Convergence towards the normal rate of capacity utilization in Kaleckian models:

The role of non-capacity creating autonomous expenditures

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Abstract:

Kaleckian models of growth and distribution have been highly popular among heterodox economists. Two drawbacks of these models have however been underlined in the literature: first, the models do not usually converge to their normal rate of capacity utilization; second, the models do not include the Harrodian principle of dynamic instability. Some Sraffian economists have long been arguing that the presence of non-capacity creating autonomous expenditures provides a mechanism that brings back the model to normal rates of capacity utilization, while safeguarding the main Keynesian message and without going back to classical conclusions. The present paper provides a very simple proof of this, showing that the Harrodian principle of dynamic instability gets tamed by the presence of autonomous consumer expenditures.

A key feature of the Kaleckian model is that the rate of capacity utilization is endogenous. In the canonical model, or even in the post-Kaleckian model, there is thus nothing that will bring back the actual rate of capacity utilization towards its normal value. This criticism of Kaleckian models was made early on by Auerbach and Skott (1988) and Committeri (1986; 1987). In their view, the normal rate of capacity is an optimal rate of utilization that firms try to achieve, at least over the long run. Therefore, entrepreneurs would not be content unless the targeted rate of capacity utilization is realized: ‘It is inconceivable that utilization rates should remain significantly below the desired level for any prolonged period’ (Auerbach and Skott, 1988, p. 53). The only possible steady state is one in which the actual rate of utilization is equal to its normal or targeted level. This leads to the belief that the only consistent steady-state analysis is one where those two rates are equal, i.e., what Vianello (1985) calls ‘fully adjusted positions’. In these positions, the actual rate of profit will also turn out to be equal to the normal rate of profit, otherwise it will not, as pointed out in the following quote:

> The possibility of capacity utilization being different from its planned degree in the long run would have an important implication for theories of distribution and accumulation....The *realized* rate of profit emerging from the interplay between distribution and effective demand may not be inversely related to the real wage, even in situations that the authors seem not to think limited to the short period; another way to say this is that the ... normal rate of profit r_n (i.e. the rate of profit technically obtainable at the normal utilization degree with [the real wage rate] taken at its current level) may diverge from its realized rate, even for long periods of time. Now, we do not wish to quarrel with this reasonable proposition: the *observed* rate of profit is very unlikely to coincide with r_n, even in terms of averages covering long periods of time, although we might suspect that after all, there must exist *some* connection between the two rates. The model, however, contains no element for the exploration of this connection, as it implies a persistent and systematic divergence between [the actual and the normal degree of capacity utilization]. (Committeri, 1986, pp. 170-1)

If the actual rate of capacity must eventually be equal to a *given* normal rate, then the rate of utilization is not an endogenous variable in the long period any more, which is likely to put in jeopardy many of the results achieved by the Kaleckian model. This objection to the Kaleckian model is highlighted by the use of investment equation (6.12) or (6.12A) which makes an explicit reference to a normal rate of utilization or to a ‘planned’ degree of utilization of capacity as Steindl (1952, p. 129) calls it. This investment function, reproduced below, is based on the distinction between undesired and desired excess capacity, or between the actual rate and the normal rate of capacity utilization, respectively denoted by u and u_n:

$$g^i = \gamma + \gamma_u(u - u_n) \tag{6.12A}$$

It is obvious from the above equation that if the actual rate of utilization turned out to be equal to the normal or desired rate, the actual rate of growth would be equal to γ. As Committeri (1986, p. 173) and Caserta (1990, p. 152) point out, if firms are content about the degree of capacity utilization that is being achieved and do not desire to have it changed, one concludes that the rate of accumulation desired by firms should be equal to the expected growth rate of sales. It is clear from equation (6.12A) that the exogenous parameter γ then represents this expected growth rate of sales. If it is assumed that the actual rate of capacity utilization u is larger than the planned rate u_n, the actual rate of growth g must be larger than the expected growth rate of sales γ. Committeri argues that this cannot be a consistent solution: in a proper steady-state model, expectations of sales growth and of spare capacity should be realized. When using investment equation (6.13), this objection seems much weaker, but still there remains the issue of the normal rate of capacity utilization.

Several answers, consistent or inconsistent with Kaleckian analysis, have been provided to this conundrum, and here we outline one of them. This is the mechanism tied to an exogenous growth component. This mechanism has been proposed by Franklin Serrano (1995a, 1995b) under the name of the Sraffian supermultiplier. His intent is to show that some Keynesian results will still hold despite the actual rate of capacity utilization being brought back to its normal level in the long run. There are thus two Sraffian positions on this issue. There are those Sraffians who support the analysis of the supermultiplier with its normal rate of capacity utilization, such as Serrano, Bortis (1997), Sergio Cesaratto (2013) and Oscar DeJuan (2005); and there are those, like

Roberto Ciccone, Man-Seop Park, Antonella Palumbo and Attilio Trezzini, who deny that rates of utilization are at their normal levels, either continuously or on average.

The crucial point made by Serrano is that the average propensity to save will move endogenously when there are autonomous consumption expenditures, even if the marginal propensity to save and the profit share are constant. This will be the case both in the short run, when autonomous consumption is a given, and in the medium run when growth occurs, with autonomous consumption growing at some given rate different from the rate of accumulation. The simplest way to put this is to write a new saving equation:

$$g^s = s_p \pi u/v - z \qquad (6.57)$$

with $z = Z/K$, where Z are the autonomous consumption expenditures of the capitalists, and hence where z is the ratio of autonomous expenditures to the capital stock.

There is thus some similarity between this variable Z and the autonomous expenditures that we called A or a in equation (5.2) when dealing with our model of employment in Chapter 5. The main difference is that Z only contains autonomous expenditures which do not lead to the creation of productive capacity. It should be further noted that here the marginal propensity to save out of profits is s_p, the marginal propensity to save out of national income is $s_p\pi$, while the average propensity to save out of national income is $s_p\pi - zv$. Thus even if s_p and π are constant, the average propensity to save will be endogenous as long as z is itself endogenous.

The main point that Serrano wishes to make is that saving can adjust to investment even when assuming that the marginal propensity to save, income distribution and the rate of utilization are all constant. The argument is thus that the 'Keynesian Hypothesis' is more general than previously thought, since it does not need to rely on an endogenous rate of utilization in the long run, in contrast to the Kaleckian approach.

There is however a second point that Serrano wishes to make. Serrano believes that as long as demand expectations by entrepreneurs are not systematically biased, the average rate of capacity utilization will tend towards the normal rate of utilization and hence that the economy will tend towards a fully-adjusted position. While other Sraffians have been happy to endorse Serrano's first point, many of them have argued that Serrano's second point is at best dubious (Trezzini, 1995; 1998). If the economy starts from a fully-adjusted position, it is unlikely to remain there; and when the economy gets away from a fully-adjusted position, it is unlikely to quickly come back to it, not because entrepreneurs make mistakes, but simply because the rate of capacity utilization will remain below (or above) its normal value for a long time. Thus the actual average rate of utilization cannot be equal to the normal rate of capacity utilization.

Can all this be somewhat modelled with our usual tools? Olivier Allain (2013) has recently put forward a formalization of this ultimate adjustment mechanism. His model is based on autonomous government expenditures and is thus different from what Serrano first proposed and different from what we propose here based on autonomous consumption expenditures, but Allain's article is the inspiration for all that follows in this subsection.

We thus start with the canonical Kaleckian investment function, given by equation (6.12A), $g^i = \gamma + \gamma_u(u - u_n)$, and the new saving equation, given by equation (6.57). In the short run, nothing special happens and all the standard Kaleckian results, such as the paradoxes of thrift and of costs hold. This is obvious from looking at the short-run solution for the rate of utilization, when the ratio z has not had time to change:

$$u^* = \frac{(\gamma - \gamma_u u_n + z)v}{s_p \pi - v\gamma_u} \tag{6.58}$$

Let us now consider a long run. The key idea here is that autonomous consumption expenditures grow at a certain rate g_z, which we assume given by outside circumstances. As Serrano (1995a, p. 84), puts it, it is usually assumed that autonomous components of aggregate demand grow in line with the capital stock, but 'it seems that it is rather the size of the economy itself that depends partially on the magnitude (and rates of growth) of these autonomous components of final demand'. Serrano refers to Kaldor (1983, p. 9) to provide support for this reversal of causality. Other post-Keynesians, also assume that autonomous expenditures are the driving force: in Godley and Lavoie (2007, ch. 11), it is autonomous government expenditures; in Trezzini and Garegnani (2010), it is consumption expenditures. With consumer credit and lines of credit based on the value of real estate, it is clear that consumption expenditures can grow independently of income to a large extent, at least for some time (Barba and Pivetti, 2009). This increase in autonomous consumption can also be tied to the attempt to keep up with the Joneses and to ‘invest’ in an appropriate lifestyle, as discussed in Chapter 2.

But assuming that Z grows at the constant rate g_z means that the ratio $z = Z/K$ must be changing through time, through the following law of motion that defines the growth rate of z:

$$\hat{z} = \dot{z}/z = \hat{Z} - \hat{K} = \bar{g}_z - g = (\bar{g}_z - \gamma) - \gamma_u(u^* - u_n) \tag{6.59}$$

The last equality is derived from the investment equation, $g^i = \gamma + \gamma_u(u - u_n)$. The bar over g_z is there to recall that the growth rate of autonomous expenditures is an unexplained constant. What we wish to know is whether the behaviour of z is dynamically stable or not, that is whether it will converge to a stable value. This will happen if $d\hat{z}/dz$ is smaller than zero. From equation (6.58), we can compute what the term $(u^* - u_n)$ is equal to:

$$u^* - u_n = \frac{(\gamma + z)v - s_p \pi u_n}{s_p \pi - v\gamma_u} \tag{6.60}$$

Combining equations (6.60) and (6.59) we get:

$$\hat{z} = (\bar{g}_z - \gamma) - \gamma_u \left[\frac{(\gamma + z)v - s_p \pi u_n}{s_p \pi - v\gamma_u}\right] \tag{6.61}$$

And thus taking the derivative of $\hat{z}$ with respect to itself, we find that:

$$\frac{d\hat{z}}{dz} = \frac{-\gamma_u v}{s_p \pi - v\gamma_u} < 0 \tag{6.62}$$

The derivative is always negative, as long as the denominator is positive, that is, as long as there is Keynesian stability. This means that z will converge to an equilibrium value z^{**}, at which the growth rates of capital and aggregate demand will be the same as the given growth rate of autonomous consumption expenditures. This also means that the long-run solutions that one could find, by assuming that at some point the growth rate of capital equates the growth rate of autonomous consumption, will indeed be realized if given enough time. In the long run, $g^{**} = g_z$, and hence making use first of the investment equation, and then of the saving equation, we can derive the two long-run equilibria:

$$u^{**} = u_n + \frac{\bar{g}_z - \gamma}{\gamma_u} \tag{6.63}$$

$$z^{**} = \frac{s_p \pi u^{**}}{v} - \bar{g}_z \tag{6.64}$$

At this stage, three remarks can be made. First, the mechanism designed by Serrano on its own does not achieve a normal rate of capacity utilization, since $u^{**} \neq u_n$. For $u^{**} = u_n$ to be achieved, the γ parameter in the investment equation would need to equal g_z. In other words, entrepreneurs would need to assess the trend growth rate of sales as being equal to the growth rate of autonomous consumption expenditures. This is recognized by supporters of the supermutiplier, who refer to perfect foresight or to correct forward-looking expectations.

Second, almost by definition, with this mechanism, we can have neither a wage-led nor a profit-led regime, as we defined them earlier, since the growth rate of capital and of output eventually adjusts to the given growth rate of autonomous consumption expenditures, and also because the long-run value of the rate of utilization depends neither on the profit share nor on the marginal propensity to save out of profits. As long as there is no change to any of the four parameters in equation (6.63), any change in the profit share or in the marginal propensity to save will have no effect on the long-run value of the rate of utilization.

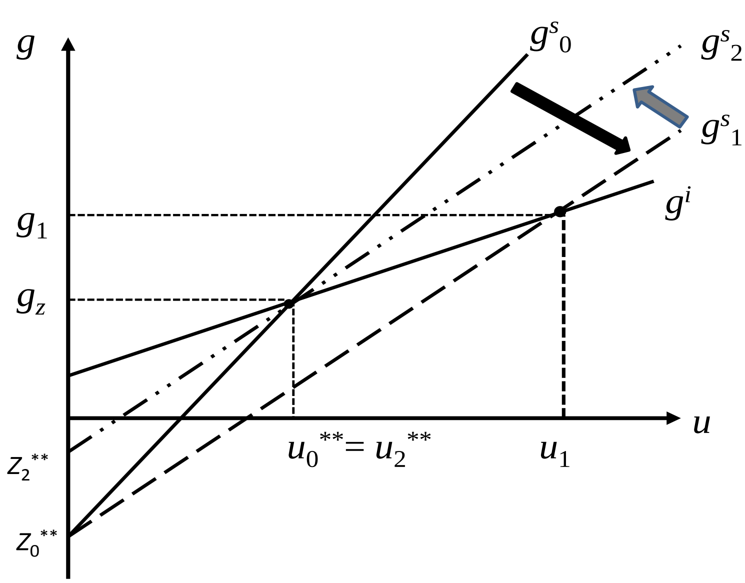
This leads however to a third remark. While the paradox of thrift and of costs are gone in the long-run version of this model, reducing the profit share or reducing the marginal propensity to save out of profits will have a positive effect on the *levels* of capital, capacity and output. This is precisely the point made by Serrano, and it is a point that Cesaratto (2013) has emphasized recently:

> That lower marginal propensity to save will increase the level of induced consumption and aggregate demand, and, consequently, also the long-period level of productive capacity. However, this will be a once-and-for-all effect. Once capacity has adjusted to the new (higher) level of effective demand implied by the higher (super) multiplier, the economy will settle back to steady growth grow at the unchanged rate given by the growth of autonomous expenditures. Therefore, on the demand side, a decrease in the marginal propensity to save brought about by the rise of the real wage will have a positive long-period level effect (on capacity output), but will have no effect on the sustainable secular rate of growth of capacity. (Serrano, 1995b, p. 138).

A fourth remark is now in order. By a strange turn of events, whereas Sraffians are usually accused by other post-Keynesians of focusing on fully-adjusted positions, several Sraffian authors have criticized Kaleckians for focusing unduly on steady states, arguing that steady-state analysis ought to be jettisoned (Trezzini, 2011, p. 143). In the example provided above by Serrano and in our little model, while the rate of capacity utilization would be the same at the beginning and at the end of the process, it will be higher during the transition process. Thus, on *average*, the rate of utilization and the growth rate of the economy are higher than at the starting and terminal points of the traverse. Thus, what these Sraffians are telling us is that more attention should be paid to the average values achieved during the traverse than to the terminal points. This is a recommendation with which all post-Keynesians could certainly agree (see for instance Henry, 1985), and it is one which is made quite explicitly by Park (1995, p. 307), who argues that the moving averages of key variables are quite distinct from their potential steady state values.

The Serrano-Allain adjustment mechanism and the appeal to average values can be illustrated with the help of Figure 6.19. Let us assume that the economy starts from a steady state where the rate of accumulation is exactly equal to the growth rate of autonomous consumption expenditures, with a rate of utilization of u_0^{**}. Let us now suppose that there is a decrease in the marginal propensity to save out of profits or in the share of profits. This will be associated with a rotation of the saving curve, from g_0^s to g_1^s, as shown with the help of the black arrow, since the slope of the curve will now be smaller. In the short run, as in all Kaleckian models, this will generate an increase in the growth rate of capital and in the rate of utilization, which move to g_1 and u_1 in the short run. But the new equilibrium is only be a temporary one, as the new discrepancy between g_1 and g_z will generate a reduction in z through equation (6.59). The saving curve will thus gradually shift up through time, as shown in Figure 6.19 with the help of the grey arrow, until the saving curve reaches g_2^s, at which point the rate of accumulation equates the given growth rate of autonomous consumption. As to the rate of utilization, it will be back to its initial equilibrium position, such that $u_2^{**} = u_0^{**}$. The change in income distribution or in the marginal propensity to save has had no impact on the equilibrium rate of utilization. However, the *average* rate of utilization and the *average* rate of growth achieved during this whole episode are higher, the economy having been run between u_0^{**} and u_1 and g_z and g_1 respectively during the whole transition. As a consequence, the level of output and of capacity will be higher than if there had been no increase in real wages or no decrease in the marginal propensity to save.

6.19



Now the topic of this section is whether there is convergence towards the normal rate of capacity utilization. It is not the case here with the current adjustment mechanism. We need to combine an additional mechanism. Allain (2013) proposes to add such a mechanism, which corresponds to the case of Harrodian. For simplification purposes, we propose a slightly modified version of the Harrodian equation (6.32), where it is the rate of change, rather than the change, in the γ parameter of the investment function which responds to a discrepancy between the actual rate of capacity utilization and the normal rate of utilization. We thus have:

$$\hat{\gamma} = \mu_2(u^* - u_n)\,, \quad \mu_2 > 0 \tag{6.65}$$

Making use of equation (6.60) once again, the Harrodian equation becomes:

$$\hat{\gamma} = \mu_2\left(\frac{(\gamma + z)v - s_p \pi u_n}{s_p\pi - v\gamma_u}\right) \tag{6.66}$$

We thus have another system of simultaneous linear dynamic equations, given by equations (6.66) and (6.61) which, omitting once more the constant terms, we can write as:

$$\begin{pmatrix} \hat{\gamma} \\ \hat{z} \end{pmatrix} = \begin{pmatrix} \dfrac{\mu_2 v}{s_p\pi - v\gamma_u} & \dfrac{\mu_2 v}{s_p\pi - v\gamma_u} \\ -\left(1 + \dfrac{v\gamma_u}{s_p\pi - v\gamma_u}\right) & \dfrac{-\gamma_u v}{s_p\pi - v\gamma_u} \end{pmatrix} \begin{pmatrix} \gamma \\ z \end{pmatrix} \tag{6.67}$$

To find how the system described by (6.67) behaves, we need to look at the determinant of the 2x2 matrix, called *J*, and at its trace. For the system to exhibit stability and converge to an equilibrium, the determinant needs to be positive and the trace needs to be negative. We get:

$$\text{Det } J = \frac{\mu_2 v}{s_p\pi - v\gamma_u}$$

$$\text{Tr}\, J = \frac{(\mu_2 - \gamma_u)v}{s_p\pi - v\gamma_u}$$

The determinant is positive whenever the Keynesian stability condition is fulfilled. The trace is negative if $\mu_2 < \gamma_u$. Thus the system is stable as long as the effect of Harrodian instability is not overly strong. If this is so, depending on the values taken by the parameters, this system may come back straight to its fully-adjusted position, where $u^{**} = u_n$ and where $g^{**} = \gamma^{**} = g_z$, or it may whirl cyclically towards it.

We thus have reached a conditional proof that Kaleckian results can be preserved even if the economy comes back systematically towards a constant normal rate of utilization, as long as we interpret them as averages measured during the period of transition. This is achieved by taking into account autonomous growth components, assuming Keynesian stability and incorporating a Harrodian instability mechanism.