The dependence of growth on the profitability of capital in the Kaleckian literature: a critical evaluation

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The dependence of growth on the profitability of capital in the Kaleckian literature: a critical evaluation

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Abstract

Kaleckian models can be considered as the most relevant set of theoretical works which study growth as a demand-led phenomenon. In these models, the pace of accumulation depends on demand expansion and on different measures of capital profitability. The relevance of the latter is generally assumed without any in-depth scrutiny of theoretical principles. This article identifies the theoretical underpinnings of this alleged dependence and reconsiders and develops the criticisms of them which can be found in the literature. This analysis leads to argue that this fundamental assumption of the Kaleckian models is not sufficiently argued as much as its cruciality would require.

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JEL codes: E11; E22.

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1. Introduction

In the scientific literature that studies economic growth as determined by the expansion of demand, one of the dominant approaches is the neo or post-Kaleckian, which is largely based on some principles attributed to the contribution of Michal Kalecki. A crucial assumption in all the works that share this approach is that investment, and therefore of the rate of growth of the stock of capital, depend on the expansion of aggregate demand *and* on a measure of investment profitability which varies in different models. The various investment functions and, more importantly, the diverse measures of profitability considered within them, are the element that distinguishes two categories of models that we call first-generation and second-generation models [1]. They essentially differ for the conclusions drawn about the impact of variations in income distribution on capacity utilization and the pace of capital accumulation (for a comprehensive illustration of Kaleckian models, refer to Lavoie, 2014, Chapter 6). Therefore, studying the theoretical principles underlying the assumption of dependence of accumulation on capital profitability appears to be crucial. This work aims to consider this assumption.

To maintain our focus on this point, we will not delve into many other equally relevant issues, such as the limitations of the 'distribution theory' implicit in these models, nor the way in which the principle of the determining role of demand expansion in the growth process is interpreted in them.

To comprehend and engage in a critical discussion on the assumption of the accumulation rate depending on the profitability of investments, it is essential, above all, to examine the representation of the production process proposed in these models. This examination includes an exploration of the various magnitudes related to the return on investment employed in the models, which are assumed as arguments in the accumulation function. We will undertake this analysis in Sections 2 and 3. This will allow us, in Section 4, to consider two different categories of accumulation functions to which the various functions in the models can effectively be attributed.

We will then trace the theoretical justifications through which the connection between accumulation and capital profitability is asserted. The main arguments, as we will see, are those originally proposed by Kalecki and Joan Robinson. Considering these arguments allows us to articulate, better than is often done in Kaleckian literature, that each of the different theoretical

[1] The suggestion to employ the terms 'first-generation models' and 'second-generation models' is our own and solely indicates a chronological distinction between the two formulations. In the literature, these formulations are commonly referred to as neo-Kaleckian and post-Kaleckian models, respectively. The distinction between 'neo' and 'post' is neither thoroughly discussed nor easily comprehensible.

arguments used can be associated with a different notion of capital profitability among those implicit in Kaleckian models and often treated as equivalent.

Finally, we will consider critical arguments that highlight the weaknesses of the principles on which the assumed dependence of accumulation on capital profitability is based. Some of these arguments, present in the literature for many decades, have mostly been ignored in the debate on Kaleckian literature. They have never been refuted and seem to deserve attention.

2. Production in Kaleckian models

While differing in the accumulation function adopted in them, Kaleckian models are based on a common representation of production and income distribution. We refer to a model, directly derived from a simplification of the one proposed by Rowthorn (1981),[2] put forth by Lavoie (1995), who defines it as the *Canonical Kaleckian model*.

Common to all these growth models are numerous simplifying assumptions, to say the least, 'heroic': the existence of a single good, that serves both as a consumption good and a means of production, is generally assumed. Furthermore, this good is durable, in its role as a means of production, and there are no non-durable means of production. Depreciation is constant and equal to an annual fraction δ of the value of capital.

A *given* wage rate, w, in monetary terms, is assumed.[3] It is then assumed that, in addition to the single produced good, money exists. Consequently, even the single produced good will have a monetary price.

A fundamental relationship in these models defines the monetary value of production, which is the product of price (p) and quantity (q):

$$pq = wL + rpK + \partial pK \qquad [1]$$

This is equal to the sum of monetary wages paid (w multiplied by the quantity of labor, L), profits (the product of the profit rate r and the value of the capital used, pK), and depreciation of the capital used (the product of the depreciation rate δ and the value of the capital). Further simplifying assumptions concern labor: it is assumed that the product per worker, determined by the technology, remains constant.

[2] Originally proposed by Del Monte (1975), this representation was effectively popularized by Rowthorn (1981) and subsequently taken up in Dutt (1984) and Amadeo (1986), as well as in numerous other works, including those that, with a different accumulation function, would constitute the second generation of Kaleckian models.

[3] It is also assumed that this wage remains constant regardless of the quantity of labor used, which excludes cost increases when resorting to overtime or night shifts. This cost component is one of the most studied in the literature on determining the degree of utilization that minimizes unit production costs. See Trezzini and Pignalosa (2021) for reference.

$$y = \frac{q}{L} \quad [2]$$

In some models, it is assumed that the quantity of labor employed is a linear function of the output level, without fixed labor (overhead labor). We adopt this analytically simpler formulation.

It is important to note that these simplifying assumptions have significant implications for the behavior of production costs and the profitability of invested capital.[4]

The utilization degree, u, is defined as the ratio of the quantity produced, q, over the *maximum* quantity that can be produced, q^{fc}:

$$u = \frac{q}{q^{fc}} \quad [3]$$

The production technique is identified with the capital/output ratio of full capacity utilization:[5]

$$k = \frac{K}{q^{fc}} \quad [4]$$

The monetary value of one unit of output is:

$$\frac{pq}{q} = \frac{wL}{q} + \frac{rpK}{q} + \frac{\delta pK}{q} \quad [5]$$

which can be rewritten as:

$$p = \frac{w}{y} + \frac{rpk}{u} + \frac{\delta pk}{u} \quad [6]$$

r and u are the only variables. Rearranging gives:

$$\frac{rpk}{u} = p - \frac{w}{y} - \frac{\delta pk}{u} \quad [7]$$

We can then divide by p:

$$\frac{rk}{u} = 1 - \frac{w}{py} - \frac{\delta k}{u} \quad [8]$$

The actual (or realized) profit rate can be represented as a function of the utilization rate:

[4] In summary, when taken together, these assumptions imply that unit costs decrease with increasing utilization. The only costs incurred are, in fact, those related to labor and fixed capital. The assumptions of constant labor productivity, the absence of overhead labor, the absence of wage differentials for overtime (see footnote 3) imply that labor has a consistent impact on the unit cost of the product.
The absence of circulating capital also implies the absence of other variable costs. The constancy of the depreciation rate, coupled with the implicit assumption of constant capital efficiency, implies that the cost of fixed capital consistently decreases, exerting a systematically diminishing influence on the unit cost of the product.
A slightly less simplified representation of production renders unit cost behavior considerably more uncertain. Labor costs may indeed encompass overhead labor expenses and result from hourly wages that vary with the number of hours worked. Variable costs for circulating capital can have divergent effects on unitary cost, contingent upon the type of circulating capital employed. The depreciation rate, which is certainly not independent of income distribution when considered in value, can also fluctuate due to the impact of wear and tear on capital, leading to contrasting implications for costs as utilization increases. The effects of all these factors on unit cost, and consequently on the profitability of employed capital, are indeed much less predictable than suggested by these overly simplified models.

[5] Usually, starting from Harrod (1939), in the literature on accumulation, the capital-output ratio that defines technology is referred to the desired or normal output level.

$$r = \frac{u}{k}\left(1 - \frac{w}{py}\right) - \delta = \frac{u}{k}\pi - \delta \qquad [9]$$

The second term within the parentheses is equivalent to the ratio of total wages to the monetary value of production:

$$\frac{w}{py} = \frac{wL}{pq} \qquad [10]$$

$\left(1 - \frac{w}{py}\right)$ represents, therefore, the share of gross profits in the product, which we define as π.

Equation [9] is an essential element in these models because it becomes an argument in both the savings function in terms of growth[6] and the accumulation function, that is, the two relationships that determine the equilibrium growth rate and the equilibrium utilization rate.

To follow our reasoning regarding the assumption of the dependence of the accumulation rate on capital profitability, we need to explicitly define certain relationships that are mostly implicit in this representation of production.

3. The distributive variables in Kaleckian models

It is important to clarify, albeit briefly, that in the Kaleckian literature, starting with Kalecki's work in 1938, the centerpiece of the theory of income distribution is the variable *m*, defined as *the degree of monopoly*. This is considered the significant variable for economic decisions and is determined by class conflict.

It is linked to and, in fact, derived from Kalecki's so-called *pricing theory*[7], according to which, under conditions of less than full capacity utilization, the monetary price is set by firms based on the marginal cost (generally assumed to be constant) and a mark-up θ, as per the following relationship:

$$p = (1 + \theta)\, c \qquad [11]$$

where *c* is the marginal cost.

Given the assumption of the absence of non-durable means of production, the sole variable cost is labor compensation, which entirely determines the marginal cost. The assumptions of constant monetary wages and constant labor productivity establish that the marginal cost is also constant.[8]

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[6] The locution 'saving function in terms of growth' refers to the ratio of savings, which is a function of the realized profit rate and the degree of capacity utilization (found in the numerator), to the amount of existing capital (found in the denominator). Consequently, it indicates the rate of accumulation that could be achieved with the entirety of existing savings.

[7] The ambiguity of the term is significant; within this literature, there is no theory of prices that explains the determination of relative prices. Instead, it assumes a rule by which firms establish monetary prices based on the monetary costs they incur, referred to as 'pricing theory'.

[8] In particular, the constant marginal cost is equal to the ratio of the monetary wage to labor productivity, *w/y*.

θ, the mark-up, is determined by the market power of firms and determines the difference between price and marginal cost. The latter, relative to the price, is defined as the 'degree of monopoly', m.

$$\frac{(p-c)}{p} = m \qquad [12]$$

from which the following can be derived:

$$m = \frac{\theta}{(1+\theta)} \qquad [13]$$

Kaleckian authors have a conflictual view of income distribution. The power of capitalists over workers is manifested in their ability to set, given monetary wages, monetary prices that include a higher or lower mark-up.

The critical considerations regarding the assumptions of the income distribution theory adopted by Kalecki and implicit in Kaleckian models are beyond the scope of this essay. However, we need to clarify an aspect of the reasoning that is important for our purposes: from equation 12, we can interpret the parameter *m*, the degree of monopoly, as the marginal share of profits in the value of output. When, in addition to all the extremely narrow assumptions made in the models, it is assumed that all labor is variable, this *marginal* share of profits in income also corresponds to the *average* share of profits in income, $m = \pi$. This assumption is done, as we are going to see, in Marglin and Bhaduri (1990), so in their models, the degree of monopoly, *m*, and the average share of profits in income, π, coincide.[9]

It is important to clarify that in cases where these two variables do not coincide, the variable that better represents the distribution theory originally proposed by Kalecki, and therefore the outcome of the conflict between workers and firms, is the degree of monopoly, *m*. This variable is univocally related to the mark-up, θ[10], and, unlike π, the bargaining power between workers and firms, it does not immediately change with variations in the level of capacity utilization."

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[9] Considering the existence of fixed labor, the profit share can instead be expressed as
$\pi = \frac{\theta}{1+\theta} - \frac{1}{1+\theta}\frac{f}{u} = m - \frac{1}{1+\theta}\frac{f}{u}$
where $f = \frac{L_f}{L^*_V}$ and L^*_v=q*/y n is the number of "variable" workers at full capacity and L_f represents fixed labor. The presence of fixed labor, therefore, is sufficient for there to be an increasing relationship between the share of profits and the rate of utilization.

[10] As we have seen in equation [13], $m = \frac{\theta}{(1+\theta)}$. Rewriting equation [9] assuming normal or desired utilization u^n,
$r^n + \partial = \frac{u^n}{k} m$
We can, therefore, associate - through a direct and univocal relationship - the degree of monopoly 'm' in the Kaleckian economy to the concept of the normal profit rate found in the classical political economy's theory of distribution. Both quantities are determined by distributive conflict. We can finally demonstrate the implicit relationship in the Kaleckian model between the actual profit rate and the normal profit rate: $r + \partial = \frac{u}{u^n}(r^n + \partial)$

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We can thus conclude that *m* is the magnitude that represents normal distribution, i.e., the effect of relative strength of the classes, and that the profit rate, r, that appears in Kaleckian models is a realized profit rate, which is the ratio of realized profits to the value of the capital stock.[12]

4. The accumulation functions in Kaleckian models

In the different Kaleckian growth models, the evolution of the aggregate productive capacity over time is studied through functions where the ratio between the level of investments and the capital stock - the rate of growth of capital or the rate of accumulation - is assumed to depend on the dynamics of aggregate demand, which determines a higher or lower degree of actual capacity utilization, and a measure of capital profitability. This assumption is the main characteristic of analyses, not only Kaleckian, in which growth is conceived as a demand-driven phenomenon.
Kaleckian authors, then, also introduce a relation between profitability of capital and accumulation. The interrelations between profitability, demand expansion and accumulation are a source of debate and disagreements among Kaleckian authors, which leads to different model formulations.

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[12] As evident from equation [9], r, in fact, varies with changes in the degree of capacity utilization. The narrow assumptions of these models imply that the relationship between the profit rate and the degree of utilization is monotonically positive. We have seen that when there is fixed labor, the profit share is in a direct relationship with the actual utilization rate: $\pi = m - \frac{1}{1+\theta}\frac{f}{u}$. This direct relationship also influences the realized profit rate, which, in the presence of fixed labor, increases as utilization grows *not only* because it reduces the average fixed cost per capital *but also* because the incidence of fixed labor cost per unit of product decreases.
However, this direct relationship between the realized profit rate and capacity utilization is based on the set of simplifying assumptions of the models. The absence of circulating capital, the assumption of constant efficiency of durable means of production, as well as the absence of wage differentials for overtime or night shifts lead to the neglect of many circumstances that, in the literature, are seen as potential causes of possible increases in unit costs as utilization increases. The monotonic relationship between actual utilization and the realized profit rate seems far from representing reality and, from a logical perspective (see Kurz 1986), it appears to contradict the hypothesis that the normal level of utilization is the level that minimizes unit production costs and maximizes profits.

The theoretical justifications for the dependence of accumulation on capital profitability are generally the same in different models, even though they result in different formalizations of the accumulation functions, where we also encounter different notions of capital profitability.

To critically examine the theoretical foundations of the supposed dependence of accumulation on the profitability of capital, we can categorize the numerous accumulation functions found in Kaleckian literature into two main forms.

The first one is the one initially introduced by Rowthorn (1981, p. 12)[13] and subsequently adopted by Dutt (1984, p. 28), Taylor (1985, p. 6),[14] Blecker (1989, p. 398), and more recently, by Allain (2009, p. 86), and Hein (2016, p. 22):

$$g_i = \gamma + \gamma_u u + \gamma_r r \qquad [14]$$

with $[\gamma_u, \gamma_r] \gg \mathbf{0}$.

g_i represents $I/K = \Delta K/K$, which is the rate of capital stock growth net of depreciation. Often in these models, it is assumed that there is no depreciation of fixed capital, and therefore, gross and net investments coincide. Hence, in formulations where depreciation is assumed to be a constant fraction δ of the value of existing capital, it would be necessary to consider the numerator of this ratio as net investment.

γ represents a component of investments driven by the expectations of investors (the so-called "animal spirits" in the Keynesian tradition).[15]

γ_u and γ_r are the coefficients that measure the responsiveness of capital accumulation to changes in the utilization degree, u, and the profit rate, r, respectively. As shown in the previous sections the profit rate, r, defined as P/K, where P represents the amount of actual profits, and K is the stock of capital, is the *realized* rate of profit.

The profitability component of the accumulation function is accompanied, additively, by another component (sometimes referred to as the 'accelerator')[16], represented by a function of the degree of utilization of productive capacity.

Since Rowthorn's model in 1981, this accumulation function has been employed alongside a savings function *in terms of growth* to determine both the rate of growth/accumulation[17] and the

[13] Although equation [14] accurately reflects the function proposed by Rowthorn we use the symbols proposed by Lavoie (1995) describing the 'canonical Kaleckian model'.

[14] In Taylor's model, what influences investment is the difference between the profitability variable, i.e. the profit rate, and the real interest rate..

[15] For example, Hein (2014, pp. 248-9) writes: «it represents the complex historical, political and psychological factors affecting investment, for example the general business climate, the pressure of competition, long-run expectations, and so on». See also Lavoie (2014, p. 361), who points out that the parameter represents, among other things, the expected growth rate of sales. In Rowthorn's model, no assumptions are made about the sign of this parameter. Instead, Hein (ibid.) assumes its positivity.

[16] Blecker (2002, p. 133 and 168, note 16) writes that the positive effect of the degree of utilization on investment is the static version of the accelerator effect, which is the positive impact on investments due to the growth of output.

[17] In these steady-state models, the growth rate and accumulation rate coincide.

equilibrium degree of utilization. Like many Keynesian growth models, it is assumed that only profit earners save a portion of their income. Consequently, the savings rate is proposed as a function of the realized profit rate.

In the savings function *in terms of growth*, realized profits are expressed as a function of the degree of monopoly. First-generation Kaleckian models assume that a change in the degree of monopoly (or the mark-up from which it derives) modifies only the slope of the savings function, consistently exerting an inverse effect on the equilibrium values of the growth rate, accumulation rate, and the equilibrium level of the degree of utilization of productive capacity (an endogenous variable in these models). A change in the degree of monopoly, *m*, necessarily implies an inverse change in the level of real wages. These models imply, then, that a shift in distribution favouring workers always results in higher growth and higher capacity utilization.

In 1990, Bhaduri and Marglin proposed two contributions in which they criticized the Kaleckian models for positing a univocal relationship between growth and real wage rates. They argued that this relationship contrasts with the historical trends of developed economies.

This relationship, they argue, contrasts with the history of developed economies, where it is possible to identify both periods of increasing real wages associated with increases in the growth rate and periods when increasing wages have had the opposite effect.

Bhaduri and Marglin assert that the accumulation function in the first generation of Kaleckian models assumed the so-called 'strong accelerator effect,' illustrated using the Weisskopf decomposition (1979). In this decomposition, the realized profit rate, i.e., the ratio of realized profits to the value of existing capital, is expressed as follows:

$$r = \frac{P}{K} = \frac{P}{Y}\frac{Y}{Y^*}\frac{Y^*}{K} = \pi\frac{u}{v} \qquad [15]$$

This is the product of the profit share, the actual utilization degree, and the reciprocal of the capital-output ratio at full capacity utilization, which represents the technique of production.

Let's consider a scenario where there is no overhead labor and the profit share in income is then equal to the degree of monopoly, π = m. As argued, the latter, in these analyses, is considered determined by the relative strength of classes.

In this case, it is possible to imagine that an increase in *u* would have a positive effect on the rate of accumulation g_i, even when it occurs alongside a distribution change unfavorable to capitalists, i.e., a reduction in π (or, in this case, *m* or θ).

In [14], indeed,

$$g_i = \gamma + \gamma_u u + \gamma_r r$$

the positive effect of *u* on *g* is added to that of *r*. Furthermore, [15] also demonstrates that the change in *u* implies a change in *r*, and it is possible that the effect of an increase in u on *r* is positive

or zero even under conditions in which it is accompanied by a decrease in π (or m). It is also possible that, even if the joint change in u and π leads to a decrease in r, it is small and is balanced by the direct effect of u on g.

This apparent paradox arises from the fact that in the accumulation function à la Rowthorn, [14], the impact of the change in utilization is counted twice – a direct effect of u on g and an effect of u on r, thus influencing g. After clarifying the meaning of the distributional variables in these analyses, it becomes evident that what is referred to as the "*strong accelerator effect*" is due to the fact that the argument of the accumulation function is the *realized* rate of profit.

The economic significance of this critique, *which can be generalized beyond the case of Kaleckian models*, lies in the necessity to differentiate between the *normal* distribution and the *actual* distribution in theoretical analyses. The former is determined, in classical political economy—as in the theoretical framework derived from Kalecki—by distributive conflict, while the latter is also a consequence of the actual utilization of productive capacity, which is related to the level of demand and actual production.

The two authors address this distinction by introducing two different accumulation functions. It is easier to consider the one proposed in Bhaduri and Marglin (1990), which is:

$$I = I(\mathrm{m}, u) \qquad [16]$$

with $I_{\mathrm{m}}, I_u >> \mathbf{0}$.

I is the ratio between investment and full utilization output. The latter is a linear function of the capital stock. I, therefore, is in a direct relationship with the ratio between investment and the stock of capital. For the purposes of our discussion, it is not different from g_i used up to this point. m represents the degree of monopoly.

The accumulation rate is, therefore, a direct function of the degree of monopoly and the degree of utilization of productive capacity. However, in the case where an increase in the profit margin is accompanied by a reduction in the degree of utilization, the effect would be determined by the relative intensity of the two phenomena.

5. Theoretical arguments regarding the relationship between accumulation and capital profitability in Kaleckian models

In the Kaleckian literature, the positive relationship between accumulation and capital profitability is asserted without excessive analytical depth. This lack of precision is coupled with the absence, within this body of literature, of a clear and explicit distinction between the various

magnitudes that can be employed to measure the profitability of capital, as we have partially outlined.

However, it is possible to identify three lines of argument supporting the direct relationship between accumulation and the profitability of capital:

1. A direct relationship between accumulation and the *expected* rate of profit is assumed. However, it is also posited that a higher *realized* profit rate implies a higher *expected* profit rate, so the direct relationship exists between the *realized* rate of profit and the pace of accumulation.
2. A higher rate of profit makes more internal funds available for firms to use for self-financing investment decisions.
3. A higher rate of profit also facilitates firms' access to credit (external funds).

In Rowthorn (1981), the role of the current rate of profit in determining investment is treated as a matter of fact, to the extent that further explanations seem unnecessary. However, the passing reference appears to encompass all three lines of argument (pp. 11-12):

> There are several obvious reasons why current profits should influence investment. They are an indicator of future profitability, and they provide internal funds for accumulation; moreover, high profits make it easier for a firm to raise external finance. The level of capacity utilization is also likely to influence investment, both indirectly through its effect on profits and directly in its own right.

Similarly, Agliardi (1988, p. 284) rapidly refers to the second and third lines of argumentation, which he explicitly attributes to Kalecki:

> In Kalecki's approach the cost and availability of external funds depend on the profits of the firm, and especially the actual profitability of a firm has a strong influence on investment, both indirectly through enhancing the borrowing opportunities, and directly, as retained earnings.

Dutt (1984, p. 28) seems to argue along the first of the listed lines:

> The reason for the rate of profit entering as an argument in the investment function is by now well known, with the development of the neo-Keynesian theories of growth and income distribution.[18] [...] The *higher* the expected profit, the *greater the amount* of investment firms will want to undertake. For simplicity, expected and actual (current) average rates of profit are assumed equal.

Dutt appears to be, then. the first to propose the identification between the expected and realized profit rates as a 'simplifying' hypothesis.

Blecker (1989, p. 398) refers to all three lines of argument, also identifying the expected rate with the realized rate. Desired accumulation depends on expected profitability because profits are

[18] In Dutt (1984), there is a reference to the work of Robinson (1956) and Asimakopulos (1969, pp. 47-52), considered the theoretical origin of this function.

both the returns to investment and the primary source of finance for investment. Assuming static expectations, the expected profit rate is equal to the current profit rate, r.

Finally, Allain (2009) also appears to follow all three lines and identify the expected rate with the realized rate (p. 86, our translation from French):

> Three arguments justify the use of the current profit rate. First, since investment decisions are characterized by radical uncertainty, the current profit rate is an indicator of expected profit. Second, current profit is a source of self-financing of investment expenditures. Third, in *imperfect* financial markets, a substantial current profit facilitates access to credit. (emphasis added)

It is worth mentioning, moreover, a contribution that has often been cited as the one that established the literature based on Kaleckian models, namely the work of Alfredo Del Monte (1975). In this contribution, the author articulates both the arguments linking realized profits to investment financing and the dependence of investment on demand expansion.

> It must be considered that profits provide a large part of the funds for investment, and therefore an increase or decrease in the rate of profit is an indication to entrepreneurs of an increase or decrease in the possibility of financing new projects; the importance of the rate of growth, on the other hand, derives from the fact that a slowdown in it is an indication to entrepreneurs of a lower dynamic of productive activity and therefore they will become more cautious in initiating new investment projects, and vice versa in the case of an increase in it. (p. 237 our translation from Italian)

6. The origins of the Kaleckian authors' arguments: Robinson and Kalecki

The theoretical roots of the relationship between investment and the profit rate can be traced back to the works of Joan Robinson and Michal Kalecki. In the brief review that follows, we will see how both authors share elements that were later incorporated into the Kaleckian models.

6.1. Joan Robinson

The relationship between investment and profit, as posited by Joan Robinson, is biunivocal. Initially, the rate of accumulation is assumed to determine the rate of profit based on the relationships represented by the Cambridge Equation.

Studying steady-state paths with continuous normal capacity utilization, the rate of profit considered in the Cambridge Equation corresponds to both the notion of the *normal* and the *realized* rate of profit. Furthermore, the same methodological assumptions imply that the rate of profit determined by the Cambridge Equation is *persistent*. Aa a result, the rate of accumulation determines a rate of profit that is simultaneously *normal*, *realized*, and *expected*.

A positive influence of the rate of profit (in its three notions) on the rate of accumulation is also assumed (Robinson 1962, p. 47). The relationship between accumulation and the rate of profit is explained as follows:[19]

> To attempt to account for what makes the propensity to accumulate high or low we must look into historical, political and psychological characteristics of an economy; with that sort of inquiry a model of this kind cannot help us. It seems reasonably plausible, however, to say that, given the general characteristics of an economy, *to sustain a higher rate of accumulation requires a higher level of profits, both because it offers more favourable odds in the gamble and because it makes finance more readily available.* For purposes of our model, therefore, the 'animal spirits' of the firms can be expressed in terms of a function relating the desired rate of growth of the stock of productive capital to the expected level of profits (*ivi*, p. 38, emphasis added).

A higher rate of profit influences both financial availabilities, making finance more readily available, and profitability expectations, favoring more favorable odds in the gamble. The arguments found in the Kaleckian models thus appear to directly stem from these positions. However, it is important to note that in this and other passages, Robinson seems more cognizant of the complexity involved in arguing for a simple, general accumulation function of the rate of profit.

In the quoted passage, there is a clear reference to the difficulty of representing the historical, political, and psychological characteristics that undoubtedly influence investment in terms of a functional relationship. As mentioned, the fact that in the Cambridge equation *normal* and *realized* rates of profit coincide and are *persistent* makes the identification of the expected rate with the realized rate less critical. Finally, the author argues in several passages that identifying the expected rate of return governing investment decisions is very difficult. And, indeed, in a well-known passage from Robinson (1956) on p. 192, she writes: «*In reality, to find the expected rate of return which governs investment decisions is like the famous difficulty of looking in a dark room for a black cat that probably is not there*».

6.2 Kalecki: the principle of increasing risk

The author we cannot fail to reference in our reconstruction of the arguments in favor of the relationship between investment and profits is Michal Kalecki. It is well known that Kalecki, upon his arrival at the University of Cambridge in the late 1930s, had a profound influence on many economists, particularly Joan Robinson. [20] She, in turn, influenced the subsequent generation of

19 Joan Robinson's contribution to the theory of accumulation and distribution can be traced back to the tradition of the so-called Cambridge equation. We will not delve into models based on that equation in this paper. Our exclusive focus is on the direction of causality from profits to investment, sometimes also employed in these models. For a more general critique of the Cambridge equation, we direct the reader to Vianello (1985), Ciccone (1986), and Garegnani (1992), who also criticize the assumption of continuous normal use underlying the analysis. Rowthorn's analysis is also rooted in a (different) critical reading of the Cambridge equation.

20 Regarding this, see Asimakopulos (1989, pp. 10 ff.) and Pasinetti (2010, pp. 96 and 101).

Cambridge scholars, mainly Rowthorn and Del Monte, who developed the first Kaleckian models of growth.

In Kalecki's work, particularly emphasized in his 1954 publication, and akin to Joan Robinson's contributions, it is possible to identify the dual relationship between investments and profits. Investments determine the level of profits, and the rate of profit serves as a determinant of investment. Concerning the effects of profitability on investment, Kalecki identified two channels of transmission:

- Actual profitability influences investment capabilities by increasing the availability of financial resources, both internally and externally.
- Actual profitability influences expectations regarding future profitability.

While the first argument is explicitly stated, the second, as we are going to see, is a matter of interpretation.

Kalecki argues, more profoundly than the Kaleckian authors, and through several lines of reasoning, for the assumption of the dependence of accumulation on the profitability of capital.

The first line of reasoning in chronological order is based on the "principle of increasing risk" proposed by Kalecki in 1937. Kalecki examines investment decisions at the individual firm level and assumes that the capital to be invested, whose amount may vary continuously[21], has a gross expected return. He refers to this return as the marginal efficiency of capital, explicitly drawing on Keynesian concepts. Importantly, however, this magnitude is considered independent of the investment amount itself. [22]

Kalecki also assumes a given interest rate at which the firm can finance itself. This implies that the *net return* on investment is constant. However, Kalecki argues that the firm must also compensate for a risk which rises as the size of the investment grows.

[21] This assumption implies the absence of a minimum indivisible size for the production plant corresponding to the given technology or, if such a size exists, it would be extremely small and infinitely replicable.

[22] Kalecki rejects what he considers the two justifications for the hypothesis of a decreasing marginal efficiency of capital: diminishing returns to scale because - they are implausible - and imperfect competition - because it is an insufficient assumption and does not explain why large enterprises could not be realized and why enterprises of different sizes coexist. Ultimately, these arguments do not seem particularly robust. More importantly, they do not seem to correctly identify the theoretical basis for the decrease in the marginal efficiency of capital.
Kalecki does not develop a detailed critique of the marginalist principles that identify the technical substitutability between factors as the origin of the decreasing functions of demand for productive factors and, therefore, of a decreasing investment demand. Essentially, he implicitly accepts these principles for the long term and at an aggregate level, while he tries to argue about short-term choices of individual firms. The principles he is enunciating, he asserts, are not generally incompatible with those long-term (marginalist) equilibria. However, these considerations also seem rather weak. The crucial point, for our purposes, is that he assumes a given technology associated with a constant expected return.

Assuming the point of view of the single entrepreneur, there are two reasons why risk increases:

- as investment increases, first, the share of the entrepreneur's wealth at risk in case of bankruptcy rises;
- second, the illiquid share of the entrepreneur's wealth increases since capital goods are not only risky but also illiquid.

As the investment expands, the entrepreneur may turn to credit; however, this action implies a decrease in the ratio of the entrepreneur's wealth to credit capital. Even if the entrepreneur doesn't personally view this as a factor of risk to be compensated, the market may prompt creditors to impose higher interest rates.[23]

The firm's investment amount is determined by the equilibrium between the constant expected return on investment and the sum of its constant interest cost and an increasing risk premium.

This determination establishes a direct relationship between the rate of profit and the level of investment.

Kalecki assumes that a higher level of realized profits implies greater savings by the entrepreneur. These savings (i) increase the entrepreneur's wealth. Moreover, when these savings are invested in the firm, (ii) they also augment the share of own capital in the total invested capital. Thus, these two effects, all else being equal, reduce the level of risk associated with the capital invested in the firm and shift the investment cost function downward and to the right. This leads to an increase in the level of investment. Therefore, the higher the rate of profit, the greater the level of investment.[24]

In the 1937 paper, the only reason why the profit rate influences investment is that higher accumulated profits allow (but do not determine) greater internal accumulation and, with it, a greater ability to borrow in the market. Unlike in Kaleckian models, there are no references to the assumption that the realized rate of profit can be seen as an indicator of the expected rate of profit.

[23] "There are two reasons for the increase of marginal risk with the amount invested. The first is the fact that the greater is the investment of an entrepreneur the more is his wealth position endangered in the event of unsuccessful business. The second reason making the marginal risk rise with the size of investment is the danger of " illiquidity." The sudden sale of so specific a good as a factory is almost always connected with losses. Thus, the amount invested k must be considered as a fully illiquid asset in the case of sudden need for "capital." In that situation the entrepreneur who has invested in equipment his reserves (cash, deposits, securities) and taken " too much credit " is obliged to borrow at a rate of interest which is higher than the market one. If, however, the entrepreneur is not cautious in his investment activity it is the creditor who imposes on his calculation the burden of increasing risk charging the successive portions of credits above a certain amount with rising rate of interest." Kalecki (1937a) p.442

[24] In this contribution, Kalecki does not distinguish between different forms of credit for the firm. Different shares of own capital with respect to the overall capital invested impact the overall riskiness of the invested capital, irrespective of whether the firm utilizes bank credit, bonds, or equity issuance.

6. 3. Kalecki: investment and the expected rate of profit

In Kalecki (1954, p. 98), a 'short-run' investment function is introduced, incorporating an additional channel of influence from realized profit on accumulation. The function is:

$$D_t = aS_t + b\frac{dP}{dt} - c\frac{dK}{dt} + d \qquad [17]$$

D_t represents the gross "investment decisions" at time t (which are equal to the investment in fixed capital at time t+1, F_{t+1})[25], S_t is the internal savings of firms, (dP/dt) is the change in profits over time, (dK/dt) is the change in capital stock with respect to time, and d is the depreciation rate of fixed capital (a constant subject to change only in the long run). a, b, and c are constant coefficients. In Equation [17], we find the same principles affirmed in the 1937 paper regarding the rate of profit and access to finance:

> Investment decisions are closely related to 'internal' accumulation of capital, i.e. to the gross savings of firms. There will be a tendency to use these savings for investment, and, in addition, investment may be financed by new outside funds on the strength of the accumulation of entrepreneurial capital. The gross savings of firms thus extend the boundaries set to investment plans by the limited capital market and the factor of 'increasing risk.' (Kalecki 1954 p. 97, italic added)

In this passage, the identification of firms' saving decisions with investment decisions becomes, however, more explicit.

Another theme found in the *Kaleckian models* is also elaborated upon. In the relation [18], the second term represents the effect of the change in profits from one period to the next. This effect is explained as follows:

> Another factor which influences the rate of investment decisions is the increase in profits per unit of time. A rise in profits from the beginning to the end of the period considered renders attractive certain projects which were previously considered unprofitable and thus permits an extension of the boundaries of investment plans in the course of the period. [….]
>
> When the profitability of new investment projects is being weighed, *expected profits* are considered in *relation to the value of the new capital equipment*. Thus, profits are taken in relation to the current prices of investment goods. We can allow for this factor by deflating profits by the price index of investment goods. In other words, if we shall denote aggregate gross profits after taxes deflated by the prices of investment goods by P, we can say that ceteris paribus the rate of investment D is an increasing function of (dP/dt). (Kalecki, 1954, pp. 97-98)

It is assumed that an increase in profitability results in a faster accumulation of fixed capital because some investments, previously considered insufficiently profitable, would now become viable. The second part of the quotation, beyond the complication introduced by reference to the need to deflate magnitudes, indicates that, on the one hand, Kalecki deemed the rate of profit as relevant, not the amount of profits, and on the other hand, that he was addressing *expected*

[25] In Kalecki (1937b), the temporal lags between investment decisions and increases in the capital stock are essential for the explanation provided for the economic cycle. In this explanation, Kalecki puts forth his version of the principle of effective demand.

profitability on new investments — i.e. an expected magnitude. Actual profitability seems thus to influence expectations regarding future profitability.

However, it remains unclear whether Kalecki is addressing a generalized increase in profitability or only in relation to certain projects (see Vianello, 1989, pp. 179-80 for further insight on this).

Regarding the relevance of changes in the capital stock, Kalecki writes:

> Indeed, an increase in the volume of capital equipment if profits, P, are constant means a reduction in the rate of profit. Just as an increase in profits within the period considered renders additional investment projects attractive, so an accumulation of capital equipment tends to restrict the boundaries of investment plans. This effect is most easily seen in the case where new enterprises enter the field and thereby render investment plans of the established firms less attractive. (ibidem, p.98)

In this passage, Kalecki also suggests that, with the entry of new firms into an industry, an increase in installed capital would generally be accompanied by an unchanged total amount of profits, thereby making the investments of firms already in the market less profitable. The economic mechanism behind this effect appears unclear. Implicit in these arguments is the assumption that the entry of new firms occurs independently of expectations of demand expansion.

We can conclude that the rather generic and vague justifications found in the Kaleckian models of the assumption of dependence of accumulation on a measure of profitability are more thoroughly investigated in Kalecki's analysis.

The implicit references to Kalecki on the relation between accumulation and capital profitability are certainly among the elements that justify the identification of this literature with the Polish economist's legacy. However, even in Kalecki's work, an analytically solid theoretical justification of this hypothesized influence does not seem to be provided.

The vagueness in Kalecki's analyses, along with the absence of a precise and explicit distinction between the various magnitudes related to the profitability of capital, are characteristics inherited from the Polish author.

7. The dependence of accumulation on the rate of expected profit: a critique of the hypothesis $r^e = r^a$

In the end, our comprehensive recognition of Kaleckian literature, including the contributions of Robinson and Kalecki himself, reveals that the arguments supporting the relation between the profitability of capital and the rate of accumulation can be traced along the three lines identified in Section 5:

1. A direct relationship between accumulation and the expected rate of profit.

2. A higher rate of profit makes more funds available for enterprises to use for self-financing investment decisions.

3. A higher rate of profit also facilitates firms' access to credit.

Let's critically consider the first assumption: the direct relationship between accumulation and the *expected* rate of profit.

The assumption is embedded in the first-generation models, as in the functions of Marglin and Bhaduri (1990) and the function proposed by Kalecki (1954). It's important to note that this assumption is twofold:

- it is assumed that the *expected* rate of profit has a positive effect on the determination of the level of investment, and that
- the *expected* rate of profit is determined by the *realized* rate of profit.

It is appropriate to consider the two separately, beginning with the second and demonstrating first the inconsistency of the assumption that the rate of *realized* profit, r^a (the rate of profit that appears in the models), is the main determinant of the expected rate of profit, r^e).

By definition, the expected rate, r^e, represents what firms expect to realize on new investments. It is certain that this expected magnitude can be influenced by various circumstances, some of which we will revisit later.

The *realized* rate of profit is, among numerous incidental circumstances, also determined by current utilization, which may differ from the desired or normal utilization. Kaleckian models, in particular, consider that *actual utilization* may deviate from the normal even over extended periods, and they correctly regard actual utilization as the primary determinant of the *realized* profit rate, r, along with the distributional variables (m, θ, and π).

Identifying the *expected* rate of profit with the *realized* rate of profit entails the assumption that entrepreneurs expect to realize on the productive capacity they are installing with investments, a degree of utilization (and thus a rate of profit) equal to the current one and, plausibly, different from the normal rate. However, this sharply contrasts with the assumption underlying the principle of the dependence of accumulation on the expansion of demand, according to which firms tend to size productive capacity to expected demand by adopting a technique—and thus a proportionality between capital and output—defined by reference to desired or normal utilization.

In Garegnani's (1992, p. 56) words:

> The profits expected from investing in a new plant will of course depend on the level of utilization expected for that plant. And that expected level of utilization will tend to be the 'desired' level because, by the very definition of the latter, the size of the new plant will be designed to make it such. The expected level of utilization will therefore tend to be independent of the levels of utilization and profits experienced in the past. A high past level of utilization of the plant might well result in a higher amount of investment, and a

larger new plant, but there is no reason why it should imply a higher expected level of utilization of that plant. That level will remain equal to the desired level chosen by the entrepreneurs themselves when deciding their investment.

This same argument has been used by Ciccone (1986) and Ciampalini and Vianello (2000).

8. The dependence of accumulation on the expected profit rate as determined by normal rate of profit

If, as mentioned in Section 7, firms can only expect to realize *normal utilization* of the capacity they are going to install, the expected rate of profit can only be *primarily determined* by the *normal* rate of profit.

In this sense, Bhaduri and Marglin's (1990) introduction of the degree of monopoly, *m*, into the accumulation function can be interpreted. In this literature, as argued, *m* represents the (*normal*) distribution determined by the conflict between firms and workers. The degree of monopoly unequivocally moves in the same direction as the *normal* rate of profit and, therefore, the *expected* rate of profit. This is why Bhaduri and Marglin introduced this magnitude in the accumulation function to avoid the so-called *strong accelerator effect* and to distinguish between the influence of *normal* profit and *realized* profits, i.e., we may say, between normal and actual distribution.

However, the question must be raised as to whether, even when more accurately considering the expected profit determined primarily by the corresponding normal magnitude, a direct relationship between accumulation and the normal (expected) profit is plausible.

The fact that the normal rate of profit is an indicator of expected profitability on new investments does not necessarily imply that the level of these investments is an increasing function of the normal/expected rate of profit.

As argued in Garegnani (1962, p. 91, note 1), the expectation of realizing the normal rate of profit on investments seems to be a precondition for their realization. The normal rate of profit, by allowing the normal return on the anticipated capital, enables the reiteration of the production process and, possibly, the realization of investments necessary to vary the scale of production, ensuring the conditions of normal profitability even on additional productive capacity.

We need to make some additional considerations here. What has been said about the expected rate of profit and the normal rate does not imply that it is impossible to assume that, in fact, some firms, under certain circumstances, expect a rate of profit higher than normal. Indeed, it is possible for an innovative enterprise to have a reasonable expectation that, by introducing a new technique, it will succeed in making profits higher than normal for an interval of time, even a considerable one.

This circumstance, however, might actually induce a higher level of investment than would otherwise have been the case. However, this effect would result from the availability of a new technique and competition among firms to introduce it, not from the level of profits higher than normal; the latter would be a manifestation of another determinant of investment. Similarly, if the increase in demand for a commodity were very intense and the capacity shortage very high, investing firms might expect profits higher than normal. However, this phenomenon would also be a transitory manifestation of the exceptional capacity shortage, and the cause of investment would be the sudden or intense expansion in demand for a particular product.

Similarly, it cannot be ruled out that there are circumstances in which firms make investments while expecting a lower-than-normal profit rate. A firm that wants to enter the market may attempt to take away shares of demand from existing firms by accepting lower-than-normal profit rates; even in this case, however, the resulting investments would be determined by the particular way in which competition manifests itself in a given circumstance and not by a specific (low in this case) level of expected profit.

Thus, it seems safe to conclude that under the assumptions of the neo-Kaleckian models, where circumstances such as technical innovation or particular competitive behaviors are neglected, it must be concluded that the *expected* rate of profit is basically the *normal* one, and that firms will not invest in the case where they expect a lower rate of profit. On whatever amount of actual investment, mainly determined by demand expansion, they will tend to expect to realize a profit rate roughly corresponding to normal capacity utilization. The determinants of investment, therefore, appear to be, at least under the simplified assumptions of these models, the circumstances that determine the amount and its eventual variations in productive capacity that will be able to generate normal profits on the total capital invested. [26]

Following this logic, we would have to conclude that if the normal rate of profit increased, the same amount of investments would be made, but a higher rate of profit would be expected, and plausibly realized, on them. Even correctly identifying the notion of the rate of profit relevant to

[26] After stating in the text that the level of investments is determined solely by expectations of final demand expansion and technological innovations, Garegnani (1962), in the footnote on page 91, argues: "We have not included among the circumstances of primary importance in determining the level of private investments three factors often considered in that connection: the rate of profit achievable on new investments, the level of undistributed profits as dividends from companies, and the interest rate. The rate of profit achievable on new investments does not seem to be considered as a factor determining investments independently of the two indicated in the text; rather, this appears to be the way in which the influence of those two factors on investments manifests itself. So, if there is an expansion of final demand, entrepreneurs will anticipate being able to sell additional quantities of products at current prices or higher prices, and investments will appear profitable, whereas they would not have appeared so in the absence of the expansion of final demand. Similarly, if there are technological innovations, entrepreneurs will expect to sell products whose cost has become lower at current prices or slightly lower prices, and investments will appear profitable." (our translation)

investment choices, there is no reason, it seems, to assume the existence of an increasing relationship between the amount of investment and expected profitability.

These arguments, based on the reappraisal of classical political economy and its notions, were originally brought to light by Garegnani (1962) and later recovered by other authors drawing on the same theoretical lines (see Serrano, 2006, and Cesaratto, 2015).

9. The dependence of investment on realized profits: the financing of investment

The other two lines of argument for the assumed dependence of the rate of accumulation on the profitability of capital are both related to the ability to finance investment.

The first, more emphasized in Kaleckian models than in Kalecki's original work, assumes that a higher rate of realized profit makes more internal funds available for firms to self-finance investment decisions.

The second line assumes that a higher rate of realized profit would make it easier for firms to access funds, both in banking and other financial markets. In other words, it would make the banking system and the stock market more willing to lend funds to firms that make higher profits. As we saw in Kalecki's original analyses, this argument was also associated with the principle of increasing risk. The firm is then able to finance, either independently or in the market, a higher level of investment than it could if the realized rate of profit were lower.

Regarding these arguments, there is no doubt that the relevant notion is necessarily that of the *realized* rate of profit. Indeed, it could be pointed out that what may affect these kinds of decisions is the difference between the *realized* and the *normal* rate of profit. In its 'normal' part, in fact, the realized profit should be paid to the owners of the financial capital (be they the owners of the firm, shareholders, or subjects who have lent the financial capital to the firm) as the normal remuneration necessary to avert disinvestment from the firm. It would only be the portion, if any, in excess of the profits needed to secure the normal remuneration that could be used to finance further investment. Similarly, it would be only this possible surplus that would make the firm, in the eyes of investors, more or less risky and more or less creditworthy.

These lines of reasoning are also composed of two distinct principles, each of which has a weakness. First, these arguments assume a radical and structural inefficiency of financial markets that systematically, even in the long run, would fail to identify the profitability of investment projects. Even without assuming the existence of perfect markets as conceived by neoclassical theory, it is possible to argue that in a minimally efficient financial market, in the long run at least, the difficulty of raising funds to finance an investment project by a firm should be considered a

symptom of the unprofitability of the investment rather than a limitation on its realization. This argument was, in fact, first developed, to the best of our knowledge, by Sraffa in an entirely different context from the analysis of accumulation[27]:

> It might seem, moreover, that the importance of the marketing difficulties as a limit to the development of the productive unit has been over-estimated as compared with the effect in the same direction exercised by the more than proportionate increase in the expenditure which a firm must sometimes incur in order to furnish itself with the additional means of production which it requires; but it will generally be found that such increases in costs are an effect, and not a determining cause, of the market conditions which render it necessary or desirable for a firm to restrict its production. Thus, the limited credit of many firms, which does not permit any one of them to obtain more than a limited amount of capital at the current rate of interest, is often a direct consequence of its being known that a given firm is unable to increase its sales outside its own particular market without incurring heavy marketing expenses. If it were known that a firm which is in a position to produce an increased quantity of goods at a lower cost is also in a position to sell them without difficulty at a constant price, such a firm could encounter no obstacle in a free capital market. (Sraffa 1926 p.449-50)

The Kaleckian authors, therefore, implicitly assume that financial markets have extreme long-run structural imperfections. However, there are two other weaknesses in the argument.

The second weakness is due to *substantial indeterminacy* in the analysis. Implicitly, they assume that the level of investment that firms intend to make is higher than it actually is, and that financial market constraints prevent it from being realized to the extent that, when these constraints are circumvented through self-financing, investment increases, and available funds become the determinant of investment. In this way, one does not determine what investment would be if the limits to corporate financing did not exist or if the availability of internal funds were so high as to overcome these limits. That is, what appear to be the ultimate determinants of accumulation are not determined.

Investment theory should identify what determines the amount of investment that firms intend to make, regardless of whether it absorbs some or all of the firm's savings or is financed otherwise.

Finally, even assuming that the constraints posed by external financing are so stringent and enduring as to make self-financing the only possible determinant of actual investment, and ignoring the substantial indeterminacy of these principles, there is a third relevant weakness in this line of argument. It implies a form of identification of saving decisions with investment decisions similar to that underlying the original version of Say's law. [28]

[27] The theoretical context in which Sraffa (1926) reasoned was the analysis of the determinants of the size of the individual firm in a context of imperfect competition. In this context as well, the shortage of funds available for financing the firm's investment had been put forward.

[28] On the differences between the original version of Say's law, in which the decisions to save are identified with corresponding decisions to invest, and its declination in marginalism, which, on the other hand, entrusts the interest rate with the role of bringing saving and investment decisions into balance, see Garegnani (1979, p.343).

Undistributed profits are conceptually savings decisions.[29] Indeed, firms decide not to distribute realized profits and thus not to allow part of the realized income to be consumed, that is, the part of the income that profit earners would consume.

Like all saving decisions, however, those made by firms do not necessarily imply an investment decision. The lack of normal profitability conditions on hypothetical investment, in fact, could, as for the individual saver, induce the firm to hoard and not spend the undistributed profits. Like savings, undistributed profits can be hoarded, loaned to financial markets, or invested to increase the capital stock. In Kaleckian reasoning, only the last possibility, investment, is considered; the assumption that greater realized profits lead to greater investment is based, therefore, on the assumption that the decision to save is immediately identified with a decision to invest.

We may extend the same consideration to the Kalecki's principle of increasing risk (only rarely recalled in Kaleckian models). As considered in the previous section, it is assumed that higher realized profits imply a greater share of own capital in the total invested capital of the firm. This reduces the evaluation of the riskiness of investing in the firm from the point of view of external lenders. This can be argued only by directly identifying not distributed profits—a form of saving decisions—with investment which increases firm's own capital.

A final weakness common to the theoretical mechanisms underlying the asserted dependence of accumulation on the (realized) profitability of investment based on the increased availability of funding is that they are proposed by reasoning only at the *level of the individual firm*. No attempt is made to test the consistency of extending this principle to the level of the aggregate economy. It is also surprising that this point has not been raised in the critical literature of Kaleckian models.

On the contrary, a brief reflection raises obvious perplexities. That is, even assuming that the individual firm, in the presence of realized profits higher than normal, is induced to invest more; this could be because the individual (or the few) firms under these conditions would be deemed *relatively* more creditworthy than their competitors. Should this condition be extended to all firms in an industry or to all firms in the entire economy, it is possible that the effect would cancel out.

In addition, and more importantly, it is possible that if all firms were able to access more financing, the opportunities for profitable investment (determined, for example, by demand

[29] The same note on page 91 of Garegnani 1962 that we cited in footnote 23 continues: "the level of profits not distributed by firms, it then seems, should be considered as a factor determining the propensity of the community to save and not the level of investment. It was seen in the first part of this study how variations in the propensity to save do not necessarily involve variation in investment more particularly the overall level of distributed and undistributed profits depends on the level of utilization of plant and in the long run also on the expansion or otherwise of productive equipment and employment in the economy taken as a whole therefore the amount of profits and therefore the amount of profits distributed will depend on the level of investment rather than vice versa." (our translation)

expansion) would turn out to be less than the sum of the opportunities that would be open to individual firms if each of them could access more funding alone. The arguments advanced in Kaleckian analyses, considering only the individual firm, which we have seen to exhibit several contradictory elements, manifest further important weaknesses when taken to justify aggregate relationships in macroeconomic models.

10. Concluding remarks

In this article, we have analyzed the assumptions made in the Kaleckian models of growth regarding a positive relationship between the amount of investment and the profitability of capital. A reconstruction of the representation of production and distribution at the basis of these models has been necessary to properly understand the different notions of profitability present in this literature. Through the exploration of their theoretical origins, we have then identified the three channels through which the aforementioned relationship is argued in different investment functions across various models. These channels are as follows: i) the direct relationship between accumulation and the expected profit rate, with the latter assumed to be equal to the realized profit rate; ii) the increased availability of funds for self-financing; and iii) the enhanced ease of access to credit resulting from higher profitability.

Regarding point i), it is necessary to underline the duality of the assumption. On one hand, the dependence of investments on the expected profit rate is assumed; on the other hand, it is assumed that the expected profit rate is equal to the realized profit rate. Demand expansion is generally assumed to influence accumulation through entrepreneurs achieving their goal of sizing their productive capacity based on a *desired* or *normal* utilization level. This assumption implies that the expected profit rate is necessarily *associated* with the *normal degree of utilization*, which is the technical condition that firms aim to realize on the newly installed capacity. It follows, then, that the expected profit rate on new investment can only be associated with the normal one, which corresponds to the conditions entrepreneurs plan to realize on their new plants.

Although this argument does not lead to a close identification between the expected and the normal profit rate, it firmly excludes the possibility of equating the expected with the realized profit rate.

Once we have clarified that the expected rate of profit tends to be determined by the normal rate of profit, we have also considered that there does not seem to be any solid reason why the level of investment should be regarded as an increasing function of the normal/expected profit rate. The determinants of investment determine the amount of investment that, since they allow for the

realization of the normal rate of profit, will be undertaken; a higher or lower level of the normal rate of profit will imply that the investments made will be more or less profitable.

Regarding the supposed positive effect that higher profitability would generate through a presumed increased capacity for self-financing or a greater possibility to obtain funds in the credit market or on the stock market, we have observed that, even in this case, there appear to be valid arguments to cast doubt on this line of reasoning.

The first argument is that, as suggested by Sraffa (1926), the existence of such transmission channels implies the assumption that financial markets are characterized by long-term structural imperfections and, consequently, are unable to identify profitable projects. The second argument is that the aforementioned assumption does not allow us to pinpoint the ultimate determinants of investment, against which the possibilities of self-financing can, at most, be a constraint.

Finally, it seems to us that the most critical aspect of such a view is the unwarranted identification between saving decisions and investment decisions, characteristic of the so-called Say's Law. This assumption challenges the very notion of investment as the *primum movens* relative to saving decisions and thus questions the principle of effective demand itself.

In conclusion, while it cannot be ruled out that changes in distribution have effects on accumulation, it appears that these effects should be sought in the impact on components of aggregate demand other than investment. The theoretical foundations of Kaleckian investment functions, at the very least, appear to be shaky.

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