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ABSTRACT

The question of the long-run prospects of profitability and its association with the stage of capital accumulation have occupied central importance in the history of economic thought. This paper focuses on Marx and Keynes and argues that Marx's analysis, despite its incomplete nature, is logically consistent in both explaining the falling tendency of the rate of profit as well as the precise mechanism that leads the economy to its crisis stage. Keynes's analysis, although sketchy, has more in common with Marx and Smith than with Ricardo and neoclassical economics. Furthermore, Keynes's views on effective demand and the way in which it affects profitability and capital accumulation might be gainfully used for the formulation of a more advanced theory to explain and at the same time direct, within strictly defined limits, the dynamics of capitalist economies.

Key words: Profitability, accumulation, crisis, Marx, Keynes
JEL classifications: B12, B22, E12, E13

1. Introduction

The question of the long-run prospects of profitability and its association with the stage of capital accumulation has occupied central importance in the history of economic thought. Many of the great economists, including Adam Smith, David Ricardo, John S. Mill and Joseph Schumpeter, accepted the tendency of the rate of profit to fall and the associated with this fall economic crisis as one of basic stylized facts of the evolution of capitalist economies. Despite wide agreement surrounding the tendency of the rate of profit, there has been scant consensus as to the cause of this fall and its exact connection to the outbreak of economic crisis. Smith attributed the falling tendency to the intensity of competition and to the pressure that it exerts on input prices. Ricardo and J.S. Mill attributed the falling tendency to the growing demand for food and the rise in the price of agricultural products due to diminishing productivity of land. Neoclassical economists argued that the diminishing marginal product of capital caused the fall in the rate of profit. Schumpeter, argued that the decay in the entrepreneurial function together with the declining importance of the classes that give political support to capitalism are among the main factors that lead to the stationary economy.

This paper focuses on the views of Marx and Keynes and argues that Marx's analysis, despite of its incomplete nature, is logically consistent in explaining both the falling tendency of the rate of profit and the precise mechanism that leads the economy to its crisis stage. Keynes's analysis, although sketchy, nevertheless is also consistent with his fundamental principle about the priority of investment over saving and therefore is innovative and characteristically different from both the classical and neoclassical approaches. Keynes's analysis despite of its vague character is full of insights about the

role of expectations and the way that they affect capital accumulation and profitability. The analyses of both Marx and Keynes may shed new light to the current developments, and may even prove to be extremely useful to the understanding of the dynamics of capitalist economies.

The remainder of the paper is organized as follows. The next section discusses the fundamentals of Marx's analysis of the falling rate of profit and evaluates some criticisms associated with his analysis. The third section examines the basic components of Keynes's argument on the same topic and points out to some of its weak aspects. The fourth section explains why a protracted fall in the rate of profit leads to an economic crisis and brings together the views of Marx and Keynes. The last section presents a summary and some concluding remarks.

2. Marx's Analysis of the Falling Rate of Profit

According to Marx "the law of the tendency of the rate of profit to fall" is "in every respect the most important law of modern political economy" (*Grundrisse*, pp. 748-9). The starting point for the analysis of the evolution of the profit rate is the nature of capitalist production, which is oriented towards the extraction of the maximum possible profit and the expansion of production activity. Capital in its effort to extract the maximum possible profit, as a necessary precondition for its own survival, is led to a two-front competition. First it competes against labour in the production process for the reduction of cost by pressing the wages to the minimum possible level and by increasing the intensity of work to the maximum level within the physical limits of workers and the legal limits of the state. It follows that the most effective way for capital to increase

profits is through the further subdivision and routinization of the labour process. The above process leads to the degradation of labour on the one hand and therefore, devaluates wages, while on the other hand makes possible the mechanization of labour activity and its replacement by fixed capital; thereby, increasing productivity and reducing unit cost of production.

In the second type of competition, the struggle is against other capitals over the expansion of their market share by reducing the unit cost and the price of the product. This is possible, once again, through investment in fixed capital, which ensures lower unit cost and for the same price higher mark-ups for the innovative capitals and eventually higher profit rates. Nevertheless, the overall cost of introducing fixed capital is a lower average rate of profits; however, since the innovating firms expand their market share their profit rate will be higher than that of their competitors.

Starting from the definition of the rate of profit expressed as the ratio of the flow of profits to the stock of invested capital and ignoring turnover time for the sake of simplicity, we have $r = s/C$, where s = total surplus value, C = the value of capital advanced. The process of mechanization refers to the replacement of variable capital (v) by fixed capital as this is reflected in the rising ratio of C/v. Fixed capital is viewed as the capital that embodies the new more effective techniques that increase the productivity of labour. In other words, the technical composition of capital (K/l), that is, the capital-labour ratio in physical terms has a tendency to increase, which is followed suit by the value composition of capital (C/v). The rising tendency in the technical composition of capital (K/l) due to mechanization, sooner or later, will be reflected on the value composition of capital defined as "[t]he value composition of capital, inasmuch as it is

determined by, and reflects, its technical composition of capital" (*Capital III*, pp. 145-6) will also be rising.[1] The idea is that the unit values of capital goods and of wage goods will be close to each other and, therefore, their ratio will be approximately constant and equal to one. Thus, their long-term influence on the ratio C/v is expected to be neutral. The rationale for this tendency is that capital goods and wage goods are aggregations of a large number of industries and there is overlap between them. For example, the output of an industry can be partly a capital good and partly a wage good. In fact, this is a standard result that arises in the aggregation of input-output tables, as is the case with capital and consumer goods sectors. Technological change, therefore, cannot be confined to any single sector but rather is rapidly diffused throughout the economy (*Capital III*, p. 212).

In this context, Marx does not really need to resort to a Ricardian argument for the demonstration of the falling rate of profit as it was claimed initially by Schefold (1976) and later by Kurz (1997). We know that Marx criticized Ricardo and also J.S. Mill for basing their falling rate of profit argument on the niggardliness of nature (*Capital III*, p. 234). On the contrary, Marx views that profitability barriers stem not from nature, but from the inner "nature" of capital (*Capital III*, p. 242).

It is important to point out that the rise in the organic composition of capital counteracts any increase in the rate of surplus-value (s/v) and necessarily leads to a long run falling tendency in the rate of profit. This result can be shown starting from the formula of the rate of profit which can be rewritten as:

$$r = \frac{s}{C} = \frac{s/l}{C/l}$$

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[1] The different compositions of capital are linked together as follows: $C/v = (\lambda_K/\lambda_v)(K/l)(1/w)$ where, λ_K and λ_v are the unit values of the means of production and consumption, respectively and w is the real wage rate.

where $l=s+v$, *i.e.*, the total (productive) labour time (l) is equal to the surplus (s) and necessary (v) labour time. The advantage of the above formula is that it sets limits to the variation of the rate of profit. For example, we derive that regardless of the rate of increase in the rate of surplus value (s/v), the numerator of the above formula has one as its upper limit, and the rate of profit for $v \to 0$ has as its limit the reciprocal of capital-labour ratio, l/C, that is the maximum rate of profit (the rate of profit for $s=l$). The mechanization process leads to a rising C/l ratio or what amounts to the same thing to a falling maximum rate of profit. The latter implies that the general rate of profit (whose magnitude depends on the level of v) fluctuates within an interval with a falling upper limit. In short, the general rate of profit with the passage of time starts to display a falling tendency; for, it is depressed from above by the falling maximum rate of profit. However this in and of itself is not an adequate proof of the falling rate of profit, since one must show that the limit of the rate of profit is zero (Kurz, 1997, p. 133).

For a proof of the above proposition that allows the explicit treatment of growth rates of the variables involved in the formula of the rate of profit and their limits, let $C'=C/l$, $s'=s/l$, $v'=v/l$ or $v'=1-s'$ and so the rate of profit can be restated as:

$$r = \frac{s'}{C'}$$

Assume now that C' grows at a rate equal to α, whereas the variable capital declines at a constant rate equal to β.[2] Hence, we assume that the rate of surplus value is rising, not only as a stylized result of the dynamics of capitalist economies but also because a constant or a falling rate of surplus value would make the fall in the rate of profit much easier to prove. By using time subscripts we can denote the evolution of each of the above

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[2] For an alternative presentation based on exponential functions see Shaikh (1992).

variables as follows:

$$C'_t = C'_0(1+\alpha)^t, \ v'_t = v'_0(1-\beta)^t \ \text{and} \ s'_t = 1 - v'_0(1-\beta)^t$$

The evolution of the rate of profit will be:

$$r_t = \frac{1 - v'_0(1-\beta)^t}{C'_0(1+\alpha)^t}$$

Clearly, as t increases without bounds the numerator of the rate of profit approaches 1 and the denominator increase to infinity, so the limit of the rate of profit as $t\rightarrow\infty$ is 0.[3]

3. Keynes's Theory of the Falling Rate of Profit

Keynes's analysis of profitability and its evolution is mainly described in chapters 11 and 12 of the *General Theory*, where investment, the most volatile component of his theory of effective demand, depends on the expected profitability as this is captured in the concept of the marginal efficiency of capital (henceforth MEC) in conjunction with the long term interest rate. Specifically, Keynes argues that when an entrepreneur buys investment goods, he buys in reality the right to a series of future incomes that he expects to earn (during the useful lifetime of the capital good) by selling the product, after the subtraction of current expenses. More specifically, Keynes defines "the marginal efficiency of capital as being equal to that rate of discount which would make the present value of the series of annuities given by the returns expected from the capital asset during its life just equal to its supply price (*General Theory*, p. 135). The supply price of the capital good, Keynes notes, should not be confused with the current price of the capital good, but rather with

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[3] Okishio (1963 and 1990) demonstrates that a falling maximum rate of profit drags the general rate profit, however, he further argues that this is only a theoretical result, since in actual time this might not be the case since capitalists do not choose techniques that lower their maximum rate of profit.

the "price which would just induce a manufacturer newly to produce an additional unit of such assets, *i.e.*, what is sometimes called its *replacement cost*" (*General Theory*, p. 135). Clearly, the definition of the MEC depends on expected and not on current or past profits and also these expected profits are not evaluated against a stock of capital but rather against the flow of capital, that is, the increment of the existing capital stock, in particular the price of new equipment investment.[4]

It is interesting to note that the assumption of expected returns is absolutely necessary to Keynes, if he wants to be consistent with his overall theory of effective demand, according to which the decisions to invest determine saving. If Keynes had assumed current or past profits instead of expected in his definition of the MEC, then he would have essentially accepted that saving determines investment. Although the MEC depends on expected and not realized profits, which of course are fraught with uncertainty, Keynes was, nevertheless, absolutely certain about the falling MEC schedule, and to such an extent that he did not feel that there is a need for any detailed analysis on this matter. The gist of his argument on the falling MEC is contained in just a single succinctly written paragraph (*General Theory*, p.136) where Keynes presents two intertwined arguments. The first refers to the short run and the supply side of the market, where the investment expenditures of a firm imply that competition with other firms over resources gets more intense. However, the supply of resources is given in the short run; as a consequence their price increases and profits decrease for each of the competing

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[4] This is the reason why Pasinetti (1997, p. 207) approves Abba Lerner's use of the term marginal efficiency of investment instead of capital. We would rather use the term MEC although Keynes refers to the flow of investment (see also Asimakopoulos, 1991). For the mathematics of the MEC and the related literature see Okishio (1984).

firms. This argument, as Keynes notes, works more effectively in the short run and weakens in the long run. When the effects of competition on the MEC get weaker, then his second argument concerning the long run becomes effective. Hence, Keynes's idea is that as a firm increases its investment and expands its output, it would become extremely difficult to keep its sales growing at the going price. Its sales can grow *pari passu* with its productive capacity only if the firm reduces its selling price. Consequently, expected profits fall and so does the MEC. It is important to stress, once again, that the supply and demand arguments in Keynes are not mutually exclusive; on the contrary, they may complement each other thereby reinforcing his overall analysis for a falling MEC (Eatwell, 1989).

For the total economy, we simply add the behaviour of individual firms. Since for each particular firm there is an inverse relation between the MEC and investment, it follows that this is true for the economy as a whole. It is important to point out that for Keynes the fall of the MEC, in and of itself, does not automatically imply a reduction in investment expenditures. Everything depends on whether or not the rate of interest on loans is lower than the MEC. If for some reason the rate of interest is kept below the MEC, then there always exists an investment motive despite the falling MEC.

Keynes's analysis of falling profitability is too brief and certainly does not contain the subtleties that one finds, for example, in the classical economists. This, however, by no means implies that there are no important insights and innovations. In fact, Keynes in chapter 11 of the *General Theory* has some original contributions such as that the MEC is based on expected profits from current investment and thus he is consistent with his view of causality running from investment to saving. This is in contrast with the view

expressed by the other economists in Keynes's time (*e.g.* Fisher and Marshall), for whom the arrow of causality was running from saving to investment, while expectations together with uncertainty were spirited away from their analysis. The importance of these points has passed unnoticed even by Keynes's major commentators (*e.g.*, Dillard, 1948, ch. 7, Hansen, 1953, ch. 5 and Asimakopoulos, 1991, ch. 4). However, a careful reading of chapter 11 of the *General Theory*, shows that Keynes right after his comment about the similarities of his MEC with that of Fisher's "rate of return over cost", notes emphatically: "The most important confusion concerning the meaning and significance of the marginal efficiency of capital has ensued on the failure to see that it depends on the prospective yield of capital, and not merely on its current yield" (*General Theory*, p. 141) an idea which, in fact, detaches investment from current saving. Moreover, Keynes does not seem to endorse any marginal productivity theory as an explanation for the returns to capital, as for example, this can be judged by the following: "If capital becomes less scarce, the excess yield will diminish, without its having become less productive—at least in the physical sense […] the only reason why an asset offers a prospect of yielding during its life services having an aggregate value greater than its initial price is because it is scarce […]" (*General Theory*, p. 213). It is clear, that if Keynes had looked into the matter more carefully he would have rejected in a direct—and less polite—fashion Fisher's notion of the "MEC" in the *General Theory*. We know that Keynes disregarded Fisher's notion of the "MEC" in his lectures, at a time as early as 1934 (Dimand, 1995, p. 257) and that he admitted, in his correspondence with Harrod (August, 27 and 30, 1936), that his definition of the MEC is quite different from the works of classical economists and that he devised this concept "last of all, after an immense lot of muddling and many

drafts" (*Collected Works XIV*, p. 85).

Although Keynes does not really present an analytically coherent argument, his desire for pragmatism leads him nevertheless to the conclusion that in fact the MEC schedule was much lower in the 1930s than in the nineteenth century. There is no doubt that Keynes thought of the falling MEC as an already accomplished fact. For example he notes: "Today and presumably for the future the schedule of the marginal efficiency of capital is, for a variety of reasons, much lower than it was in the nineteenth century" (*General Theory*, p. 308).

4. The Relation between the Falling Rate of Profit and Economic Crisis

As we have noted many of the major economists agree to the idea of the long run falling tendency of the rate of profit, which eventually leads to a stationary economy; they do not agree, however, on the rationale for such a fall and also on the exact relation between the falling rate of profit and the outbreak of crisis. The explanations that they offer are, usually, far from convincing. This was not, however, the case with Marx who presented a detailed analysis of the mechanism through which a persistent (and not just a short run) fall in the rate of profit leads the economy to a crisis. He argued that the outbreak of crisis is the result of the cumulative long-run effect of the falling tendency of the rate of profit on investment and on the mass of real net (of interest, taxes, *etc.*) profits. More specifically Marx notes: "[t]here would be absolute over-production of capital as soon as additional capital for purposes of capitalist production = 0. The purpose of capitalist production, however, is self-expansion of capital, i.e., appropriation of surplus-labour, production of surplus value, of profit. As soon as capital would, therefore, have grown in

such a ratio to the labouring population that neither the absolute working-time supplied by the population, nor the relative surplus working-time, could be expanded any further (this last would not be feasible at any rate in the case when the demand for labour were so strong that there were a tendency for wages to rise); at a point therefore, when the increased capital produced just as much, or even less, surplus–value than it did before its increase, there would be absolute over-production of capital; i.e., the increased capital C+ΔC would produce no more, or even less, profit than capital C before its expansion by ΔC" (*Capital III*, p. 251).

Thus in Marx, a fall in the rate of profit for some time period can be consistent with any stage of accumulation. For example, he notes: "[a] fall in the rate of profit and accelerated accumulation are different expressions of the same process only in so far as both reflect the development of productiveness" (*Capital III*, p. 241). Only if the rate of profit falls for a protracted period of time does its cumulative effect lead to a stagnant mass of net profits that discourage investment spending and so the lack of investment and the unemployment that accompanies it constitute the two major phenomena of crisis. It is also interesting to note that for Marx the economy is led to an economic crisis by the protracted fall of the rate of profit of enterprise, that is, the rate of profit net of the interest rate. In fact, Marx (*Capital III*, pp. 370-90) defines as "profit of enterprise" the difference between profits and interest equivalent. The ratio of such net profits to capital advanced naturally becomes a more relevant indicator of profitability which guides the investment decisions of capitalists. For example Marx notes: "the expansion of the actual process of accumulation is promoted by the fact that the low interest […] increases that portion of profit which is transformed into profit of enterprise" (*Capital III*, p. 495).

Keynes's views on the connection between falling profitability and economic crisis are mainly discussed in his "Notes on the Trade Cycle" (*General Theory*, ch. 22), a chapter that in our view has not attracted the attention that it deserves. In fact, Keynes follows a whole tradition of economists who regard that falling profitability, past a point, leads the economy to its crisis stage. More specifically, Keynes uses the analytical framework of chapters 11 and 12 to explain the occurrence and the regularity of business fluctuations of various lengths, depending on the durability of fixed capital, and also to provide an explanation of the economic crisis of the 1930s. Of course, Keynes is aware of the difficulty of the task when he states that "we shall find that it [the trade cycle] is highly complex and that every element in our analysis will be required for its complete explanation" (*General Theory*, p. 313).

It is interesting to note that Keynes's views on business cycles were formulated in his early writings as this can be judged by a paper of his in 1912, when he stated that "After a crisis there is probably too little fixed capital; hence large profits for what there is; hence the creation of more fixed capital with the expectation of equal profits; hence creation of too much fixed capital" (Keynes papers UA/6/21/12, quoted in Barnett, 2001, p. 461). In the above quotation Keynes points out to two kinds of disproportionalities the first of investment in fixed capital which falls short of (expected) profits; a disproportionality which is resolved through economic expansion. The second of fixed investment in excess of (expected) profits, a disproportionality which, this time, is resolved through an economic crisis. Keynes continues these ideas in his (1930) *Treatise of Money* where he notes: "I find myself in strong sympathy with the school of writers— Tugan-Baranovski, Hull, Spiethoff and Schumpeter—of which Tugan-Baranovski was

the first and most original, and especially with the form which the theory takes in the works of Tugan-Baranovski himself [...]. The fault of Tugan-Baranovski lay in his holding [...] that savings can in some way accumulate during depressions in an uninvested form [...] and also in his suggesting that this failure of savings to become materialised in investment at a steady rate is due to the unequal distribution of wealth instead of to Schumpeter's "innovations" in conjunction with a failure of the banking system to respond in such a way as to preserve the desirable degree of stability" (Keynes, 1930, vol. 2, pp. 100-101). In the *Treatise* Keynes tried to create a theory of the business cycles that were caused by swings in investment that were originated from investors' perceptions of the long run prospects of profitability of investment.

Having developed these ideas that are based on a long term analysis in the *Treatise* and his earlier work Keynes does not repeat them in the *General Theory*, where in his notes he points out that the trade cycle "is mainly due to the way in which the marginal efficiency of capital fluctuates" (*General Theory*, p. 313). Keynes further argues that the downturn comes because of pessimism about the future of the MEC. His basic thesis is that cyclical fluctuations stem from swings in investment that are in turn governed by variations in investors' perceptions of profitability of investment. He notes: "[t]he disillusion comes because doubts suddenly arise concerning the reliability of the perspective yield, perhaps because the current yield shows signs of falling off, as the stock of newly produced durable goods, steadily increases [...]. Once doubt begins it spreads rapidly" (*General Theory*, p. 317). This is why in the immediate aftermath of the onset of a major depression (1929) monetary policy may be of little use; the idea is that the crisis is not caused by rising interest rates but the other way around. The cause of

crisis is identified with the fall in the MEC and the expectations that are formed about it. If entrepreneurs' profit expectations plummet to zero (in the case of economic crisis) then any level of interest rate will be perceived as too high. Similarly, in the financial sector of the economy even exceptionally high interest rates might not be high enough to sway potential lenders to grant new loans because of their doubts that loans will ever be paid back. Keynes (*General Theory*, pp. 315-7) argued that discrepancies between the subjective MEC and the objective long-term rate of interest are responsible for fluctuations in the aggregate investment. These discrepancies Keynes argued get magnified, through the operation of the multiplier, into instability, thus setting the course for the trade cycles of different periods that afflict the economies.

It follows, that, for both Keynes and Marx, investment depends on the difference between expected profitability and the rate of interest. In Keynes, for example, there is a straightforward distinction between expected profitability, as measured by the difference between the MEC and the rate of interest, a distinction that is in full agreement with Marx's notion of the expected profit of enterprise which refers precisely to the difference between the expected profit rate and the rate of interest.[5] It is important to point out that Marx does not use "expected profits", "expectations" or "uncertainty" in any explicit and direct way. Nevertheless, there are many passages in *Capital*, as well as in other works of his where "expectations" are implicitly treated and they emanate from past results (for

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[5] Keynes and Marx differ in this respect with the neoclassical economics, where the distinction between profit rate and interest rate is blurred since interest is usually viewed as the reward of capital for the contributions of its services to production and the rate of interest as the measure of the marginal productivity of capital. By way of an example, in Marx and Keynes, a fall in the rate of interest leads to higher profits and wages remain unaffected, while in neoclassical economics, a fall in the rate of interest would mean higher wages.

details see Sardoni, 1989, p. 33).[6] Marxists treat expectations in the formulation of their investment function according to which the realized results of the past guide current investment decisions. For example, Okishio notes that "[…] the investment decision must be based on capitalists' expectations of the economic conditions in the next period. Their expectations are formed by their interpretation of the limited information about present and past occurrences. They may be a bull at one time and may be a bear at another time" (Okishio, 1988, p. 129). Similar arguments can be found in the Marxian literature (*e.g.*, Marglin, 1984, chs. 3 and 20; Marglin and Bhaduri, 1990 and Glyn, *et al*. 1990). Furthermore, since for Marx the circuit of capital starts with money and ends up with more money, it follows that the whole process is fraught with uncertainty because there is no guarantee what so ever that the circuit will be completed successfully. An idea that Keynes borrowed explicitly in a draft of the *General Theory* three years before its publication and retained implicitly in the *General Theory* when it was published by referring to the "monetary economy" (for details see Sardoni, 1987, p. 75, *inter alia*).

In both Marx and Keynes crises are caused by a falling profitability which past a point leads to the withholding of investment since additional investment does not bring forth any extra profits. As the level of investment falls and becomes even negative unemployment increases and so we get the two major phenomena of crisis. This mechanism is straightforwardly stated in Marx, while in Keynes the term "overinvestment" is used in an equivalent way to Marx's term "overaccumulation". For

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[6] In this context, the quotation (*Capital III*, p. 251) cited above about overaccumulation implies that expectations about the future are formed on the basis of previous or current performance of investment with regard to profits. If additional investment does not bring forth an increase in profits it follows that capitalists cease to invest because their expectations for higher profits are pessimistic.

example Keynes notes: "For the term overinvestment is ambiguous. It may refer to investments which are destined to disappoint the expectations which prompted them or for which there is no use in conditions of full employment, or it may indicate a state of affairs where every kind of capital goods is so abundant that there is no new investment which is expected, even in conditions of full employment, to earn in the course of its life more than its replacement cost. It is only the latter state of affairs which is one of over-investment strictly speaking, in the sense of any further investment would be a sheer waste of resources. Moreover, even if overinvestment in this sense was a normal characteristic of the boom, the remedy would not lie in clapping on a high rate of interest which would probably deter some useful investments and might further diminish the propensity to consume, but in taking drastic steps, by redistributing incomes or otherwise, to stimulate the propensity to consume" (*General Theory*, p. 321). Clearly, Keynes's fear is that the growth of investment at some point leads to a stagnation in profits and so he argues that this stage must be postponed if not avoided and the method is not higher interest rates since investment is, almost, never enough for full employment but rather income redistribution policies in the effort to keep capital accumulation going through higher demand, that is, the increase in the rate of capacity utilization.

There is no doubt that Marx and Keynes have many differences; for example, in Keynes the emphasis is placed on expectations and on the idea that expectations govern capital accumulation and the rate of profit (Mattick, 1969, p. 15); in contrast, for Marx the center of analysis is the general profit rate on which expectations are rooted and also the notion that the rate of profit primarily and expectations to a certain extent determine the rhythm of capital accumulation. Marx's analysis hypothesizes normal capacity

utilization (*Capital III*, pp. 189-190), whereas for Keynes the rate of capacity utilization is usually below normal (*General Theory*, p. 254) and this exerts an influence on the economy which can become the focus of economic policy. However, they share as common the idea that profitability which is directly relevant for the analysis is the one net of interest payments. Keynes starting from a realistic analysis, that is, an analysis looking at the way that real economies operate was led to a definition of the concept of MEC similar to that of business people in their evaluation of their alternative investment projects against the interest rate. Marx, on the other hand, since he utilizes a detailed analysis arrives at a similar result, if we think of the rate of profit of enterprise. Furthermore, for Marx the crisis stage is determined by the profitability of investment. If profits created by investment do not increase it follows that the incentive for new investment spending evaporates. This view of profitability is similar to the MEC concept, where expected profits are compared to investment flows.

5. Falling Profitability and Economic Crisis, a Formal Analysis

In what follows we can show that the views of Marx and Keynes can be formally stated. Starting with the usual formula of the general rate of profit $r = s/Cu$, where, s is the amount of profits net of depreciation, interest payments and taxes, C is the amount of capital stock and u is the capacity utilization rate. Hence, we want to find the necessary and sufficient conditions where the net profits are maximized and subsequently reach a plateau. Presumably at that point there will be no incentive for the economy for new investment spending since profits cannot be enhanced any more. For this purpose we take the total derivative of the rate of profit with respect to capital stock:

$$\frac{ds}{dC} = ru + Cu\frac{dr}{dC} + rC\frac{du}{dC} \quad \text{or} \quad \frac{ds}{dC} = ru\left(1 + \frac{dr}{dC}\frac{C}{r} + \frac{du}{dC}\frac{C}{u}\right)$$

The point of overaccumulation or overinvestment is reached when $ds/dC=0$. To obtain this condition the two elasticities (in the above parenthesis) must add to -1 or:

$$\frac{\tilde{r}}{g} + \frac{\tilde{u}}{g} + 1 = 0 \quad \text{and} \quad \tilde{r} + g + \tilde{u} = 0$$

We assume now that the rate of profit follows a function of the form: $r_t = r_0(1+a)^{-t}$, where r_o is the initial rate of profit, a is the growth factor and t is time. The economy's growth rate depends on the evolution of the rate of profit times the capitalists' propensity to save (s_c); thus, we can write $g_t = s_c r_0(1+a)^{-t}$. Finally, the evolution of the capacity utilization, for simplicity's reasons, is also falling $u_t = u_0(1+b)^{-t}$, where u_0 stands for the initial capacity utilization and b is its growth factor. We substitute to the above formula and we get:

$$-\ln(1+a) + s_c r_o(1+a)^{-t} - \ln(1+b) = 0$$

then solving for t we determine the time period for the outbreak of the crisis:

$$t = -\frac{\ln\left[\frac{\ln((1+a)(1+b))}{s_c r_0}\right]}{\ln(1+a)}$$

Consistency reasons require that $0 < \frac{\ln((1+a)(1+b))}{s_c r_0} < 1$

We tried some realistic figures for the parameters ($a=6\%$, $s=70\%$, $r_0=35\%$) and we solved the above equation assuming that $-0.04 \leq b \leq 0.04$. In Marx's analysis $b=0$ whereas in Keynes's analysis $b \neq 0$ and capacity utilization can become a policy variable.
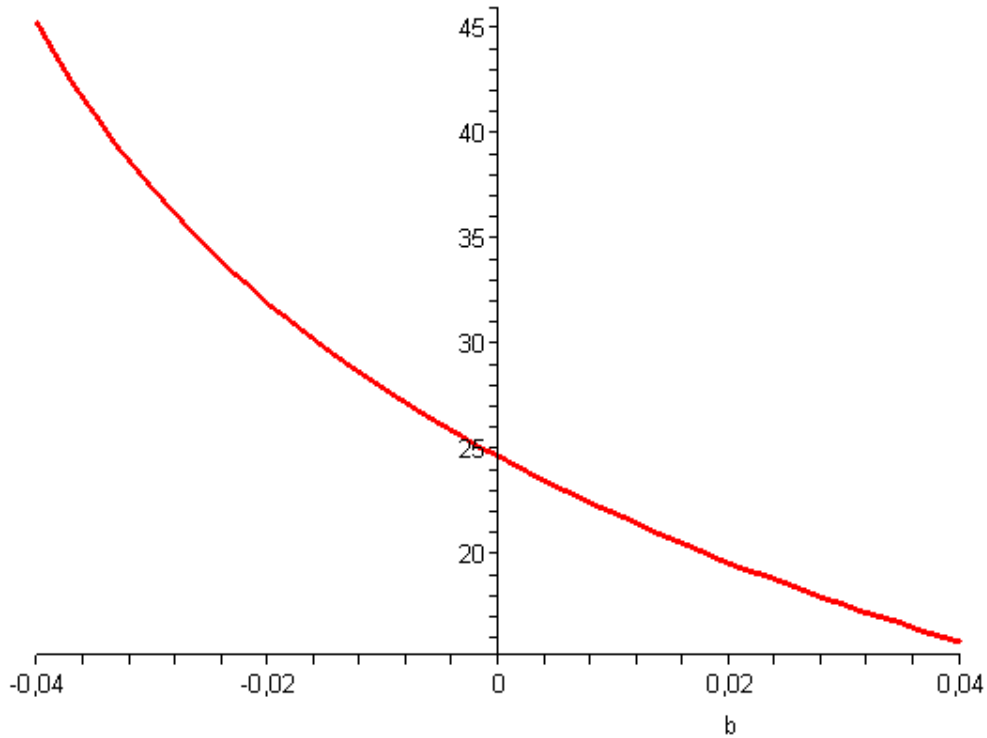
Figure 1. Sensitivity Analysis of Capacity Utilization

Figure 1 conveys the idea that if the growth rate of capacity utilization (horizonatal axis) is zero, as is the case in Marx, the crisis is expected to occur in about 25 years (vertical axis), which is approximately the time frame of Keynes's analysis for a phase-change ("a single generation"), assuming that we are in the downward phase of the long cycle and the government reduces the fall in the growth rate of capacity utilization, this amounts to a delay in the time of the occurrence and it can accelerate by increasing the fall in the rate of capacity utilization. So capacity utilization may exert an effect on the economy within strictly specified limits, however, by no means, the variations in the rate of capacity utilization lead to a phase-change just can shorten or lengthen the time of its occurrence.

6. Concluding Remarks

This paper has argued that Marx and Keynes despite their differences in some respects, both make net expected profitability and its evolution the lynchpin of their analysis when

it comes to the determinants of capital accumulation. For both of them the expected profit rate net of interest payments, that is, in Marx's analysis the current or past rate of profit of enterprise are crucial for the current capital accumulation. It is interesting to note in this connection that investment spending is determined by a short run expected profit rate. This is clear in Keynes's analysis of the MEC, where the immediate future is the most relevant determinant of current decisions. Likewise, in Marx investment follows the expected rate of profit. The difference is that in Keynes expectations are determined by the "uncontrollable and disobedient psychology of the business world" for which we cannot say much. In fact, Keynes is led to this idea because of his view that investment determines savings; consequently, since investment is not limited by currently available resources and in a sense becomes autonomous it follows that expectations also must be somewhat detached from the current or immediate past situations. By contrast, in Marx this psychology is rooted on objective conditions, which are determined by the historical evolution of the general rate of profit. In other words, since there is no definitive evidence for the direction of change, the most recent events may be expected to continue in the near future. Thus, the realized results of the recent past can be viewed as a relatively safe guide for the expectations related to the near future. The idea is that short term expectations are tested out regularly and are therefore revised according to the realized results.

In short, for Marx the general rate of profit is what determines both profitability conditions and also expectations about the future which exert an influence on the rhythm of capital accumulation. The intuitive idea is that a persistently rising rate of profit naturally makes capitalists optimistic about the future and encourages them to invest even

in excess of current profits by borrowing. A persistently falling rate of profit, by contrast, makes capitalists pessimistic about the future and so they tend to invest less than their current profits by increasing their reserves or by investing in various financial instruments waiting for more opportune times (see also Okishio 1975, pp. 129-30). The idea of variations in reserves (or hoarding) constitutes *prima facie* evidence of the importance of expectations in Marx's analysis. Hence, effective demand is periodic and structural, deriving within the elemental process of accumulation. In Keynes, by contrast, there is an exaggeration of the financial autonomy of capital and introduces an essentially fictional *deus ex machina* in the form of "expectations" or "animal spirits" that regulate capital accumulation, the level of output, employment and profitability. The idea is that capitalists are assumed to have some approximate idea on whether or not the MEC will be at some particular level, so they invest accordingly, and they affect output, employment and profits, thereby validating their expectations. In Keynes's overall analysis, capacity utilization as well as marginal propensity to save (or consume) together with interest rates are variables amenable to government control and can exert an influence on output, employment and profitability to a desired direction. In Marx's analysis it could be argued that although expectations are important their role is nevertheless limited as they are conditioned by the evolution of the general rate of profit.

Finally, while in both Marx's and Keynes's analysis there is a long run tendential fall in profitability which is associated with the economic crisis, Keynes's idea of a declining MEC has obvious parallels with Marx's theory of the tendency of the rate of profit to fall although for different reasons; however, the crisis mechanism is approximately the same. Both argued that capitalism is an evolving system whose stage is

determined, to a great extent, by the fluctuations in expected profitability. This is the reason why they are both interested in the future of the system, of course, with different visions. Keynes, whose primary interest was in the maintenance of the capitalist character of the system, realized that the fall in the MEC must lead to substantial reforms, with "a gradual disappearance of the rate of return on accumulated wealth" providing "a sensible way of gradually getting rid of many of the objectionable features of capitalism [...]" (*General Theory*, p. 221), otherwise the "socialist" alternative, identified with the state's control of the means of production would prevail. Marx, contrary to Keynes, objects to the capitalist character of the system and not just to some of its "objectionable features" and he provides us with a detailed analysis of both. We showed that Marx's and Keynes's analyses have important similarities and that their differences in analysis may supplement each other in a way so as to enhance our understanding of both the dynamics of the capitalist system as well as of the limits of economic policy.

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