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the birth of macrotheory:
the Keynes-Hayek
exchange in retrospect

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Capital controversy in the birth of macrotheory: the Keynes-Hayek exchange in retrospect¹

Gilberto Tadeu Lima

Abstract

This paper approaches the Keynes-Hayek debate in the early 1930s. The author attempts show that many of the theoretical issues occupying contemporary macro and monetary economists were dealt with in that debate. Accordingly, the author calls attention to a research agenda coming from that debate whose importance goes well beyond the limits of the historiographic curiosity.

Key-words: Keynes, John Maynard, 1883-1946; Hayek, Friedrich A. von, 1889-; Capital controversy.

Resumo

O presente artigo aborda o debate Keynes-Hayek do início dos anos 30. O autor busca mostrar que muitas das questões teóricas que hoje ocupam macro-economistas e economistas monetários foram enfocadas naquele debate. O autor ressalta uma agenda de pesquisa que brota deste debate, agenda cuja importância vai além dos limites da curiosidade historiográfica.

Palavras-chave: Keynes, John Maynard, 1883-1946; Hayek, Friedrich A. von, 1889-; Capital (Economia).

1. A close historical inspection shows that many of the theoretical issues occupying contemporary macro and monetary economists clearly surfaced in the Keynes-Hayek debate in the early 1930s. Indeed, one might well claim that a close examination of some major theoretical issues involved in that debate is critical for understanding the evolution of macrotheory as a separate discipline. More precisely, several contemporary theoretical debates centered on issues such as the process of equalization between investment and saving, the relative speed of adjustment of prices and quantities, and the source and propagation of economic

¹ I benefited from valuable discussions with Amitava Krishna Dutt in the course of working on an earlier version of this essay. The sole responsibility for the ideas expressed here, though, rests with me.

fluctuations, for instance, surfaced in the Keynes-Hayek exchange.² On the other hand, that debate came to an abrupt end before the important themes it had brought to the fore had been really tackled, and right after the publication of Keynes' *General Theory* (hereafter GT) the debate quickly died out. Many of the issues that were central to that debate were never resolved, particularly those related to capital theory. Indeed, current mainstream literature, be it neoclassical or Keynesian, by and large ignores Hayek's emphasis on the relationship between the capital structure and the monetary structure of the economy. As far as historical significance is concerned, it is worthy of recall that the Keynes-Hayek exchange involved two of the most cited 'macroeconomists' in the early 1930s.³

Even though the plasticity of the Keynes-Hayek debate tends to create a tendency to use the historical setting to stage modern theoretical controversies, the discussion that follows is intended to focus primarily upon those issues being explicitly dealt with by Keynes and Hayek themselves; mine, therefore, is not an exegetical analysis intended to find out what the whole debate really meant, really. In other words, though the discussion that follows is predicated upon the notion that that exchange anticipated several modern controversies, it is not intended to discuss issues such as whether Keynes and Hayek meant something other than they said or left important positions unstated or relevant questions unanswered.

But as far as the implications of that exchange are concerned, I will allow myself to sprinkle a few idiosyncratic speculations along the way. To that end, I intend to read out of the exchange the discussion of the major issues actually dealt with alone, taking the participants' positions at face value. To put it more precisely, I focus primarily upon some capital-theoretic issues involved in the Keynes-Hayek exchange with a view to very tentatively evaluate to what extent, if any, some macrotheoretic conclusions advanced in Keynes' *Treatise on Money* (hereafter TM) are undermined by Hayek's capital-theoretic objections.

The sharpest theoretical exchanges between Hayek and Keynes took place during the course of Hayek's two-part profoundly unfavorable review of the TM (Hayek, 1931a; 1932a), along with a reply by Keynes (Keynes, 1931) and a

2 Hicks (1967:203) reminds us: "When the definitive history of economic analysis during the 1930s comes to be written, a leading character in the drama (it was quite a drama) will be Professor Hayek. Hayek's economic writings...are almost unknown to the modern student; it is hardly remembered that there was a time when the new theories of Hayek were the principal rival of the new theories of Keynes".

3 Deutscher (1990) analyzed citations in articles listed under *Aggregative and Monetary Theory and Cycles* and the nonhistorical categories of *Money, Credit and Banking* in the American Economic Association Index of Economic Journals. In 1931-35, after the publication of *A Treatise on Money* by Keynes (1930) and *Prices and Production* by Hayek (1931), Keynes was the most cited macroeconomist with 66 citations, followed by Robertson (44) and Hayek (33).

rejoinder by Hayek (1931b).⁴ In addition, Keynes sicked Piero Sraffa on Hayek, thus leading to further exchanges and interventions (Sraffa, 1932a; 1932b & Hayek, 1932b).⁵ A striking feature of the Keynes-Hayek debate is that the theoretical issues actually at stake are not easily detectable, a problem greatly compounded by the fact that several concepts and variables are defined quite differently by Keynes and Hayek. Given the limited scope of this essay, though, I should say that such terminological differences will be addressed only to the extent that they have some bearing on the basic capital-theoretic issues involved in the debate.

I would submit that a major source of theoretical disagreement between Keynes and Hayek regards the role played by monetary factors in the causal process through which a disequilibrium between investment and saving leads to a corresponding change in the price level. While Keynes sustained that such disequilibrium may lead to a price level change even if the amount of money in circulation remains constant, Hayek, based upon capital-theoretic considerations, sustained that a change in the price level arising from a disequilibrium between investment and saving will be necessarily accompanied by a proportional change in the amount of money in circulation.

As I detail in what follows, while Keynes' position is that changes in investment and/or saving can occur autonomously, so that changes in the price level can be set in motion independently of a change in the volume of monetary circulation, Hayek claimed on capital-theoretic grounds that saving and investment cannot remain equal when a change in that volume takes place. More broadly, Hayek's position was that money and credit are in fact the necessary and sufficient conditions for the occurrence of cyclical fluctuations.

4 An interesting historical account of the Keynes-Hayek debate is delivered by McCormick (1992), though it focuses almost exclusively upon the policy issues surrounding the debate rather than, as I do here, on the theoretical issues separating Keynes and Hayek.

5 It goes beyond the scope of this essay a discussion of the intervention by Sraffa in the debate. A first-rate reinterpretation of the Sraffa-Hayek exchange, both on theoretical and methodological grounds, is delivered by Lawlor and Horn (1992). Additionally, Mongiovi's (1990) suggestive analysis of the connection between that exchange and the origins of the Chapter 17 of the GT, its lack of enough textual evidence notwithstanding, is also worthy of reference. I would only suggest that another possible connection between Keynes and Sraffa may be found in Keynes' digression on index numbers in TM. Keynes argues that since the purchasing power of money depends on the quantity of goods and services which a unit of money will purchase, it follows that it can be measured by the price of a composite commodity, made up of the various individual goods and services in proportions corresponding to their importance as objects of expenditure. Also in Chapter 17 of the GT, which was greatly influenced by the notion of own-rate of interest introduced by Sraffa in his exchange with Hayek, one finds Keynes noting that there are the same obstacles in the way of the definition of a composite commodity as there are to the setting up of a unique standard of value. A possible connection between Keynes' notion of a composite commodity and Sraffa's standard commodity is an interesting issue that, at least to my knowledge, has not received enough attention in the literature.

2. Keynes' fundamental equations for the value of money were intended to provide a framework for the analysis of both the causal process by which the price level is determined and the method of transition from one position of equilibrium to another. In order to treat these issues dynamically, Keynes broke away from the traditional method of setting out from the total quantity of money irrespective of the purposes on which it is employed. He started with the twofold division of the money income into the parts which have been earned by the production of consumption goods and of investment goods, on the one hand, and into the fractions which were spent on consumption goods and on savings, on the other hand.

For Keynes, if the first of these divisions of money income is in the same proportion as the second, then the price level of consumption goods will be in equilibrium with their cost of production. Keynes derived the fundamental equations in the following way. Let E be the total money income, and I' the fraction of it which has been earned by the production of investment goods. Thus, I' measures the production cost of new investment and $E - I'$ the cost of production of the output of consumption goods. Further, let S be the amount of savings, so that $E - S$ measures the current expenditure on consumption goods. Let us choose the units of quantities of goods in such a way that a unit of each has the same cost of production at the base date. Now, let O be the output of goods in terms of these units, R the volume of consumption goods purchased by consumers, and C the net increment of investment, thus implying that $O = R + C$.

Let P be the price level of consumption goods, so that $P.R$ represents the current expenditure on consumption goods and EC/O is the cost of production of new investment, I' . Since the expenditure on consumption goods is equal to the difference between income and savings, we have

$$P.R = E - S = E(R + C)/O - S = E(R + I' - S)/O$$

or

$$P = E/O + (I' - S)/R \quad (1)$$

which is the first of Keynes' fundamental equations.

Now, let W be the rate of earnings per unit of human effort, W_1 the rate of earnings per unit of output, and e the coefficient of efficiency, so that $W = e.W_1$. We can then rewrite equation (1) as follows:

$$P = W_1 + (I' - S)/R \quad (2)$$

or

$$P = W/e + (I' - S)/R \quad (3)$$

Thus, the stability of the price level of consumption goods, and for that matter of the purchasing power of money, involves two conditions, namely, that efficiency earnings should be constant and the cost of new investment should be equal to the volume of current savings. In other words, the price level, as determined by the cost of production, is upset by the fact that the division of the output between investment and goods for consumption is not necessarily the same as the division of the income between consumption and saving. For workers are paid just as much as when they are producing for investment as when they are producing for consumption; but having earned their wages, it is they who please themselves whether they spend or refrain from spending them on consumption. Meanwhile, the entrepreneurs have been deciding quite independently in what proportions they will produce the two categories of output.

If we assume the price level of new investment goods as given, we can obtain a formula for the price level of output as a whole in the following way. Let P' be the price level of new investment goods, Z the price level of output as a whole, and $I = P'.C$ the value (as distinguished from I' , the cost of production) of the increment of new investment goods. Then

$$\begin{aligned} Z &= (P.R + P'.C)/O \\ &= (E - S + I)/O \\ &= E/O + (I - S)/O \end{aligned} \tag{4}$$

which is the second of Keynes' fundamental equations. As before, we can rewrite equation (4) as follows:

$$Z = w_1 + (I - S)/O \tag{5}$$

$$= W/e + (I - S)/O \tag{6}$$

Let us now turn to the characteristics of profits. Keynes reserved the term *profits* for the difference between the cost of production of the current output and its actual sales proceeds, so that they are not part of money income. Thus, it is the difference between the actual remuneration obtained by the entrepreneurs and their normal remuneration that is defined by Keynes as profits. As for normal remuneration, it is defined as that rate of remuneration which, if entrepreneurs were open to make new bargains with all the factors of production at the currently prevailing rates of earnings, would leave them under no motive either to increase or to decrease their scale of operations.

Let Q_1 be the amount of the profit on the production and sale of consumption goods, Q_2 the corresponding profit on investment goods, and Q the total profit. Then

$$\begin{aligned} Q_1 &= P.R - (E.R)/O \\ &= E - S - (E - I') \\ &= I' - S \end{aligned} \tag{7}$$

and, since

$$\begin{aligned} Q_2 &= I - I' \\ Q &= Q_1 + Q_2 \end{aligned}$$

it follows that

$$Q = I - S \tag{8}$$

Thus, the profits on the production of consumption goods are equal to the difference between the cost of *new* investment and savings, and the total profits on output as a whole are equal to the difference between the *value* of new investment and savings. It follows that we can rewrite equations (2) and (5) as follows:

$$P = W_1 + Q_1/R \tag{9}$$

$$Z = W_1 + Q/O \tag{10}$$

In words, the price of consumption goods is equal to the rate of earnings of the factors of production *plus* the rate of profits per unit of output of consumption goods, and correspondingly with output as a whole. As Keynes noted, one peculiarity of profits is that when entrepreneurs choose to spend a portion of their profits on consumption, the effect is to increase the profit on the sale of consumption goods by an amount exactly equal to the amount of profits which have been so spent. In other words, however much of their profits entrepreneurs spend on consumption, the increment of wealth belonging to them remains the same as before.

It was in this sense that Keynes referred metaphorically to profits as a widow's cruse which remains undepleted however much of them may be devoted to consumption. When, on the other hand, entrepreneurs are making losses, and seek to recoup these losses by curtailing their expenditure on consumption, i.e. by saving more, the cruse becomes a Danaid Jar which can never be filled up; for the effect of

this lower expenditure is to inflict on the producers of consumption goods a loss of an equal amount.⁶

In this context, it is worth noting that a distinctive conclusion of Keynes' analysis, and one that will play a crucial role in the later Cambridge growth models, is that profits are an effect of the rest of the situation rather than a cause of it.⁷ For this reason, Keynes argued, it would be anomalous to add profits to (or subtract losses from) income; for, in that case, savings could never fall off, however great the expenditure of the public on current consumption, and equally savings could never be increased by a reduced expenditure on consumption; provided merely that entrepreneurs were continuing to produce the same output of investment goods as before.

More precisely, if windfall profits and losses are included in income, i.e. if income is defined as being not E , but $E + O$, and saving as the excess of income over expenditure on consumption, it follows that saving is in all cases exactly equal to the value of current investment. In other words, total savings cease to be a factor having any independent existence, in the sense that its amount cannot be affected by the voluntary decision of the various recipients of income as to how much of their income they will spend on consumption, thus depending solely on what the value of current investment happens to be.

Thus, the conditions for the equilibrium of the purchasing power of money require that the banking system should so regulate its rate of lending that the value of investment is equal to savings; for otherwise entrepreneurs will, under the influence of positive or negative profits, be both willing in themselves and at the same time influenced by the abundance or scarcity of bank credit at their disposal, to increase or diminish the average rate of remuneration W_1 which they offer to the

6 The metaphor of the widow's cruse that magically refills as it is emptied thus means that as a class, if not individually, capitalists' pockets refill with profits as they are emptied by investment expenditures. Even though the terminology is Keynes' (1971:139), the same idea appeared in Kalecki (1933:13) as well. The reference is to the Bible story about the miraculously refilled oil cruse of the widow who helped the prophet Elijah (1 Kings 17:9-19). As for the Danaid Jar, the reference is to the forty-nine Danaid sisters of the Greek mythology who, having killed their husbands on the wedding night, were condemned to spend eternity trying to fill a leaky jar with water.

7 In fact, Kaldor's (1956) version of the Cambridge growth theory, in which the share of profits in income depends simply on the ratio of investment to output, is assumedly based on such metaphor. Robinson's (1962) version, in turn, has a more Kaleckian flavor. As is well-known, the double-sided relationship between profit and investment, which figured prominently in Kalecki's theory of business cycle, is based upon the influence of current conditions on current long-term expectations. Current investment expenditures (determined by decisions made in previous periods) have a positive effect on current profits, while these profits have a positive effect on current investment decisions, and thus on future investment expenditures. By bringing in a value for capital, Robinson's (1962:48) famous "banana diagram" made this into a double-sided relationship between the rate of profit and the rate of accumulation.

factors of production. But the conditions for equilibrium also require that the cost of new investment should be equal to savings; for otherwise producers of consumption goods will be endeavouring, under the influence of profits or losses, to alter their scale of output.

It is thus evident in what manner changes in the bank rate – or, more strictly, changes in the interest rate – are capable of influencing the purchasing power of money. The attractiveness of investment depends on the prospective income which the entrepreneur anticipates from current investment relatively to the rate of interest which she has to pay in order to be able to finance its production; or, to put it the other way around, the value of capital goods depends on the interest rate at which the prospective income from them is capitalised. The higher the interest rate, for instance, the lower, other things being equal, will be the value of capital goods.

Therefore, if the rate of interest rises, P' , the price level of new investment goods, will tend to fall, which will lower the rate of profit on the production of capital goods, which will in turn be deterrent to new investment. Thus, a high interest rate will tend to diminish both the price level and the volume of output of capital goods. The rate of saving, in turn, is stimulated by a high interest rate and discouraged by a low rate. It follows that an increase in the interest rate tends, other things being equal, to make the rate of investment (whether measured by its value or by its cost) to decline relatively to the rate of saving, thus moving the second term of both fundamental equations, namely, equations (1) and (4), in the negative direction, so that the price level tends to fall.

Following Wicksell, Keynes called the rate of interest which would cause the second term of the second fundamental equation – equation (4) – to be zero the *natural* rate of interest, and the rate which actually prevails the *market* rate. If, therefore, the banking system can regulate the amount which it lends in such a way that the market rate of interest is equal to the natural rate, then the value of investment will be equal to the volume of saving, total profits will be zero, the price of output, as a whole, will be at an equilibrium level, and there will be a motive moving resources between the production of consumption goods and the production of capital goods unless or until the purchasing power of money is also at an equilibrium level.

Hence, Keynes' fundamental equations for the value of money can be seen as a (Marshallian) reformulation of the Wicksellian theory in terms of deviations between saving and investment. While the central feature of the Wicksellian theory is that deviations between the market rate and the natural rate give rise to cumulative changes in the level of prices, Keynes' fundamental equations are

intended to illustrate the macro processes through which any divergence between saving and investment must necessarily equal the aggregate profits or losses incurred in production. It is in this sense that I would venture that Keynes' fundamental equations can be seen as an attempt to provide the Wicksellian theory with sounder (meaning Marshallian) *macrofoundations*. Besides, it is in this specific context that I will very tentatively evaluate how plausible is Hayek's claim that Keynes completely ignored the theoretical basis of Wicksell's theory, that basis being, Hayek argued, the most elaborate theory of capital we possess.

3. In the first part of his review of the TM, Hayek (1931a) begins with a detailed analysis of the concept of entrepreneur's profits used by Keynes. Hayek admits not to have any fundamental objection either to their exclusion from money income or to Keynes' contention that when they are positive (negative) entrepreneurs will seek to expand (curtail) their scale of production. What Hayek does not agree with is Keynes' explanation of why profits arise, nor with Keynes' notion, according to Hayek, that only changes in that sense can lead to a change in output. For Hayek, the problem with Keynes' argument is that profits are seen as a purely monetary phenomenon, in the sense that the cause of their emergence is not a real factor, not some maladjustment in the relative demand for and supply of cost goods and their respective products – that is, the relative supply of intermediate products in the stages of production – but simply and solely spontaneous changes in the quantity and direction of the flow of money. Indeed, Hayek contends, the flow of money is treated as if it were the only independent variable which could cause a positive or negative difference between the prices of the products and their respective costs.

For Hayek, Keynes seems never to have been concerned to study the fundamental non-monetary problems of capitalistic production. Indeed, the Austrian flavour of Hayek's objection is made clear when Keynes is criticized for having treated the flow of money as if it were the only independent factor which could cause a positive or negative difference between the prices of the products and their respective costs. In Hayek's view, "[t]he structure of goods on which this flow impinges is assumed to be relatively rigid. In fact, of course, the original cause may just as well be a change in the relative supply of these classes of goods, which then, in turn, will affect the quantities of money expended on them" (1931a:273).

For Hayek, Keynes' position flows from the truism that profits can arise only if more money is received from the sale of goods than has been spent on their production, the conclusion Keynes' drawn from it being a fallacy if only the prices of finished consumption goods and the prices paid for the factors of production are contrasted. With the insufficient exception of new investment goods, Hayek argues,

Keynes in fact treated the process of the current output of consumption goods as an integral whole in which only the prices obtained at the end for the final products and the prices paid at the beginning for the factors of production have any bearing on its profitability. In order to show the supposedly fallacious nature of Keynes' analysis, Hayek formulates the following counter-example.

Let us assume that no investment takes place, so that the total expenditure on the factors of production is to be counted as being directed towards the production of consumers' goods. In this case, it is conceivable that there may be no net difference between the total receipts for the output and the total payments for the factors of production, and no net profits for the entrepreneurs as a whole, because profits in the lower stages of production (i.e. those nearer consumption) are exactly compensated by the losses in the higher stages.

However, it will not be profitable for a time for entrepreneurs as a whole to continue to employ the same quantity of factors of production as before. We would need only consider the case that in each stage of the successive stages of production there are more intermediate products than are needed for the reproduction of the intermediate products existing at the same moment in the following stage, so that in the lower stages there is a shortage, and in the higher stages there is an abundance, as compared with the current demand for consumers' goods.

In this case, entrepreneurs in the higher stages of production will probably make losses; but even if these losses were exactly compensated by the profits made in the lower stages, in a large part of the whole process it will not pay to employ all the factors of production available. And while the losses of the producers of those stages are balanced by the profits of those finishing consumption goods, the diminution of their demand for the factors of production cannot be made up by the increased demand from the latter because these need mainly semi-finished goods and can use labour only in proportion to the quantities of such goods which are available in their respective stages.

In such a case, profits and losses are originally not the effect of a discrepancy between the receipts for consumption goods and the expenditure on the factors of production, not being therefore explained by Keynes' equations. Or, rather, there are no total profits in Keynes' sense in this case, and yet there occur those very effects which Keynes regards as only conceivable as the consequence of the emergence of net total profits or losses. In Hayek's view, Keynes' macro analysis of profits involves a fallacy of composition: while Keynes' definition of profits serves well when it is applied to individual profits, it becomes misleading when it is applied to entrepreneurs as a whole. The entrepreneurs making profits need not necessarily employ more original factors of production (labour and land)

to expand their production, but may draw mainly on the existing stocks of intermediate products of the preceding stages while entrepreneurs making losses dismiss workmen.

Moreover, Hayek argues that it is not only possible for the changes which Keynes attributed solely to changes in total profits to occur when total profits in Keynes' sense are absent, but it is also possible for total profits to emerge for causes other than those contemplated in Keynes' analysis. In other words, it is not necessary for total profits to be the effect of a difference between current receipts and current expenditure. Nor need every difference between current receipts and current expenditure lead to the emergence of total profits. For even if there is neither positive nor negative investment, yet entrepreneurs may gain or lose in the aggregate because of changes in the value of capital which existed before – changes due to new additions to or subtractions from existing capital.

In Hayek's view, it is such changes in the value of existing intermediate products which act as a balancing factor between current receipts and current expenditure. To put it another way, profits cannot be explained as the difference between expenditure in one period and receipts in the same period or a period of equal length because the result of the expenditure in one period will very often have to be sold in a period which is either longer or shorter than the first period. It is indeed the essential characteristic of positive or negative investment that this must be the case.

In Hayek's view, another mischievous peculiarity of Keynes' definition of profits is that it implies that there exists some normal rate of remuneration of invested capital which is more stable than profits. For Hayek's, even granted it is true, as it probably is, that the rate of remuneration of the original factors of production is relatively more rigid than profits, it is certainly not true in regard to the remuneration of invested capital. Hayek claims that Keynes arrived at this view by an artificial separation of the function of the entrepreneurs as owners of capital and their function as entrepreneurs in the narrow sense. For Hayek, this kind of separation cannot be made, for the essential function of an entrepreneur, i.e. that of assuming risks, necessarily implies the ownership of capital. Besides, any new chance to make entrepreneurs' profits is identical with a change in the opportunities to invest capital, and will always be reflected in the earnings (and value) of capital invested.

It is such artificial separation, in turn, that is claimed to have led Keynes not to an adequate explanation of the changes in the demand price offered by the entrepreneurs for new capital, but only to an explanation of changes in their aggregate demand for factors of production in general. More to the point, what

would be missing in Keynes' analysis is an explanation of the causes which make investment more or less attractive. For Hayek, such explanation can be reached only by means of a close analysis of the factors determining the relative prices of capital goods in the different successive stages of production, for the difference between these prices is the only source of interest; since this is excluded from the outset if only total profits are made the aim of analysis, Keynes' aggregates can be conceived as concealing the most fundamental mechanism of change.

To sum up, Hayek's claim is that Keynes' failure to realise the necessity of dealing with the all-important problem of changes in the value of existing capital is the main cause of his unsatisfactory treatment of profit. And it is in this sense that I would suggest that Hayek's capital-theoretic objections to the fundamental equations can be seen as an early (maybe even the earliest) attempt to challenge Keynesian macro outcomes by arguing that they lack sound microfoundations.

Having assessed Keynes' definition of profits, Hayek then turns to Keynes' description and explanation of the process of investment, which he conceives as lacking an adequate theory of capital and saving. For Hayek, Keynes' analysis of eventual changes in the direction of money flows (as between consumption and saving) is misleading for it impinges on a rigid structure of production. Hayek claims that the decision to save implies, and actually set in motion through a fall in the interest rate, a transfer of factors of production into more roundabout processes for producing consumption goods.

It should be recalled that Hayek expressed the ratio of capital employed in production to output in terms of time, which meant that the use of a greater amount of capital for a given process is to be regarded as prolonging it, or making it more roundabout. Hence, Hayek says, a more careful analysis of the reasons which make different stages of production more or less attractive would have shown that changes in saving habits can never of themselves give rise to total profits and losses in Keynes' sense, or an eventual divergence between investment and saving; for only a change in the effective amount of money can do that, which implies that Keynes' claim that investment and saving can diverge depends on the banking system departing from monetary neutrality.

Hence, Hayek's criticisms were grounded on one major characteristic of the Austrian tradition, namely, a close connection between the theories of capital and interest. Derived from the work of Böhm-Bawerk, such a connection was intended to show how the market system would secure an optimal distribution of resources not just at any moment in time, but also over time, the rate of interest being a real phenomenon. Decisions to save are nothing but decisions to give up a certain amount of goods now in order to secure the consumption of a greater

quantity of goods in the future, the rate of interest being the natural rate of exchange between present and future goods.⁸ In this framework, changes in the structure of production, reflecting changes in intertemporal preferences, occur smoothly provided money is kept neutral; that is, in the absence of inflation or deflation by the banking system. In a word, unless the effective amount of money is kept constant, the market rate of interest deviates from the natural rate, so that producers receive price signals which do not reflect the wishes of consumers.

Therefore, Hayek's original contribution was the utilization of Wicksell's hypothesis of a divergence between the natural rate and the market rate of interest as the starting point not of an analysis of the determination of the general price level under static conditions, but of a dynamic analysis of disequilibrium processes of a monetary economy where the structure of relative prices and quantities produced is distorted by a continuous influx of newly created money. In a word, Hayek tried to demonstrate on theoretical grounds that changes in the quantity of money, by redistributing the money stream among different goods, does have an effect on relative prices and, therefore, on the distribution of productive resources between the different sectors and on the quantities produced on the different kinds of goods. Indeed, these changes in the structure of production and capital play a paramount role in Hayek's theory of the cycle.

To put it crudely, a typical cycle would unfold as follows. When banks expand credit, thus lowering the market rate of interest, firms use this newly created purchasing power to begin lengthening the process of production, just as if there had been a fall in the natural rate. But as all resources are fully employed, resources are taken away from consumers who, unlike a situation in which the natural rate has fallen, did not voluntarily reduce their real desired consumption; rather, they were forced to consume less than they desired. The partially unmet demand for current consumption goods, in turn, begins to push up the prices of such goods relative to future goods, or, what amounts to the same thing in the Austrian view, the market rate of interest starts rising. This signals firms that their previous decisions to undertake more roundabout investment projects are no longer

⁸ Assume, for instance, that there is an increase in a community's desire to save, that is, an increase in its preference for future over present goods. As such an increase will lower the natural rate of interest, firms realize that production processes that are more roundabout, that is, those which take a longer time to produce consumer goods, become profitable. Now, a fundamental claim within the Austrian theory of capital is that more roundabout methods are also more productive ones, in the sense that they allow firms to produce more goods in the future, thereby meeting the desires of consumers. On the other hand, the movement to more roundabout methods of production also involves a change in the relative prices of a whole range of producer's goods, and these price changes bring about a change in the whole structure of the capital stock: in Austrian parlance, goods of a higher order, that is, capital goods that are further away (in time) from the production of first-order consumption goods, are added, thus lengthening the structure of production.

profitable and must be abandoned before they come to fruition, thus initiating the crisis, or slump, phase of the cycle.⁹

It is in this sense that Hayek contended that Keynes' was simply a version of a forced-saving theory, Keynes being charged with having lifted the interest rate story out of its original (i.e. Austrian) context.¹⁰ For Hayek, Keynes, having wrongly ignored the capital-theoretic basis of Wicksell's theory, which is based on Böhm-Bawerk's, made a satisfactory analysis of investment quite difficult for himself for the following reasons. First, he failed to discuss the conditions which must be necessarily met to secure the effective continuation of the existing capitalistic (i.e. roundabout) organisation of production. Second, he took the maintenance of the existing capital stock as a matter of course, which it certainly is not, for it requires definite relationships between the prices of consumption goods and the prices of capital goods to make it profitable to keep capital intact. Finally, he separated the process of reproduction of the old capital from the addition of new

⁹ As a detailed account of Hayek's cycle theory goes beyond the scope of this essay, I do not discuss the implied view that such a crisis will, sooner or later, play itself out. An excellent summary of Hayek's cycle theory is delivered by Collona (1990); Cottrell (1994) and Desai (1991). Collona focuses on the central role assigned by Hayek to changes in the structure of production over the course of business cycle, and to the connection between such changes and the credit system. Cottrell sets out a clarifying formal example of the kind of transition between structures of production that Hayek described. Desai, in turn, argues that Hayek was engaged in the 1930s on a very ambitious research programme to integrate money and capital into Walrasian General Equilibrium Theory, using the Austrian approach. For Desai, Hayek wanted nothing less than an equilibrium theory of the business cycle in a monetary economy with heterogeneous capital. In turn, the major similarities and differences between Hayek's and the contemporary real business cycle theory are aptly assessed by Cochran and Glahe (1994).

¹⁰ An interesting issue that would certainly deserve further elaboration is a comparative analysis of the accounts of the role played by credit-money (and interest) in changes in the structure of production provided by Hayek and Schumpeter. Even though such an analysis goes beyond the compass of this essay, some idiosyncratic speculations may contribute to further research. As I detailed elsewhere (Lima, 1995), credit-money plays a crucial role in Schumpeter's theory of development, for bank financing is a necessary condition if entrepreneurs are to introduce innovations. In this sense, Schumpeter's cycle theory, like Hayek's, is based upon the non-neutrality, as far as the structure of production is concerned, of money creation. Indeed, the origins of both cycle theories can be traced back to Wicksell's monetary theory, which is often identified with the cumulative process expounded in his 1898 *Interest and Prices*. More precisely, in one of the few pages which Wicksell devotes to the effects of credit on accumulation, thus relinquishing the hypothesis that the level and composition of income in the cumulative process is stationary (i.e. that changes in the interest rate does not bring about any modification in the techniques of production that entrepreneurs choose to adopt), it is suggested that "it lies in the power of the credit institutions, acting in cooperation only with entrepreneurs, to determine the direction of production and consequently the period of investment of capital" (p. 155). However, Schumpeter's approach, in which the incessant process of creative destruction via technological change plays a paramount role, in fact broke with the Austrian view in (at least) two fundamental ways. Firstly, by seeing (endogenous) money creation as a positive feature of a market economy, for it allows the latter to move beyond a circular flow and thus to generate development. Secondly, by cutting the relationship posed by Böhm-Bawerk between time and interest. As Schumpeter defined capital as a fund of purchasing power which can be created *ad hoc*, rather than as a means of production, interest emerges as a monetary phenomenon, rather than as a real one.

capital, and treated the former simply as a part of current production of consumption goods, in defiance of the obvious fact that the production of the same goods, whether they destined for the replacement of, or additions to, the old stock of capital, must be determined by the same set of conditions.

The origin of the problem, according to Hayek, is that instead of a horizontal division between capital goods (or goods of higher stages) and consumption goods (or goods of lower stages), Keynes attempted a vertical division, thus counting that part of the production of capital goods which is necessary for the continuation of the current production of consumption goods as a part of the process of producing consumption goods, and only that part of the production of capital goods which *adds* to the existing stock of capital as production of investment goods. For Hayek, this analytical procedure created serious difficulties when Keynes had to determine what was to be considered as additional capital. The question is whether any increase of the value of the existing capital is to be considered as such an addition – in this case, of course, such an addition could be brought about without any new production of such goods – or whether only additions to the physical quantities of capital goods are counted as such an addition – a method of computation which becomes clearly impossible when the old capital goods are not replaced by goods of exactly the same kind, but when a transition to more capitalistic methods brings it about that other goods are produced in place of those used up in production.

It is in this context that Hayek attributes to Keynes the contention that any divergence between investment and saving must arise from, and be equal to, changes in the supply of money made available to entrepreneurs by the banking system. It should be recalled that Keynes' picture of the circulation of money shows three points where disturbing spontaneous changes may be initiated: (1) the rate of saving may change; (2) the rate of investment may change; and (3) banks may pass on to investors more or less money than that part of the savings which is not directly invested (and that part of the old capital which is withdrawn from investment) but converted into bank deposits, so that the total of money going to entrepreneurs as investment surpasses or falls short of total savings. If only (1) changes, the effect will be that producers on consumption goods receive so much or less for their output than has been spent on its production. Provided that (3) remains at the equilibrium position, the effect on the production of investment goods will be exactly the reverse of the effect on the production of consumption goods.

A change in (1), therefore, will never give rise to total profits, but only to partial profits balanced by equal losses, and only lead to a shift between the production of consumption goods and the production of investment goods which

will go on until profits on both sides disappear. It can be seen that the effect of changes in (2) will, if not accompanied by changes in either (1) or (3), be of exactly the same nature as of changes in (1). Positive profits on the one hand and negative profits on the other will soon show that the deviation from the equilibrium position existing before without a corresponding change in (1) is unprofitable and will lead to a re-establishment of the former proportion between the production of consumption goods and the production of investment goods.

Thus, only a change in (3) will lead to total profits, which is also shown by the formula for total profits given by equation (8). It is in this context that Hayek wrongly attributed to Keynes the contention that the fact that more (or less) money is being invested than is being saved is equivalent to so much money being added to (or withdrawn from) industrial circulation. As detailed below, Keynes' argument is in fact that changes in saving or investment can occur autonomously, so that cyclical movements can be set in motion independently of changes in the money supply. It is worth pointing out that an implication of Keynes' position is that monetary policy can, by altering the bank rate, be effective in counteracting cyclical fluctuations, a policy effectiveness argument that may have been the feature of Keynes' analysis which drew Hayek's fire.

4. In his reply to Hayek, Keynes (1931) denies to have claimed that the difference between saving and investment could be exactly measured by changes in the quantity of money, corrected or uncorrected for changes in the velocity of circulation or the volume of output or the number of times intermediate products change hands.¹¹ For Keynes, Hayek holds himself, and wrongly implies that he (Keynes) also holds, that a monetary expansion is not merely a possible cause of investment exceeding saving, but also (1) that it is a necessary cause of this and (2) that the amount of the monetary expansion exactly measures the excess of investment over saving and hence is exactly equal to the amount of profits in Keynes' terminology.

Keynes' reply is that money may be advanced to entrepreneurs (directly by the banks, or through the new issue market or by the sale by them of their existing assets) either to meet losses or to provide for new investment, and that statistics of

¹¹ The first part of Hayek's review (Hayek, 1931a) made Keynes quite unhappy, for his copy of that issue of *Economica* is among the most heavily annotated of the surviving copies of his journals, with no less than 34 marks or comments on Hayek's review. At the end of his copy of the review, Keynes wrote: "Hayek has not read my book with the measure of 'good will' which an author is entitled to expect of a reader. Until he can do so, he will not see what I mean or know whether I am right. He evidently has a passion which leads him to pick on me, but I am left wondering what this passion is" (Keynes, 1973b:243).

the quantity of money do not enable us to distinguish between the two cases. Besides, if an entrepreneur, desiring to be more liquid, sell Consols to a bank in exchange for a bank deposit and the bank does not choose to offset this transaction but allows its deposits to be correspondingly increased, the quantity of money is changed without anything having happened either to saving or to investment.

For Keynes, Hayek's argument seems to run as follows. Voluntary saving always finds its way into investment, for an increase in saving means, other things being equal, a net increase of purchasing power directed to the buying of investment goods. It does not, though, follow from this that voluntary saving and investment are always equal. Hayek argues that if the banking system increases the supply of money, additional funds will be available for investment in excess of the amount provided by voluntary saving, with the result that investment will exceed saving, and contrariwise if the banking system decreases the supply of money. In this context, investment due to an increase in the quantity of money involves the public in a corresponding amount of what may be called forced saving.¹²

Thus, it is only a departure on the part of the banking system from what Hayek calls neutrality that would be capable of upsetting the equilibrium between investment and saving. Keynes replies that his view is that saving and investment can get out of gear without any change on the part of the banking system from neutrality as defined by Hayek. Such an imbalance may arise merely as a result of the public changing their rate of saving or the entrepreneurs changing their rate of investment, there being no automatic mechanism in the economic system (as Hayek's view would imply there must be) to keep the two rates equal, provided that the effective quantity of money is unchanged. As Keynes conceives it, a changing price level – due to an imbalance between saving and investment, costs of production being unchanged – merely redistributes purchasing power between those who are buying at the changed price level and those who are selling at it, as compared with what would have happened if there had not been a change in the relation between saving and investment.

12 A crippling objection to the forced savings argument and the distinction between natural and money rates of interest set forth by Hayek, which constituted the theoretical core of his *Prices and Production*, is provided by Sraffa (1932a), in which the role of money as a store of wealth and the concept of a commodity's own-rate of interest both play an important role. One of the main arguments used by Sraffa was that Hayek's notion of monetary neutrality was theoretically unsound; the reason being that there is no such thing as an equilibrium (or unique natural) rate of interest, but rather a multiplicity of commodity rates of interest all of which can diverge from each other in disequilibrium. As a consequence, a non-monetary economy could also be subject to cyclical fluctuations. The interested reader is again directed to the excellent contribution by Lawlor and Horn (1992).

As for Hayek's claim that Keynes neither propounded any satisfactory theory of capital and interest nor built on any existing theory, Keynes' reply runs as follows. On the one hand, Keynes admits that this is quite true, and agrees with Hayek that a development of this theory would be highly relevant to his (Keynes') treatment of monetary matters. On the other hand, Keynes replies that no satisfactory theory of capital and interest had been completed up that moment.¹³ In other words, though Keynes substantially conceded Hayek's point, thus agreeing with him that a clear account of the factors determining the natural rate ought to have a place in a completed treatise on money, he also made the telling suggestion that his and Hayek's theories occupied different terrains: while Hayek's was a theory of dynamic equilibrium, marked by fluctuations of the natural rate, Keynes' dealt with a situation in which the market rate departs from the natural one.

It is for this compelling reason, I would like to submit, that Keynes rightly neither tried to refute most of Hayek's capital-theoretic objections to Keynes' macrotheorizing in the TM nor embarked in a detailed analysis of Hayek's attempt, not only in his review of the TM but mainly in *Prices and Production*, to make an integration between capital theory and monetary theory. More to the point, Keynes rightly charges Hayek's book for tacitly assuming that at every moment of time the market rate of interest is equal to what the natural rate would be if the prevailing relationship of capital to consumption were to be permanent, and if entrepreneurs were acting on this latter assumption, without other errors of forecasting. For Keynes, it follows that Hayek is not dealing with the case that he (Keynes) is mainly concerned, that is, of what happens when the market rate of interest departs from the natural one.

I will take up this issue later, but it is worthy of wonder right here to what extent Keynes later development of a distinction between interest as the price of money and the natural rate (though he abandoned the term) as the price of capital was somehow born in those earlier elaborations on the implications of a departure of the market rate from the natural rate. To put it more precisely, one might wonder the extent to which that departure is due to the fact that in a monetary economy the rate of interest is not, as Hayek had it, the natural rate of exchange between present and future goods, but rather the premium on present over future liquidity, as Keynes had it in the GT. In this sense, one might venture that one of Hayek's role in Keynes' thought process leading to the GT was to force out of Keynes the logical

13 In his rejoinder to Keynes, Hayek (1931b) argues that the obvious answer, of course, is that even if we have no quite satisfactory theory we do at least possess a far better one than that on which Keynes is content to rely, namely, that of Böhm-Bawerk and Wicksell. For Hayek, Keynes neglects this theory not because he thinks it is wrong, but simply because he has never bothered to make himself acquainted with it.

distinction between a 'monetary' and a 'real exchange' economy, a distinctive feature of the former being money as such having its price determined separately from the price determination of capital assets.

Besides, Keynes interpreted some of Hayek's capital-theoretic objections as terminological disputes that do not have a bearing on the central theme of the TM, and it is quite fair to say that Keynes clarified some terminological matters. For instance, (1) by showing that it is not the case that he contrasted with the prices paid for the factors of production only the prices of finished consumption goods, for his definition of new investment goods also includes unfinished consumption goods; and (2) by showing that it is not the case that he separated the process of the reproduction of the old capital from the addition of new capital, for he reckons the wearing out of old capital as disinvestment and its replacement as investment. As for Hayek's contention that Keynes paid scarce attention to some real factors leading to the emergence of profits such as the relative supply of intermediate products in the stages of production and the changes in the value of the existing capital brought about by new additions to that capital, I would venture that a possible reason why Keynes did not deal with it regards his Marshallian treatment of profits. For in the TM, as Amadeo (1989) correctly put it, equilibrium refers to Marshallian long periods, in which windfall profits or losses (i.e. those experienced whenever producers' expectations are not fulfilled) and quasi-rents (i.e. differences between the price, which in equilibrium equals the marginal cost of production, and the average costs) do not exist.¹⁴

More generally, one might venture that a major reason why Keynes did not feel compelled to reply to Hayek on capital-theoretic grounds lies in the method of analysis underlying his macrotheorizing. To put it more precisely, one might well submit that Hayek's capital-theoretic objections to the fundamental equations for the value of money become somewhat illegitimate once we realize the Marshallian nature of the analytical device adopted by Keynes, namely, that of a single production period repeating itself ad infinitum apart from the variations which it is desired to explain. Hence, Keynes' (monetary) *macrotheory of capital* can incorporate the relative price effects and changes in the time structure of the production that, according to Hayek, only a (real) *microtheory of capital* would be

14 Indeed, Amadeo's (1989) analysis of the transition from the TM to the GT convincingly shows that the price versus quantity dichotomy is not an adequate basis for comparing these two works, for the actual difference between them lies in their methods of analysis. As Amadeo does not discuss, though, the Keynes-Hayek exchange, one is left to wonder to what extent, if any, Hayek's capital-theoretic criticisms played some role in the methodological shift from the single-period analysis of the TM to the static equilibrium approach of the GT. I will tentatively return to this issue later.

able to incorporate. Indeed, this is just one sense in which one might suggest that the TM was spoiled by Hayek precisely by being cast in the mould of Marshall instead of in that of Böhm-Bawerk. In other words, Hayek's fundamental disagreement with Keynes can be conceived as being essentially methodological. What Hayek really rejected was the core idea of a macrotheory, namely, the existence of stable relationships among aggregate variables.

Not surprisingly, Hayek's *Prices and Production* is predicated upon the notion that a truly legitimate monetary theory should turn upon relative prices rather than an aggregate price level, for Hayek's viewed macro variables as epiphenomena whose movement masks the micro forces that alone can explain them. In this sense, Hayek's capital-theoretic objections can be conceived as having been raised against macrotheory as such rather than just Keynes' specific form of macrotheorizing. Indeed, Hayek's views were much more radical than most of those that surfaced in the huge debate over the microfoundations of macrotheory in the 1970s, for they amounted to nothing less than the very impossibility of doing macrotheoretic analysis as such.¹⁵

Indeed, Hayek (1978) ended up admitting that the major reason why he did not review the GT was that his disagreement with that book did not refer so much to any detail of the analysis as to the general approach followed in the whole book. Hayek admitted that the real issue was the validity of what we now call macroeconomics, the significance of that book being that more than any other single work it decisively furthered the ascendancy of macroeconomics and the temporary decline of microeconomic theory. For Hayek, Keynes' conceptions rest entirely on the wrong belief that there exist relatively simple and constant functional relationships between such measurable aggregates as total demand, investment, and output. Hayek replied that there seems not only to exist no reason whatever to assume that those functions will remain constant, but also that microtheory had already demonstrated long before Keynes that they cannot be constant but will change over time both in quantity and in direction. What these relationships will be, which all macroeconomics must treat as quasi-constant, depends indeed on the microeconomic structure, especially on the relationships

15 The exchange between Keynes and Hayek in print resulted in further letters. At the end of an inconclusive series of letters between them on definitions over the months December 1931 to March 1932, Keynes can be quoted as manifesting in the following way his position regarding the February 1932 second part of Hayek's review, which argued that the model described in the TM cannot explain a divergence between investment and saving: "Having been much occupied in other directions, I have not yet studied your *Economica* article as closely as I shall. But, unless it be on one or two points which can perhaps be dealt with in isolation from the main issue, I doubt if I shall return to the charge in *Economica*. I am trying to re-shape and improve my central position, and that is probably a better way to spend one's time than in controversy" (Keynes, 1973b:266).

between different prices which macroeconomics systematically disregards. They may well change very rapidly as a result of changes in the microeconomic structure, and conclusions based on the assumption that they are constant are bound to be very misleading.¹⁶

Hayek's (1931) capital-theoretic objections to underconsumption theories of crises, for instance, illustrates his position regarding the misleading nature of the concept of aggregate demand. In his view, to say that savings will never lead to a corresponding increase in investment because they involve a decline in the demand for consumers' goods is the most typical underconsumptionist fallacy. Though it is true that the relative magnitude of the demand for producers' goods for a particular industry will depend upon the demand for the product of that industry, it is not true that the demand for capital goods in general is directly determined by the magnitude of the demand for consumers' goods. In his view, the magnitude of the aggregate demand for producers' goods is not a simple derivative of the aggregate demand for consumers' goods, for any given demand for consumers' goods can lead to methods of production involving very different demands for producers' goods, and the particular method of production chosen will depend upon the proportion of the total wealth not required for immediate consumption.

5. This essay was intended to discuss the Keynes-Hayek exchange from a capital-theoretic perspective with a view to very tentatively evaluate to what extent some of the macro conclusions drawn by Keynes from the fundamental equations for the value of money are undermined by Hayek's objections. As I was primarily concerned with the analytical tools which Keynes created for the explanation of dynamic processes and the trade cycle rather than with his actual explanation of those processes, I discussed neither Keynes' detailed analysis of the dynamics of the price level and the transition from one position of equilibrium to another nor the second part of Hayek's review (1932a), which discusses those aspects of Keynes' analysis. I would suggest that though Keynes, symptomatically enough, did not reply to the second part of Hayek's review of the TM (1932a), and instead sided

16 On Keynes' macroeconomic approach, Hayek (1978:289) wrote: "Though with its reliance on apparently measurable magnitude it *appears* at first more scientific than the older micro-theory, it seems to me that it has achieved this pseudo-exactness at the price of disregarding the relationships which really govern the economic system. Even though the schemata of micro-economics do not claim to achieve those quantitative predictions at which the ambitions of macro-economics aim, I believe by learning to content ourselves with the more modest aims of the former, we shall gain more insight into at least the principle on which the complex order of economic life operates, than by the artificial simplification necessary for macro-theory which tends to conceal nearly all that really matters" (original emphasis). Such methodological dimension of the Keynes-Hayek debate is further discussed in Bresser Pereira and Lima (1995), now in the context of the stormy contemporary debates on the microfoundations of macrotheory.

Sraffa on a review of *Prices and Production*, Hayek's capital-theoretic objections against the TM left some impression on Keynes, thus triggering a thought process which culminated in some distinctive features of the GT.

In my view, Keynes' attempt to distinguish the factors determining the rate of interest as a purely monetary phenomenon from the real productive forces determining the marginal efficiency of investment and the rate of profits is a major case in point. Indeed, one of Keynes' main motivations in the GT was to refute the loanable funds theory, for it conflicted directly with his principle of effective demand, which implies that the equalization between investment and saving is brought about by changes in income, and not in the rate of interest. Keynes accomplished this by developing his own liquidity preference theory of interest, proposing that the interest rate is determined by the supply and demand for liquidity, and not by the supply and demand for funds, thus avoiding the capital-theoretic problems associated with his employ of the Wicksellian theory which Hayek had pointed out.

In the classical view, the rate of profit on capital (i.e. the natural rate of interest) is determined by real economic forces embodied in saving function and marginal product of capital curves, while the actual, or money, rate of interest is assumed to fluctuate around and gravitate toward this real rate of return. In this context, as Kregel (1991) cogently put it, a fundamental proposition in the GT is the clear separation of the determinants of the interest rate from those of the return to capital, that is, the separation of the interest rate from the marginal productivity of capital. Indeed, Keynes insisted that his theory was the direct opposite of Wicksell's, in which the natural or real interest rate, which would be established in the absence of money, determined the nominal or money interest rate in equilibrium. Keynes not only reversed the causal link between the real and the money interest rate, he also rejected the idea of a real interest rate or a marginal physical productivity of capital. For Keynes, it is money that is the real variable and the money interest rate that determines the real rate or, as he called his version of the concept, the marginal efficiency of capital. In this sense, Keynes cut both the money interest rate and the real interest rate free from any objective or real physical factors associated with the technical aspects of the production process.

As Keynes demonstrated in Chapter 11 of the GT, which deals with the marginal efficiency of capital, the idea of marginal product of capital involves enormous difficulties as to the definition of the physical unit of capital, which he believed to be both insoluble and unnecessary. Instead, Keynes developed the notion of marginal efficiency of capital, which is a monetary-expectational notion defined as 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. Indeed, in this way the yield of an investment in a particular asset is specified by one summary number. However, Keynes asks the reader to note at once that neither the knowledge of an asset's prospective yield nor the knowledge of the marginal efficiency of the asset enables us to deduce either the interest rate or the present value of the asset. Rather, we must ascertain the rate of interest from the monetary side of the system, and only then we can actually value the asset by capitalising its prospective yield. That being the case, as Keynes would elaborate later, the rate of interest on money plays a peculiar part in setting a limit to the level of employment, for it sets the standard to which the marginal efficiency of a capital-asset must attain if it is to be newly produced. In actuality, capital has to be kept scarce enough in the long-period to have a marginal efficiency which is at least equal to the interest rate for a period equal to the life of capital, as determined by psychological and institutional conditions.¹⁷

It is in this sense that I would suggest that Keynes' can be interpreted as a monetary theory of capital (and thus profits), in contrast, for instance, to the real theory of capital proposed by Austrian economists like Hayek. For in a monetary (i.e. indirect exchange) economy, in which output determination is regulated by the principle of effective demand, the owner of wealth desires not a capital-asset as such, but actually its prospective yield, the latter wholly depending on the expectation of future effective demand in relation to future conditions of supply. In a monetary economy, therefore, it is the notion of marginal efficiency of capital, rather than the notion of marginal productivity of capital, which is the relevant one as far as investment determination is concerned. Indeed, in a monetary economy the rate of interest at which the value of a capital-asset is ascertained (by capitalising its prospective yield) is itself cut free from any objective physical factors associated with the technical aspects of the production process.¹⁸

17 As Keynes would detail in Chapter 16: "It is much preferable to speak of capital as having a yield over the course of its life in excess of its original cost, than as being *productive*. For the only reason why an asset offers a prospect of yielding during its life services having an aggregate value greater than its initial supply is because it is *scarce*; and it is kept scarce because of the competition of the rate of interest on money. If capital becomes less scarce, the excess yield will diminish, without its having become less productive – at least in the physical sense" (1973:213, original emphasis).

18 It is worth pointing out, specially in light of Hayek's capital-theoretic objections to Keynes' analysis of the emergence of profits in the TM, that the value of capital was already cut free from physical factors in that book. As I detail above (p. 9), Keynes already conceived of the value of capital goods as depending on the interest rate at which the prospective income from them is capitalised. However, since the core notions of marginal efficiency of capital and interest rate as a monetary phenomenon were still to be developed, one might suggest that, in some sense, Keynes' monetary analysis of capital (and profits) was not fully insulated against Hayek's objections yet.

Arguing along similar lines, Keynes consistently rejected, in the appendix to Chapter 14 of the GT, Hayek's notion that changes in the rate of interest can be identified with changes in the relative price levels of consumption goods and capital goods. Underlying such a notion, Keynes says, is a drastic simplification through which the marginal efficiency of capital is taken as being measured by the ratio of the supply price of new consumers' goods to the supply price of new producers' goods, this being then identified with the interest rate. Hence, a fall in the ratio of the price of consumers' goods to the price of producers' goods is argued by Hayek to be favourable to investment, and by this means a link is established between increased saving by an individual and increased aggregate investment. For it is common ground, Keynes concedes, that increased individual saving will cause a fall in the price of consumers' goods, and, quite possibly, a greater fall than in the price of producers' goods; so that, according to Hayek's reasoning, it does mean a reduction in the rate of interest which will stimulate investment. But, of course, Keynes promptly replies, a lowering of the marginal efficiency of particular capital assets, and hence a lowering of the schedule of the marginal efficiency of capital in general, has exactly the opposite effect to what Hayek's reasoning assumes: for investment is stimulated either by a raising of the schedule of the marginal efficiency or by a lowering of the rate of interest.

That being the case, Chapter 17 of the GT is intended to show that it is the money rate of interest, established primarily by monetary forces, which rules the roost, thus becoming the controlling factor which regulates the rate of return of physical capital. For Keynes, the reason why money rules the roost is precisely that its output does not readily increase when its own rate of return exceeds that of other assets. More precisely, the basic idea of Chapter 17, which Keynes owed to the Sraffa-Hayek debate, is that the marginal returns to money, not just in any period, but also over time, do fall less than those of capital as output expands, this being due to money having a unique liquidity premium, allied to negligible elasticities of production and substitution.

Indeed, Keynes closed Chapter 17 by noting that in the TM he had defined a unique rate of interest, which he called the natural rate of interest – namely, the rate of interest which preserved equality between investment and saving – with a view to provide a development and clarification of Wicksell's natural rate of interest. However, Keynes admits that he had overlooked the fact that in any given society there is, on this definition, a different natural rate of interest for each hypothetical level of employment. And, similarly, for every rate of interest there is a level of employment for which that rate is the natural rate, in the sense that the

system will be in equilibrium with that rate of interest and that level of employment.¹⁹

Keynes argues that since the equalization between investment and saving is brought about by changes in the level of income, and not by changes in the rate of interest, the level of employment at which that rate is the natural rate may well be below full employment: "Thus it was a mistake to speak of *the* natural rate of interest or to suggest that the above definition would yield a unique value for the rate of interest irrespective of the level of employment. I had not understood then that, in certain conditions, the system could be in equilibrium with less than full employment" (1973:242-3). Keynes then states his new position as follows: "I am now no longer of the opinion that the concept of a "natural" rate of interest, which previously seemed to a most promising idea, has anything very useful or significant to contribute to our analysis. It is merely the rate of interest which will preserve the *status quo*; and, in general, we have no predominant interest in the *status quo* as such" (Idem:243).²⁰

On the other hand, it is fair to say that the monetary theory of production presented by Keynes in the GT works out the implications of the non-neutrality of money in a direction which is foreign to Hayek's views regarding the major purpose of the monetary theory. More precisely, while Hayek believed that its major purpose is to analyze the role played by the elasticity of the credit system in the changes in relative prices leading to (cyclical) changes in the time structure of the production, Keynes believed that that purpose is to provide a background for a macroeconomic theory of changes in the scale of output and employment.²¹ As a

19 It is worthy of underline the symmetry between Keynes' critique of Wicksell's unique natural rate and Sraffa's critique of Hayek's unique natural rate (see f. 11 above). Indeed, while Sraffa pointed out that in a multi-commodity world to each commodity a natural rate will correspond, Keynes can be interpreted as meaning that in a monetary economy – in which the principle of effective demand implies that the equalization between investment and saving is brought about through changes in income rather than in interest rate – to each hypothetical level of employment a natural rate will correspond.

20 In turn, in the Preface to the German edition of the GT (Keynes, 1873a:xxvi) Keynes referred to Wicksell as having engaged in the most important unorthodox discussion on theoretical lines. But he then argued that Wicksell's followers were mainly Swedes and Austrians, the latter of whom combined Wicksell's ideas with specifically Austrian theory so as to bring them in effect, back again towards the classical tradition.

21 In his reply to Hayek's review, Keynes, while disagreeing with him on several issues, quoted with approval the following passage from *Prices and Production*: "[T]he task of monetary theory is a much wider one than is commonly supposed...its task is nothing less than to cover a second time the whole field which is treated by pure theory under the assumption of barter, and to investigate what changes in the conclusions of pure theory are made necessary by the introduction of indirect exchange. The first step towards a solution of this problem is to release monetary theory from the bonds which a too narrow conception of its task has created" (1935:127). However, what Keynes already meant by such a release was something orthogonal to Hayek's views. Indeed, Keynes would then search for a monetary macrotheory of output and employment, whereas Hayek's was a monetary microtheory of the allocation of given resources. As Keynes put it in the Preface to

corollary, they ended up providing different answers for the question of what changes in the conclusions of moneyless classical theory are required once the non-neutrality of money is considered. For Hayek, the elasticity of the credit system inevitably leads to cycles marked by persistent disequilibria in the time structure of production of a monetary economy, whereas Keynes saw the latter as being subject not only to cyclical imbalances, but as typically operating below full employment.²²

To put it another way, while for Hayek the very self-adjusting tendencies envisaged by classical economics may be temporarily suspended in a monetary economy, Keynes's position is more radical in the sense that it means that those self-adjusting mechanisms are permanently suspended; in a word, while Keynes felt that monetary influences will persist over time, Hayek felt that they cannot, for sooner or later the real (i.e. productive) forces will eventually dominate those purely monetary influences. So that it is in this precise sense that I would submit that Hayek's is in fact a pseudo-monetary theory of production and employment as a whole. For even though Hayek believed that only money allows an account of a disequilibrium situation different in character from the adjustment problems raised by any other real factor, Hayek's theory, by virtue of focusing exclusively upon changes in the structure of production, is actually a supply-side monetary microtheory of production. Keynes', in turn, by virtue of focusing on the search for liquidity affecting effective demand, can be seen as a demand-side monetary macrotheory of production.

the GT: "When I began to write my *Treatise on Money* I was still moving along the traditional lines of regarding the influence of money as something so to speak separate from the general theory of supply and demand. When I finished it, I had made some progress towards pushing monetary theory back to becoming a theory of output as a whole" (Keynes, 1973a:xxii).

- 22 Desai (1991) complains that since Keynes' GT over-took Hayek in the race to integrate money into the theory of output and employment, the Keynesian revolution ended up ostracizing capital theory, especially as regards the problems caused by heterogeneity of capital and disequilibria in the structure of production. For Desai, J. B. Clark's theory of the aggregate production function with malleable capital won the day over Böhm-Bawerk's theory of capital as produced means of production. Paradoxically, though, it is then argued, it was this battle that Keynes' Cambridge fought with the other Cambridge in the 1950s and 1960s: during that debate, several questions raised by Hayek came back via Sraffa, who brought back heterogenous capital goods, i.e. commodities produced by commodities. A detailed discussion of this issue goes beyond the compass of this essay, but I would like to warn the reader to the effect that one should not take U.K. Cambridge's capital critique as necessarily validating Hayek's plea for the imperative of focusing on changes in the time structure of production when doing macroanalysis. Indeed, U.K. Cambridge's major concern regarding both meaning and measurement of capital in an aggregate production function (i.e. the logical impossibility of having a measure of capital which is itself independent of prices and distribution) seems to apply to Hayek's framework as well.

Indeed, as I detailed elsewhere (Lima, 1992; 1993), a fundamental feature of Keynes' monetary economy, as presented in the preparatory material for the GT, is that in it money allows receivers of income to divorce the act of purchasing goods from the act of selling the services of their income-earning endowments. Indeed, such an idea is a distinctive feature of Chapter 16 of the GT, in which Keynes forcefully argued that an act of saving does not mean a substitution of future consumption demand for present consumption demand, but it is rather a net diminution of such demand. For Keynes, it is simply not true that current investment is promoted by individual saving to the same extent as present consumption is diminished, the reason being that an act of saving implies a desire for wealth as such, that is, for a potentiality of consuming an unspecified article at an unspecified time. It is clear that Keynes' position implies a denial of Hayek's (amongst others') notion that the interest rate adjusts to ensure that every fraction of current income not spent on consumption is automatically channelled into investment. Indeed, Chapter 16 anticipates the discussion of the following chapter by noting that it is the interest rate which governs the yield on real assets, and it does that precisely by keeping them scarce enough to earn a rate of return at least equal to the rate of return on money.

Moreover, Keynes' remarks on "sundry" (as he put it) observations on the nature of capital in Chapter 16 challenge some basic conceptions of Austrian capital theory, specially the notion that more roundabout methods of production, by allowing firms to produce more goods in the future, are also more productive ones. For instance, Keynes claimed that even if saving consisted not merely in abstaining from consumption but in placing simultaneously a specific order for future consumption, its immediate effect would still be adverse to employment. In principle, in that case the expectation of some future yield from investment would be improved, and the resources released from preparing for present consumption could be turned over to preparing for the future consumption. However, Keynes replies, they would not necessarily be on a scale equal to the amount of resources released, since the desired interval of delay might require a method of production so inconveniently roundabout as to have an efficiency well below the current rate of interest. On the other hand, even though Keynes admits that some lengthy or roundabout processes are physically efficient, he correctly notes that so are some short processes, which means that lengthy processes are not physically efficient because they are long. Invoking Marshall's objections to Bohm-Bawerk, Keynes points out that some, probably most, lengthy processes would be physically very inefficient, for there are such things as spoiling or wasting with time.

More importantly, Keynes, having showed that it is not the case that more roundabout methods are necessarily more productive ones, invoked his principle of effective demand to undermine the Austrian supply-side notion that savings generate investment in a much more damaging way. Even though Keynes does not hesitate to concede that the optimum amount of roundaboutness being given, entrepreneurs will, of course, select the most efficient roundabout processes, he cogently points out that the optimum amount itself should be such as to provide at the appropriate dates for that part of consumers' demand which it is desired to defer. In optimum conditions, that is to say, production should be so organised as to produce in the most efficient manner compatible with delivery at the dates at which *consumers' demand is expected to become effective*. Or, as Keynes put it, "it is no use to produce for delivery at a different date from this, even though the physical output could be increased by changing the date of delivery; except in so far as the prospect of a larger meal, so to speak, induces the consumer to anticipate or postpone the hour of the dinner" (1973:215). Even though Keynes does not make reference to Hayek at this juncture, the careful reader will easily realize that Keynes' principle of effective demand, which is the true principle in a monetary economy, greatly undermines Hayek's capital-theoretic conceptions. In fact, I would say that this is just another way of disclosing the pseudo-monetary nature of Hayek's production theory.

Finally, one might well wonder to what extent Keynes' decision to pursue a short period analysis in the GT, which meant to assume as given the quantity and quality of the capital stock, can be interpreted as a further attempt by Keynes to immunize both his macrotheory of investment and his theory of aggregate output from Austrian capital-theoretic objections. In that case, however, I would invite the reader to contemplate the possibility of seeing the aforeoutlined basic features of Keynes' cursory analyses of changes in the capital stock in Chapters 16 and 17 – which move his general theory from the Marshallian short-run fixed capital stock to a longer-run changing capital stock – as making them immune to those objections. But in any case, a question that would certainly deserve a much more careful examination regards to what extent the operation of the multiplier, which plays a crucial role in the quantity-adjustment process described in the GT, is actually immune to capital-theoretic objections such as Hayek's. For a possible Hayekian objection to the multiplier is that its actual operation is likely to trigger changes in the relative prices across the stages of production that may require a microtheory of investment along Austrian lines.

Thus, the extent to, and the direction towards, which Keynes' theoretical ideas were somehow shaped in the intense intellectual debate between himself and

Hayek is a research agenda whose importance goes well beyond the limits of the historiographic curiosity. For instance, the dynamic interactions between monetary changes and changes in the structure of production which is at the core of Hayek's approach in fact pose a precedent question for those involved in the elaboration of a Post Keynesian, monetary approach to growth and distributional dynamics. For Hayek's approach is predicated upon the conviction that crucial questions about the role of money and time cannot be effectively addressed either in simple quantity equation-type models or in equilibrium growth models with a single homogenous capital good, for those questions cannot be effectively addressed in models without addressing issues in capital theory and the time structure of production as well.²³ To what extent, if any at all, a Post Keynesian approach to growth and distribution must be predicated upon such conviction as well, this is a question that does deserve careful consideration.²⁴ At this stage, I would only suggest that a potentially promising starting point would be a careful analysis of the reasons that may have led Kaldor to abandon Hayek's capital theory in the 1930s, thus dropping all capital-theoretic considerations from his subsequent Keynesian contributions to growth and distribution, when he was, according to Desai (1991), the only economist in position to actually bridge the gap between Keynes' short run analysis of output with a given capital stock and the long run theory of growth and cycles with technical progress, heterogenous capital and money that Hayek was striving for.²⁵

23 Intriguingly enough, Hicks (1982) recounted the following passage: "I once asked Harrod what had put him on to the construction of his so-called 'dynamic' theory; he said, to my surprise, that it was thinking about Hayek. Hayek, of course, had been thinking in terms of prices and interest rates; but his special concern had been with the effect of changes in these on the real 'structure of production'. What I think Harrod meant was that Hayek had started him thinking about the structure of production, and its bearing on fluctuations. This had happened while he himself had been deeply under the influence of Keynes; so he had to fit something about the structure of production into an otherwise Keynesian system" (p. 341). It should be recognized, however, that like Keynes' analysis in Chapters 16 and 17 of the GT, Harrod's was a demand-oriented analysis of growth rather than a supply analysis à la Hayek, of crucial importance being what will drive the growth in effective demand as accumulation of capital proceeds.

24 Some preliminary and sketchy elaborations on how monetary issues can be incorporated into a Post Keynesian, monetary theory of cyclical growth may be found in Lima (1994; 1995).

25 The complex process leading to Kaldor's repudiation of Hayek's capital theory (and actually of the entire apparatus of Austrian capital theory) is briefly described also by Thirlwall (1987) in his admirable biography of Kaldor.

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