UNIVERSITÀ
DI SIENA
1240

QUADERNI DEL DIPARTIMENTO
DI ECONOMIA POLITICA E STATISTICA

Riccardo Pariboni

Autonomous demand and the Marglin-Bhaduri model: a critical note

n. 715 – Agosto 2015

Autonomous demand and the Marglin-Bhaduri model: a critical note

Riccardo Pariboni*

Abstract

Within Post-Keynesian macroeconomic theory, the contribution by Marglin and Bhaduri (Marglin and Bhaduri, 1990; Bhaduri and Marglin, 1990) on the relationship between income distribution and growth has progressively asserted itself as a benchmark model, a reference point that has originated and still gives rise to plenty of theoretical and empirical works. Given this popularity, in the related literature it is often claimed that the only open question left is an empirical one - to assess econometrically whether a particular economy is wage or profit-led. In this essay, I will argue that some theoretical issues, related to this model and to the literature inspired by it, can nonetheless be raised. In particular, the treatment of investment appears to be the least convincing aspect of the approach *a là* Marglin-Bhaduri. More specifically, it seems possible to raise some doubts about an independent long-run influence of the profit rate or of the profit share on investment, influence that is not in general justified or explained in detail by this literature and that to some extent is simply taken for granted. It will be shown that, if the Marglin-Bhaduri model is integrated with an explicit consideration of the autonomous components of demand, income distribution does not exert any permanent influence on the rate of growth of the economy and on the rate of accumulation. Matching this result with the usual assumption, made in Post-Keynesian models of growth and distribution, that capacity utilization is the adjusting variable in equilibrating investment and savings leads to paradoxical results that question the plausibility of an accumulation function like the one used in the Marglin-Bhaduri model.

JEL Classification: B51, E11, E12, O41

Keywords: Income distribution, Investment function, Growth, Marglin-Bhaduri

*Department of Economics and Statistics, University of Siena, pariboni2@unisi.it.

Introduction

It seems fair to claim that the Post-Keynesian approach to economics, with its multifaceted declinations[1], has established itself as the most consistent and organic alternative to the dominant Neoclassical paradigm. Within Post-Keynesian macroeconomic theory, the Marglin-Bhaduri's contribution (Marglin and Bhaduri, 1990; Bhaduri and Marglin, 1990) on the relationship between income distribution and growth has progressively asserted itself as a benchmark model, a reference point that has originated and still gives rise to plenty of theoretical and empirical works, extensions and applications.[2] In this essay, I will point out some critical aspects of the Marglin-Bhaduri model that I find both in the original formulation and in the most recent literature inspired by it.

In its original and more general version (Marglin and Bhaduri, 1990), the model is constituted by a consumption function that positively depends on the degree of capacity utilization and negatively on the profit share[3] and by an accumulation function, positively related with the degree of capacity utilization and the profit share. A net exports function, which depends negatively on both capacity utilization and the wage share, is added in the open-economy extensions (see for example Bhaduri and Marglin, 1990). Within this framework,

1 See Lavoie (2011).

2 Lavoie and Stockhammer (2012, p. 10) refers to it as "*The* post-Kaleckian model of growth and distribution" [italics added]. Other relevant contributions to this literature can be found in Bowles and Boyer (1995), Blecker (2002), Hein and Vogel (2008), Stockhammer, Onaran and Ederer (2009), Hein and Tarassow (2010), Onaran, Stockhammer and Grafl (2011), Stockhammer, Hein and Grafl (2011), Hein (2012), Lavoie and Stockhammer (2012), Onaran and Galanis (2012), with the last two being part of an ILO research project recently collected in a book and published as Lavoie and Stockhammer (2014).

3 The marginal propensity to consume of workers is assumed to be higher than the propensity to consume out of profits.

the overall effect on aggregate demand and growth of a shift in functional income distribution depends on the parameters of the model, in particular the relative sensitivity of the components of demand to the profit share and to the degree of capacity utilization.

In spite of the fact that the literature inspired by the Marglin-Bhaduri model often claims that the only open question left is an empirical one - to assess econometrically whether a particular economy is wage or profit-led - it will be argued in this essay that some theoretical issues can nevertheless be raised. The original model neglects the existence of components of demand other than investment and induced consumption.[4] A proper inclusion into the picture of these components will allow me to maintain that the treatment of investment appears to be the least convincing aspect of the approach *a là* Marglin-Bhaduri. More specifically, it seems possible to cast some doubts about an independent long-run influence of the profit rate or the profit share on investment, influence that is not in general justified or explained in detail in the relevant literature and that to some extent is simply taken for granted, making a generic reference to the actual profit share as an indicator of expected profitability and to profits as a necessary source of internal funds. In this respect, it will be shown that, once the original model is integrated with an explicit consideration of autonomous demand, income distribution does not exert any permanent influence on the rate of growth of the economy and on the rate of accumulation. Once this result is matched with the usual assumption made in Post-Keynesian and Neo-Kaleckian models[5] of growth and distribution

4 On the other hand, in Bhaduri and Marglin (1990) the open economic scenario is discussed as well and exports are introduced into the analysis, but in a temporal framework limited to the short-run, which leaves no room for the capacity generating effects of investment.

5 With this last term, I refer to a series of models of growth and distribution whose first examples can be traced back to Rowthorn (1981) and Amadeo (1986). The Marglin-Bhaduri model can be attributed to this theoretical tradition. Its main novelty is represented by the

that the degree of capacity utilization is the adjusting variable in equilibrating investment and savings, we obtain paradoxical results that question the plausibility of an accumulation function like the one used in the discussed literature. In addition, the famous taxonomy introduced by the authors (stagnationist vs exhilarationist demand regimes; wage-led vs profit-led growth regimes) is proved to be problematic as well.

The essay proceeds as follows: in section 1, a baseline version of the Marglin-Bhaduri model is presented; in section 2, I introduce the autonomous components of demand into the model. This inclusion leads to paradoxical results, which allow me to cast some doubts about the investment function of the Marglin-Bhaduri model and the main findings of the entire approach. The last section summarizes the main results of the essay and draws some conclusions.

1. A baseline version of the model

In the original formulation of the model (Marglin and Bhaduri, 1990), aggregate demand is modelled according to the following three equations:

$$r \equiv \frac{P}{K} \equiv \left(\frac{P}{Y}\right)\left(\frac{Y}{Y^n}\right)\left(\frac{Y^n}{K}\right) \equiv \Pi \frac{u}{v} \tag{1}$$

$$g^s = \frac{S}{K} = sr = s\,\Pi \frac{u}{v} \tag{2}$$

accumulation function (see eq. 3 below), introduced because of the authors' dissatisfaction with the supposed rigidity of standard Keynesian theory, according to which higher wages always increase demand. Indeed "we view the Keynesian insistence on aggregate demand as an important ingredient to understand how modern capitalism works, but the stagnationist model as very much bound to particular places and times" (Marglin and Bhaduri, 1990, p. 155). Through the introduction of the profit share in the accumulation function, the authors' objective was to provide a more flexible theoretical framework, able to produce different demand and growth regimes.

$$g^K = \frac{I}{K} = f(r^e(\Pi, u)) \tag{3}$$

where the first one is simply an accounting identity representing the rate of profit *r* as the product of the profit share Π, the rate of capacity utilization *u* and the inverse of the normal capital-output technical coefficient *v*. The second is the saving function, with the implicit assumption that only capitalists save (*s* represents their marginal propensity to save). The third is the accumulation function. The rate of accumulation is assumed to be a positive function of the expected rate of profit ($\frac{df}{dr^e} > 0$), which in turn is positively affected by the profit share and the capacity utilization ($\frac{\partial r^e}{\partial \Pi} > 0$ and $\frac{\partial r^e}{\partial u} > 0$). As Marglin and Bhaduri (1990, p. 163) explain: "*the first because the unit return goes up, the second because of the likelihood of selling extra units of output increases*". In their attempt to explain the slowdown in growth in many western economies during the 1970s through the concept of *profit squeeze*, the authors justify the influence of the profit share on the accumulation rate also by regarding profits as "*an important source of saving, so the reduction of profits made less income available for accumulation*" (ibid., pp. 152-153). Incidentally, the last argument completely reverses the causality between savings and investment with respect to the standard Keynesian and Post-Keynesian view[6] and it is hardly consistent with claims like "*the pace of accumulation is determined by firms' decision to invest, independent of savings*" (Hein, 2012, p. 46), often made in the recent literature that develops the same theoretical framework and uses the same functions of Marglin and Bhaduri (1990).

6 For a detailed discussion, see Garegnani (1978).

The equilibrium condition $g^S = g^K$ completes the model. From equations (1) to (3), we obtain:

$$s\Pi\frac{u}{v}=f(r^e(\Pi,u)) \tag{4}$$

Totally differentiating, we get $(s\frac{u}{v}-\frac{df}{dr^e}\frac{\partial r^e}{\partial \Pi})d\Pi-(\frac{df}{dr^e}\frac{\partial r^e}{\partial u}-s\frac{\Pi}{v})du=0$, from which we can derive an IS function - the locus of points where savings equalize investment - whose slope is equal to:

$$\frac{du}{d\Pi}=\frac{\frac{df}{dr^e}\frac{\partial r^e}{\partial \Pi}-s\frac{u}{v}}{s\frac{\Pi}{v}-\frac{df}{dr^e}\frac{\partial r^e}{\partial u}} \tag{5}$$

The sign of equation (5), even assuming that the standard Keynesian stability holds[7] (the denominator higher than 0), cannot be established a priori, since it depends on the parameters and on the relative responsiveness of the accumulation and saving functions to variations in *u* and Π. If the numerator is positive, the economic regime is defined "*exhilarationist*" (Marglin and Bhaduri, 1990, p. 166), meaning that an increase in the profit share has a positive effect on the *level* of economic activity; if it is lower than 0, it is defined "*stagnationist*" (ibid., p. 166), entailing that an increase in the wage share is necessary to attain a higher *level* of aggregate demand.

It is important to recall that in the Marglin-Bhaduri theoretical construction, and more in general in Neo-Kaleckian models, a change in one of the exogenous parameters (as the profit share in the above example) leads to a new equilibrium level for the capacity utilization, as a consequence of a variation in demand with given productive capacity. However, this new level of

7 The Keynesian stability condition requires that savings are more reactive to variations in the capacity utilization than investment.

u persists over time. Indeed, in these models (i) no attempt is done to attain normal capacity utilization and (ii) the rate of accumulation and the rate of output growth are assumed to be coincident. Hence the numerator and the denominator of u evolve in parallel after the exogenous shock. This implies that the short-run outcome of a change in the profit share, which is represented by the variation in u, extends its effects also to the long-run, the time horizon usually referred to when economic growth is studied.

Marglin and Bhaduri (1990) provide a further categorization, dividing economic regimes between co-operative and conflictual. In the first one, the interests of capitalists and workers are shown to coincide. This situation prevails when the *rate* of profit and - curiously enough given that the comparison is between a relative and an absolute magnitude - the wage *bill* move in the same direction when capacity utilization varies. When, on the other hand, the expansion of activity is beneficial only for one class and detrimental to the other (the rate of profit and the wage bill react to a change in u by moving in opposite directions), the economic regime is defined conflictual.

Combining the various classifications, it is possible to arrive at a matrix, which shows the famous concepts of wage-led and profit-led growth regimes, terms that refer to economic regimes in which a rise in the wage share causes, respectively, an increase or a decrease in the rate of growth of the economy:

	EXHILARATIONIST	**STAGNATIONIST**
CO-OPERATIVE	profit-led	wage-led
CONFLICTUAL	profit-led	profit-led

Table 1: Taxonomy of economic regimes

We may recall that, according to equation (4), the rate of accumulation/rate of growth is proportional to the rate of profit. This implies that the only case for wage-led growth is given by the intersection of co-operation and stagnationism. In fact, in this last case an increase in the wage share leads, by definition, to an increase in the rate of capacity utilization.[8] Being the regime co-operative, this also leads to an increase in the rate of profit[9] and consequently in the rate of growth.

In any case, apparently, the interests of the capitalist class appear to coincide with the general interest. If the regime is exhilarationist – as it is possible to see in table 1, this always implies a profit-led growth regime - an increase in their income share has long period positive effects on growth. In a stagnationist situation, if the regime is co-operative a higher rate of profit goes along with higher growth again. If instead is conflictual, workers can obtain a bigger slice of the cake only at the expense of the size of the cake itself.

Notably, the temporal framework to which the model refers in its original version[10] is claimed to be "*a longer run than the textbook short run in which capacity utilization is the sole adjusting variable*" (Marglin and Bhaduri, 1990, p. 167). On the other hand, in the twin paper (Bhaduri and Marglin, 1990, p. 384) "*the focus is entirely on the short period*" and the discussion is limited to the reactions of the *level* of aggregate demand to variations in the profit share, on the basis of the same concepts of stagnationist and exhilarationist regimes.

Traces of the dichotomy between these two different versions of the model can be found also in the following literature. In the spirit of Bhaduri and

8 Obviously, these two events have a positive effect on the wage bill.

9 In spite of the fact that the profit share is now lower, the positive effect on r of a higher u, in this case, prevails.

10 It is also shorter than the very long-run in which, according to the authors, rational expectations are supposed to work.

Marglin (1990), some recent works like Stockhammer, Onaran and Ederer (2009), Stockhammer, Hein and Grafl (2011), Onaran, Stockhammer and Grafl (2011) and Stockhammer and Onaran (2012) confine their analysis to the short-run. The terms "*wage-led*" and "*profit-led*" are utilized there to identify regimes in which the increase in the wage share has, respectively, positive and negative effects on the *level* of demand.[11] Since in these last cases productive capacity is taken as given and fixed, a variation in demand leads to a variation in the degree of capacity utilization in the same direction. Hence, the two possible scenarios correspond to the stagnationist and exhilarationist of Marglin and Bhaduri (1990). Lavoie and Stockhammer (2012) distinguish between the impact of variations in functional income distribution on demand, qualified by them as the short-run effect and leading to wage-led and profit-led demand regimes, and the impact on the rate of accumulation - the long-run effect - that generates wage-led or profit-led investment regimes, which are analogous to the Marglin and Bhaduri (1990) growth regimes. Hein and Vogel (2008), Hein and Tarassow (2010) and Hein (2012) study both demand and growth regimes.

The discussion will concern, from now on, the original version of the model, as presented in Marglin and Bhaduri (1990), to assess both its level and growth outcomes. Moreover and for the sake of simplicity, the present analysis will focus exclusively on the effects of changes in income distribution on the equilibrium level of capacity utilization[12] (with the related distinction between stagnationist and exhilarationist regimes) and on the rate of growth of the economy (profit-led versus wage-led regimes), leaving aside the co-operation/conflict dichotomy.[13]

11 On the contrary, in Marglin and Bhaduri (1990) wage-led and profit-led refer to alternative *growth* regimes.

12 Capacity utilization is treated as a proxy of the level of demand.

13 For a critical discussion of these aspects, see Cavalieri, Garegnani and Lucii (2004).

A simple graphical analysis can be useful to capture the main features of the model and to introduce my criticisms. I utilize a linear specification[14] of equation (3), expressed by equation (6):

$$g^K = \alpha + \beta u + \gamma \Pi \tag{6}$$

where α can be seen as a parameter related to capitalists' assessed trend growth of sales and β and γ are positive parameters. Relaxing the assumption that only capitalists save, we obtain a modified version of equation (2):

$$g^S = \frac{S}{K} = \frac{s_\pi \Pi Y + s_w (1-\Pi) Y}{K} = s(\Pi) \frac{Y}{K} = s(\Pi) \frac{u}{v} \tag{7}$$

with $s(\Pi)$ equal to the aggregate marginal propensity to save. The latter is a positive function of the profit share, on the basis of the assumption that the marginal propensity to save out of profits s_π is higher than the propensity to save out of wages s_w, as it is commonly done in the heterodox literature.[15] Equations (6) and (7) can be reported in Figure 1[16], with g^K and g^S expressed as increasing functions of u.[17]

14 For the provision of arguments in favor of such a formalization of the Marglin-Bhaduri investment function, see Hein and Vogel (2008, p. 485, footnote 1). Equation (6) is also consistent with Marglin and Bhaduri's own approach, which treats "profit share and capacity utilisation as independent and separate arguments in an investment function" (Bhaduri and Marglin, 1990, p. 380).

15 See for example Kaldor (1955-56).

16 Lavoie and Stockhammer (2012, p. 11) present a similar graphical representation of the Marglin-Bhaduri model.

17 Given that the Keynesian stability is assumed to hold, the g^S curve is steeper than g^K.

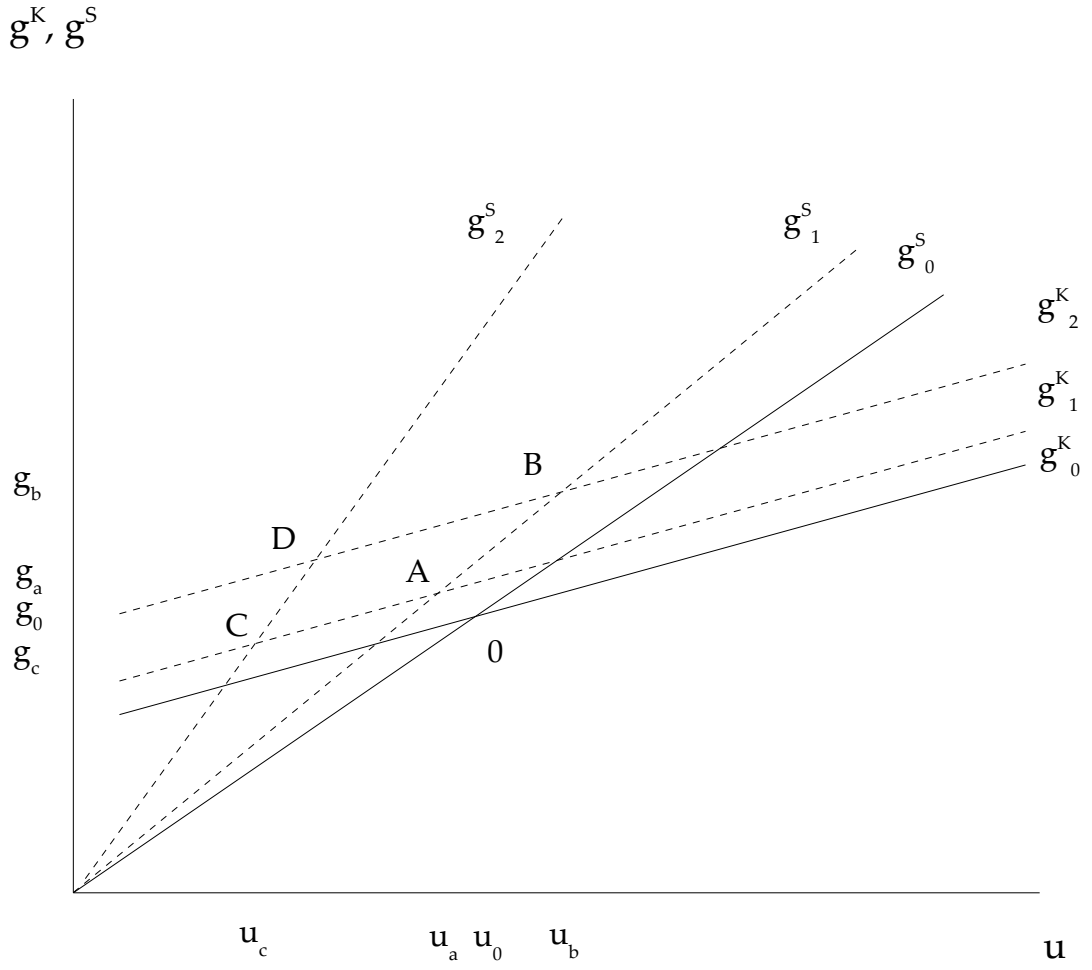

Figure 1: The effects of an increase in the profit share in a standard Marglin-Bhaduri model.

Starting from the initial equilibrium 0, given by the intersection of the curves (g^K_0, g^S_0), to which correspond the level of capacity utilization u_0 and the rate of accumulation g_0, an exogenous increase in the profit share shifts upward the investment function, whose intercept is equal to $\alpha + \gamma\Pi$, and rotates leftward the saving function. The relative reaction of the two curves depends on the parameters measuring the responsiveness to u and Π.

If the new situation of the economy is represented by the curves (g^K_1, g^S_1),

the corresponding equilibrium point A represents a stagnationist demand regime and a profit-led investment/growth regime, as can be seen respectively on the u-axis and the g-axis and recalling that *u*, coherently with Marglin and Bhaduri (1990), is utilized as a proxy for demand.

If the reaction of investment to the increase in the profit share is stronger than in the previous case, so that the g^K curve shifts to g^K_2, while the impact on savings is the same (therefore, the economy is now represented by the g^K_2 and g^S_1 curves), we obtain the equilibrium point B. This depicts an exhilarationist demand regime and a profit-led investment/growth regime.

If, finally, consumption is very sensitive to variations in functional income distribution and the saving function rotates up to g^S_2 while the impact on investment is still represented by g^K_1, the intersection point C reveals a stagnationist demand regime and a wage-led investment/growth regime.[18]

Let us now turn to some criticisms to this model, with a particular concern on its investment function.

2. Some critical aspects of the model

a. The Marglin-Bhaduri model and autonomous demand

The Marglin-Bhaduri model is built under the assumptions of a closed economy, without government and no possibility for credit-financed consumption. Hence, it does not consider the existence of components of aggregate demand other than induced consumption and investment. Given their relevance and their undeniable existence in real-world economies, I will include into the picture these components – the autonomous demand – arguing

18 The possible equilibrium given by the intersection of g^K_2 and g^S_2 (point D), is characterized by regimes analogous to those of point A.

that this leads to two main results: (i) the taxonomy introduced in table 1 no longer holds; (ii) the Marglin-Bhaduri accumulation function appears questionable.

In my critical discussion of the investment function proposed by Marglin and Bhaduri and adopted in the literature inspired by their contribution, I will assume that productive units decide their gross investment in order to endow themselves with the capacity necessary to produce the amount they expect to be demanded at normal prices.

It can be reasonably assumed that firms' objective is to produce in the most efficient, cost-minimizing way; that is to say they aim at operating their productive capacity at its 'normal' level, as defined for example by Kurz (1986) and Shaikh (2008)[19], which will be in general lower than full utilization.

Finally, to appreciate properly the fundamental role of investment, it is necessary to take into account also its double nature, because this allows a proper analysis of the persistent and non transitory effects on the economy of a shift in income distribution. Indeed, investment is the driving force of the productive capacity and of the potential output of an economy. At the same time, it is also an important component of aggregate demand. Its evolution contributes, together with the other components of demand, to the determination of the rate of growth of aggregate demand and actual output. As it will be argued below, the absence of autonomous demand in the Marglin-Bhaduri model does not allow a full recognition of investment's double role.[20]

19 "The 'normal' degree of capital utilization refers to the cost-minimizing system of production" (Kurz, 1986, p. 38); "The normal rate is determined by the (real) cost structure of the firm … the minimal cost rate of capacity utilization is largely immune to variations in the actual rate of capacity utilization" (Shaikh, 2008, p. 461). See also the seminal contribution of Steindl (1952), with his introduction of the concept of "planned excess capacity" (p. 127) as a strategic choice of the firm to be able to meet efficiently peaks of demand and to discourage possible entrants.

20 See also Cardoso and Crespo (2014), where a similar argument is developed.

With these premises in mind, I will argue that, if proper consideration is given to the capacity generating effects of investment and to the existence of autonomous components of aggregate demand in addition to investment and induced consumption, the Marglin-Bhaduri's accumulation function leads to untenable results that question the solidity of the function itself and, to some extent, circumscribe the relevance of the taxonomy introduced in the previous section.

As it has been discussed above, the most "prudential" versions[21] of the Marglin-Bhaduri model, those which confine their analysis to the effects on the *level* of aggregate demand and that I will not discuss in detail here, explicitly limit their focus to the short period, when productive capacity is fixed and eventual increases in the produced output can be brought about only through a more intensive utilization of the existing capacity.

On the other hand, the model originally presented in Marglin and Bhaduri (1990), which is the main object of my discussion, and its most "ambitious" following versions, claim to extend to the medium-to-long run the results. In doing this, they present some unsatisfactory aspects. A dichotomy seems in particular to be present: either potential output is still taken as given and fixed, with no room for the capacity generating effects of investment[22], or it is assumed to be always growing in line with actual output. In this last case, it seems plausible to argue that the absence of an explicit distinction between a specific equation explaining the temporal evolution of productive capacity and an equation tracking the path of actual output can be attributed to the fact that

21 See Stockhammer, Onaran and Ederer (2009); Stockhammer, Hein and Grafl (2011); Onaran, Stockhammer and Grafl (2011) and Stockhammer and Onaran (2012).

22 This is explicitly admitted in Hein and Vogel (2008, p. 485) in the discussion of their equilibrium results: "Whereas equilibrium capacity utilization indicates equilibrium activity with *given* productive capacities..." [italics added] but this is quite at odds with their objective to investigate "the long-run relationship between distribution and growth" (p. 481).

Neo-Kaleckian models – and their Marglin-Bhaduri version - claim themselves to be investment driven. For this reason, there is the tendency to identify the rate of capital accumulation (I/K) with the rate of growth of demand and output. This is consistent with either (i) the neglect of the existence of the autonomous components of demand, as Marglin and Bhaduri (1990) do; or, alternatively, with (ii) the arbitrary assumption that these components grow at the independently determined rate of accumulation, as it is proposed by some other authors, according to which, for example, public spending G is "*a constant proportion of the capital stock*" (Blecker, 2002, p. 140), or credit-financed consumption is such that "*debt must grow at the same rate as the capital stock*" (Palley, 2014, p. 20). This, obviously, means that the rate of growth of these components is no longer autonomous at all, being by definition equal to g^K. Anyway, in both cases demand (output, the numerator of *u*) and productive capacity (potential output, the denominator of *u*)[23] evolve always at the same rate g^K and any equilibrium level of *u* obtained with given potential/normal output will be maintained also beyond the short-run, when the new productive capacity is installed.

Following the seminal contribution of Serrano (1995) and the further developments of Lavoie (2013) and Allain (2014)[24], it is possible to integrate the autonomous components of demand into a Marglin-Bhaduri model of growth and distribution. I qualify as autonomous those components that do not depend on the actual or expected level of output and whose rate of growth can be taken, in this framework, as exogenously given: autonomous consumption[25], public

23 From the definition of the given technical capital-normal output ratio $v = K/Y^n$, we can see that $g^{Y^n} = g^K$.

24 Lavoie (2013) and Allain (2014) provide a formalization of a Neo-Kaleckian model with some components of demand growing at a rate independent from the output rate of growth.

25 With this term, I refer to "the component of aggregate consumption that is not financed by the purchasing power introduced in the economy by capitalists' production decisions. The

expenditure, exports.

Once the autonomous components of aggregate demand are taken into account, the IS condition of equilibrium on the goods market is represented by:

$$I = s_{\pi}\Pi Y + s_w(1-\Pi)Y - Z = S \quad (8)$$

where Z are the already mentioned autonomous components, while the other terms are analogous to those in equation (7). For the sake of simplicity, I will consider a closed economy.[26] Dividing all terms by K, the stock of capital, we can rewrite the IS equilibrium condition as:

$$g^K = s(\Pi)\frac{u}{v} - \frac{Z}{K} = g^S \quad (9)$$

with g^K defined according to equation (6) and s(Π) as in equation (7).

We can imagine to start our analysis with an equilibrium situation, like point 0 in Figure 2, in which it is assumed that productive capacity is utilized at its normal, target level and that $g^K = g^S = g^Z$ ($= g^Y$). In this position, all the components of demand evolve at the same rate of growth. Moreover, also productive capacity grows in line with aggregate demand and *u* remains at its normal level.

Let us now suppose a shift in income distribution. In the first stage, the effects will be the same of the standard model, depicted in Figure 1: if for example Π increases, the g^K curve shifts upward and g^S (whose vertical intercept in the <u,g> space is no longer zero but negative and equal to – Z/K) rotates leftward. But at this point, independently from the specific economic regime, the new intersection occurs at a level of g^K that is different from the exogenously given g^Z, with the consequence that the ratio of Z over K varies

purchasing power used to finance autonomous consumption comes from the monetization of accumulated wealth and/or the access to new credit finance" (Freitas and Serrano, 2013, p. 3).

26 It will be argued below that the argument does not change in an open economy.

over time accordingly to:

$$(\frac{\dot{Z}}{K})=\frac{Z}{K}(g^Z-g^K) \tag{10}$$

and the g^S curve shifts as long as these two rates of growth diverge.[27]

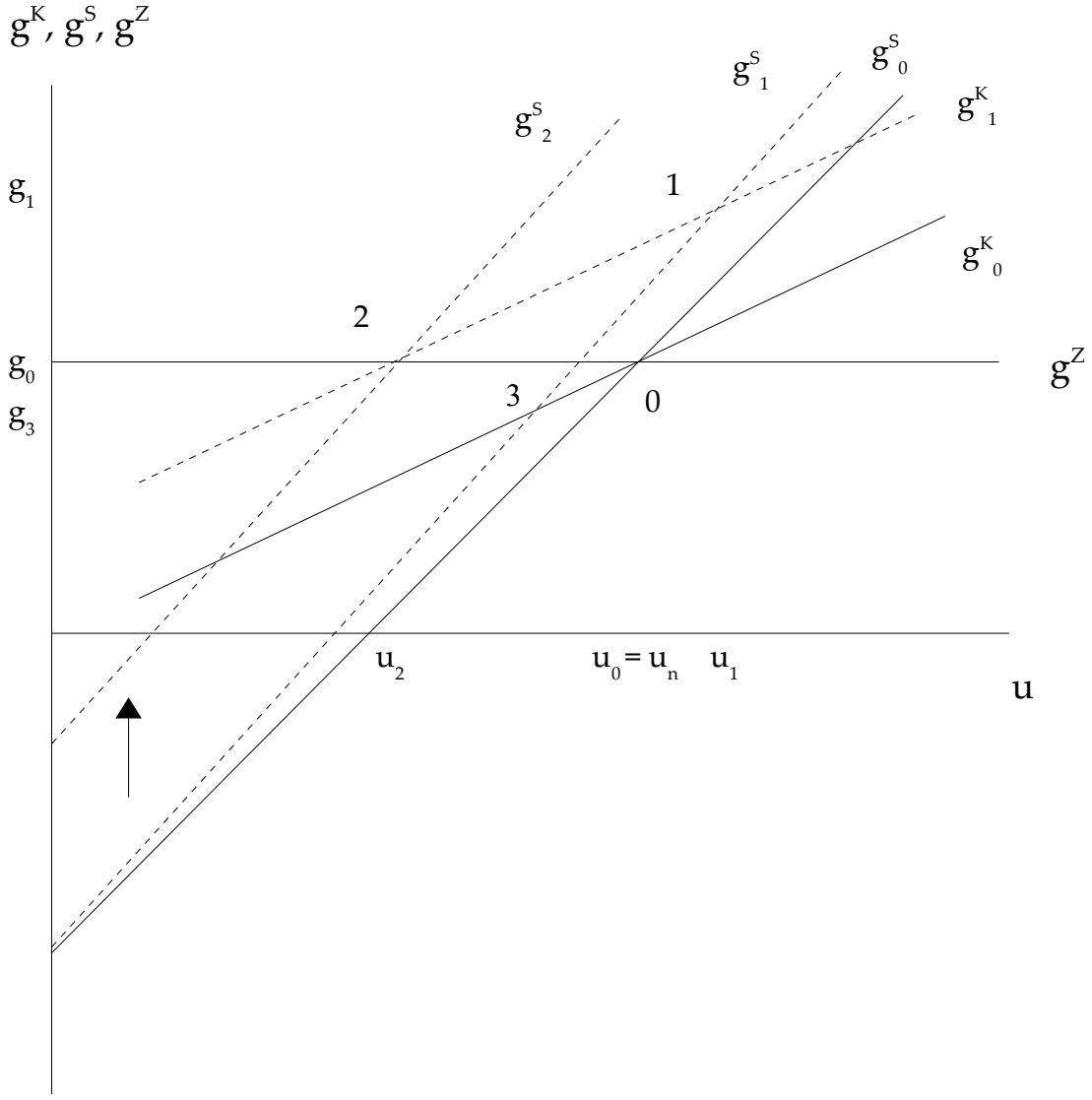

Figure 2: The effects of an increase in the profit share in a Marglin-Bhaduri model with autonomous demand: the exhilarationist, profit-led case.

27 Lavoie (2013, p. 6) proves that the Keynesian stability condition – which is assumed to hold here - guarantees that the Z/K ratio converges to a stable equilibrium value, which also implies the convergence of g^K to the exogenously given g^Z.

On this basis, it is now possible to reconsider the cases showed above in the Figure 1. Beginning with an economic regime that should be, according to the previous definitions and in a standard version of the model, exhilarationist for what concerns demand and profit-led for growth[28], we see that the short-run effect of an increase in the profit share is the displacement of the economy from 0 to 1, as it happened in Figure 1 in the passage from 0 to B. As it is possible to see from the Figure 2, as soon as new productive capacity is built, that is to say as soon as investment starts to produce its long-run effects, the economy no longer remains in 1. In fact $g_1 > g^Z$ implies that the ratio of Z over the stock of capital gradually decreases and the g^S curve starts to shift upward, until the new equilibrium point 2 is reached, where again $g^K = g^S = g^Z$. Unless the variation in income distribution is capable of modifying g^Z, the rates of growth and accumulation of the economy are not affected. Besides, it may be useful to recall that in Neo-Kaleckian models capacity utilization is the adjusting variable of any exogenous shock and, if the equilibrium level for capacity utilization is different from u_n, there is no attempt to restore a normal level of utilization. Given this, in spite of having classified the model as exhilarationist – an increase in the profit share should cause an increase in the equilibrium degree of capacity utilization - according to the Marglin-Bhaduri terminology, the economy ends up, after the increase in Π, in a position of rest in which the equilibrium degree of capacity utilization is lower than in the starting point.

It should be noticed that the expansion of investment decided by capitalists after an increase in their income share goes against their own interests.[29] If, in fact, they did not shift their accumulation function, the

28 This implies that, after an increase in the profit share, we should expect a rise in the equilibrium level of *u* and an accelerating growth.

29 The argument works also in the case of a reduction of the profit share, in an analogous economic regime. Assuming that in the initial position capacity utilization is at its normal,

economy would move towards the intersection of g^K_0 with g^S_1 (point 3). But in this position $g_3 < g^Z$ and the g^S curve would shift downward until the economy is back in 0, where the rate of profit is higher[30] than in 2 and production is carried on at the desired level of capacity utilization.

The same exercise can be repeated for an economy characterized by a stagnationist demand regime and a profit-led growth/investment regime, as case A in Figure 1. Once again, the short-run effect of an increase in the profit share is the displacement of the economy, in Figure 3, from 0 to 1, analogously to the movement from 0 to A in Figure 1. When investment begins to deploy its capacity-building effects, the economy moves gradually from 1 to 2 and capacity utilization suffers a further decrease, as it is shown in Figure 3.

Given that:

$$\dot{u} = u(g^Y - g^K) \tag{11}$$

the reduction in the equilibrium capacity utilization is perhaps less surprising than in the case depicted in Figure 2, considering that in the transition from 0 to 1 total demand and the accumulation rate move in opposite direction, with the first one decreasing and second one increasing. The obvious result is that the capital endowment of the economy exceeds the productive requirements of firms, which have to run their plants at a sub-desired level. Furthermore, as in the previous case, the rate of accumulation tends to equalize the exogenously given g^Z.

---

desired level, if capitalists react to a decrease in Π shifting down their accumulation function, they will end up in a new equilibrium situation with a higher capacity utilization, which means short-run extra profits but that it is not optimal in the long-run, the time span relevant for the computation of the normal degree of capacity utilization.

30 See equation (1).

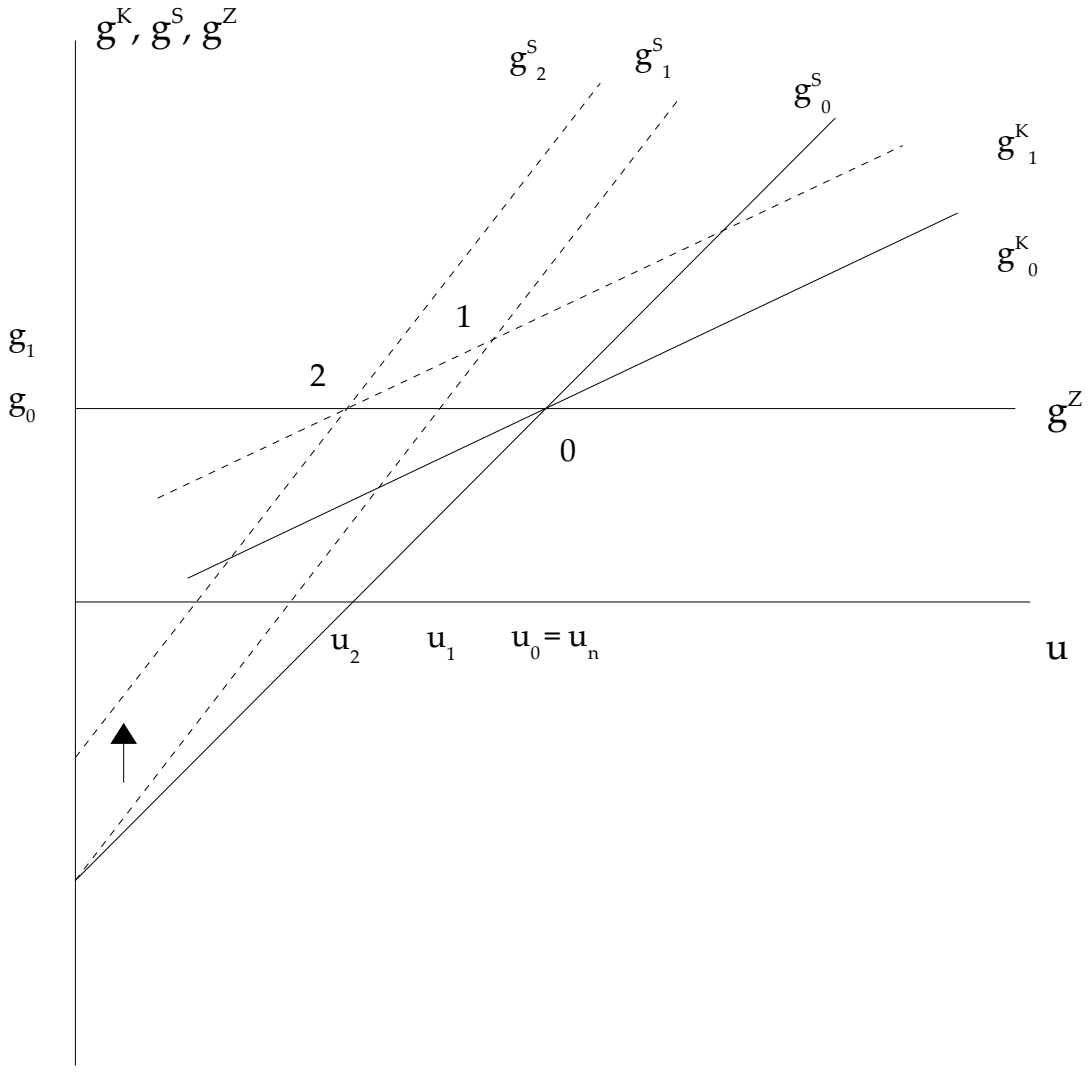

Figure 3: The effects of an increase in the profit share in a Marglin-Bhaduri model with autonomous demand: the stagnationist, profit-led case.

Let us finally analyze the case of an economy characterized by a consumption function very sensitive to income distribution and by an accumulation function that reacts more to *u* than to the profit share. This would give rise, in the original case, to a stagnationist regime for demand and to a wage-led regime for growth and investment (the case C in Figure 1).

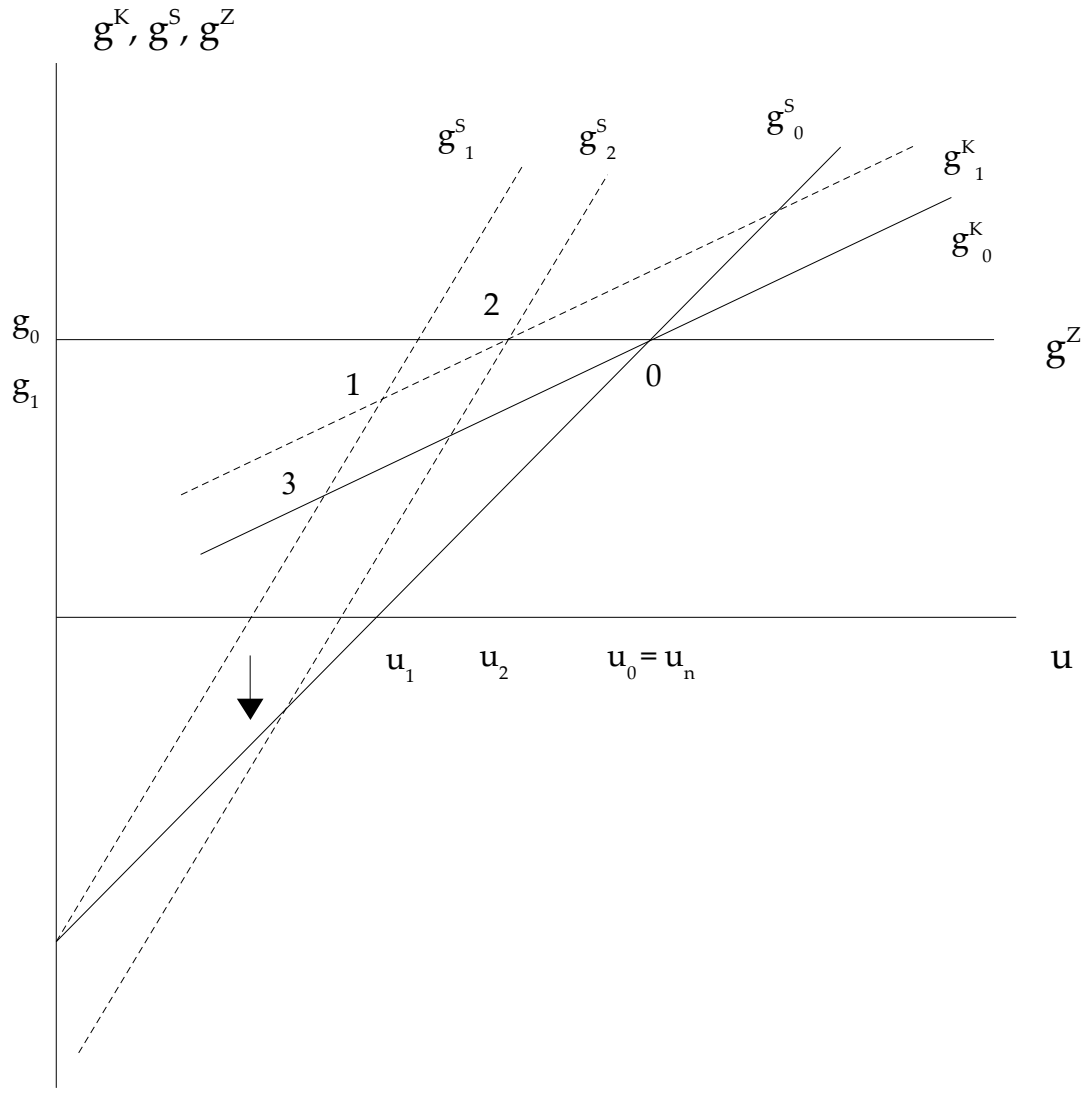

Figure 4: The effects of an increase in the profit share in a Marglin-Bhaduri model with autonomous demand: the stagnationist, wage-led case.

In the augmented version of the model adopted in this section, with Z into play, the increase in the profit share leads, in Figure 4, to a position - 2 - that is still stagnationist (the equilibrium degree of capacity utilization is reduced). However, with respect to the case depicted in Figure 3, the negative impact on *u* is relatively smaller, given that the accumulation of capital and aggregate

demand move, in the transit from 0 to 1, in the same direction, negative in the case under observation. Nonetheless, the fact that the g^K curve shifts upward makes the reduction in investment less than proportional to the reduction in aggregate demand, with the result that $u_2 < u_0$. On the contrary, if the accumulation function remained the original one, that is to say if capitalist did not positively react in the absence of a demand increase, the equilibrium degree of capacity utilization would be unaffected. Indeed, in this event the economy would move at first towards 3 and then come back to 0.

With the three examples above it has been shown that, if proper consideration is given to the existence of components of aggregate demand growing at a rate that is autonomous with respect to actual and expected income, a rate which is not arbitrarily assumed to be equal to the rate of capital accumulation and that is also largely independent from income distribution[31], the analysis of a shift in functional income distribution, beyond the simple short-run, impact effect, leads to different results with respect to the Marglin-Bhaduri's ones.

b. The investment function of the Marglin-Bhaduri model

If no longer can be assumed that the rate of accumulation and the rates of growth of aggregate demand and output always coincide, with the former rate determining the other two, investment growing faster than aggregate demand causes a fall in capacity utilization (and vice versa). Coming back to the example depicted in Figure 2 and starting from point 0, in which capacity is

31 As shown by Thirlwall (2011), a once-for-all variation in the wage level, with the subsequent change in the real exchange rate, caused by the variation in the internal price level, is not capable of affecting permanently the rate of growth of exports, one of the components of Z, but only of generating a once-for-all shift in their level.

utilized at its desired, normal level, the increase in Π is assumed to have expansionary effects on demand, given a supposed positive impact on investment larger than the negative impact on consumption, so we get to point 1. In this way productive capacity grows for a while more than proportionally to aggregate demand and output, due to negative effects on consumption and to the presence of the autonomous components that, in principle, are not affected by the expansion of investment. As a result, after that the saving function has completed its adjustment through variations in the Z/K ratio, the economy ends up in a position such 2, in which firms have endowed themselves with more productive capacity than the one required to meet aggregate demand at the target degree of utilization. But there are not good reasons to expect such accumulation behavior from capitalists and, given the analogous results of Figures 3 and 4, it seems possible to cast some doubts about the model's aggregate investment function, in particular on an independent influence of the profit share.

A similar argument was developed, several decades ago, by Josef Steindl:

> if an industry raises its rate of profits, then it will in fact tend to a lower degree of utilisation, because the incentive of the higher profit rate will make it expand more quickly in the first instance. The reduced utilisation, however, will discourage investment, and at some point, this discouraging effect will outweigh the stimulating effect of the increased profit rate, so that industry will again expand at its previous rate, and thus avoid a *further* fall in utilisation
>
> (Steindl, 1952, p. 131, italics added)

In his influential 1952 book, the Austrian economist, who accepts the dependence of investment on the profit rate, points out that, if this distributive variable increases, *u* will decrease. To avoid this problem, Steindl argues, the profit margin should be elastic and react to possible discrepancies between *u* and u_n (Steindl, 1952, p. 134). Its argument runs as follows: if, for any reason, the rate of growth of capital increases above the rate of growth of aggregate demand (for example because of an increase in the profit share, with the corresponding upward shift in the g^K curve in the previous figures), the only way to keep utilization stable at its desired level is through a self-correcting reduction in the profit margin, or mark-up in the Kaleckian literature, to counteract the previous positive stimulus. Given that, in Steindl's opinion, this elasticity of the profit margin is not likely to occur, capitalists' own behavior leads to an undesired reduction in the degree of capacity utilization.

It appears possible to agree with the Austrian economist's argument, according to which an increase in the accumulation rate, stimulated by a rise in the profit share and not justified by an expected increase in aggregate demand, leads to over-accumulation. However, the premise (the accepted dependence of I on Π) which leads Steindl to consider these undesired variations in *u* as necessary and unavoidable, seems disputable. On the other hand, it appears more reasonable to argue that capitalists, being aware of the eventual negative[32] effects of a rise in investment not matched by a correspondent increase in demand, will not react at all to an increase in their profit share.

A counterargument could be raised: at least in a regime that is both profit-led and exhilarationist, if we imagine for example an increase in Π, the initial increase in investment overcomes the negative impact on consumption

32 Negative not in general terms but for their own interests.

and triggers, through the multiplier, an aggregate increase in demand that might confirm the logic of the previous acceleration in capital accumulation. But this generates some doubts about the behavioral assumptions behind this conduct: either capitalists behave as imagined by Tugan-Baranovsky[33], according to whom investors do not perceive aggregate demand as a constraining factor as long as aggregate investment itself is high enough and "*machines were to produce machines for production of machines*" (Kalecki, 1967, p. 458) or they have a strong background in Keynesian theory and are confident that their first move will activate a suitable multiplier-driven reaction in consumption. Both cases seem not particularly compatible with the decentralized, competitive nature of capitalism. Anyway, even neglecting these perplexities, the final result is an over-endowment of capital stock - as it has been shown in Figure 2 - which depresses further investment and the realized profit rate and that would require a reduction in investment for several periods, in order to restore a desired level of capacity utilization.

Considering the other Marglin and Bhaduri's argument that some firms can be constrained in the amount they can borrow, due to low internal funds, and are not able to undertake investment projects, this does not imply that other firms, including new entrants, could not provide the investment necessary to meet demand requirements.[34] The neglect of capitalist competition appears as another weakness of the theorized investment behavior: if, independently from the actual profit share or even in the case of a reduction of it, capitalists do not take the opportunity given by an expansion of demand,

33 Sardoni (2015, pp. 151-152) provides a detailed discussion of the implausible outcomes and of several weaknesses of Tugan-Baranovsky's analysis. On Kalecki on Tugan-Baranovsky see also Cesaratto (2013), section 4.

34 See Petri (1993).

they will simply observe a reduction in their market share[35], in favor of competitors willing to satisfy the demand coming from the customers able to pay the normal prices.[36]

To summarize, in spite of Marglin and Bhaduri's claims, at the aggregate level capitalists cannot just assume that their output can be sold (Marglin and Bhaduri, 1990, p. 173), cannot all together simply be "*confident of their ability to sell extra output*" and cannot overlook "*whether or not they can sell additional output*" (ibid., p. 168).

Moreover, the interpretative power of the taxonomy introduced in table 1 is somehow downscaled: growth is neither wage nor profit-led, while the exhilarationist demand regime, defined as in Marglin and Bhaduri (1990), is no longer a feasible option. As shown in Figures 2-4, if the investment behavior is defined by equation (3), an increase in the profit share always leads to a reduction in the equilibrium degree of capacity utilization.[37]

It seems possible to argue that, for a more satisfactory treatment of aggregate investment in a baseline model of accumulation and distribution, two paths are open: if a significant impact of variations in the profit share on investment is maintained, then a second-stage process of adjustment of the productive capacity to the long period level of demand must be modelled and discussed as well. In this case, the profit sensitivity would be ephemeral and temporary and it would be counteracted by firms' attempt to restore an adequate endowment of capital stock. As it is well known, this is not what

35 See Serrano (2004), in particular p. 14.

36 The prices, according to Serrano (2004, p. 14) that "allow firms to obtain the normal rate of profits, which defines the minimum accepted standard of profitability".

37 From simple computations, it is possible to see that the equilibrium degrees of capacity utilization of Figures 2-4 are given by $u_2 = (g^Z - \alpha - \gamma\Pi)/\beta$. For a formal analysis, see the sub-section below and Lavoie (2013).

happens in Neo-Kaleckian models[38], where the equilibrium degree of capacity utilization bears the brunt of the equalization between investment and savings and it is, in principle, free to range between zero and full utilization. In this respect, the Marglin-Bhaduri version of the Neo-Kaleckian model presents the supplementary problem that not only production is carried over persistently at a level of *u* different from the desired one, but entrepreneurs exacerbate actively this situation with their deliberate investment behavior.

Given these difficulties, an alternative approach would regard investment as exclusively induced, depending on expected demand[39] (that forthcoming at normal prices) and quite insensitive to income shares. As Garegnani put it over fifty years ago[40], to argue the exclusion of the rate of profit from his analysis of the determinants of investment,

> The rate of profit on new investments appears not to be a factor that influences investment independently of the two factors mentioned in the text (*Garegnani is referring to demand expansion and technical innovation)*; it seems, rather, to be how the influence of those two factors manifests itself. Thus, if there is an increase in final demand, entrepreneurs will anticipate being able to sell additional quantities

38 For a detailed discussion, see for example Hein, Lavoie and van Treeck (2011, 2012), Skott (2012) and Cesaratto (2015). A relevant exception of a Post-Keynesian model with an equilibrium normal degree of capacity utilization is represented by the older models of growth and distribution based on the Cambridge Equation. For a discussion of the weaknesses of these models, see Ciccone (1986).

39 This conclusion is independent from the existence or not of a mechanism assuring that expectations will be fulfilled in the long-run and/or that the long period equilibrium will be characterized by a normal utilization of productive capacity and whether or not this equilibrium will be dynamically stable. For a detailed discussion of arguments in favor of the feasibility of a long-run, demand-driven stable equilibrium with $u = u_n$ and with growth led by the autonomous components of demand, see for example Freitas and Serrano (2015).

40 The original reference is Garegnani (1962), recently translated in English and published as Garegnani (2015).

> of goods at current or higher prices, and investment will appear to be profitable, whereas it would not appear so without the increase in final demand … In the economy as a whole, therefore, the total amount of profits, and hence of undistributed profits, will depend on the level of investment rather than vice-versa.
>
> (Garegnani, 2015, pp. 11-12)

This appears confirmed by the findings of the most recent empirical contributions in the wage-led/profit-led literature. For example Onaran, Stockhammer and Grafl (2011) find that "*there is no long-run relationship between the profit share and investment*" (p. 649), Stockhammer, Hein and Grafl's (2011) results show "*a statistically insignificant effect of profits on investment*" (p. 8) and Onaran and Galanis' (2012) that "*the profit share has no statistically significant effect on investment*" (p. 17).

c. A simple, formal analysis of a Marglin-Bhaduri model with autonomous demand

It is possible to summarize the arguments presented in the subsections 2.a and 2.b by means of a simple, formal analysis of a Marglin-Bhaduri model, integrated with an explicit consideration of the autonomous components of demand. For this purpose, I will rely on an analogous exercise, performed in Lavoie (2013), where the properties of a Neo-Kaleckian model[41] of growth and distribution with autonomous demand are illustrated and discussed.

41 With this term, I am referring to a model whose accumulation function is described by $g^K = \alpha + \beta(u - u_n)$.

We can begin from the IS condition (9) - $g^K = s(\Pi)\frac{u}{v} - \frac{Z}{K} = g^S$ - introduced above and given by the equalization of the accumulation function (6) - $g^K = \alpha + \beta u + \gamma\Pi$ – and the saving function with autonomous demand $g^S = s(\Pi)u/v - Z/K$. Assuming an increase in the profit share, from Π to Π_1, I solve (9) for the short-run equilibrium degree of capacity utilization, which corresponds to the positions u_1 of the Figures 2, 3 and 4. I obtain:

$$u_1 = \frac{\alpha + \gamma\,\Pi_1 + Z/K}{s(\Pi_1)/v - \beta} \tag{12}$$

I have already noticed that, independently from the specific economic regime, the economy moves away from u_1 as soon as investment starts to produce its long-run effects and the new capital stock is installed. Indeed, the Z/K ratio varies continuously so long as the rate of accumulation and the exogenously given rate of growth of Z diverge, through the law of motion (10) - $\left(\frac{\dot{Z}}{K}\right) = \frac{Z}{K}(g^Z - g^K)$ - which can be expressed as:[42]

$$(\hat{Z/K}) = \frac{(\dot{Z/K})}{(Z/K)} = g^Z - (\alpha + \beta\, u_1 + \gamma\, \Pi_1) \tag{13}$$

Consistently with what Lavoie (2013) finds for the Neo-Kaleckian model with autonomous demand, it is possible to prove that the derivative of $(\hat{Z/K})$ with respect to (Z/K) is always negative, if the Keynesian stability condition holds.[43] As discussed above, this is the case for the Figures 1-4 and it amounts to say that the denominator of (14) – $s(\Pi_1)/v - \beta$ - is greater than zero:

$$\frac{d(\hat{Z/K})}{d(Z/K)} = \frac{-\beta}{s(\Pi_1)/v - \beta} < 0 \tag{14}$$

42 See Lavoie (2013, p. 6).

43 As Freitas and Serrano (2015) notice, this assumption, usually labeled in the Neo-Kaleckian literature as Keynesian stability, is equivalent to maintain that output is demand-determined.

From condition (14), it derives that the ratio of Z over K converges to a stable equilibrium value.[44] This also implies that the rate of accumulation converges to g^Z, as it happens in the Figures 2-4, where the economy is shown to tend to the positions labeled with 2, described by (u_2, g^Z). From $g^K = g^Z$, it can be easily found that:

$$u_2 = \frac{g^Z - \alpha - \gamma \Pi_1}{\beta} \tag{15}$$

from which it can be concluded that, if the investment behavior is described by a function like equation (6) and a positive influence of the profit share is maintained, any increase in the latter leads to a reduction in the equilibrium degree of capacity utilization. In the Marglin-Bhaduri's terminology, this means that the economy is always stagnationist.

Conclusions

The proponents of the Marglin-Bhaduri approach praise the model for its supposed elasticity and capability of being able to provide various scenarios and regimes but, as I have attempted to argue in the present essay, this elasticity is to some extent artificial and depends on an implausible investment function. Moreover, the model neglects the existence of components of aggregate demand other than induced consumption and investment. Once these components are properly considered – where *properly* implies that they are not arbitrarily assumed to grow at the rate of capital accumulation, as it is done in some Neo-Kaleckian literature – it is possible to stress more clearly the weaknesses of the investment function.

44 If Z/K increases (decreases), its rate of growth decreases (increases), until the latter approaches 0.

It has been proved, by means of a simple graphical analysis, that the consideration of autonomous demand allows capacity and output to grow, during the disequilibrium adjustments, at different rates. On this basis, I have claimed that a rise in investment simply motivated by an increase in capitalists' income share generates an accumulation temporarily faster than the growth of aggregate demand and output. This implies an over-endowment of capital, which means producing the quantities demanded at a degree of capacity utilization inefficiently low. For this reason, I have raised doubts about an independent and persistent influence of the profit share or the profit rate on the aggregate investment behavior. Indeed the contingent existence, in the investment function, of a factor of permanent disturbance of the process of adaptation of the productive capacity to aggregate demand and output would simply lead to a production permanently and deliberately carried over with an unsatisfactory endowment of capital. This aspect transcends the standard critique, raised to Neo-Kaleckian models of growth and distribution, of the non plausibility of a steady-state equilibrium with a level of capacity utilization different from its normal level. If in that case the entrepreneurs' problem was one of passivity – the lack of reaction to an equilibrium level of u different from u_n - in the circumstance under discussion here capitalists contribute, with their own active investment behavior, to an outcome negative for their own interests. This allows us to conclude that it would appear preferable not to include functional income distribution among the arguments of the aggregate investment function, which has to be considered dependent on the expected rate of growth of aggregate demand.

I am very grateful to Sergio Cesaratto, Ariel Dvoskin, Daniele Girardi, Fabio Petri and Rafael Wildauer for useful suggestions, comments and remarks. It goes without saying that the remaining errors are entirely my own.

References

Allain, O. (2014), 'Tackling the instability of growth: a Kaleckian-Harrodian model with an autonomous expenditure component', *Cambridge Journal of Economics*, doi:10.1093/cje/beu039.

Amadeo, E. J. (1986), 'The role of capacity utilisation in long-period analysis', *Political Economy*, **2** (2), 147-185.

Bhaduri, A. and S. Marglin (1990), 'Unemployment and the real wage: the economic basis for contrasting political ideologies', *Cambridge Journal of Economics*, **14** (4), 375-393.

Blecker, R.A. (2002), 'Distribution, demand and growth in neo-Kaleckian macro-models', in Setterfield, M. (ed.), *The Economics of Demand-led Growth*, Cheltenham: Edward Elgar, pp. 129-152.

Bowles, S. and R. Boyer (1995), 'Wages, aggregate demand and employment in an open economy: an empirical investigation', in Epstein, G.A. and H. Gintis (eds.), *Macroeconomic policy after the Conservative Era*, Cambridge: Cambridge University Press, pp. 143-171.

Cardoso, M. and E. Crespo (2014), 'Some critical appraisals on the profit-led models of growth', *Circus*, **6**, 98-113.

Cavalieri, T., Garegnani, P. and M. Lucii (2004), 'Anatomia di una sconfitta', *La Rivista del Manifesto*, **48**, 44-50.

Cesaratto, S. (2013), 'Beyond Harrod: lecture notes on orthodox and heterodox growth theories', unpublished lecture notes.

Cesaratto, S. (2015), 'Neo-Kaleckian and Sraffian Controversies on the Theory of Accumulation', *Review of Political Economy*, **27** (2), 154-182.

Ciccone, R. (1986), 'Accumulation and capacity utilisation: Some critical comments on Joan Robinson's theory of distribution', *Political Economy*, **2** (1), 17-36.

Freitas, F. and F. Serrano (2013), 'Growth, distribution and effective demand: the supermultiplier growth model alternative', mimeo.

Freitas, F. and F. Serrano (2015), 'Growth rate and level effects, the stability of the adjustment of capacity to demand, and the Sraffian Supermultiplier', *Review of Political Economy*, forthcoming.

Garegnani, P. (1978), 'Notes on consumption, investment and effective demand: I, *Cambridge Journal of Economics*, **2** (4), 335-353.

Garegnani, P. (2015), 'The problem of effective demand in Italian economic development: on the factors that determine the volume of investment', *Review of Political Economy*, doi:10.1080/09538259.2015.1026096.

Hein, E. (2012), 'Finance dominated capitalism, capital accumulation and macroeconomic regimes', in Hein, E., *The Macroeconomics of finance-dominated capitalism – and its crisis*, pp. 36-65.

Hein, E., Lavoie, M. and T. van Treeck (2011), 'Some instability puzzles in Kaleckian models of growth and distribution: A critical survey', *Cambridge Journal of Economics*, **35** (3), 587-612.

Hein, E., Lavoie, M. and T. van Treeck (2012), 'Harrodian instability and the "normal rate of capacity utilization" in Kaleckian models of distribution and growth – A survey', *Metroeconomica*, **63** (1), 139-169.

Hein, E. and A. Tarassow (2010), 'Distribution, aggregate demand and productivity growth: theory and empirical results for six OECD countries based on a Post-Kaleckian model', *Cambridge Journal of Economics*, **34** (4), 727-754.

Hein, E. and L. Vogel (2008), 'Distribution and growth reconsidered – empirical results for six OECD countries', *Cambridge Journal of Economics*, **32** (3), 479-511.

Kaldor, N. (1955-56), 'Alternative theories of distribution', *The Review of Economic Studies*, **23** (2), 83-100.

Kalecki, M. (1967), 'The problem of effective demand with Tugan-Baranovsky and Rosa Luxemburg', in Osiatinyński, J. (ed.), (1991), *Collected works of Michał Kalecki vol. II*, Oxford: Clarendon Press, pp. 451-458.

Kurz, H.D. (1986), 'Normal positions and capital utilisation', *Political Economy*, **2** (1), 37-54.

Lavoie, M. (2011), 'History and methods of Post-Keynesian economics', in Hein, E. and E. Stockhammer (eds.), *A modern guide to Keynesian macroeconomics and economic policies*, Cheltenham: Elgar, pp. 1-33.

Lavoie, M. (2013), 'Convergence towards the normal rate of capacity utilization in Kaleckian models: a Sraffian mechanism', paper drawn from *New Foundations of Post-Keynesian Analysis* (book in progress).

Lavoie, M. and E. Stockhammer (2012), 'Wage-led growth: concept, theories and policies', ILO Conditions of work and employment series, no. 41.

Lavoie, M. and E. Stockhammer (eds.), (2014), *Wage-led Growth: An equitable strategy for economic recovery*, Geneva: International Labour Office.

Marglin, S. and A. Bhaduri (1990), 'Profit squeeze and Keynesian theory', in

Marglin, S. and J. Schor (eds), *The Golden Age of capitalism: reinterpreting the postwar experience*, Oxford: Clarendon, pp. 153-186.

Onaran, Ö. and G. Galanis (2012), 'Is aggregate demand wage-led or profit-led? National and global effects', ILO Conditions of work and employment series, no. 40.

Onaran, Ö., Stockhammer, E. and L. Grafl (2011), 'Financialisation, income distribution and aggregate demand in the USA', *Cambridge Journal of Economics*, **35** (4), 637-661.

Palley, T.I. (2014), 'Rethinking wage vs. profit-led growth theory with implications for policy analysis', IMK working paper 141-2014.

Pérez Caldentey, E. and M. Vernengo (2013), 'Wage and Profit-led Growth: the limits to Neo-Kaleckian models and a Kaldorian proposal', Levy Economics Institute of Bard College working paper no. 775.

Petri, F. (1993), 'Critical notes on Kalecki's theory of invesment', in Mongiovi, G. and C. Rühl (eds.), *Macroeconomic Theory: Diversity and convergence*, Aldershot: Elgar, pp. 189-207.

Rowthorn, R. (1981), 'Demand, real wages and economic growth', *Thames Papers in Political Economy*, 1-39.

Sardoni, C. (2015), 'Is a Marxist explanation of the current crisis possible?', *Review of Keynesian Economics*, **3** (2), 143-157.

Serrano, F. (1995), 'Long period effective demand and the Sraffian Supermultiplier', *Contributions to Political Economy,* **14**, 67-90.

Serrano, F. (2004), 'Power relations and American macroeconomic policy, from Bretton Woods to the floating dollar standard', in Fiori, J.L. (ed.), *O Poder Americano*, Petrópolis: Editora Vozes, pp. 1-43.

Shaikh, A.M. (2009), 'Economic policy in a growth context: A classical synthesis of Keynes and Harrod', *Metroeconomica*, **60** (3), 455-494.

Steindl, J. (1952), *Maturity and stagnation in American capitalism*, Oxford: Blackwell.

Stockhammer, E., Hein, E. and L. Grafl (2011), 'Globalization and the effects of changes in functional income distribution on aggregate demand in Germany', *International Review of Applied Economics*, **25** (1), 1-23.

Stockhammer, E., Onaran, Ö. and S. Ederer (2009), 'Functional income distribution and aggregate demand in the Euro area', *Cambridge Journal of Economics*, **33** (1), 139-159.

Stockhammer, E. and Ö. Onaran (2012), 'Wage-led growth: theory, evidence, policy', PERI working paper series, no. 300.

Thirlwall, A.P. (2011), 'Balance of payments constrained growth models: history and overview', *PSL Quarterly Review*, **64** (259), 307-351.