fyoo, 2008; Hein and Schoder, 2011). However, as has been demonstrated by (*inter alia*) Taylor (1990) and Blecker (2002), saving behaviour affects the likelihood that certain comparative static results associated with the canonical Kaleckian model (and in particular, the paradox of costs) will hold.⁴

¹ See also Lavoie (2010, pp.136-7) for a brief summary of this critical literature.

² The question of Harroddian instability is closely related to a long-standing debate over the relationship between the actual and normal rates of capacity utilization in the long run. The distinction between the Keynesian stability condition and Harroddian instability (and, by extension, the relationship between the actual and normal rates of capacity utilization) is useful and is used to narrow the focus of this paper. But the two issues are by no means unrelated. Hence for Skott, the chief vice of the Kaleckian model is its “extension to the long run of a standard, Keynesian short-run stability condition: the relative insensitivity of investment to variations in aggregate demand” (Skott, 2010, pp.111-12; emphasis added). This brings the Kaleckian model into conflict with Skott's preferred Harroddian long-run dynamics, in which the actual rate of utilization adjusts towards the normal rate.

³ Inevitably, there are also questions as to what the data actually reveal. Skott (2012, p.135), for example, describes empirical evidence on the performance of the Kaleckian model – both his own and that of others – as “sketchy and incomplete”, even as he concludes that “the evidence, such as it is, fails to support the Kaleckian position”.

⁴ See also Setterfield and Kim (2016) for further discussion of these results.

Other extensions of the canonical model have also been shown to affect the Keynesian stability condition. For example, Dutt et al (2015) construct a model in which firms hire labour on both long-term and short-term employment contracts. They show that the Keynesian stability condition is more likely to be satisfied if hiring involves exclusively long-term contracts. Extending the canonical model to include a rentier class on which capitalists depend to finance investment spending can also affect the Keynesian stability condition, especially when the propensities to save of capitalists and rentiers differ (see, for example, Hein, 2014, ch. 9; Lima and Meirelles, 2007). Finally, Franke (2015) proposes a model in which a fiscally active public sector levies proportional taxes on production, corporate, and personal income. This introduction of additional withdrawals from the circular flow of income is shown to increase the likelihood that the Keynesian stability condition will hold without any modifications to saving behaviour.

In this paper, we investigate an alternative route to addressing the plausibility of the Keynesian stability condition.⁵ Our point of departure is the insufficient attention paid to output and profit expectations in the canonical Kaleckian model, particularly as these affect the investment behaviour of firms.⁶ We argue that the canonical model needs to be enriched with regard to its treatment of expectations, and that when a more fully developed Keynesian theory of expectations formation is introduced, the responsiveness of investment to variations in capacity utilization is reduced through mechanisms that have clear behavioural interpretations. This makes it more likely (in principle) that the Keynesian stability condition in our expectations-augmented Kaleckian growth model will hold in practice. It also provides an explicit behavioural account as to why this might be so. We also investigate the consequences of our re-specification for certain comparative static results associated with the canonical Kaleckian model – namely, the paradox of costs and the paradox of thrift.

The remainder of the paper is organized as follows. In section 2, we discuss the basic form of the investment function on which our analysis rests. In section 3, we briefly describe a Keynesian theory of expectations formation that is suitable for use in Keynesian macrodynamic analysis. Section 4 combines the description of expectations formation from section 3 with the investment function outlined in section 2. The Keynesian stability condition in the resulting expectations-augmented Kaleckian growth model is then investigated, as are certain comparative static properties of this model. Finally, section 5 concludes.

⁵ Note, again, the narrow focus of our analysis. In what follows, we do not reflect on issues pertaining to Harrodian instability (the relationship between the actual and natural rates of capacity utilization in the long run). Neither do we reflect on issues concerning the so-called Robinsonian stability condition (Marglin and Bhaduri, 1990, pp.165-168). This condition, which stipulates that at the margin saving is more sensitive than investment to changes in the profit share, is usually seen as not too stringent and therefore realistic. According to Flaschel and Skott (2006, p.308), for instance, the condition for Robinsonian instability seems implausible, as empirical evidence suggests that variations in real wages mainly affect consumption rather than investment. Meanwhile, Marglin and Bhaduri (1990, p. 167) show that the Robinsonian stability condition always holds in the presence of what they call the “strong accelerator condition”. This stipulates that an increase in capacity utilization increases the expected profit rate for any given actual rate of profit. The strong accelerator condition, as a result of which the rate of accumulation rises in response to an increase in capacity utilization for any given rate of profit, is characteristic of the canonical Kaleckian investment function on which we build in the analysis that follows.

⁶ Firms’ pricing behaviour and households’ saving behaviour may also be affected by such expectations. Here we hold the mark up (and hence the profit share) and the propensity to save constant as in the canonical Kaleckian model. Endogenizing these parameters so that they respond to expectations of future income and exploring the implications for the Keynesian stability condition is a topic left for future research.

2. The Basic Investment Function

As is well known, a crucial feature of the canonical Kaleckian growth model is an investment function in which the rate of accumulation depends on both the rate of profits and the rate of capacity utilization. The second of these variables captures accelerator effects on investment spending, arising from the expected expansion of real output. The influence of the rate of profit on investment, meanwhile, is twofold. First, following Kalecki (1971) and Robinson (1962), current profits play a role in financing investment. This role may be direct, as when investment is funded by retained earnings. Alternatively it may be indirect, as a result of current profits contributing to the liquid financial assets that firms leverage to debt-finance investment spending (following Kalecki's (1937) principle of increasing risk), or as a result of current profits providing a flow of funds that enables firms to service outstanding debt commitments. Second, following Kalecki (1935) and Robinson (1962), the expectation of future profits provides the basis of firms' motivation to invest.

Clearly, these arguments regarding the impact of profit on investment are not mutually exclusive, and both can be explicitly incorporated into the investment function of the canonical Kaleckian growth model as follows:

$$g = \gamma + g_r[\lambda r + (1 - \lambda)r^e] + g_u u^e \quad (1)$$

where g is the rate of accumulation, r is the rate of profit, u is the rate of capacity utilization, $0 < \lambda < 1$ is the weight attached to current earnings (and hence the relative importance of current earnings in the financing of investment expenditures) *vis a vis* expected future earnings in the investment decision, and e -superscripts denote the expected values of variables. Note that this re-specification of the canonical Kaleckian investment function is, in and of itself, quite benign since, under the standard equilibrium condition $r = r^e$, the second term on the right-hand side of [1] becomes $g_r r^e$. The investment function thus collapses to its canonical form (see Lavoie, 1992, p.308), from which the results traditionally associated with the Kaleckian growth model (including the paradoxes of thrift and costs) follow.⁷

Since:

$$r \equiv \frac{\pi u}{v} \quad (2)$$

where π is the profit share and v is the full-capacity capital to output ratio, it follows that:

$$r^e = \frac{\pi u^e}{v} \quad (3)$$

given π and v , and assuming that firms form profit and utilization expectations "consistently" (i.e., not independently of one another and in violation of the relationship between r and u stated in [2]). Substituting [2] and [3] into [1] and re-arranging yields:

$$g = \gamma + \frac{g_r \pi \lambda}{v} u + \left[\frac{g_r (1 - \lambda) \pi}{v} + g_u \right] u^e \quad (4)$$

⁷ It should also be noted at this juncture that we deliberately take the canonical Kaleckian investment function as our starting point rather than the more general investment function proposed by Bhaduri and Marglin (1990) and Kurz (1990), which allows for both wage- and profit-led growth outcomes. This is for the simple reason that allowing for both wage- and profit-led growth outcomes is not the central concern of this paper.

This is our basic investment function.

3. A Keynesian Theory of Expectations Formation

The model developed so far involves expectations but does not, as yet, furnish a description of how these expectations are formed. Indeed, such specifications are usually avoided in Kaleckian macrodynamics, in favour of invoking the realization of expectations ($x^e = x$ for any variable x) as part of the equilibrium closure that completes the model.

The approach taken here, however, involves specifying how expectations are formed. It is inspired by authors such as Gerard (1995) and Dequech (1999), who describe decision making under uncertainty as a two-step process, based initially on the decision maker's best possible forecast (which will, by hypothesis, reflect incomplete information about the future), and subsequently by the propensity to act on the basis of this forecast, which is influenced by factors such as confidence, optimism/pessimism, and animal spirits that make up the "state of long run expectations". For the purposes of this paper, our focus rests on the best possible forecast. Hence for any variable x , we write:

$$x^e = E(x|\Omega)$$

where Ω denotes the incomplete information set on which the forecast or expectation, x^e , is based. Decision makers are understood to be aware of the incompleteness of this information set, and thus make decisions in a self-acknowledged state of partial ignorance about the future.⁸

We next appeal to the claims originally made by Keynes (1936, 1937) that, in an environment of fundamental uncertainty, want of complete information (including anything approximating a "true model" of the data generating process that will actually be responsible for producing future events) will result in expectations of future events being heavily influenced by recent events and social conventions. In light of this insight, for any variable x that decision makers are attempting to forecast, we re-write the forecast $x^e = E(x|\Omega)$ as:

$$x^e = kx + (1 - k)x_c$$

where $0 < k < 1$, and x_c denotes a salient conventional value of x . In other words, the expected value of x is modelled as a weighted average of the convention x_c and the current actual value of x . The parameter k can be thought of as decreasing in the salience and state of confidence in, or *credibility* of, the conventional value x_c .⁹ Following Lima and Setterfield (2008, 2014), we then assume that transparent policy rules are good examples of salient social conventions, and can therefore be expected to contribute to the formation of expectations. This is not a new idea. It can be traced back at least as far as the "direction setting" role (and its influence on expectations) ascribed to the Ministry of International Trade and Industry

⁸ It is decision makers' self-awareness that admits the subsequent influence of the state of long run expectations on decision making. It is well to be aware that under conditions of fundamental uncertainty, decision makers' forecasts themselves may also be influenced by the state of long run expectations, which will therefore affect decision making both directly and (via the best possible forecast) indirectly (Dequech, 1999). We abstract from this possibility in what follows for the sake of simplicity, which abstraction can be considered equivalent in the analysis that follows to holding the state of long run expectations constant.

⁹ We treat k as a constant, but it is easy to imagine that it need not be. For example, the value of k may change over time in response to discrepancies between x_c and the actual value of x , to the extent that such discrepancies are understood to reduce the credibility of x_c . See, for example, Lima et al (2014-15).

(MITI) and Economic Planning Agency (EPA) by commentators on post-war Japanese economic development such as Dore (1986, 2000). It even finds a place in modern neoclassical macroeconomics (where seemingly it should be rendered redundant by the capacity of decision makers to form rational expectations) in the literature that identifies a role for central bank inflation targets in providing anchors for inflation expectations (see, for example, Bernanke et al, 2001).

Putting the pieces together, we therefore write:

$$u^e = k_u u + (1 - k_u) u^T \quad (5)$$

where:

$$u^T = \frac{y^T v}{K}$$

is the salient, conventional value of u that is derived from policy makers' target level of output (given v and the size of the capital stock, K), and where it is assumed that the ratio y^T / K remains constant as y and K grow over time.¹⁰ For the sake of simplicity, u^T is assumed to be both an exogenously given constant and the only social convention deemed germane to the forecasting process by decision makers.¹¹

4. The Keynesian Stability Condition in an Expectations-Augmented Kaleckian Growth Model

Substituting [5] into [4] and re-arranging yields:

$$g = \gamma + \left[\frac{g_r(1-\lambda)\pi}{v} + g_u \right] [1 - k_u] u^T + \left[\frac{g_r\pi(\lambda + [1-\lambda]k_u) + g_u v k_u}{v} \right] u \quad (6)$$

This expression is somewhat inelegant, but it is essentially a standard Kaleckian investment function with a larger intercept term and with the response of g to u modified by the parameters λ and k_u (which derive, in turn, from the basic structure of the investment decision discussed in section 2 and from the process of expectations formation discussed in section 3).

The remainder of the Kaleckian growth model is derived by combining the Cambridge equation ($g^s = s_\pi r$) with equation [2], which yields:

¹⁰ Note that as long as $y^L = L/a < K/v$ where a is the labour to output ratio and L denotes the available labour force, policy makers must set:

$$y^T \leq y^L < \frac{K}{v}$$

$$\Rightarrow u^T = \frac{y^T v}{K} < 1$$

Hence although policy makers do not face the same incentives as firms to set a target rate of capacity utilization below one, given an abundance of capital relative to labour on the supply-side of the economy (conditions that are plausible in an advanced capitalist economy operating close to full employment), macroeconomic constraints will automatically bring about this result.

¹¹ This is an appropriate abstraction in the current model, wherein u^e is the critical behavioral variable driving investment plans, and u is the critical adjusting variable that facilitates achievement of macroeconomic equilibrium.

$$g^s = \frac{s_\pi \pi}{v} u \quad (7)$$

where s_π is the propensity to save out of profits.¹² The resulting model is traditionally rendered stable by appeal to what Duménil and Lévy (1987, p.136) originally labeled the *Keynesian stability condition*.¹³ The Keynesian stability condition posits quantity adjustments in the goods market in response to any discrepancy between planned investment and saving (i.e., aggregate demand and supply), coupled with changes in expectations in response to any discrepancy between actual and expected values of variables that lead the economy toward a steady state equilibrium in which planned investment and actual saving are equal and expectations are realized (see Hein et al, 2011, pp.590-1; Hein et al, 2012, pp.142-43). Formally, the Keynesian stability condition involves the rate of capacity utilization changing in proportion to excess demand in the goods market:

$$\dot{u} = \alpha(g(u) - g^s(u)) \quad , \quad \alpha > 0$$

Stability therefore requires:

$$\frac{d\dot{u}}{du} = \alpha \left(\frac{dg(u)}{du} - \frac{dg^s(u)}{du} \right) < 0$$

This last condition is satisfied when:

$$\frac{dg^s(u)}{du} > \frac{dg(u)}{du}$$

which is the Keynesian stability condition. When the model has an explicit expectational structure (as in equation [1] above), the counterpart to the expression for \dot{u} above is:

$$\dot{u}^e = \beta(u - u^e) \quad , \quad \beta > 0$$

The condition for stability can now be stated as:

¹² Note that no appeal is made to expectations in the construction of the savings accumulation function in [7]. As previously noted, it is possible that saving will depend on expectations – as, for example, when expectations affect investment behaviour and hence corporate retention rates – but we abstract from this possibility. Meanwhile, note that the demand-led nature of the Kaleckian growth model is such that aggregate saving is always generated by investment. More specifically, *ex post* equalization of the (independent) level of investment and (dependent) level of savings is brought about by variation in the actual level of output, so in keeping with this adjustment dynamic, the saving equation in [7] features the actual rather than expected rate of capacity utilization.

¹³ Our focus in this paper is the canonical, linear Kaleckian growth model, the equilibrium of which is unique. We are therefore overlooking the potential for multiple equilibria that can arise in models of this genus as illustrated, for example, by Robinson's (1962) famous banana diagram. Note also that the Keynesian stability condition is *sufficient* but not *necessary* for the Kaleckian growth model to be stable. As originally discussed by Bruno (1999) and Bhaduri (2006, 2008), if the quantity adjustments implicit in the Keynesian stability mechanism operate simultaneously with a price-adjustment mechanism (as in Robinson, 1962) – which involves relaxing the fixed mark up assumption implicit in the assumed constancy of the profit share in the canonical Kaleckian model – the Kaleckian model may be stable even if the Keynesian stability condition is violated. See Lavoie (2010, pp.136-43) for discussion of this dual adjustment process, and Ohno (2014) for a model in which the price adjustment mechanism depends on firm entry and exit (and the resulting influence of industrial concentration on the size of the mark up).

$$\frac{d\dot{u}^e}{du^e} = \beta \left(\frac{du}{du^e} - 1 \right) < 0$$

$$\Rightarrow \frac{du}{du^e} < 1$$

It is straightforward to demonstrate that this is equivalent to the Keynesian stability condition. Hence note that it follows from the inequality above that:

$$\frac{dg(u)}{du^e} \frac{dg^s(u)}{dg(u)} \frac{du}{dg^s(u)} < 1$$

$$\Rightarrow \frac{dg(u)}{du^e} \frac{dg^s(u)}{dg(u)} < \frac{dg^s(u)}{du}$$

Since the basic structure of the Kaleckian model involves g^s adjusting to accommodate g in each period (so that saving equals investment *ex post*) through variations in the rate of capacity utilization, we have $dg(u) / dg^s(u) = 1$ and hence:

$$\frac{dg(u)}{du^e} < \frac{dg^s(u)}{du}$$

This last inequality simply restates the Keynesian stability condition derived earlier, in a form that allows for the fact that accumulation varies with the expected (rather than actual) rate of capacity utilization.

As is clear from the stability results derived immediately above – and as is generally well known – the Keynesian stability condition requires that *the responsiveness of investment to the rate of capacity utilization be weaker than the responsiveness of savings*. In the canonical Kaleckian growth model, $\lambda = 0$ and $k_u = 1$ so that [6] becomes:

$$g = \gamma + \left[\frac{g_r \pi}{v} + g_u \right] u \quad (6')$$

It is then evident from inspection of [6'] and [7] that the Keynesian stability condition requires:

$$\frac{s_\pi \pi}{v} > \frac{g_r \pi}{v} + g_u$$

$$\Rightarrow s_\pi > g_r + \frac{g_u v}{\pi} \quad (8)$$

However, inspection of [6] and [7] reveals that in our expectations-augmented Kaleckian growth model, the Keynesian stability condition requires only that:

$$\frac{s_\pi \pi}{v} > \frac{g_r \pi [\lambda + (1 - \lambda) k_u] + g_u v k_u}{v}$$

$$\Rightarrow s_\pi > g_r [\lambda + (1 - \lambda) k_u] + \frac{g_u v k_u}{\pi} \quad (9)$$

The crucial point that emerges here is that the right-hand side (RHS) of the inequality in [9] is smaller than the RHS of the inequality in [8]. This can be verified by noting that since, by assumption:

$$k_u < 1$$

it follows that:

$$\frac{g_u v}{\pi} k_u < \frac{g_u v}{\pi}$$

and that:

$$(1 - \lambda)k_u < (1 - \lambda)$$

$$\Rightarrow \lambda + (1 - \lambda)k_u < 1$$

$$\Rightarrow g_r[\lambda + (1 - \lambda)k_u] < g_r$$

The upshot of this result is that the Keynesian stability condition is “less demanding” – i.e., it is, in principle, more likely to be satisfied – in the expectations-augmented Kaleckian growth model.

Comparative statics and behavioural interpretation

Some simple comparative statics shed light on the substance of the result derived above. In particular, they furnish behavioural underpinnings for the notion that *ceteris paribus*, the Keynesian stability condition is more likely (in principle) to be satisfied in the expectations-augmented Kaleckian growth model – behavioural underpinnings that, according to critics such as Skott (2010, p.138), are generally wanting when appeal is made to the Keynesian stability condition.

We begin by using R to denote the RHS of the inequality in [9], so that:

$$R = g_r[\lambda + (1 - \lambda)k_u] + \frac{g_u v k_u}{\pi} \quad (10)$$

Two important comparative static results follow. First, observe from [10] that:

$$\frac{dR}{d\lambda} = g_r(1 - k_u) > 0 \quad (11)$$

In other words, as λ gets smaller – i.e., as firms put more weight on expected future profit and less weight on current profit in the investment decision – the value of R gets smaller, which increases the likelihood that the Keynesian stability condition in [9] will be satisfied. This suggests that the importance of current earnings for financing investment affects the likelihood of stability – specifically, that the more firms can borrow relative to their current earnings, the greater the likelihood that the Keynesian stability condition will be satisfied. This result seems almost perverse (since current earnings are required to service debts), but in fact it is quite intuitive: the greater the extent to which the financing of investment is independent of current earnings, the less responsive investment will be to variations in capacity utilization (and hence, via [2], current earnings) and hence the more likely it is that investment spending will be less responsive to capacity utilization than savings (as required by the Keynesian stability condition). Of course, as has been intimated above, this result draws attention to the fact that *stability* of the equilibrium growth rate does not necessarily ensure *sustainability* of the growth process: indeed, if the former is attained by means that cause stock-flow imbalances (associated with rising corporate debt to income ratios) to accumulate, then the latter is likely to be compromised with the result that the

growth process eventually breaks down.¹⁴ But in the context of this paper, the importance of the result in [11] is that it provides a behavioural underpinning for the result in [9], according to which we are more likely (in principle) to observe satisfaction of the Keynesian stability condition in the expectations-augmented Kaleckian growth model. Moreover, this behavioural underpinning is related to the composition of investment financing – a recognizable and important theme in Kaleckian macroeconomics.

The second important comparative static result that follows from [10] is:

$$\frac{dR}{dk_u} = g_r(1-\lambda) + \frac{g_u v}{\pi} > 0 \quad (12)$$

In other words, as k_u gets smaller – i.e., as firms attach more weight to the policy target that provides one of the conventional anchors of their expectations – the value of R gets smaller, which increases the likelihood that the Keynesian stability condition in [9] will be satisfied. What this means is that the *credibility of policy making* influences the Keynesian stability condition, since it is sensible to associate the diminution of k_u with increases in the credibility of the policy authority responsible for setting the economy's target output to capital ratio (and hence u^T). Put differently, a policy maker who proves adept at “fine tuning” the economy towards a clearly announced, target level of real economic activity (even one that, from a Keynesian perspective, is mistakenly associated with an innate “natural rate” of unemployment) will succeed in reducing the sensitivity of investment to capacity utilization.¹⁵ Hence the result in [12] once again provides a behavioural underpinning – this time related to the credibility of policy making – for the result in [9], according to which we are more likely (in principle) to observe satisfaction of the Keynesian stability condition in the expectations-augmented Kaleckian growth model.

Do traditional comparative static results of Kaleckian growth theory survive in the expectations-augmented model?

The canonical Kaleckian growth model exhibits both the paradox of thrift (an increase in the saving rate depresses growth) and the paradox of costs (an increase in the wage share of income boosts growth). To check for these results in our expectations-augmented model, we begin by noting that under the equilibrium condition $g = g^s$, equation [7] becomes:

$$u = \frac{v}{s_\pi \pi} g$$

Substituting this expression into equation [6] and solving for g yields the equilibrium rate of growth:

$$g = \frac{\left(\gamma + \left[\frac{g_r(1-\lambda)\pi}{v} + g_u \right] [1-k_u] u^T \right) s_\pi \pi}{s_\pi \pi - \left(g_r \pi [\lambda + (1-\lambda)k_u] + g_u v k_u \right)} \quad (13)$$

¹⁴ It is, of course, beyond the scope of this paper to fully analyse the stability/sustainability trade off suggested above, which would require extension of the canonical Kaleckian model to include financial variables (such as the corporate debt to income ratio).

¹⁵ Note that such behavior is a fairly weak requirement to make of policy makers, given that historically, macroeconomic policy has always been based on the pursuit of more-or-less explicit targets (such as full employment, the natural rate of unemployment, and/or an inflation target).

Now note that it follows from [13] that:

$$\frac{dg}{ds_{\pi}} = \frac{-\left(\gamma + \left[\frac{g_r(1-\lambda)\pi}{v} + g_u\right][1-k_u]u^T\right)\pi\left(g_r\pi[\lambda + (1-\lambda)k_u] + g_uv k_u\right)}{s_{\pi}\pi - \left(g_r\pi[\lambda + (1-\lambda)k_u] + g_uv k_u\right)^2} < 0 \quad (14)$$

$$\frac{dg}{d\pi} = \frac{s_{\pi}\pi\frac{g_r(1-\lambda)\pi}{v}[1-k_u]u^T\left(s_{\pi}\pi - \left[g_r\pi(\lambda + [1-\lambda]k_u) + g_uv k_u\right] - g_uv k_u\right) - s_{\pi}\left(\gamma + g_u[1-k_u]u^T\right)g_uv k_u}{s_{\pi}\pi - \left(g_r\pi[\lambda + (1-\lambda)k_u] + g_uv k_u\right)^2} \quad (15)$$

The inequality in [14] confirms that the paradox of thrift holds in the expectations-augmented model. But the sign of the expression in [15] is ambiguous. Note that a sufficient (but not necessary) condition for [15] to be negative is that:

$$s_{\pi}\pi - g_r\pi(\lambda + [1-\lambda]k_u) - 2g_uv k_u < 0$$

Under these conditions, the paradox of costs will hold. But in general – and as in models where the Keynesian stability condition is more likely to be satisfied by virtue of the saving behaviour of workers – it appears that the paradox of costs result is weaker in the expectations-augmented Kaleckian growth model than in the canonical model. The intuition for this result is straightforward: it is evident from comparisons of equations (6) and (6') that the same factors that are responsible for making the Keynesian stability condition “less demanding” in our expectations-augmented model (per the discussion of (8) and (9) above) simultaneously weaken the accelerator mechanism in the investment function. And as is evident from the discussion of the Bhaduri-Marglin results in Blecker (2002), the accelerator mechanism must be sufficiently strong in order for the paradox of costs to hold. In general – that is, bearing in mind both this result and the earlier results of Taylor (1990) and Blecker (2002) regarding the sensitivity of the paradox of costs to the saving behaviour of workers – we can say that a less demanding Keynesian stability condition will always follow from the weakening of multiplier-accelerator effects in the Kaleckian framework, with the consequence that the paradox of costs result is also weakened. Of course, this last observation need not be considered problematic. Hence suppose we imagine a project that asks the question “can the long run be Keynesian in the same way as the short run?” Now define the short run as truly Keynesian if an increase in the saving rate depresses demand, output and employment whereas, following Keynes (1936, chpt. 19), a decrease in the real wage either increases or depresses these same variables (the total derivatives of demand, output and employment with respect to the real wage being dependent upon partial derivatives of opposing signs). It follows that a long run characterized by the paradox of thrift and an ambiguous paradox of costs can be thought of as a genuine analog of the Keynesian short run.

Finally, notice (from inspection of equation [9]) that any increase in s_{π} or π automatically increases the likelihood that the Keynesian stability condition will be satisfied. Hence from the point of view of Kaleckian growth theory (and to the extent that both the paradox of thrift and the paradox of costs hold) the parameters s_{π} and π can be considered “double-edged swords”. An increase in either parameter will simultaneously depress the

equilibrium rate of growth, and increase the likelihood that this equilibrium growth rate will be stable.¹⁶

5. Conclusions

A key ingredient in the canonical Kaleckian growth model is the demand-led output-adjustment stability condition usually referred to as the Keynesian stability condition, which stipulates that saving be more responsive to changes in capacity utilization than investment. According to some authors, however, this condition is too stringent and therefore unrealistic. Existing responses to such criticism appeal to either empirical or theoretical considerations (or both), and in the vast majority of cases show that the Keynesian stability condition is more likely to be satisfied when there exist withdrawals from the circular flow of income additional to saving out of profit income.

Against this backdrop, this paper explores the plausibility of the Keynesian stability condition by enriching the investment behaviour embedded in the canonical Kaleckian growth model with a more fully developed Keynesian theory of expectations formation. In the resulting specification, both current and expected future profits positively affect desired investment, and policy makers' target level of output performs as a conventional anchor for profit expectations. As the responsiveness of investment to changes in capacity utilization is reduced, and through mechanisms that have both clear and plausible behavioural foundations, it becomes more likely (in principle) that the Keynesian stability condition will hold in practice.

In fact, as firms put more weight on expected future profit and less weight on current profit in the investment decision, the likelihood that the Keynesian stability condition will be satisfied increases. Intuitively, the greater the extent to which the financing of investment is independent of current earnings, the less responsive investment will be to variations in capacity utilization and hence the more likely it is that investment spending will be less responsive to utilization than savings. Note, however, that this result draws attention to the fact that *stability* of the equilibrium growth rate does not necessarily ensure *sustainability* of the growth process: indeed, if the former is attained by means that result in the accumulation of stock-flow imbalances, then the latter is likely to be compromised with the result that the growth process eventually breaks down.

Meanwhile, as firms attach more weight to the policy target that provides one of the conventional anchors of their expectations, the likelihood that the Keynesian stability condition will be satisfied once again increases. Interestingly, this means that the *credibility of policy making* influences the Keynesian stability condition: a policy maker who proves adept at "fine tuning" the economy towards a clearly announced, target level of real economic activity will simultaneously (if unintentionally) succeed in reducing the sensitivity of investment to capacity utilization.

Finally, it is well known that the canonical Kaleckian growth model exhibits both the paradox of thrift and the paradox of costs. While the paradox of thrift necessarily holds in the expectations-augmented Kaleckian growth model, the paradox of costs does not. The intuition

¹⁶ This "double edged sword" interpretation relies on our interpreting stability as a virtue. This is generally the case in equilibrium models, since stability implies that we can rely on the equilibrium configuration of the system as a description of its actual outcomes, and similarly renders the outcomes of comparative static exercises straightforward. Note, however, that stability is by no means an essential feature of the Kaleckian growth model (nor growth models generally). See, for example, Lavoie (1992, pp.288-90) on variants of the Kaleckian growth model that are unstable and their use to explain events during discrete regimes or episodes of growth.

for this result is quite straightforward: the same factors that are responsible for making the Keynesian stability condition less stringent in the expectations-augmented model simultaneously weaken the accelerator mechanism in the investment function from which the paradox of costs arises in the first place. This dovetails with existing results that suggest a trade-off between the likelihood that the Keynesian stability condition will be satisfied, and the likelihood that the growth process will be wage-led.

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