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## **THE TREATMENT OF TIME IN KEYNES'S ECONOMICS**

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### **I INTRODUCTION**

Fifty years after his death, Keynes is still known as a great economist, and by many is still regarded as the greatest economist that England has ever produced. The passage of the years has, however, blurred the public understanding of his economic doctrines. This blurring has been caused by a number of circumstances, some negative and some positive. On the negative side, memories have faded of the economic conditions for which Keynes was prescribing, and he was a very prescriptive economist. Also, Keynes has been ill served both by the majority of his disciples, who simultaneously sanctified and simplified what he had to say, and by the majority of his opponents, who demonised him in the process of rejecting the neo-Keynesian simplifications. On the positive side, the last twenty-five years have seen the emergence of much deep scholarship aimed at recovering the epistemological foundations on which Keynes built, especially his neglected theories of the relation between probability and moral action. But this is difficult ground, and these debates are continuing vigorously.

The purpose of this essay, however, is not to discuss how time has treated Keynes. Rather, it is to try to clarify how, in analytical terms, Keynes treated time. I surmise that, if today one asked the average educated person if they could recall anything that Keynes

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had said, the most popular reply would be: "in the long run, we are all dead." It is hard to see quite why this aphorism should be so universally memorable. Taken at face value, it is banal. If one tries to go behind the words themselves to find something more profound, what does it really mean? The saying has an Old Testament quality to it, being at the same time vastly resonant and not a little obscure. The task of what follows is to try to disperse some of this obscurity, and in the process of doing so to clarify how Keynes dealt with the problem of theorising the passing of time in economic life.

For this task, the starting point must be to see how this problem had been tackled by Keynes's mentor, Alfred Marshall. I shall argue that a recent revisionist interpretation of how Marshall incorporated time into economic analysis, specifically that his period analysis was meant to refer to real historical time, requires a consequential re-evaluation of the contrast that is usually made in this regard between Marshall and Keynes.

## II THE LEGACY OF ALFRED MARSHALL

At the start of the twentieth century, Alfred Marshall had already established himself as the dominant figure of the Cambridge school of economics. An important part of his intellectual contribution to economics concerned the analytical treatment of time. Marshall stressed in his *Principles of Economics* "the great importance of the element of time in relation to demand and supply" (PE: 289, quoted in Reisman, 1986: 52). In assessing the basic influences that he exerted on economics, that of making time a major factor in the theory of value is placed "first and foremost" by Stigler (1990: 5). That is not to say that he entirely succeeded in his ambition to integrate time into economics. Nevertheless, as two recent commentators have put it, "Marshall's attempt to wrestle with time in economic analysis was a serious and long-lasting one and if, in his efforts to promote both realism and rigour in economic theory, he did not always achieve their impossible reconciliation, we should perhaps respect his efforts more than we regret his incomplete achievement." (Currie and Steedman, 1990: 34).

In his discussion of Supply in Book V, Chapter V, he elaborates a scheme of periodisation within which to analyse supply responses. His four periods are (i) the market period, or the very short run, the period in which supply cannot be expanded or contracted in response to price change; (ii) the short period, in which the quantity supplied can be varied, but only within the limits set by the existing stock of plant, personal and impersonal; (iii) the long period, in which supply means what can be produced by plant, which itself can be remuneratively produced and applied within the given time; and (iv) the secular period, or the very long run, in which all economic parameters may vary, including population size, knowledge, production techniques and the aggregate stock of capital, making the supply response of firms quite unpredictable.

In this and other passages Marshall frequently refers to calendar time - a day, a month, a year or several years, a generation - when discussing his four periods. Nevertheless, modern textbooks do not interpret Marshall as speaking about chronological or "clock" time. Rather they treat his periods as representing "operational time". Marshall's periods are here defined to mean the time during which supply cannot be increased, or capital assets cannot be expanded, or capital formation can take place, or, finally, during which everything can vary. On this modern view, given the defining operational characteristic of each period, the chronological lapse of real time can be longer or shorter according to the operational context of different industries. For example, the lags involved in adding to plant will differ as between fishing and steel-making. So, say the textbooks, the Marshallian periods cannot refer to actual calendar time. But this account has now been successfully over-turned (*ibid.*: 21 -28). Textbook Marshallian analysis turns out to be different from Marshall's own analysis, and the construct of a theoretical tidying-up campaign started in the 1920s.

After his death, Marshall's periodisation was interpreted as a device to present a sequence of partial equilibria. As Machlup explained it, "there are three models (or sub-models) with separate equilibria; each equilibrium is "final" on its own terms, though

"temporary" in terms of a model with more variables" (1958: 8)<sup>2</sup>. Marshall was credited with developing an analytical apparatus that appeared to explain the determination of the prices of commodities over several decades of "clock" time, by assuming that the conditions affecting demand are constant over time, and that the conditions affecting supply are discrete and separable into different "periods". Thus continuous time was analysed with static methods, a technique that Leijonhufvud subsequently referred to as "pseudo-dynamics" (1968: 50).

The new revisionist view of Currie and Steedman is that Marshall was attempting to set out a genuine historical dynamic, but became disillusioned with the use of statics for this purpose. The notion of equilibrium in economics derives from an analogy with mechanics<sup>3</sup>. Marshall made the analogy himself in his 1885 Inaugural Lecture. In his view, economics was "not a body of concrete truth, but an engine for the discovery of concrete truth, similar to, say, the theory of mechanics" (Moggridge, 1992: 87). The analogy, however, was always a loose one. Price theory may be similar to mechanics, but it is not the same. Disappointment awaits those who have sought an exact analogy between the two, (for example Knight, 1956: 179-201). Marshall himself became increasingly dissatisfied with the mechanical analogy. In the Preface to the fourth edition of his *Principles* (1898), he argued that it is simpler than the biological analogy which he took to be its alternative, and therefore more helpful in the earlier stages of economic analysis. But he went on to stress "the essentially organic character of the larger and broader problems towards which we are working our way." By 1901, in the Preface to the sixth edition, the relevance of

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<sup>2</sup> It follows from this that "any concrete economic situation may correspond at the same time to an equilibrium of one model and a disequilibrium of another" (ibid.: 12). Further, the observed fact that an economic variable is stable (or unstable) over time does not imply that it is in equilibrium (or disequilibrium). That will depend on the presence or absence of changes in the other variables in the explanatory model.

<sup>3</sup> Jevons had already said, in the Preface to his *Theory of Political Economy* (1871), that "The Theory of the Economy...presents a close analogy to the theory of Statical Mechanics" (quoted in Deane, 1984 (1978): 95).

biology even to the foundations of economic analysis is boldly asserted. "Fragmentary static hypotheses are used as temporary auxiliaries to dynamical - or rather biological - conceptions; but the central idea of economics, even when its Foundations alone are under discussion, must be that of living force and movement."

His dissatisfaction with the mechanical analogy seems to have been related to his conclusion that movement up or down his long-period supply curve was irreversible in real historical time<sup>4</sup>. But he made little progress in applying the biological metaphor. His treatment is ambiguous in this regard. Although one brief passage shows some influence of the ideas of Herbert Spencer, his use of the idea of the representative firm points in the opposite direction. It is an abstract concept that avoids the need to analyse industries in terms of the real dynamic characteristics of the many different firms that compose them (Hodgson, 1993: 406-15). "The essentially organic character of the larger and broader problems" towards which Marshall was working his way after 1890 was never given a systematic treatment by him. He never produced the second volume of his *Principles*, planned in 1887, and his remaining works made no progress in advancing the use of the biological analogy in economics. Rather, the tendency of economics generally, as well as the reading of Marshall's periodisation scheme in particular, was to become ever more mechanical (Whitaker, 1990: 193 -222).

Not all modern commentators have taken the mechanical path, or regarded the mechanical and biological metaphors as irreconcilable. Shackle's reading of Marshall brought him to a strikingly different, and less critical evaluation. According to Shackle, "Marshall's peculiar triumph is his creation of a unity out of the conceptions of equilibrium and evolution". He explains his assessment thus:

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<sup>4</sup> The problem of time irreversibility is related to the existence of increasing returns to the firm. If they do exist, "whatever firm gets a good start will obtain a monopoly of the whole business in its trade in its district" (quoted by Deane, 1984 (1978): 150). And if this can happen, then the assumption of perfect competition, on which the results of the static equilibrium analysis depend, is violated.

"Equilibrium he conceives in a sophisticated, profoundly thought-out form where the economic subjects concerned are not helpless weights on elastic strings but anxiously thinking humans whose conduct is governed in part by their knowledge and the stages in which they attain it and by the conjectures which they base upon it. Equilibrium is a state of adjustment to circumstances, but it is a fiction, Marshall's own and declared fiction, for it is an adjustment that *would* be attained if the very endeavour to reach it did not reveal fresh possibilities, give fresh command of resources, and prepare the way for inevitable, natural, organic further change. It is this powerful conception which is the most worth-while object of study in Marshall . . ." (Shackle, 1965: 36-37).

In order to sustain this interpretation, Shackle has to convict Marshall of a confusion between the long period supply curve viewed *ex ante*, and as the composite of an infinite series of short period supply and demand curves each of a different date. But there is only one footnote in the *Principles* that alludes to the latter concept, which is the one needed to unify equilibrium and evolution. For that reason, the Shackle view is less than convincing.

Marshallian period analysis can be criticised on a number of fronts. For present purposes, two points are relevant. For the equilibrium of the long run, the theoretical requirement of *ceteris paribus* becomes highly unrealistic. The assumption that all the variables outside the model remain unchanged throughout the twenty or thirty years of the economic life of the plant is highly artificial, as Marshall himself acknowledged. The weak version of this criticism is that life simply is not like that, and so a model which assumes that it is not a very interesting thought experiment. The strong version says that life cannot be like that, because the investment in the new plant itself triggers a series of other economic consequences, beyond the discovery of internal and external economies, which violate the *ceteris paribus* assumptions.

The second point concerns the equilibrium of the short run. While in principle the same objection of the violation of *ceteris paribus* applies in the short run, because firms cannot be prevented from investing during any period of real time, it is much easier to justify ignoring the effects of such investment on *de minimis*

grounds. The criticism here is that Marshall himself did not make much use of his own tools of short period analysis. His illustrations of their use was deferred to the never completed second volume (Whitaker, 1990: 202). Marshall had little interest in the short run. On this point we can agree with Shackle that "it was in the long period that Marshall sought the arcanum, the real nature and meaning of the economic process as part of the historical process" (Shackle, 1965: 39). For it was in the long period that he sought the "normal" values of commodities. Paradoxically, he defined "normal" values as "the average which economic forces *would* bring about if the general conditions of life *were* stationary for a run of time long enough for them all to work out their full effect." (*ibid.*: 37, emphasis added). The paradox lies in identifying the normal by means of a counterfactual<sup>5</sup>.

Such was the ambiguous legacy of Marshall's period analysis for those who wanted to incorporate time into economic analysis<sup>6</sup>.

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<sup>5</sup> The basis for this approach was presumably Marshall's concern that his economics should be truly "scientific". In mechanics, air resistance has to be excluded to arrive at a true measurement of the force of gravity. By analogy, the friction caused by subsequent economic events has to be excluded to arrive at true long period equilibrium prices. But the method of a science of inanimate objects is not appropriate to an analysis of behaviour driven by human intentions and expectations. Shackle's interpretation overcomes this problem by positing an infinite series of instantaneous adjustments to new intentions and expectations. But it is far from clear that this is what Marshall was "really" getting at, or, if indeed he was, how this analysis could be operationalised.

<sup>6</sup> The intellectual strategy of trying to make time analytically tractable by partitioning it has its contemporary adherents beyond economics. Since Marshall, it has been adopted by historians of the *Annales* school, who seek an integration of history with the social sciences. Their scheme of division - events, conjunctures and the *longue durée* - is also a partitioning by period. The latter is assigned, like Marshall's long period, a paramount importance because it is thought to reveal the deep structures of the subject. The deep structures of the *Annales* historians - physical geography, ecology, demographics, mentalities - are naturally different from the economic structures of Marshall: the *longue durée* corresponds to his secular period. The proposed relationship between periods was also different. For the *Annales* school, they were waves of different

We are now in a position to turn to the central question of this essay. How did Marshall's period analysis influence the thinking of his greatest pupil, Maynard Keynes?

## II THE INFLUENCE OF MARSHALLIAN PERIOD ANALYSIS ON KEYNES

To the extent that he was an economic theorist, Keynes was more an intellectual heir of Alfred Marshall than of any other. From the start of his economic work, he felt the influence of the Cambridge school and its dominant figure, Alfred Marshall. He had read the new Cambridge Economics tripos at Marshall's instigation, had had personal supervision from him and had been strongly encouraged by him to turn professional economist rather than enter the Civil Service (Moggridge, 1992: 95-7). He took over Marshall's lecturing responsibilities on monetary economics, when the latter retired. There are many reasons to expect Marshall's influence on Keynes to have been powerful.

At the same time, one must be careful not to assume that, just because Marshall was the leading English economist of his generation as well as a personal friend of the Keynes family from Maynard's childhood, that his intellectual moulding of Keynes's own economic thinking was profound and lasting. There were some mitigating factors. Keynes took up economics rather late in his intellectual formation. As a Cambridge undergraduate he read mathematics, although without achieving a brilliant success, while his extra-curricular interests lay in philosophy and politics. His major postgraduate project was in the field of probability theory, while his first academic publication was on the statistics of index numbers.

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lengths superimposed on each other, while for Marshall they provided a sequence, a natural history of the representative firm. But an underlying similarity in their treatment of time remains. So does the underlying weakness of the strategy. This is the focus on the long period to the virtual exclusion of the short, and the more general failure to re-integrate what was divided initially for analytical convenience (see Hexter, 1979 and Clark, 1985).



Thus economics came to him as a late addition to an already extraordinarily well-furnished mind.

Further, at the moment of his pupil-tutor encounter with Marshall, the latter was already in his early sixties and well past the peak of his powers. Keynes later expressed this as follows: "I think that the informality of his lectures may have increased as time went on. Certainly in 1906, when I attended him, it was impossible to bring away coherent notes." (CW X: 216). This picture is corroborated by what Marshall himself wrote in a letter to the Austrian economist Richard Lieben dated June 19th, 1906: "I practically never use any diagrams at all in lectures now, & have forgotten much that is in my own *Principles*" (Whitaker, 1990: 202). Keynes had of course read the *Principles*, but it is unclear how much reinforcement his understanding of its theory of value received from his tuition by the author. Where Keynes benefited much more from Marshall's lectures was in the field of monetary theory<sup>7</sup>. Gerald Shove is reported to have said, that "Maynard had never spent the twenty minutes necessary to understand the theory of value". But a more accurate assessment is that of Joan Robinson, that "he carried a good deal of Marshallian luggage with him, and never thoroughly unpacked it to throw out the clothes he could not wear" (1962: 76).

An opportunity to do so came just as Keynes embarked on his phase of creative economic theorising. After Marshall's death, Keynes wrote a commemorative essay. This long memoir runs to some seventy pages of the *Collected Writings* (CW X: 161-231). Much of it is, quite naturally, biographical in content. But even having allowed for the need to get that kind of detail right, a

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<sup>7</sup> With specific reference to Marshall's lectures on money, Keynes also noted that the former's "unsystematic method of lecturing prevented the average, and even the superior, student from getting down in his notes anything very consecutive or complete". Nevertheless, "his main ideas became known to pupils in a general way, with the result that there grew up at Cambridge an oral tradition...different from, and...superior to, anything that could be found in printed books" at that time. Keynes also asserts that Marshall did use "some very elegant diagrams" in his 1906 lectures on the demand for money (CW X: 189-92).

remarkably small proportion of the memoir (only some ten pages in all) is devoted to an evaluation of Marshall's original contributions to economics. About half of this is given to monetary economics, and the other half to the theory of value. The first half is Keynes's unaided work, but for the brief evaluation of Marshall's advances in the theory of value Keynes evidently felt the need to call in the assistance of Edgeworth. The usually super-confident Keynes explained his decision to do so as follows. "It is difficult for those of us who have been brought up entirely under the influences of Marshall and his book to appreciate the position of the science in the long interregnum between Mill's *Principles of Political Economy* and Marshall's *Principles of Economics*, or to define just what difference was made by the publication of the latter" (CW X: 204-5).

The Keynes/Edgeworth selection of six elements of theoretical novelty in Marshall has attracted criticism from subsequent historians of economic thought. Schumpeter's view was that "none of them can be accepted without qualifying reference to the work of others, though in conjunction and as elements of a general treatise for a wider circle of readers, they were of course new enough" (1954: 839, n.13). Stigler is slightly more lenient than Schumpeter, striking down only four of the six Keynes/Edgeworth claims for Marshall's originality (1990: 2-10). As has already been noted, he places the introduction of time into value theory first and foremost among Marshall's achievements. In this he agrees with Keynes/Edgeworth, whose third element is that "the explicit introduction of the element of time as a factor in economic analysis is mainly due to Marshall" (CW X: 206). One conclusion to be drawn from all this is that Keynes did not feel himself capable of single-handedly unpacking the Marshallian luggage, at least in so far as it contained the theory of value. Moreover, he chose as his assistant a senior who was himself too much in Marshall's thrall to be of serious help to him in that task.

But even while praising Marshall's introduction of the element of time, through the partial equilibrium analysis, Keynes criticised it. In this instance his praise was distinctly more double-edged than it was in relation to the other theoretical achievements that he claimed for Marshall. Here is Keynes's way of putting it.

'By means of the distinction between the long and the short period, the meaning of 'normal' value was made precise; and with the aid of two further characteristically Marshallian conceptions - quasi-rent and the representative firm - the doctrine of normal profit was evolved.

All these are path-breaking ideas which no one who wants to think clearly can do without. Nevertheless, this is the quarter in which, in my opinion, the Marshall analysis is least complete and satisfactory, and where there remains most to do.' (CW X: 207)

Keynes, however, was not specific in this memoir about which parts of the Marshallian period analysis he thought were incomplete and unsatisfactory, or why he thought so. This seems to give credence to the claim that Keynes's had difficulty in distinguishing his own ideas about time in economic analysis from those of Marshall.

### III THE *TRACT ON MONETARY REFORM*

In Keynes's *Tract on Monetary Reform* of 1923, some clues are given to the nature of his dissatisfaction with the treatment of time in the then current methods of economic analysis. The *Tract* itself is not a treatise and does not provide the reader with a unified theoretical position (Moggridge, 1992: 64). It begins with a description of contemporary monetary facts, follows on with one theoretical chapter, and concludes with a set of concrete proposals for monetary management aimed at overcoming inflation. The focus here is on Chapter III, which presents a theory of money and a theory of the foreign exchanges

The theory of money in the *Tract* is the Cambridge version of the quantity theory of money, based on the work of Marshall, as subsequently developed by Pigou. The theory of the foreign exchanges is the doctrine of purchasing power parity (henceforth PPP) anticipated by Marshall and then re-stated by Cassel. As Keynes explains, both of these "theories" can be stated in a tautological form. The cash balances equation starts off as an

identity, and becomes an equation only when one or more of the variables are held constant. PPP remains a truism as long as internal purchasing power is defined to mean internal purchasing power over goods that enter international trade, the truism being that arbitrage will equalise external and internal prices of traded goods (allowing for transport costs and trade taxes) via changing the exchange rate (CW IX: 61-5; 70-5). Thus both theories need to be further refined if they are to be useful for answering the policy question that Keynes is addressing, namely, is it better for countries with inconvertible paper currencies to stabilise their economies by deflating or by devaluing?

Both theories, when refined, imply mechanisms of economic adjustment. When a country's monetary authorities print more paper money than the public and the banks wish to hold, the domestic price level rises. When at the existing exchange rate it is profitable to switch supplies from foreign to domestic markets, there will be pressure on the exchange rate of the domestic currency to fall. Both theories also imply the existence of equilibrium values of the price level and of the exchange rate, at which the process of adjustment specified within each model has worked itself out and there is no incentive for further change. In the *Tract*, Keynes wrestles with two problems. One is *precisely* how these two simple models need to be refined. The other is how to use them to analyse real life situations when their equilibration mechanisms are not time-specific.

Unlike the Marshallian theory of supply, the quantity theory of money and the PPP doctrine did not have any sub-models nested within them that could serve as some sort of surrogate for the passage of time. They lacked even a period analysis, let alone an historical time dimension. Keynes, in his efforts to provide a policy analysis of alternative options for economic reform, felt that lack keenly. This is the origin of Keynes's most memorable remark, that "*in the long run we are all dead*". The fuller context of this famous quotation is a discussion of the application of the Cambridge cash balances equation to post-war reconstruction in a previous era.

The passage runs as follows. Note that  $n$  = the quantity of cash with the public,  $p$  = the index number of the cost of living,  $k$

= the volume of consumption over which the public wishes to retain command in cash,  $k'$  the volume of consumption over which the public wishes to retain command by cheque and  $r$  is the cash ratio maintained by the banks.

'If, after the American Civil War, the American dollar had been stabilised and defined by law at 10 per cent below its present value, it would be safe to assume that  $n$  and  $p$  would now be just 10 per cent greater than they actually are and that the present values of  $k$ ,  $r$ , and  $k'$  would be entirely unaffected. But this *long run* is a misleading guide to current affairs. *In the long run* we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again.' (CW IV: 65).

Keynes's point (less elegantly put) is that, granted the quantity theory is the appropriate tool to analyse the effects of a policy intervention that occurred sixty years ago, it is not a useful tool now, even if the initial conditions and the nature of the intervention, then and now, are identical.

This passage can be easily misinterpreted as an expression of Keynes's impatience with long-run equilibrium analysis *and therefore a rejection of Marshallian period analysis*. Nothing could be further than the truth. "In the long run we are all dead" is an exaggeration which seems plausible only because Keynes selected the American Civil War as his example of post-war reconstruction. It is a bold stroke of wit, but nothing more. The real thrust is a complaint that, while the quantity theory has a long run equilibrium position, *it does not have a short run equilibrium, or temporary equilibrium position*<sup>8</sup>. It is not a rejection of Marshallian period analysis<sup>9</sup>.

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8 The fact that Keynes called the definition of long run equilibrium "too useless a task" does not, to my mind, imply that he thought that it was absolutely useless, but rather that he thought it less useful than something else, namely the definition of short run equilibrium. It has been said that Keynes's witticism "does not imply that the long run is unimportant...What Keynes was actually emphasising was that the study of the short run is also important..." (Granger, 1993: 307). I would gloss this by adding that he thought the latter was more important for practical purposes, but that he

It is a plea for its introduction into the theory of money, on the analogy of the theory of supply. In the *Tract*, Keynes tries his hand at this. Although in the long run  $p$  is a simple function of  $n$ , he suggests that a small rise in  $n$  may not leave  $r$  unaffected; that a large change in  $n$  may not, because of its effect on expectations, leave  $k$  and  $k'$  unaffected and that the trade cycle will in any case be lowering  $k$  and  $k'$  in the boom and raising them again in the slump<sup>10</sup>.

One could, therefore, surmise that when he came write the memoir of Marshall in the following year, Keynes was alluding to the failure to extend the period analysis to the theory of money when he described it as "the quarter in which the Marshall analysis is least complete and satisfactory". He had, in the memoir,

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did not yet believe that he could get to the latter without having first arrived at the former.

<sup>9</sup> However, Keynes's choice of the storm/ocean surface metaphor suggests that he may have been tilting at Walras. Lesson 32 of the *Elements of Pure Economics* insists that the equilibrium state is constantly changing, but that the processes of adjustment to equilibrium take time. To describe his idea of the "continuous market", he uses the metaphor of the surface of a lake that is continuously agitated by the wind. He then remarks that ". . . just as a lake is, at times, stirred to its very depths by a storm, so also the market is sometimes thrown into violent confusion by *crises*, which are sudden and general disturbances of equilibrium. The more we know of the ideal conditions of (sc. general) equilibrium, the better we shall be able to control or prevent these crises" (Currie and Steedman, 1990: 64-5). This is the assertion that Keynes may have been implicitly criticising. But did Keynes actually know of this passage, given that the definitive French edition of the *Elements* was not published until 1926, and was not translated into English until after his death? This remains a puzzle. Perhaps the channel was through Marshall, who was familiar with Walras's work.

<sup>10</sup> In Schumpeter's opinion, "the variability of Keynes'  $k$  and  $k'$  is in fact the main *theoretical* contribution of the *Tract*". The main practical contribution of the *Tract* is judged by Schumpeter to be the retention of an inconvertible paper currency (albeit with a gold reserve), for which he finds a precedent in the debate about economic reconstruction after the Napoleonic Wars, namely T.P. Thompson's 1824 article in the *Westminster Review* "On the Instrument of Exchange"(1954: 706, n5; 713, n22).

praised Marshall's "exposition of the Quantity Theory of Money as a part of the General Theory of Value" as one of his most important original contributions on the monetary side of the subject (CW X: 191). Given this step towards the integration of what had previously been a more fragmented intellectual terrain, Keynes perhaps saw the need to go beyond Marshall by introducing partial equilibrium analysis fully into monetary theory.

#### IV KEYNES'S ENCOUNTER WITH RAMSEY'S THEORY OF SAVING

Whereas the classical political economists were centrally interested in explaining the process of economic growth and development, the marginalists of the second half of the nineteenth century generally placed these concerns beyond the ambit of economics. Jevons, for example believed that "dynamical branches of the Science of Economy may remain to be developed", but himself said nothing about them (Deane, 1984 (1978): 101, n12). Marshall, as already noted, made gestures towards the use of the biological analogy as a method for tackling broader questions, but hardly started on advancing this line of thought. Nothing happened to validate Jevons's hunch until Frank Ramsey, like a twenty-four year old intellectual *deus ex machina*, sent Keynes the draft of his article on "A Mathematical Theory of Saving" in June, 1928, saying that "the equations must arise in any attempt to apply utilitarianism to saving and so far as I know they have never been treated before" (CW XII: 784).

Our interest here is not in Ramsey's theory as such, but in Keynes's reactions to it. However, to understand his reactions, it is necessary to be aware of at least the gist of the theory. Ramsey's problem was that of optimal saving: how much of its income should a nation save? He pointed out that there is a maximum obtainable rate of enjoyment from consumption, which he called Bliss, and that adding to the stock of capital by saving is the means of approaching that maximum. Why then should we not save the whole of our income in order to arrive at Bliss as soon as possible? His answer was that this would be irrational because each addition

to saving has its own (increasing) cost in utility deprivation in the present. The optimal rate of saving then is that rate where the marginal benefits in terms of real returns on investment are just equal to the marginal costs in terms of lost utility of consumption in the present<sup>11</sup>. Although cast in normative terms, by assuming that following the Ramsey rule is what rational persons will do if left to themselves, the rule easily becomes the basis for a positive theory of long run growth.

Keynes saw the rightness of the Ramsey rule instantly. He quickly specified two important extra assumptions that were required for the rule to hold good. He also supplied an intuitive proof of it. This Ramsey at first rejected as "just a muddle", but then saw Keynes's point and included his proof in the published article. Keynes also suggested the use of an accelerating rate of discount, which Ramsey showed to be a mistake (CW XII: 784-9). As amended, the article was published promptly and without further ado. After Ramsey's sudden death, Keynes praised it as "one of the most remarkable contributions to mathematical economics ever made, both in respect of the intrinsic importance and difficulty of its subject, the power and elegance of the technical methods employed, and the clear purity of illumination with which the writer's mind is felt to play about its subject". He added that "the article is terribly difficult reading for an economist", an interesting contrast with Ramsey's own view that "the mathematics is all very elementary" (CW X: 335-6).

Keynes's subsequent use of the article was in its normative aspect. He seized on Ramsey's illustrative calculation and its conclusion that "the rate of saving that the rule requires is greatly in excess of that which anyone would normally suggest" (1928: 548-9). It was this policy implication which Keynes carried in his own

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<sup>11</sup> Scott (1989:218) gives the main idea of the Ramsey approach as that "the marginal real rate of return on investment should be brought into equality with the real rate at which marginal consumption benefits are discounted". Ramsey himself stated his rule as that "the rate of saving multiplied by the marginal utility of money should always be equal to the amount by which the total net rate of enjoyment of utility falls short of the maximum possible rate of enjoyment" (Ramsey, 1928: 543).



thinking and writing. He made use of it in the second volume of the *Treatise on Money* when considering whether periods of profit inflation were desirable because of the stimulus that they give to capital accumulation. Ramsey's rule was quoted on the side of speeding up capital formation. Doing so by means of a profit inflation led, however, to a more unequal distribution of wealth. But this evil could be mitigated "so long as wealth and its fruits are not consumed by the nominal owner but are accumulated". Nevertheless, these considerations did not persuade Keynes to abandon the policies for price stability that he had set out in the *Tract*. But they did prompt him to think that the rate of capital development should ultimately become "more largely an affair of state" (CW VI: 144-5).

The influence of the state, he thought, would be more likely to be shaped by collective wisdom and long views. His reasoning in this is worth noting.

"If the task of accumulation comes to depend somewhat less on individual caprice, so as to be no longer at the mercy of calculations partly based on the expectation of life of the particular mortal men who are alive today, the dilemma between thrift and profit as the means of securing the most desirable rate of growth for the community's aggregate wealth will cease to present itself." (CW VI: 145).

The emphasis on avoiding the accumulation calculations partly based on the expectation of life of the particular mortal men who are alive today brought Keynes 180 degrees from his most remembered witticism: "in the long run, we are all dead". In my view, the latter was never a serious pronouncement. But if it ever was, Keynes's encounter with Ramsey's theory of saving provided him with an excellent reason for disowning it.

This interpretation clashes somewhat with that of Chakravarty (1991: 5-6). He suggested that "the *Zeitgeist* obviously took a poor view of the long run, in which we were all supposed to be dead", and he associated the name of Keynes with that spirit of the times. I would argue that it was not as simple as this. Keynes maintained his interest in long run (but not indefinitely prolonged) accumulation, and in the role that the state could play in this,

especially in conditions of uncertainty. I have discussed elsewhere the clear preference which Keynes maintained for political liberalism over Stalinism as the context for state action on capital accumulation (Toye, 1993: 250- 260). It is true, as Chakravarty states, that, until Tinbergen, no-one thought it particularly worthwhile to develop the Ramsey model as a theory of long-run growth. But despite his continuing concern for analysing the short term, Keynes had by no means lost sight of the long run, even if his approach to it was that, in the real world, much less information was available than what was needed to follow the Ramsey rule.

## V THE *TREATISE ON MONEY*

It is perhaps not too much to say that the whole of Keynes's creative engagement with economic theory from 1923 to 1937 has about it a stream of consciousness quality, albeit at the highest level of ratiocination. During these years, allowing for a myriad of interruptions and distractions, Keynes grappled continuously with the question of how to inter-relate a cluster of aggregate economic variables - the demand for and supply of money, the price level, the interest rate, output and income, savings and investment, the level of money wages and (his ultimate *explicandum*) the quantity of employment. The whole process was marked by the discovery and attempted resolution of new problems, the active search for and digestion of external criticism, drafting and re-drafting, formulation, re-formulation and re-formulation once more. Given this way of working, it would be wrong to see the *Treatise* (1930), the *General Theory* (1936) and his 1937 article in the *Quarterly Journal of Economics* on "The General Theory of Employment" as fully distinct and separable theoretical statements. They are better viewed as a series of major reports from a single battleground of ideas.

Moreover, both the *Treatise* and the *General Theory* do not achieve complete internal consistency even as interim reports. Keynes was well aware of this. Of the *Treatise*, he told its readers boldly that "its parts are not entirely harmonious with one another", but nevertheless offered it to the world "for what it is worth at the

stage it has now reached, even if it represents a collection of material rather than a finished work" (CW V: xvii - xviii). The *General Theory* itself "contains some minor theoretical errors, as well as seemingly contradictory statements about key elements in the theory, such as the determination of investment" (Asimakopulos, 1991: 2). The 1937 *QJE* article was intended as a distillation of the essence of the *General Theory*, but it emphasises some aspects more than others, particularly the investment and employment consequences of fundamental uncertainty about the future.

All this creates considerable problems of exegesis which have occupied many commentators, and which cannot possibly be reviewed within a short compass. The tactic adopted here is to focus on the *General Theory*, as Keynes's most famous work, taking backward and foreword glances as required to make sense of it. Fortunately, our focus is the narrow one of Keynes's use, or failure to use, Marshall's period analysis of time. Even more fortunately, many of the problems of this topic have recently been clarified by Asimakopulos (1991).

The central problem of the first volume of the *Treatise*, entitled *The Pure Theory of Money*, was to specify the determinants of the long-run equilibrium of the price level. The second fundamental equation of chapter 10,

$$\Pi = \frac{E}{O} + \frac{I-S}{O},$$

states that the price level of output is wholly governed by the three factors: (i) *E*, the volume of money earnings of the factors of production, *defined to exclude unanticipated or windfall profits or losses*, (ii) *O*, the volume of current output, and (iii) *I - S*, the relation between the volume of *intended saving out of anticipated earnings*, *E*, and the value of *actual investment*<sup>12</sup>. The conditions

<sup>12</sup> In these definitions of the terms of the Fundamental Equation, I have used Keynes's words, but have interpolated my own clarifications in italics.

of long-run price equilibrium are, therefore, that  $E = O$  and that  $I - S = 0$ .

Keynes then presents a typology of possible causes of disequilibrium. They are (I) monetary factors that unbalance the demand for and supply of money; (II) investment factors that cause the market rate of interest to diverge from the natural rate, i.e. the rate at which savings and investment would be equal; and (III) industrial factors, changes in the volume or unit cost of output that alter entrepreneurs' demand for money. He traces through in considerable detail the different (and inter-connected) sequences by which these three categories of initial causes of disequilibrium work themselves out. He argues that monetary disturbances "of a quasi-permanent nature" lead to a new equilibrium price level, while investment disturbances produce only oscillation around the existing price level, in the form of credit cycles. The main policy thrust of the *Treatise* is the use of the Bank Rate to keep market rates of interest as close as possible to the natural rate.

It was the intricate web of paths of adjustment from disequilibrium to a re-established or a new equilibrium that was Keynes's response to what he had identified in 1924 as "least complete and satisfactory" in Marshallian period analysis. Keynes titled Book IV of the *Treatise* "The Dynamics of the Price Level". In effect, he tried to situate dynamics within a comparative static analysis of the long period. He held on to the Marshallian belief in the long period as the touchstone for understanding the normal economy, but allowed greater scope than Marshall did for the disappointment of entrepreneurial expectations and, in a variety of complicated ways, set up the disappointment of expectations to drive his mechanisms of equilibration. But in the dynamics of the *Treatise* there is no analysis of the short period as such, any more than there is in Marshall's monetary theory.

While Keynes has a notion of the short period - the time during which existing commitments cannot be revised - he does not use it to delineate a partial equilibrium. This may be illustrated by his discussion of how entrepreneurs react to the realisation of lower earnings than they had anticipated. This will depend on which reaction(s) they choose, and then on the strength of their existing

commitments, e. g. labour bargains and agreements for the use of fixed capital, which will govern the speed of their reaction (CW V: 112-3). Across the economy, these reaction speeds will be very different, and this would make any formal short period analysis "intricate".

"When for any reason an entrepreneur feels discouraged about the prospects, one or both of two courses may be open to him - he can reduce his output or he can reduce his costs by lowering his offers to the factors of production. Neither course, if adopted by entrepreneurs as a whole, will relieve in the least their losses as a whole . . . Nevertheless these courses will in actual fact appeal to them, because, in so far as any class of entrepreneurs is able to adopt either of these courses in a degree greater than the average, they will be able to protect themselves. A discussion of the precise circumstances which determine the degree in which a class of entrepreneurs or an individual entrepreneur pursues the one course or the other over the short period would, however, lead me too far into the intricate theory of the economics of the short period. It must be enough here to repeat . . . that we do not require for the purposes of the present analysis to make any particular assumptions as to the time which has to elapse before losses (or profits), actual or anticipated, produce their full reaction on the behaviour of entrepreneurs. It is sufficient that the general tendency of a disequilibrium between saving and investment is in the sense described, and that, if the cause persists, the tendency must materialise sooner or later." (CW V: 144-5)

In other words, an unkind critic might murmur, when the storm is long past, the ocean is flat again. Nevertheless, the long period equilibrium analysis of the *Treatise*, as stated in Chapters 9 and 10, has been recognised as "a complete macro-dynamic theory, a formal frame able to find a place for all questions about the movements of the great aggregative variables" (Shackle, 1974: 25).

Why then did Keynes break with the approach of the *Treatise*? Why, even though recognising its "artistic failure" at the point of publication, did he never try to improve it in a revised edition? And how did Keynes come to produce a macroeconomic theory of the short period in his next report from the battlefield,

the *General Theory*? No doubt there were many reasons, but three seem worth highlighting. They are the unresolved contradiction in the *Treatise* concerning changes in the level of output; the impact of the economic crisis of 1930-1 on Keynes's thinking; and the need to re-focus the objectives of economic policy from avoiding inflation to reducing mass unemployment. All three reasons were interconnected, but let us examine them separately below.

"Its parts are not entirely harmonious with each other", Keynes had warned readers of the *Treatise*. One important inconsistency was its treatment of the level of aggregate output. The second Fundamental Equation has  $O$  as a constant, not a variable. Yet, in tracing the paths of adjustment to disturbances to equilibrium of the price level, entrepreneurs are said to be able to reduce their output, as in the quotation above. If any do take that option, rather than relying on reducing their costs of production, the assumed constancy of  $O$  is violated. But the macroeconomic consequences of permitting flexible output are not followed through. This criticism was made by Ralph Hawtrey. Moreover, the young Richard Kahn, who had worked with Keynes on the final proofs of the *Treatise*, published in 1931 his article on the multiplier effects of an increase in public investment on the quantity of employment. This hinted at how changes in the level of investment could be linked with changes in the level of output, but neither man saw the hint and took it until a year or so later, when the key ideas for the *General Theory* all fell into place

Kahn's own work had from the start focused on the economics of the short period, which was the title of his Fellowship Dissertation for King's. He picked up a crucial insight of Dennis Robertson, that Marshall's "short period is not the same at both ends - and never has been". In other words, the length of historical time that corresponds to Marshall's definition of the short period is different, depending on whether the firm is prospering and wanting to add to its fixed capital, or languishing with an excess capacity of fixed capital. In the first case, "this space of time may not, in some cases, extend over more than a year", but when "it is the rate of decay (of existing fixed capital) that sets the bounds to the short period . . . the short period may run into decades. . . ." (quoted by O'Shaughnessy, 1994: 42). Since after 1929, languishing rather than

prospering was the dominant economic condition of the time, 'the long end of the short period' gained a new relevance for economic analysis. Keynes recognised this when replying to Hawtrey's criticism of the *Treatise*. ". . . I agree that it will probably be difficult in future to prevent monetary theory and the theory of short period supply from running together. If I were to write the book again, I should probably attempt to probe further into the difficulties of the latter. . . ." (Moggridge, 1992: 533).

## VI THE *GENERAL THEORY*

Keynes never did re-write the *Treatise*, and the *General Theory* was a different kind of book. His aim became "to press home as forcefully as possible certain fundamental opinions - and no more" (ibid.: 557). It was not simply that his own ideas continued to evolve, but that he felt that others, too, were trapped inside outworn habits of economic theorising. Thus the *General Theory* had to be polemical, and it had to achieve a decisive overthrow of key tenets of existing theory. This could not be done by simply abandoning the old framework, metaphorically just washing his hands of it and walking away. It had to be done by transforming it, so as to alter the mindset of economists and economic policy-makers once and for all. Keynes chose to do this by demonstrating that the economy as a whole could settle at an equilibrium at less than full employment.

This result could be relied on not merely to underpin his policy recommendations to alleviate unemployment, which had hitherto proceeded on a separate track while Keynes addressed in his academic mode monetary theory and the policies for price stability. It would also fly as dramatically as possible in the face of the current economic orthodoxy. For this demonstration, he worked with the short period. Originally, his intuition had suggested a special case, relevant to Britain, of the economy getting stuck on the way back to full employment in some kind of "false equilibrium". But then he came to suspect that the underlying assumption of full employment as being normal that ran through

the *Treatise* had no proper theoretical justification. So he gave it up, along with its concomitant, the natural rate of interest.

For the *General Theory* Keynes did give a careful specification of what he meant by the short period.

"We take as given the existing skill and quantity of available labour, the existing quality and quantity of available equipment, the existing technique, the degree of competition, the tastes and habits of the consumer, the disutility of different intensities of labour and of the activities of supervision and organisation, as well as the social structure including the forces, other than our variables set forth below, which determine the distribution of the national income."  
(CW VII: 245)

These factors were not said to be constant, but were held constant by a *ceteris paribus* assumption for the purposes of the analysis. The analysis itself (once a number of logical errors which Keynes made are corrected) can be represented in a schema of ten equations that give the value in equilibrium of ten variables (Asimakopulos, 1991: 102)<sup>13</sup> These variables are the amount of

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<sup>13</sup> I quote Asimakopulos's formalisation here to illustrate the main gist of Keynes's schema. There are numerous other variants, with slightly fewer or more equations and variables and different definitions of some variables. In the present context, it is not crucial to come to a judgement of which formalisation is, in some sense, the best.

The ten equations of Asimakopulos are:



labour that workers would want to supply ( $N_s$ ), the level of employment ( $N$ ), the money wage rate ( $w$ ), the price level ( $P_w$ ), aggregate demand measured in wage-units ( $Y_w$ ), consumption and investment both measured in wage-units ( $C_w$  and  $I_w$ ), the rate of interest ( $r$ ), aggregate income ( $Y$ ) and the quantity of money ( $M$ ). The most important thing to note about this schema is that, in contrast to orthodox models, the labour market is not required to clear: in equilibrium  $N$  does not necessarily equal  $N_s$ . Involuntary unemployment can exist for a long time without there being any natural economic mechanism to eliminate it. This is a fundamental implication of the *General Theory*.

Although the economic relationships that Keynes discusses in the *General Theory* can be represented in the schema set out in note 12, or variants of it, it should not be understood as an economic model in the modern sense, let alone "the Keynesian model". This is because Keynes explicitly recognises that the independent variables that he identified may not be strictly independent, and that changes in some of the dependent variables may feed back in a way that influences the value of some of the independent variables. He therefore warns against the mechanical uses of his relationships to give infallible answers, regarding them as only a way of organising thinking, and of rendering the analysis of economic reality more intellectually manageable.

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$N_s = S(w/P_w)$ .....	1
$Y_w = g(N)$ .....	2
$Y_w = C_w + I_w$ .....	3
$M = \bar{M}$ .....	4
$w/P_w = H(N)$ .....	5
$C_w = C(Y_w)$ .....	6
$Y = wY_w$ .....	7
$N \leq N_s; \bar{w} = w$ .....	8
$I_w = I(r)$ .....	9
$M = L(r, Y)$ .....	10

The definition of the variables is given in the main text.

Keynes became therefore less concerned with proving the existence of an unemployment equilibrium as such than with explaining the processes of adjustment by which the level of employment comes to be what it is. His explanation is radically different from the process envisaged in Marshall's short run, which is based on infinitely fast price movements which elicit supply responses. In contrast Keynes envisages wide fluctuations in the volume of investment driven by changes in the state of liquidity preference (or the propensity to hoard) and by changing opinions of the future yield of capital assets. Investment fluctuations change the level of income, which through a multiplier process alters the level of consumption expenditure, and thus the level of income, output and employment once again. Meanwhile, prices adjust much more slowly to these quantity adjustments. So "the Marshallian ranking of price- and quantity- adjustment speeds is reversed" (Leijonhufvud, 1968: 52).

Keynes's short period equilibrium cannot be treated as "self-contained" in the sense defined by Hicks. That is to say that the equilibrium values are not determined solely by the actual values in the short period, and without reference to anything that goes on outside it in the temporal sense. Keynes says that his marginal efficiency of capital schedule is fundamentally important precisely "because it is mainly through this factor (much more than through the rate of interest) that the expectation of the future influences the present". Further, "the mistake of regarding the marginal efficiency of capital primarily in terms of the *current* yield of capital equipment, which would be correct only in the static state where there is no changing future to influence the present, has had the result of breaking the theoretical link between to-day and to-morrow" (VII: 145). However, in permitting longer term expectations to influence the equilibrium of the short period, Keynes did remain within the Marshallian tradition, contrary to the views of some of its later interpreters<sup>14</sup>.

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<sup>14</sup> It might be assumed that this is a matter on which Keynes departed from the example of Marshall, since Hicks attributed "self-containedness" to Marshall's short period equilibrium. But this inference must be rejected in the light of Currie and Steedman's new reading of Marshall's fishing industry example, which led them

Where Keynes decisively broke with Marshall (in addition to reversing him on price- and quantity adjustment speeds) was in not treating short period equilibrium as a temporary phase in a movement towards long period equilibrium. Keynes's short period equilibria are indeed temporary, but one succeeds another rapidly as new intelligence is received, just as do the images of a kaleidoscope with each fresh twist of the hand (Shackle, 1965: 47-8). This is because in his view long term expectations were highly volatile, while for Marshall they were unchanging. As Asimakopulos put it: "long-period equilibrium has no place in Keynes's analytical framework since the stationary conditions that are required to make long-period equilibrium values centres of attraction for actual values are at variance with Keynes's vision of capitalist economies which are subject to changes from many sources" (1991: 26).

## VII THE 1937 *QJE* ARTICLE

It is this break with Marshall that Keynes placed at the centre of his 1937 *Quarterly Journal of Economics* article on "The General Theory of Employment", in which he finally distilled the essence of his distinctive thinking on macro-economics. This short piece was "a discussion as to certain definite points where I seem to myself to be most clearly departing from previous theories" (CW XIV: 112). Its most substantial section is devoted to a rejection of the assumption, attributed to Marshall among others, that facts and expectations could always be given "a definite and calculable form, and that risks were capable of "an exact actuarial computation" (ibid.). Keynes argues instead that uncertainty is radical. "The sense in which I am using the term is that in which the prospect of a European war is uncertain" (ibid., 113). He denies that there is any scientific basis on which to calculate the probability of future events that will affect the yield of capital assets, that our beliefs about

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to the conclusion that it is not possible to attribute a fully "self-contained" short period to Marshall (1990: 27).

such events are merely conventional judgements, and therefore that they are subject to sudden and violent changes<sup>15</sup>

Keynes then draws out the implications of radical uncertainty about the future for his view of money and interest. People hold money as a store of value to the extent that they distrust the conventional picture of the future. If the propensity to hoard (or liquidity preference) increases, while the quantity of money remains constant, the rate of interest will rise to equate the demand for and supply of hoards. A rise in the rate of interest will depress the prices of existing capital assets and reduce the volume of current investment. More pessimistic opinions on the future yield of capital assets will tend to reinforce this effect of a greater propensity to hoard in diminishing current investment, rather than offsetting it. Next, a fall in the level of current investment will affect the overall level of income and employment because, through the consumption multiplier, it reduces the demand for consumption goods.

Using these considerations, Keynes claimed to be able to show why output and employment are so liable to fluctuation, and the particular influences exercised on these fluctuations by the propensity to hoard and the chosen level of investment. In so doing he proposed a new theory of the determination of the rate of interest, and one that took account of the possibility that the economy could move to a position of less than full employment. Significantly, however, in the *QJE* article he no longer claimed that a less than full employment economy had no tendencies to recovery. He admitted that it did, but argued that such tendencies were weak. As he put it, "the only element of self-righting in the system arises at a much later stage and in an uncertain degree", after a decline

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<sup>15</sup> If Keynes occasionally sounds like an Old Testament prophet, one Old Testament prophet's words sound remarkably like Keynes's "philosophical disquisition on the behaviour of mankind" of 1937. I offer the following extract from *Ecclesiastes 8, v. 6-9* in the New English Bible translation. "There is a time and a method for every enterprise, although man is greatly troubled by ignorance of the future; who can tell what it will bring? It is not in man's power to restrain the wind, and no one has power over the day of death. In war no one can lay aside his arms, no wealth will save its possessor."

in aggregate output reduced the amount of money required for active circulation and thus allowed the propensity to hoard to be satisfied at a lower rate of interest (*ibid.*, 118). This statement throws the notion of an unemployment equilibrium back into doubt.<sup>16</sup>

## VIII CONCLUSION

*Wrestling with Time*: how apt a title for Currie and Steedman's fascinating story of how various economists have tried to advance beyond the timeless economics of Ricardo and his followers. It has been a wrestle, and continues to be, with few if any outright winners among the economists. Keynes was not part of their story, although Marshall was. What I have tried to do here is to respond to the challenge of Lord Skidelsky, who asked in a recent review of a new biography of Marshall (1996): "By what steps and transformations did Marshallian economics become Keynesian economics? Was it 'all in Marshall', as Keynes's pupil Dennis Robertson claimed? Or was the Keynesian revolution a genuine mutation?" Regarding the treatment of time, the answer seems to be that it was not all in Marshall, and that in the course of a long

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<sup>16</sup> In this connection, it is interesting to note that the theory of the determination of the interest rate in the *General Theory* had been powerfully attacked in May, 1936 by his old associate Hubert Henderson, in a paper to the Marshall Society in Cambridge. The ferocity of the attack can be gauged by its conclusion. ". . . Mr Keynes's own assertion that the rate of interest is . . . independent. . . of the propensity to save or to consume on the one hand, and of . . . the marginal efficiency of capital on the other, is the most extravagantly untrue proposition that has ever been put forward as a major contribution to economic theory by any serious economic writer" (Henderson, 1955: 161-177). I am not suggesting that Keynes caved in to Henderson's sheer aggression. But I think that he may have seen merit in Henderson's common sense insistence that "the depression would not last for ever; a process of recovery, once it has fairly begun, is cumulative." Henderson based his argument on the orthodox Marshallian distinction between the short run and the long run, and I suggest that Keynes did not in fact entirely free his mind from the whole of that distinction, even by 1937.

evolution away from Marshall, Keynes made many important analytical departures, without ever being quite as revolutionary as he would have liked others to believe him to be.

*In the long run, we are all dead* was not, in 1923, a jettisoning of Marshall's long period equilibrium. It was an early recognition of the analytical problem that Keynes went on to solve, namely the element of disjunction that remained in Marshall's scheme between value theory and monetary theory, and the particular asymmetry according to which the former featured a short period equilibrium, while the latter did not. It was not a plea that *all* policy analysis should be focused on the short run, as is clear from his reaction to Ramsey's theory of optimal saving, and his welcoming of the prospect of the community's accumulation becoming less dependent on the saving decisions of "particular mortal men who are alive today". Moreover, long period equilibrium remained the framework for the failed *Treatise on Money*.

This framework was indeed surrendered in *The General Theory*. But it would be too simple by far to attribute to the latter a short period model of unemployment equilibrium. He regarded the notion of a closed model as much too mechanical to be useful for policy, which was his main concern. In this he was much closer to the methodology of Marshall than of the moderns. Given the deflationary conditions of the 1930s, the relevant short period was the "long end of the short period" that Robertson and Kahn had drawn from Marshall. Finally, within that period, Keynes, after demonstrating the possibility of an unemployment equilibrium in the *General Theory*, acknowledged the existence of a self-righting tendency, although a weak and uncertain one, in the *QJE* article of 1937.

Keynes broke most decisively with Marshall on the question of how adjustment takes place, emphasising the speed of changes in quantities rather than in prices. He also developed a new theory of the volatility of investment, by denying the effectiveness of the "pretty and polite" conventional technique by which entrepreneurs were supposed to be able to transform radical uncertainty about the future prices of capital assets into an actuarial calculation of risks. No doubt Marshall had discussed the role that business confidence

played in the trade cycle, but it had never been given such an integrated and central treatment in economics as it received from Keynes. That treatment still stands as an intellectual challenge to the rational expectations enthusiasts of modern macroeconomics (Gerrard, 1994).

The treatment of time is one of the most intractable problems in economic theory. Keynes's technical limitations as an economic theorist have often been stressed, and rightly so. Nevertheless, it is possible to exaggerate their impact on Keynes's own treatment of time in economics. Leijonhufvud, for example, asserted that "it is known for a fact that (Keynes) had no patience at all with the technicalities of period-analysis" (1968: 37). The reader is then referred to a footnote of Schumpeter's which states that Keynes once said to a pupil "Forget all about periods" (1954: 1184, n28). This note occurs just at the point where Schumpeter's manuscript broke off unfinished. Thus we have no idea who the pupil was, or when or in what context the alleged remark was made. This seems a rather flimsy basis on which to erect a known fact. The evidence presented here suggests the opposite, that Keynes throughout his theoretically creative years worked away patiently within the period analysis framework of Marshall, although the vigour of his intuition and his craving for realism did, on occasion, lead him to forget about periods and tempt him to trespass beyond their formal boundaries.

Rather than focusing on Schumpeter's footnote, we would do well to read his text.

"Professor Hicks was obviously right in saying that 'the *General Theory of Employment . . .* is neither the beginning nor the end of Dynamic Economics'. But it is also true that, unintentionally and perhaps even against his will, Keynes gave a mighty impulse to it - almost all work in macro dynamics now starts from a 'dynamized' form of his model. In a history of analysis this is the point to stress" (1954: 1183-4).

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