Liquidity-Preference/Loanable-Funds and The Long-Period Problem of Saving

By
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Abstract

This paper reexamines the central issue of the liquidity-preference/ loanable-funds controversy in an attempt to provide a definitive explanation of the way in which the rate of interest is determined. The Marshallian roots of the controversy are examined in section I, and in section II it is explained why the liquidity-preference theory is compatible with the Marshallian paradigm and the loanable-funds theory is not. The long-period problem of saving that lies at the center of Robertson's objection to Keynes' theory of interest is examined in section III, and in section IV it is explained why the failure to understand this problem within the Marshallian context of Keynes' liquidity preference theory has led mainstream economists to recommend economic policies over the past forty years that culminated in the Crash of 2008 and the economic stagnation we are in the midst of today.

I spent a great deal of time in an earlier life plodding through the Liquidity-Preference/ Loanable-Funds debate that followed the publication of J. M. Keynes' The General Theory of Employment, Interest, and Money. I was astonished at the time by the extent to which the conventional wisdom within the discipline of economics was out of touch with the reality of that debate.1 By the late 1970s it seemed the debate had already become a classic in the sense that everyone knew about it, but no one had actually read it, and, as far as I can tell, nothing much has changed since then.

I found the debate itself to be surreal. Before and during the early part of World War II the debate was waged explicitly in Marshallian terms. Keynes argued there was a fundamental difference between the two theories in that the liquidity-preference theory assumes the rate of interest (i.e., the "complex of rates of interest for debts of different maturities" [Keynes (1936, p. 131)] is determined by the supply and demand for liquidity (i.e., "money or its equivalent" [Keynes (1936, p. 106)] and not by savings and investment (i.e., loanable-funds). [2] His main protagonist, D. H. Robertson, argued that the two theories were the same and that Keynes failed to understand the mechanism by which savings and investment determine the rate of interest through their contribution to the supply and demand for loanable funds.

After the War, when Keynes was no longer around to defend his theory, the Keynesians came along and the debate entered a Walrasian phase. The Keynesians argued that the two theories are the same in the sense that it doesn't make any difference whether one assumed the rate of interest is determined by savings and investment (i.e., supply and demand for loanable funds) or by the supply and demand

for money (i.e., liquidity) since the same short-run equilibrium rate of interest is implied by either assumption. The Robertsonians continued to attack Keynes' arguments as they insisted that the rate of interest is determined by savings and investment (presumably in a Marshallian sense) irrespective of whether the short-run equilibrium was the same or not. And so it went until the early 1960s when Robertson left us, and the debate just sort of petered out. At that point we were left with two schools of thought within mainstream economics: one that argued the rate of interest is determined by savings and investment and one that argued it didn't make any difference what you assumed about how the rate of interest is determined.

It seemed quite obvious to me in the late 1970s and early 1980s, and seems even more obvious to me today, that both of these schools of thought were wrong in their understanding of what Keynes had to say about the way in which the rate of interest is determined since this understanding simply does not correspond to what Keynes actually said. It also seemed obvious to me that the failure to resolve the fundamental issue that separated Keynes and Robertson in this controversy was a mistake with the potential for serious consequences, and it is quite clear to me today that these consequences have, in fact, come home to roost.

A great deal of the controversy we see in the discipline of economics today arises from a failure to definitively resolve the central issue of the liquidity-preference/loanable-funds controversy within the context in which it originally began, namely, within the context of the Marshallian paradigm of supply and demand. Now there are many grounds on which one can criticize this paradigm, but almost all economists recognize its essential validity, and I can't even imagine what it would be like trying to make sense out of a market economy in a principles course without the concepts of supply and demand as put forth by Marshall. It seems quite clear to me that the Marshallian paradigm is the *sine qua non* of all short-run/long-run equilibrium analysis in economics: If you can't start with an explanation of the way in which prices and quantities are determined by the actions of decision-making units in individual markets within the context of a Marshallian, partial-equilibrium model how is it possible to provide a *causal* explanation of the way in which prices and quantities are determined within any economic model? [Blackford (2016)] Thus, we will begin with an examination of the Marshallian roots of the liquidity-preference/loanable-funds controversy.

I. The Marshallian Roots of the Controversy

In his November, 1936 review of Keynes' *General Theory*, Robertson took Keynes to task for his analysis of what Robertson called the "long-period problem of saving." [3] Toward the end of his analysis Robertson concluded: "Ultimately, therefore, it is not as a refutation of a common-sense account of events in terms of supply and demand for loanable funds, but as an alternative version of it, that Mr. Keynes' account as finally developed must be regarded." [Robertson (1936, p.183)]

In his February 1937 reply to Robertson, Keynes asked Robertson to provide at least one reference to where this "common sense" account is to be found. [Keynes (1937a, p. 210)] Keynes made this request because Robertson based his conclusion on an analysis framed entirely within the context of the supply and demand for money (see footnote 3 above), and at no point did he define what he meant by the supply and demand for loanable funds. Prior to Keynes' request, no one had attempted to give a precise explanation of what is meant by these terms, and the first attempt to do so was by B. G. Ohlin. [4]

In June of 1937 Ohlin stated that prices in financial markets, and thereby rates of interest, "are governed by . . . supply and demand in the usual way" [Ohlin (1937a, p. 225)], and in September he concluded that

> the curves of demand and supply of credit determine the prices of claims, i.e., the rates of interest, and the actual credit transaction in the same way as prices and dealings are fixed on commodity markets. *Anyone who refuses to accept this analysis of the pricing of claims must, I think, refute also the Marshallian supply and demand curve analysis in toto* [*emphasis* added]. [Ohlin (1937b, p.426)]

In response, Keynes insisted that his liquidity-preference theory and the loanable-funds theory put forth by Ohlin were "radically opposed to one another." [5] The problem was that Ohlin had defined the supply and demand for loanable-funds to include saving and investment and then simply asserted that the theory he had explained is consistent with the Marshallian paradigm. [6] In fact, Keynes had demonstrated in his *Treatise on Money* that any theory that assumes the rate of interest to be determined by saving or investment is *logically* inconsistent with this paradigm. This was the central issue with which Keynes was concerned. That it was also the central issue that stood between Robertson and Keynes is indicated by Robertson's 1936 [p. 188] objection to Keynes' "old argument."

This argument is to be found in Keynes' *Treatise on Money*, and by virtue of this argument Keynes had explained why it was *logically* impossible for a change in saving or investment, *in itself*, to cause a change in the rate of interest. [7] Both Robertson and F. A. Hayek [8] had criticized this argument in 1931 for its failure to consider the effects of a subsequent fall in income on the rate of interest. In his September 1931 reply, Keynes restated the argument, emphasized the words "in itself" in the first sentence of his original argument, [9] and toward the end of the discussion added a footnote explaining that his argument does not deal with a situation in which output changes.[10] In addition, in the preface to *The General Theory*, Keynes explained the nature of the theoretical arguments put forth in his *Treatise on Money* as an "instantaneous picture taken on the assumption of a given output." [11]

From the text of Keynes' old argument itself, from Keynes' emphasis on the words "in itself" in his response to Robertson's and Hayek's criticisms, from the footnote stating that his argument does not deal with the situation in which output changes, and from Keynes's explanation in the preface to *The*

General Theory that his argument in *The Treatise on Money* assumes a given output, it is clear that—in spite of the fact that Robertson presented his objections to Keynes' old argument within the context of "the long-period problem of saving" [Robertson, (1936, p. 187)]—this argument does not deal with the long-period effects of an increased rate of saving on income or the rate of interest. Specifically, it has to do with a *ceteris paribus* situation in which *output*, that is, *income* is assumed to be constant. This is, of course, *precisely the kind situation that is the essence of Marshall's partial-equilibrium paradigm.*

II. Loanable Funds and Marshall

Keynes argued that if income is defined as the value of output produced, and savings as the difference between income and expenditures on consumer goods (and if we do not accept these almost universally accepted definitions of income and saving it is not at all clear what we are talking about until both income and saving are otherwise clearly defined) it is impossible to explain the determination of the rate of interest in terms of the supply and demand for loanable funds by way of the Marshallian paradigm of supply and demand. The reason is that, given these definitions—that is, if this is what we mean when we talk about income and saving—it is impossible for a *ceteris paribus* change in either the saving or the investment schedule to affect the rate of interest, given income, in the absence of a change in either the supply or demand for money.

The nature of this problem can be seen by considering a situation in which there is an increase in the propensity to save and, hence, *by definition*, a fall in the propensity to consume that arises as a result of, say, a national catastrophe such as 9/11. People feel insecure, and in response they consume less and simply allow a larger portion of their incomes to accumulate in their bank accounts than they otherwise would. How will this increase in savings—*which, by definition, means a decrease in consumption*—affect the rate of interest in this situation in the absence of a change in the supply of money or in income?

Within the context of the liquidity-preference theory the accumulation of money in inactive deposits would be seen as an increase in the precautionary demand for money on the part of households. [12] In the absence of a change in income (value of output produced) there would be no decrease in the demand for transactions or precautionary balances on the part of businesses, and businesses would find they could no longer replenish their transactions balances from sales. When faced with this situation, businesses would be forced to either sell assets or increase borrowing in order to maintain the transactions and precautionary balances needed to meet their expenditure obligations. As the demand for precautionary balances on the part of households increased with no change in the demands for precautionary balances on the part of firms or in transactions balances on the part of either households or firms, the net effect would be an increase in the total demand for money. Thus, in the absence of an

increase in the supply of money, we would expect this increase in the demand for money to *cause* an increase in the rate of interest in order to make speculative balances available to households and firms to meet their transactions and precautionary needs. [13]

How can this situation be explained within the loanable-funds theory? The only way it would seem to make sense is if we assumed that the increase in the propensity to save (the loanable-funds supply schedule) that made it impossible for businesses to replenish their transactions and precautionary balances through sales and forced them to increase their borrowing *caused* an increase in the loanable-funds demand schedule that is greater than the increase in the loanable-funds supply schedule. But once we have done this the concept of the supply and demand for loanable funds becomes meaningless for analytical purposes since *the behavior of supply and demand for loanable funds schedules are now defined by the supply and demand for money,* and it no longer makes sense to argue that the rate of interest is determined by savings and investment (loanable funds) in any sense that would be recognized by Marshall. But the alternative is to *arbitrarily* assert that the rate of interest will fall in this situation by way of some sort of magic (i.e., *tâtonnement*/recontract process) *without any explanation of any kind, causal or otherwise, as to why it will fall.* [14]

But the inconsistency with Marshallian paradigm does not end here since it is reasonable to assume that *eventually* the increase in saving (which, by definition, means a decrease in consumption), if it persists, must lead to a change in expectations on the part of producers of consumption goods with regard to the profitability of continuing to produce at the current level of employment and output. This, in turn, must lead to a fall in employment, output, and, hence, income. But this change in expectations and fall in income must also *cause* a fall in the saving (i.e., the supply of loanable funds) schedule at each rate of interest and (as we will see) will probably have an effect on the investment (i.e., the demand for loanable funds) schedule as well. This means that the intersection of these two schedules—which defines the equilibrium rate of interest in the loanable-funds theory—must change as expectations and income change *before* the rate of interest can change.

What does it mean to say that savings and investment determine the rate of interest in a Marshallian supply-and-demand, partial-equilibrium analysis in a situation in which, *given income,* an increase in the propensity to save (the loanable-funds supply schedule) will force an increase in borrowing (an increase in the loanable-funds demand schedule) so that there is no reason for the rate of interest to fall until income falls, and when income falls the equilibrium rate of interest given by the intersection of these two schedules—and toward which the rate of interest is supposed to move—will change?

When the supply of apples increases we can reasonably argue that, given the incomes of demanders, competition among suppliers and demanders for apples will *cause* the price of apples to fall toward the new equilibrium price defined by the supply and demand for apples. How would a Marshallian

analysis of the market for apples work if an increase in the supply of apples created a situation in which demanders for apples were somehow forced to buy the increased supply of apples until their incomes fell, and once their incomes fell both the supply and demand curves for apples changed? *This sort of thing does not happen in the market for apples, and that is why a Marshallian analysis of the market for apples makes sense in terms of cause and effect and why it makes sense to say that the price of apples is determined by the supply and demand for apples.* This sort of thing does happen in the loanable-funds market when savings and investment are included in the supply and demand for loanable funds schedules. That is why Keynes argued it does not make sense to talk about the supply and demand for loanable funds determining the rate of interest as if this market were no different than the market for apples.

The loanable-funds market is fundamentally different from every other (competitive) market in this regard. It makes sense to argue that competition among decision-making units will force (i.e., *cause*) the rate of interest to move to the partial-equilibrium value determined by the intersection of the supply and demand for money schedules, given income, just as it makes sense to argue that competition among decision-making units will force the price of apples to move to the partial-equilibrium value determined by the supply and demand for apples schedules, given income. It also makes sense to argue that decision-making units will be able to force the level of income (output and employment) to the partial-equilibrium value determined by the saving and investment schedules given the rate of interest. *But it does not make sense to argue that it is possible for decision-making units to force (i.e., cause) the rate of interest to move to the partial-equilibrium value in the market for loanable funds, given income*. [Blackford (2016)]

When economists look at the world through the lens of a static short-run or long-run equilibrium model where a set of endogenous variables are assumed to be determined by a set of exogenous variables and parameters this problem does not arise. It is only in the realm of *dynamic* analysis that it becomes important. When undertaking dynamic analysis one can, of course, assume that the changes in a price are determined by anything one wishes, but that choice should not be made arbitrarily. That choice should be made in a way that makes sense in terms of a Marshallian partial-equilibrium analysis because within the context of a Marshallian partial-equilibrium analysis it is possible to establish the *temporal order in which events must occur* and, thus, to give a *causal* explanation in terms of the behavior of those who are willing to buy and sell in the market—*that is, in terms of the behavior of those decision-making units that actually have the power to determine the price at which apples are purchased in the market*—as to why we would expect a change in price to occur. [Blackford (2016)] Following this convention, it makes sense in terms of *cause and effect* to assume that changes in the rate of interest are determined by the excess demand for money [see Blackford (2016)], and, as was noted above, the only way in which the loanable-funds theory makes sense *in terms of cause and effect* is if the supply and demand for loanable funds schedules are *defined* in such

a way that their behavior is determined by the supply and demand for money, otherwise the a priori predictions of this theory are nonsense.

It is worth stopping here for a moment to think about what this means. What this means is that, given the almost universally accepted definitions of income and saving, the rate of interest cannot change in response to a change in the propensities to save or invest until *after* there is a subsequent change in the supply or demand for money. Even though a change in the propensity to save or invest will undoubtedly set in motion a chain of events that will ultimately *cause* a change in the rate of interest *along with all of the other endogenous variables in the system*, it can only *cause* the rate of interest to change through an *effect* on the supply or demand for money. *This means that the rate of interest is a purely monetary phenomenon*—determined by the supply and demand for money, not by saving or investment. It also means that *if we want to understand how the system works in terms of cause and effect we have to begin with the assumption that the rate of interest is determined by the supply and demand for money (i.e., liquidity) and cannot assume that it is determined by saving and investment.* [Blackford (2016)]

Robertson was never able to accept the implications of this simple *logical* fact, yet neither he nor any of his fellow anti-Keynesians were able to specify a sensible model in which the rate of interest was not determined by the supply and demand for money. [15] This failure on their part is of little import, but the fact that the Keynesians were either unable or unwilling to incorporate this insight into their neo-classical models has had the gravest of consequences, for it has meant that mainstream economists have simply ignored the fundamental problem that lies at the very core of Keynes' general theory, namely, the long-period problem of saving.

III. Keynes' General Theory and the Long-period Problem of Saving

As has been noted, it was the determination of the rate of interest in the Marshallian sense with which Keynes was most concerned. The reason is that economists could, and did (and, unfortunately, still do) use the idea that the rate of interest is determined by savings and investment to argue that an increase in the propensity to save will lead to a fall in the rate of interest which will, in turn, lead to an increase in investment, output, and economic wellbeing in the future. This is the kind of argument Robertson was attempting to justify in his November 1936 review quoted at length in footnote 3 above, and Keynes adamantly rejected this kind of argument.

Keynes argued that whenever the production of output takes time, at each and every point in time at which a decision must be made concerning employment and output this decision must be made on the basis of currently held expectations with regard to the costs to be paid and the proceeds to be received in the future when the output is to be produced and sold. The actual costs and proceeds that result from

employment and output decisions cannot have a direct effect on these decisions, only an indirect effect, and, even then, only to the extent that they have an effect on subsequent expectations, that is, on expectations formed after the expected costs and proceeds are (or are not) actually realized. [16]

This argument has clear implications with regard to income. Keynes took great care in constructing his definition of income, and he constructed this definition in such a way that the value of income depends only on *the value of output produced* where this value is dependent on the *expectations* of producers. Whenever production takes time, income, so defined, is earned *before* the output produced in generating that income is sold. As a result, income is a purely psychological phenomenon, determined in the minds of decision-making units, and income cannot be separated from the current expectations of these units. [17] The implication is that whenever production takes time, at each and every point in time at which a decision must be made concerning income, this decision must be made on the basis of currently held expectations in exactly the same way in which decisions concerning employment and output must be made on the basis of currently held expectations. [18]

In addition, Keynes argued that since the actions of decision-making units depend crucially on their expectations with regard to the future, the way in which wealth holders react to the fall in the return on assets in the consumer-goods industries that must accompany an increase in the propensity to save (i.e., a decrease in the propensity to consume) will depend on how it affects their expectations with regard to the expected future returns on those assets. He also argued that since expectations are greatly affected by current experiences there is no reason to assume that an increase in the propensity to save will have a positive effect on these expectations with regard to the profitability of investing in the consumer-goods industries. [19]

As a result, Keynes saw no reason to accept the conventional wisdom to the effect that there will be an increase in economic output and wellbeing in the future as a result of the increase in the rate of capital accumulation that will occur in response to an increase in the propensity to save because the conflicting forces operating on investors in this situation imply that *there is no a priori reason to believe that the net effect of an increase in the propensity to save on investment will be an increase in the rate of capital accumulation.* [20]

This is a very different way of looking at the problem than the way Robertson looked at it. The difference can be seen by examining the way in which Robertson discussed this problem (quoted in its entirety in footnote 3 above) in his 1936 review of Keynes' *General Theory*:

> . . . it may be convenient to conclude by examining briefly the bearing of his liquidity preference formula on the long-period problem of saving. . . . Will an increased rate of saving which is not itself hoarding (e.g. which takes the form of an increased demand for securities), but which involves an actual diminution in the rate of expenditure on consumable goods, lead to a progressive shrinkage in total money income?

> . . . Mr. Keynes appears to invoke his formula in support of the view that such an event has no tendency to bring down the rate of interest nor therefore to stimulate the formation of capital equipment. For why, he asks, the quantity of money being unchanged, should a fresh[3] act of saving diminish the sum which it is required to keep in liquid form at the existing rate of interest? The answer surely emerges from the composite nature of liquidity preference. If the event in question deprives the producers of consumption goods of income, *it reduces by the same act their ability to hold money for transaction and precautionary purposes* [*emphasis* added]. . . .
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> . . . . if there exists for the community as a whole a negatively inclined curve of "liquidity preference proper" . . . some part of the additional savings devoted by individuals to the purchase of securities will come to rest in the banking accounts of those who, at the higher price of securities, desire to hold an increased quantity of money.[6]
>
> Thus the fall in the rate of interest and the stimulus to the formation of capital will be less than [the fall in consumption] and the stream of money income will tend to contract. . . .
>
> It would, I think, be agreed by "orthodox" writers[7] that this is a situation calling for a progressive increase in the supply of money. [Robertson (1936, pp. 187-9)]

As is indicated in this passage, in Robertson's view of this problem the increase in the rate of savings that takes the form of an increased demand for securities will *simultaneously* ("by the same act") cause a fall in income, the demand for money, and, hence, the rate of interest. The fall in the rate of interest will, in turn, lead to an increase in the demand for capital goods thereby leading to a smooth transfer of resources out of the consumer-goods industries and into the capital-goods industries if facilitated by an increase in the supply of money to compensate for the increased demand for speculative balances brought on by the fall in the rate of interest. [21] Keynes did not see this sequence of events in this way at all.

From the perspective of Keynes' general theory, what we are looking at here is a *dynamic* sequence of events that can only take place *through time*. Keynes saw this sequence as beginning with a *ceteris paribus* situation in which, *given the expectations on which employment, output, and, hence, income depend,* businesses would find they could no longer replenish their transactions and precautionary balances from sales. To meet their expenditure obligations they would be forced to sell assets or increase their borrowing to maintain the transactions and precautionary balances needed to meet their obligations. Keynes argued that it is only *after* expectations change with regard to *the profitability of continuing to produce at the current level of employment and output* that businesses could be expected to reduce the level of output, employment, and income, and it is only *after* output, employment, and income fell that the rate of interest would fall.

Why would anyone think businesses would not react in this way in response to a fall in sales? After all, businesses do in fact live in a world of uncertainty in which sales fluctuate from day to day, week to week, and month to month. They cannot know that a fall in receipts on any given day or during any given week or month is permanent and will not be compensated for by an increase on the following day or during the following week or month. They are in fact forced to form expectations with various

degrees of confidence as to what the future will bring, and their decisions with regard to employment, output, and income in the present must be based on those expectations. Where did Keynes go wrong in assuming that until expectations change and employment, output, and income fall businesses must turn to the credit markets to finance their income payments and other obligations that determine their demands for money to the extent these payments and obligations cannot be financed otherwise? All of this seems reasonable, and to argue otherwise one must accept the absurd implication that businesses have unit-elastic expectations that adjust instantaneously to changes in sales and that employment, output, and the demand for money adjust accordingly. [22]

We have already seen that if savers choose to hold the increase in savings that will accumulate in this *ceteris paribus* situation in the form of money this will cause the demand for money and rate of interest to increase. How will the situation change if savers, as Robertson suggest, choose to accumulate securities instead of money with their increased savings? The only difference is that the resulting increase in the willingness of producers in the consumer-goods industries to borrow—in the absence of a change in income or in the supply or demand for money—would *exactly* offset the increase in the willingness of savers to lend, and instead of the rate of interest increasing there would be no reason for the rate of interest to change at all. [23]

The only way Robertson could have phrased his question so that it made sense in terms of an increase in the accumulation of capital is to assume that the increased rate of saving in this *ceteris paribus* situation (i.e., given income and the supply and demand for money) takes the form of a direct increase in the demand for capital goods. If this were the case it would be reasonable to assume that the increased demand for capital goods would, *ceteris paribus*, lead to an increase in the prices and output of capital goods, but even in this situation there is no reason to believe it would cause a fall in the rate of interest in the absence of a fall in income, and there could even be an increase in the rate of interest *before there is an effect on investment* by way of a concomitant increase in the demand for money through what Keynes called the demand for "finance". [24]

At the same time, it is important to keep clearly in mind what we are talking about in this hypothetical situation. We are talking about an increase in the demand for capital goods—that is, *investing*—that will stimulate the formation of capital, *not an increase in saving!* By definition, saving is the act of *not* consuming one's income. This is not the same thing as investing. Investing is the accumulation of newly produced real assets. It is the increased demand for real assets that will cause the prices and output in the capital-goods industries to increase in this situation, *not the increase in the propensity to save* (that is, not the decrease in the propensity to consume). And even in this situation *there is no guarantee that the long-run effect of this increase in saving will be an increase in output or capital formation as this dynamic sequence of events plays itself out.*

If you believe, as Keynes believed, that production takes time and must be guided by expectations there is no reason to believe that income will begin to fall in the consumer-goods industries, no matter what form the increase in saving takes, until *after* there is a change in *expectations* in the consumer-goods industries with regard to *the profitability of continuing to produce in those industries at the current levels of output and employment*. Furthermore, if you also believe, as Keynes believed, that all production is ultimately for the purpose of satisfying the consumer, there is also no reason to believe that the subsequent fall in expectations in the consumer-goods industries with regard to the profitability of continuing to produce at the current level of output and employment will not have an adverse effect on expectations with regard to the profitability of further investing in those industries.

As was noted above, this means that the resulting fall in the rate of interest that is supposed to increase investment as output, employment, and income in the consumer-goods industries fall is apt to be accompanied by *a fall in expectations with regard to the profitability of investing in those industries*. There is no a priori justification for assuming that, in the end, the net effect of these two opposing forces acting on investment will be an increase in the accumulation of capital in the long run. The positive effect on investment from the fall in the rate of interest could be more than offset by the negative effect from the change in expectations with regard to the profitability of investment. Thus, there is no a priori reason to believe that the increase in saving will not ultimately lead to *a net decrease* in output, employment, and income in the long run as this dynamic sequence of events plays itself out, *especially if the fall in the demand for consumer goods is seen to be permanent*. [25]

IV. Summary and Conclusion

Economists are trained to think of the economic system in terms of simultaneous equations, the properties of which are assumed to tell us something about how the actual economic system works. A great deal of effort is put into specifying those equations and examining their equilibrium and stability properties and how changes in exogenous variables affect the equilibrium values of endogenous variables, but relatively little effort is put into examining the dynamic mechanisms by which the economic system described by those equations is supposed to get from one point of equilibrium to another over time. When it comes to dynamics we find a collection of superficial specifications of dynamic relationships, based on simplifying assumptions that are chosen primarily for their mathematical tractability rather than their correspondence to reality, and little attention is paid to issues of causality. At least that seemed to be the case when I was in academia in the 1960s through the 1980s, and judging from the progress that has since been made in RBC and DSGE modeling that was coming to the fore in the 1980s it seems to me that not much has changed since then.

The result seems to be that much of the research undertaken by mainstream economists within this tradition, *along with the policy advice supported by this research*, apply only to a fantasy world that is

out of touch with reality—a world in which expectations are rational; markets are efficient; market regulation is inefficient; fraud is a problem that is best left to market discipline; speculative bubbles do more good than harm; trade deficits are inconsequential since international capital flows lead to an efficient allocation of resources; factors of production receive the value of their marginal products; monopolies, monopsonies, and oligopolies are irrelevant as is an increasing concentration of income and a rising debt relative to income; the economic system is self-regulatory given the appropriate monetary policy; and in which financial institutions are fully capable of regulating themselves for the good of all humanity due to the enlightened self interest of bankers.

Keynes did not present his general theory in terms of a system of simultaneous equations. That was done by A. H. Hansen [1953], J. R. Hicks, P. A. Samuelson, D. Patinkin, and countless other Keynesians. Their approach was Walrasian, and as a result of their efforts a Walrasian revolution took place in economics in the name of Keynes following the publication of *The General Theory* in spite of the fact that Keynes emphatically rejected this kind of mathematical approach to the exposition of his work. [26] Keynes was a *protégé* of Marshall, not Walras, and he refused to specify sophisticated mathematical models that ignore the details. He spent his entire life examining the details in an attempt to discover the *casual relationships that drive the economic system through time*. [Blackford (2016)] In so doing, among many other things, it became clear to him that 1) the ultimate justification for production is to satisfy the demands of consumers, 2) the true *causal* variables in a market system in which the processes of production takes time are expectations with regard to the future, 3) the rate of interest is a purely monetary phenomena determined by the supply and demand for liquidity as the prices of assets adjust to equate wealth-holder demands for assets to the existing stocks of assets, 4) given the supply of money, the rate of interest cannot change in a significant way in response to an increase in the propensity to save until there is a change in expectations with regard to the profitability of continuing to produce at the current level of employment and output, and 5) there is no a priori reason to believe that a change in expectations with regard to the profitability of continuing to produce at the current level of employment, output, and income in the face of a decrease in demand for consumer goods will leave expectations with the regard to the profitability of investment unchanged.

These are all crucial insights that lie at the very core of Keynes' general theory, especially the realization that the rate of interest is a purely monetary phenomenon determined by the supply and demand for liquidity. What this means is that investment is determined by the rate of interest, not the other way around. It also means that monetary policy is limited in its ability to stimulate the economy by the propensities of wealth holders with regard to their demands for liquidity, and once rates of interest have reached the lower bounds set by the propensities of wealth holders the level of economic activity is determined by the propensity to consume and the demand for investment goods. And since the demand for investment goods is ultimately determined by expectations with regard to future consumption, and since expectations with regard to future consumption are largely determined by

current consumption, the level of economic activity must be largely determined by current consumption and, ultimately, by the way in which current consumption changes over time. [27]

When you put all of these arguments together, as Keynes did in *The General Theory of Employment, Interest, and Money,* what you find is that *consumption is the driving force for economic growth, not saving.* All of this would seem to be rather straightforward, yet even though these arguments and this conclusion stand at the very core of Keynes' general theory, none of this was taught or even acknowledged in graduate schools when I was in academia and, as far as I know, is not taught or acknowledged in graduate schools to this day. Instead, graduate students are taught the Walrasian paradigm with *tâtonnement*/recontract dynamics while the Marshallian paradigm from which the dynamics of Keynes is drawn is ignored other than in undergraduate principles courses.

It is obvious, or at least it should be obvious, that something is wrong here. Everyone knows that Walrasian dynamics makes no sense at all since, in point of fact, neither households nor firms are constrained in their choices in the real world by a Walrasian budget constraint. They are constrained in their choices by the value and liquidity of their assets, the availability of sellers of goods at various prices, the availability of buyers of goods at various prices, and in their access to credit. They have no choice but to be guided by expectations with regard to the income they *expect* to receive in the future, but they are not—as is assumed in the Walrasian paradigm—*constrained* in their choices by the *rate* at which they receive income at any point in time at which a choice is actually made. The rate at which decision-making units receive income has no way of affecting their choices other than through an effect on expectations as any consumer who has ever purchased a home, a car, or has simply walked the aisles of a supermarket knows implicitly and as any businessman who has ever had to meet a payroll knows implicitly as well. There is no mystery about this. It is well known that Walrasian dynamics is empirically irrelevant by virtue of its reliance on the mythical auctioneer of the Walrasian *tâtonnement*/recontract assumption. [Jaffe]

The real mystery is why so many economists have invested so much of their time and energy over the years in trying to prove that Keynes is wrong in this regard as they ignored Marshall and attempted to force Keynes into a Walrasian mold. The end result of this attempt was the Walrasian revolution that followed Keynes' publication of *The General Theory* that ultimately led to the world-wide catastrophe we are in the midst of today. A catastrophe brought on by economic policies justified by mainstream models and recommended by mainstream economists who totally ignored the Marshallian cause and effect insights embodied in Keynes' general theory.

It seems quite clear to me that the primary cause of the financial crisis that began in 2007, and the reason mainstream economists are unable to understand its cause or the nature of the disaster that is developing in its wake, is the fact that mainstream economists have ignored those aspects of Keynes's

general theory that they were either unable or unwilling to incorporate into their mathematical models—the very aspects of Keynes's general theory that contains the essence of Keynes' *cause and effect* insights, based on the Marshallian paradigm, as to how the economic system actually works in the real world. [Blackford (2016)]

Specifically, mainstream economists have ignored the fact that the rate of interest is a purely monetary phenomenon—determined by wealthholders as they balance their portfolios of assets—and is affected by the saving and investment only indirectly through the effects of saving and investment on the supply and demand for money. They have also ignored the fact that since output and employment are determine by effective demand, and since effective demand is ultimately determined by expectations with regard to future consumption, *economic growth in the long run is enhanced only by increasing consumption, and is inhibited by saving*. As a result, the economic models created by mainstream economists over the past fifty years have ignore the long-run relationship between consumption and effective demand, output, and employment—the vanishing "complicated partial differentials 'at the back' of several pages of algebra" that Keynes [1936, p. 188] warned about—to the effect that these models have been used to justify deregulating the domestic and international financial systems, cutting corporate taxes and taxes on the wealthy while increasing taxes on the not so wealthy, reducing public investment in infrastructure and human capital, eliminating usury laws, minimizing the enforcement of laws against fraud in the housing and consumer goods markets, destroying labor unions, promoting the adoption of private retirement accounts, converting Social Security from a pay-as-you-go into a partial-prepayment system, neglecting the minimum wage, and many other supposedly beneficial policies that only make sense within models that ignore the long-run relationship between consumption and effective demand and assume that increasing saving enhances economic growth.

The end result of these policies has been a dramatic increase in our current account deficit along with an equally dramatic increase in the concentration of income at the top of the income distribution. This, in turn, has led to a situation in which saving in the foreign sector has increased dramatically (by way of our increased current account deficit) and at the top of the income distribution in the private sector (by way of the higher propensity to save at the top of the income distribution than at the bottom). This increase in saving in the foreign sector and at the top of the income distribution in the private sector has been partially offset by dissaving in the public sector and at the bottom of the income distribution in the private sector over the past forty years. It has also been accompanied by increases in investment as a result of speculative bubbles in the commercial real estate markets in the 1980s, in the markets for tech stocks in the 1990s, and in the housing market in the 2000s. [28]

In the process these policies have transformed our economic system in such a way that, given the resulting current account deficits and concentration of income at the top of the income distribution, the mass markets for consumer goods in the United States have been undermined to the point that it is no

longer possible to achieve potential output and employment with the given state of mass-production technology in the absence of a continual increase in debt relative to income. [29] It is the unsustainability of a continual increase in private-sector debt relative to income that eventually led to the Crash of 2008, and it is the inability to further increase debt relative to income through dissaving at the bottom of the income distribution (or through continually increasing debt relative to income in the public sector) combined with the lack of speculative bubbles to stimulate investment that has led to the diminished long-term expectation with regard to consumption that is the primal cause of the economic stagnation we have experienced since 2007. [Blackford (2014)]

In other words, what we are facing today is the fallout from Keynes' long-period problem of saving.

The long-period problem of saving stands at the very core of *The General Theory of Employment, Interest, and Money*. In Keynes' understanding of this problem, *consumption creates its own supply by stimulating investment*—it does not work the other way around. The failure of mainstream economists to understand Keynes' analysis of this problem and to accept his conclusion with regard to the importance of consumption as the driving force of economic growth has resulted in the adoption of economic policies over the past fifty years that have promoted saving and inhibited consumption in a way that has led us down a path that, in the long run, inevitably leads to the kinds of economic, social, and political problems we faced in the 1930s, the last time we saw the kind of economic stagnation we see developing throughout the world today.

It seems quite clear to me that there can be little hope for the future until mainstream economists are able to look beyond their mathematical models, put aside their ideological blinders, and look at the long-period problem of saving in a way that leads to an overwhelming consensus within the discipline of economics to the effect that Keynes' conclusion with regard to this problem—that consumption is the driving force for economic growth, not saving—is right and that the understanding of this problem by both Keynesians and anti-Keynesians alike is wrong. Only then will it be possible for economists to speak with one voice in a way that will make it possible to solve the long-period problem of saving in the absence of some kind of world-wide conflagration that, in this nuclear age, is apt to be even more devastating than the one that began on September 18, 1931 and reached its climax on August 6th and 9th, 1945. [30]

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1 This controversy went far beyond the contributions of Robertson, Ohlin, and Keynes to be discussed in this paper. For a survey of the literature in this area see Haberler, Shackle, Johnson, and Tsiang. See also Blackford (1983; 1984; 1985) for an extensive discussion of the issues of the LP/LF controversy and especially (1984; 1985; 2016) for a discussion of the dynamic nature Keynes' methodology and the static nature of the loanable-funds theory.

[2] See Keynes:

> It should be obvious that the rate of interest cannot be a return to saving or waiting as such. For if a man hoards his savings in cash, he earns no interest, though he saves just as much as before. On the contrary, the mere definition of

the rate of interest tells us in so many words that the rate of interest is the reward for parting with liquidity for a specified period. For the rate of interest is, in itself; nothing more than the inverse proportion between a sum of money and what can be obtained for parting with control over the money in exchange for a debt[1] for a stated period of time.[2].

Thus the rate of interest at any time, being the reward for parting with liquidity, is a measure of the unwillingness of those who possess money to part with their liquid control over it. The rate of interest is not the 'price' which brings into equilibrium the demand for resources to invest with the readiness to abstain from present consumption. It is the 'price' which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash;—which implies that if the rate of interest were lower, i.e. if the reward for parting with cash were diminished, the aggregate amount of cash which the public would wish to hold would exceed the available supply, and that if the rate of interest were raised, there would be a surplus of cash which no one would be willing to hold. If this explanation is correct, the quantity of money is the other factor, which, in conjunction with liquidity-preference, determines the actual rate of interest in given circumstances. Liquidity-preference is a potentiality or functional tendency, which fixes the quantity of money which the public will hold when the rate of interest is given; so that if r is the rate of interest, *M* the quantity of money and *L* the function of liquidity-preference, we have $M = L(r)$. This is where, and how, the quantity of money enters into the economic scheme. [Keynes (1936, p. 107)]

[3] See Robertson:

According to Mrs. Robinson,[2] Mr. Keynes' theory has been developed mainly in terms of short period analysis, but at times his purview extends over centuries, and it may be convenient to conclude by examining briefly the bearing of his liquidity preference formula on the long-period problem of saving. This problem can be put in various forms, of which I choose what is, I hope, alike the simplest and the best adapted to bring out Mr. Keynes' points. Will an increased rate of saving which is not itself hoarding (e.g. which takes the form of an increased demand for securities), but which involves an actual diminution in the rate of expenditure on consumable goods, lead to a progressive shrinkage in total money income?

In one of his extremer passages (pp.211-213) Mr. Keynes appears to invoke his formula in support of the view that such an event has no tendency to bring down the rate of interest nor therefore to stimulate the formation of capital equipment. For why, he asks, the quantity of money being unchanged, should a fresh[3] act of saving diminish the sum which it is required to keep in liquid form at the existing rate of interest? The answer surely emerges from the composite nature of liquidity preference. If the event in question deprives the producers of consumption goods of income, it reduces by the same act their ability to hold money for transaction and precautionary purposes. It is only if they resist the switch in public demand by continuing to indulge in expenditure, to offer employment, and hence to hold (or cause to be held) money balances on the old scale, that liquidity preference as defined will remain unchanged. Mr. Keynes' argument in this passage seems to be a repetition in disguise of his old argument that increased saving which is not itself hoarding is necessarily balanced by the sale of securities on the part of entrepreneurs who are making losses but are determined not to restrict the amount or change the character of their output. In so far as this argument is ever valid, it is as valid when employment is full to start with as when it is not—indeed, as Professor Hayek pointed out long ago,[4] it depends on the assumption that employment will be kept full at all costs. . . . *So long as such a situation exists and is expected to continue, the rate of interest will, it is true, not fall* [*emphasis* added] nor the formation of capital equipment be stimulated, but neither, so far as the mere maintenance of income[5] and employment goes, is it necessary that they should. If such a situation does not exist, there is nothing in the doctrine of liquidity preference to invalidate the common sense view that the increased demand for securities will tend to raise their price.

There remains, however, a further point. Even tho the producers of consumption goods take their medicine, nevertheless, if there exists for the community as a whole a negatively inclined curve of "liquidity preference proper" . . . some part of the additional savings devoted by individuals to the purchase of securities will come to rest in the banking accounts of those who, at the higher price of securities, desire to hold an increased quantity of money. . . .

It would, I think, be agreed by "orthodox" writers[7] that this is a situation calling for a progressive increase in the supply of money. [Robertson (1936, pp .187-9)]

[4] It is clear that Robertson did not have a loanable-funds theory of his own:

> Mr. Keynes complains[1] that, in comparing[2] his theory of interest with "a common sense account of events in terms of supply and demand for loanable funds," I have given no indication of where an example of the latter is to be found. In point of fact, I am afraid I was referring primarily to the account which I had just attempted to give myself,[3] and on which Mr. Keynes has found no space to comment. No doubt I had also in mind the more elaborate analysis of Dr. Haberler, which was not, I admit, then generally accessible.[4] But these accounts are both, I think, merely attempts to give a rather pedantic precision to the ordinary view enshrined in such well-known studies of the capital and credit markets as those of Lavington and Hawtrey, as well as in a thousand newspaper articles. [Robertson (1937b, p. 428)]

As has been noted, Robertson's analysis in his 1936 review (quoted in footnote 3 above) was framed solely in terms of the supply and demand of money.

[5] See Keynes:

> The liquidity-preference theory of the rate of interest which I have set forth in my *General Theory of Employment, Interest, and Money* makes the rate of interest to depend on the present supply of money and the demand schedule for a present claim on money in terms of a deferred claim on money. This can be put briefly by saying that the rate of interest depends on the demand and supply of money though this may be misleading, because it obscures the answer to the question, demand for money in terms of what? The alternative theory held, I gather, by Prof. Ohlin and his group of Swedish economists, by Mr. Robertson and Mr. Hicks, and probably by many others, makes it to depend, put briefly, on the demand and supply of credit or, alternatively (meaning the same thing), of loans, at different rates of interest. Some of the writers believe that my theory is on the whole the same as theirs and mainly amounts to expressing it in a somewhat different way.[1] Nevertheless the theories are, I believe, radically opposed to one another. [Keynes (1937b, p. 241)]

[6] See Ohlin:

> Evidently, the curves of demand and supply of credit, which are identical with the curves of supply and demand for claims, are quite different from *but interrelated with* [*emphasis* added] the curves which refer to planned new investment and savings.[3] The former curves determine the prices of claims, i.e. the rates of interest, and the actual credit transactions in the same way as prices and dealings are fixed on commodity markets. Anyone who refuses to accept this analysis of the pricing of claims must, I think, refute also the Marshallian supply and demand curve analysis *in toto.*
>
> *Thus, there is a connection between the dealings in claims and the activity of saving and investing* [*emphasis* added]. [Ohlin (1937b, pp. 425-6)]

[7] See Keynes:

> Before leaving this section it may be well to illustrate further the conclusion stated above, that a fall in the price of consumption-goods due to an excess of saving over investment does not in itself—*if it is unaccompanied by any change in the bearishness or bullishness of the public or in the volume of savings-deposits*, [*emphasis* added] or if there are compensating changes in these two factors—require any opposite change in the price of new investment-goods. For I believe that this conclusion may be accepted some readers with difficulty.
>
> It follows from the fact that, on the above assumptions, the total value of the investment-goods (new and old) coming on to the market for purchase out of current savings is always exactly equal to the amount of such savings and is irrespective of the current output of investment-goods. For if the value of the new investment-goods is less than the volume of current savings, entrepreneurs as a whole must be making losses exactly equal to the difference. These losses, which represent a failure to receive cash up to expectations from sales of current output, must be financed, and the non-receipt of the expected cash receipts must be somehow made good. The entrepreneurs can only make them good either by reducing their own bank-deposits or selling some of their other capital assets. The bank-deposits thus released and the securities thus sold are available for, and are exactly equal to, the excess of current savings over the value of new investment.
>
> In the more general case where the public sentiment towards securities or the volume of savings-deposits is changing, then if the extent to which the entrepreneurs have recourse to the expedient of releasing bank-deposits plus the increase in savings-deposits allowed by the banking system just balances the increase desire of the public to employ their resources in bank-deposits, there is no reason for any change in the price of securities. If the former is in excess

of the latter, the price of securities will tend to rise and if the latter is in excess of the former, the price of securities will tend to fall. [Keynes (1930, pp. 145-6)]

[8] The exchange between Keynes and Hayek is a most interesting example of the kind of paradigmatic debate discussed by Kuhn (Chapter VIII-XI), as is the entire liquidity preference/loanable funds controversy itself. Particular attention should be paid to Keynes' (1931b) reply to Hayek in this regard, for in this reply Keynes carefully examined the obstacles that arise as a result of the conflicting views of reality embodied in his and Hayek's separate paradigms. [See also Keynes (1931a)] It also should be noted that much of *The General Theory* is devoted to explaining the kinds of paradigmatic differences discussed by Kuhn, and that these explanations have not been well understood by mainstream economists.

[9] See Keynes:

> An increase of saving relatively to investment during any period means that the savers find themselves at the end of the period with an increase of wealth, which they can embark at their choice either in liquid or in non-liquid assets, whilst the producers of consumption goods find themselves with an equal decrease of wealth, which must cause them to part at their choice either with liquid or with non-liquid assets which they previously possessed. *Unless the propensity to hoard of the savers is different from the propensity to hoard of the entrepreneurs* [*emphasis* added]—and if it is different, it will mean that there is a change of hoarding-propensity for the community as a whole, which change is as like a priori to be in one direction as in the other—it follows that the excess of saving has *in itself*, and apart from its repercussions on the aggregate propensity to hoard, no tendency to cause any change at all in the price of non-liquid assets. [Keynes (1931a, p.415)]

[10] See Keynes:

> [1] I did not deal in detail in my book, and I am not dealing here, with the train of events which ensues when, as a consequence of making losses, entrepreneurs reduce their output. This is a long story, though not, I think, fundamentally different, which I intend to treat in detail in due course. Its only bearing on the present argument is that a change in output affects the demand for active deposits, and may therefore (according to how the banking system behaves) affect the supply of hoards. [Keynes, 1931a, p.418)]

[11] See Keynes:

> When I began to write my *Treatise on Money* I was still moving along the traditional lines or regarding the influence of money as something so to speak separate from the general theory of supply and demand. . . . But my lack of emancipation from preconceived ideas showed itself in what now seems to me to be the outstanding fault of the theoretical parts of that work (namely, Books III and IV), that I failed to deal thoroughly with the effects of changes in the level of output. My so-called "fundamental equations" were *an instantaneous picture* [*emphasis* added] taken on the assumption of a given output. [Keynes (1936, p. 4)]

[12] Keynes explained the various motives for holding money, and the relationships between them as follows:

> The three divisions of liquidity-preference which we have distinguished above may be defined as depending on (i) the transactions-motive, i.e. the need of cash for the current transaction of personal and business exchanges; (ii) the precautionary-motive, i.e. the desire for security as to the future cash equivalent of a certain proportion of total resources; and (iii) the speculative-motive, i.e. the object of securing profit from knowing better than the market what the future will bring forth. . . .
>
> It may illustrate the argument to point out that, if the liquidity-preferences due to the transactions-motive and the precautionary-motive are assumed to absorb a quantity of cash which is not very sensitive to changes in the rate of interest as such and apart from its reactions on the level of income, so that the total quantity of money, less this quantity, is available for satisfying liquidity-preferences due to the speculative-motive, the rate of interest and the price of bonds have to be fixed at the level at which the desire on the part of certain individuals to hold cash (because at that level they feel 'bearish' of the future of bonds) is exactly equal to the amount of cash available for the speculative-motive. . . .
>
> As a rule, we can suppose that the schedule of liquidity-preference relating the quantity of money to the rate of interest is given by a smooth curve which shows the rate of interest falling as the quantity of money is increased. [Keynes (1936, pp. 108-9)]

[13] If the demand for transactions balances by firms were met wholly through a decrease in their demand for precautionary

balances (assuming their existing stocks of precautionary balances were sufficient to accomplish this end) in response to an increase in saving there would be no change in the rate of interest in this situation rather than an increase. Similarly, if precautionary balances on the part of firms were to fall and transactions balances on the part of households also fell as these balances were simply transferred from transactions balances into precautionary balances we would expect a fall in the rate of interest. But the point is that *what happens to the rate of rate of interest in this situation, given income and the supply of money, depends on the demand for money, not the fact that there has been an increase in saving*. (See footnote 23 below for further discussion on this point.)

It is worth noting that the transactions and precautionary demands for money were described by Keynes in 1937 as arising from "the time-lags between the receipt and disposal of income by the public and also between the receipt by entrepreneurs of their sale-proceeds and the payment by them of wages, etc." [Keynes (1937b, p.319)]. (See also Keynes (1937c, p.368).) This is a rather passive description of this demand, but it is a mistake to consider the demand for money associated with income payments as "passive acceptance of money" (Tsiang, 1980, p. 475). This demand is undoubtedly far more intense than the demands that arise from other motives given the fact that firms forego the acquisition of these balances only at the risk of defaulting on their income payments and other contractual obligations and households forego the acquisition of these balances only at the cost of postponing consumption.

[14] It should not be surprising that the only way to make sense out of this situation in terms of the loanable-funds theory is to define the behavior of the supply and demand for loanable-funds schedules in terms of the supply and demand for money. After all, there are only two ways to purchase something in the economy, with money or with borrowed money, that is, with credit. That means that when demanders do not otherwise receive the money needed to finance their expenditures they have no place to turn if they are to maintain their expenditures except to the credit (i.e., loanable-funds) market.

In June of 1937 Keynes (1937b, p.245) pointed out that Ohlin (1937a) had defined his loanable-funds theory in *ex post* terms. Ohlin responded (1937b) that he had meant to define this theory in *ex ante* terms, and as a result of this exchange a consensus emerged within the discipline to the effect that Keynes was confused in his criticism of Ohlin. (See Leijonhufvud (1968, pp.62-3).) This consensus was a mistake. As should be clear from the above discussion there is no explanation of any kind as to why the rate of interest should respond to Ohlin's *ex ante* savings and investment schedules in the *ceteris paribus* situation examined in the text above. See also Blackford (1985; 2016).

In addition, Keynes can only be held accountable for understanding what Ohlin actually said about this terminology, not what others think Ohlin meant to say. There can be no doubt that what Ohlin actually said in June 1937 (1937a) was unclear. Ohlin admitted this in September 1937 (1937b, pp.423; 424n; 425n; 427n), and he did in fact give the term *ex ante* a purely temporal connotation, i.e., meaning "'in advance of' or 'in anticipation of'. (See Leijonhufvud (1968, p. 62n) and cf. Ohlin (1937a, p.64).)

In addition, Ohlin's assertion in September 1937 "that demand and supply curves, which express the planned sales purchases at different possible prices during a certain future period . . . are ex-ante concepts and indicate alternative purchase and sales plans" (1937b, p. 423) and that "Ex-post we have only the point of intersection of the curves, *ex ante* we have the whole curves, which determine where the point of intersection will be" (1937b, p. 424n) did not help to clarify the situation, for Ohlin did not explain why he assumed the intersection of *ex ante* supply and demand curves which indicate alternative purchases and sales plans during a future period determine realized prices and quantities in the future period rather than the actual supply and demand curves that exist in the period in which the prices and quantities are actually realized. Ohlin's position on this issue would seem to imply that expectations are always realized—an assumption that Ohlin most certainly did not intend, and one that he most certainly would not have wished to defend. But even if it is granted, and there is no reason it should not be, that what Ohlin intended was the behavioral interpretation of saving and investing rather than definitional relationship (which was, in fact, Keynes' interpretation, cf. Leijonhufvud (1968, p.63); Klein (p.116); and Keynes (1937b, pp. 249-50)) and that there was no fundamental disagreement between Ohlin and Keynes' Chapters 5 and 6, it should be clear from the above that there is no way to salvage the loanable funds theory along the lines Ohlin was attempting to salvage it.

The point is that Keynes was correct on the issues of substance in the liquidity-preference/loanable-funds controversy, and the reason for the difficulties in communication arose from the fact that the vast majority of economists simply failed to grasp the fundamental contradiction of the saving-investment/loanable-funds theory of interest in that the arguments of the proponents of the loanable funds theory presuppose some sort of *tâtonnement* /recontract process and Keynes' arguments do not. See Blackford (2016).

[15] See Blackford for a formal analysis of the attempts by anti-Keynesians to deny the central role of money in determining the rate of interest and the way in which this made their analysis static while Keynes' liquidity-preference theory made it possible for him to establish cause and effect in a way that made his analysis dynamic. It must also be noted at this point that it has been argued by both Keynesian (e.g., Hansen, 1951) and non-Keynesian (e.g., Horwich, Chapter X) alike that Keynes' Chapter 14 indeterminacy criticism of the classical theory of interest applies to his own theory of interest as well:

> For the classical theory, as can be seen from the above quotations, assumes that it can then proceed to consider the effect on the rate of interest of (e.g.) a shift in the demand curve for capital, without abating or modifying its assumption as to the amount of the given income out of which the savings are to be made. The independent variables of the classical theory of the rate of interest are the demand curve for capital and the influence of the rate of interest on the amount saved out of a given income; and when (e.g.) the demand curve for capital shifts, the new rate of interest, according to this theory, is given by the point of intersection between the new demand curve for capital and the curve relating the rate of interest to the amounts which will be saved out of the given income. The classical theory of the rate of interest seems to suppose that, if the demand curve for capital shifts or if the curve relating the rate of interest to the amounts saved out of a given income shifts or if both these curves shift, the new rate of interest will be given by the point of intersection of the new positions of the two curves. But this is a nonsense theory. For the assumption that income is constant is inconsistent with the assumption that these two curves can shift independently of one another. If either of them shift, then, in general, income will change; with the result that the whole schematism based on the assumption of a given income breaks down. [Keynes (1936, p. 114)]

It should be clear from the above that the notion that this criticism of the classical theory applies to Keynes' theory arises from a failure to grasp the nature of Keynes' criticism. It is, of course, true that if either the savings or investment or the money supply or demand schedule shifts the resulting change in income will cause all of these schedules to shift (save, perhaps, the supply of money) but—*as Keynes makes perfectly clear in his discussion of the diagram that that follows this passage* [Keynes (1936, pp.114-6)]—this misses the point of Keynes' criticism of the savings/investment theory.

Keynes demonstrated that it is nonsense to assume that, given income and the supply and demand for money, the rate of interest will adjust to equate saving and investment in response to a change in either the saving or the investment schedule because *there exists no causal mechanism whereby the rate of interest can perform this task*. Given the supply and demand for money, the rate of interest cannot change in response to a change in either saving or investment until income changes, and a change in income must *cause* the savings schedule to shift and (as we will see, probably the investment schedule as well) *before* the rate of interest can change.

This indeterminacy criticism most definitely does not apply to Keynes' liquidity preference theory. There is nothing to prevent wealth holders from adjusting their portfolios of assets in such a way as to *cause* the rate of interest to adjust to equate the supply and demand for money (i.e., liquidity) in response to a change in one of these schedules given income, savings, investment, or any other flow variable, *and as income changes and these schedules shift over time there is nothing to prevent the rate of interest from continuing to adjust in this way to equate the supply and demand for money*.

[16] See Keynes (1936, Chapter 5 and 6), and:

> All production is for the purpose of ultimately satisfying a consumer. Time usually elapses, however—and sometimes much time—between the incurring of costs by the producer (with the consumer in view) and the purchase of the output by the ultimate consumer. Meanwhile the entrepreneur (including both the producer and the investor in this description) has to form the best expectations he can as to what the consumers will be prepared to pay when he is ready to supply them (directly or indirectly) after the elapse of what may be a lengthy period and he has no choice but to be guided by these expectations, if he is to produce at all by processes which occupy time.
>
> These expectations, upon which business decisions depend, fall into two groups. . . . The first type is concerned with the price which a manufacturer can expect to get for his "finished" output at the time when he commits himself to starting the process which will produce it. . . . The second type is concerned with what the entrepreneur can hope to earn in the shape of future returns if he purchases (or, perhaps, manufactures) "finished" output as an addition to his capital equipment. We may call the former short-term expectation and the latter long-term expectation.
>
> Thus the behaviour of each individual firm in deciding its daily[2] output will be determined by its short-term expectations—expectations as to the cost of output on various possible scales and expectations as to the sale-proceeds of this output. . . . It is upon these various expectations that the amount of employment which the firms offer will

depend. The actually realized results of the production and sale of output will only be relevant to employment in so far as they cause a modification of subsequent expectations. . . . *Thus, on each and every occasion of such a decision, the decision will be made . . . in the light of the current expectations of prospective costs and sale-proceeds* [*emphasis* added]. [Keynes (1936, p. 37)]

[17] See Keynes (1936, Chapter 6). It is interesting to note that in December 1933 Hawtrey explained his view of the psychological dependence of income on expectation to Robertson:

> The relation between income and expenditure is a psychological one; the recipient of income regulates his expenditure by his receipts. And it is by no means true that the disposal of income, interpreted in this sense, only occurs at an interval after receipt. Indeed it is more often true that expenditure on consumption is regulated with reference to future income than to past income. The purpose of a cash balance is to permit of expenditure being in some degree independent of receipts. It is a capital fund, and in deciding what drafts to make upon it, the owner considers primarily what his future current receipts are likely to be. [Hawtrey (1933, p.702)]

Hawtrey then pointed out the obvious with regard to Robertson's (1933a) refusal to take into account the dependence of income on expectations:

> It is theoretically possible so to adjust prices that there is no change in stocks of goods. But why does Mr. Robertson persist in adopting this hypothesis? It is utterly out of accord with the facts of practical life. It implies that retail prices are exactly and instantaneously adjusted to any change in demand *every day*. The introduction of so extravagant an assumption places all his analysis on an abstract plane from which it cannot be redeemed till the assumption is modified. [Hawtrey (1933, p.704)]

In response, Robertson argued that he found his own formulation "easier than Mr. Hawtrey's conception of consumers' outlay, which is defined as expenditure 'out of income' though the income which it is 'out of' may apparently not yet have been received." [Robertson (1933b, p. 711)] Hawtrey's position is very much akin to that of Keynes', and Robertson's response to Hawtrey gets to the heart of the fundamental difference between Robertson's and Keynes' methodologies, namely, that Robertson's analysis is static and Keynes' analysis is dynamic. See Blackford (1985).

[18] See footnote 16 above. The importance of this psychological dependence of income on expectations is emphasized by Keynes in his discussion of the relationship between net income and consumption. In defining net income Keynes (1936, Chapter 6) carefully adjusted for all of those factors that are either "voluntary" (i.e., user cost) or if not voluntary at least "not unexpected" (i.e., supplementary costs), and he explicitly excluded consideration of those factors that are "unforeseen" (i.e., windfalls). By defining net income in this way Keynes was able to draw a clear distinction (at least conceptually) between the way in which net income (defined in terms of expected and not unexpected results) and windfalls (defined in terms of unexpected results) affect decision making behavior with regard to consumption:

> The causal significance of net income lies in the psychological influence of the magnitude of [supplementary costs] on the amount of current consumption, since net income is what we suppose the ordinary man to reckon his available income to be when he is deciding how much to spend on current consumption. This is not, of course, the only factor of which he takes account when he is deciding how much to spend. It makes a considerable difference, for example, how much windfall gain or loss he is making on capital account. But there is a difference between the supplementary cost and a windfall loss in that changes in the former are apt to affect him in just the same way as changes in his gross profit, . . . whereas, although the windfall loss (or gain) enters into his decisions, it does not enter into them on the same scale—a given windfall loss does not have the same effect as an equal supplementary cost. [Keynes (1936, p. 44)]

Part of the reason for the difference is that decisions concerning consumption in Keynes' general theory are made with reference to existing wealth (i.e., "capital account") on the basis of currently held expectations with regard to net income. Actually realized income inclusive of windfalls affects these decisions only to the extent it has an effect on wealth held and expectations formed after the income is (or is not) actually realized.

It is also worth noting that the importance of expectations is implicit in Keynes' definition of income in the *Treatise* where income is assumed to include normal remuneration and exclude windfalls. (See Keynes (1930, Chapter 9).) The concept (as opposed to the definition) of income employed by Keynes in *The General Theory* is largely the same as the concept of income employed by Keynes in the *Treatise*. Keynes did not attempt to provide an operational definition for his concept of income, and no attempt shall be made to do so here except to note that this concept is quite broad, and there is, as far as I

can see, no fundamental inconsistency between Keynes' theoretical construct and Freidman's permanent income hypothesis. I find Freidman's hypothesis to fit well within the context of Keynes' general theory. (Cf., Keynes (1936, pp.77-8; Chapter 6) and Friedman.)

[19] See footnote 16 above and:

> The trouble arises, therefore, because the act of saving implies, not a substitution for present consumption of some specific additional consumption which requires for its preparation just as much immediate economic activity as would have been required by present consumption equal in value to the sum saved, but a desire for 'wealth' as such, that is for a potentiality of consuming an unspecified article at an unspecified time. The absurd, though almost universal, idea that an act of individual saving is just as good for effective demand as an act of individual consumption, has been fostered by the fallacy, much more specious than the conclusion derived from it, that an increased desire to hold wealth, being much the same thing as an increased desire to hold investments, must, by increasing the demand for investments, provide a stimulus to their production; so that current investment is promoted by individual saving to the same extent as present consumption is diminished.
>
> *It is of this fallacy that it is most difficult to disabuse men's minds* [*emphasis* added]. It comes from believing that the owner of wealth desires a capital-asset as such, whereas what he really desires is its prospective yield. Now, prospective yield wholly depends on the expectation of future effective demand in relation to future conditions of supply. *If, therefore, an act of saving does nothing to improve prospective yield, it does nothing to stimulate investment* [*emphasis* added]. . . . The creation of new wealth wholly depends on the prospective yield of the new wealth reaching the standard set by the current rate of interest. The prospective yield of the marginal new investment is not increased by the fact that someone wishes to increase his wealth, since the prospective yield of the marginal new investment depends on the expectation of a demand for a specific article at a specific date.
>
> Nor do we avoid this conclusion by arguing that what the owner of wealth desires is not a given prospective yield but the best available prospective yield, so that an increased desire to own wealth reduces the prospective yield with which the producers of new investment have to be content. For this overlooks the fact that *there is always an alternative to the ownership of real capital-assets, namely the ownership of money and debts* [*emphasis* added]; so that the prospective yield with which the producers of new investment have to be content cannot fall below the standard set by the current rate of interest. [Keynes (1936, pp. 134-5)]

[20] See Keynes:

> New capital-investment can only take place in excess of current capital-disinvestment if future expenditure on consumption is expected to increase. Each time we secure to-day's equilibrium by increased investment we are aggravating the difficulty of securing equilibrium to-morrow. A diminished propensity to consume to-day can only be accommodated to the public advantage if an increased propensity to consume is expected to exist some day. . . .
>
> The obstacle to a clear understanding is . . . an inadequate appreciation of the fact that *capital is not a self-subsistent entity existing apart from consumption. On the contrary, every weakening in the propensity to consume regarded as a permanent habit must weaken the demand for capital as well as the demand for consumption* [*emphasis* added]. [Keynes (1936, p. 71)]

And:

> An act of individual saving means—so to speak—a decision not to have dinner to-day. But it does not necessitate a decision to have dinner or to buy a pair of boots a week hence or a year hence or to consume any specified thing at any specified date. Thus it depresses the business of preparing to-day's dinner without stimulating the business of making ready for some future act of consumption. It is not a substitution of future consumption-demand for present consumption-demand,—it is a net diminution of such demand. Moreover, *the expectation of future consumption is so largely based on current experience of present consumption that a reduction in the latter is likely to depress the former, with the result that the act of saving will not merely depress the price of consumption-goods and leave the marginal efficiency of existing capital unaffected, but may actually tend to depress the latter also* [*emphasis* added]. In this event it may reduce present investment-demand as well as present consumption-demand. [Keynes (1936, p. 134)]

[21] It should also be noted that in the passage quoted from Robertson (1940, pp. 18-9) in footnote 25 below Robertson

asserts that the net result of his decision to save rather than spend money on new clothes will be "an increase, perhaps, in capital outlay.[1]" and in the accompanying footnote he stated that "Even this is not certain, since the demand of the tailor, weaver, etc., for machines will decline." This is, of course, precisely the issue raised by Keynes (see footnote 20 above). In addition, in retelling this example in his 1957 *Lectures* Robertson reverted to his original 1936 position that there will be an increase in capital outlay in this situation, and at no point did Robertson explain why he believed the potential fall in the investment demand schedule will either not occur or will be more than offset by a fall in the rate of interest. Nor did Robertson explain why he believed monetary policy will *necessarily* be an effective instrument in offsetting a fall in the investment demand schedule in light of Keynes' objections to this belief. Robertson was simply unable to perceive the importance of Keynes' arguments with regard to these issues, and the reason is, to a large extent, due to Robertson refused to accept the validity of Hawtrey's 1933 admonitions quoted in footnoted 17 above. Cf. Kuhn (Chapters VIII-XI).

[22] See F. Modigliani (p. 45) and the explanation of the static nature of intraperiod analysis implicit in Robertson's methodology to be found in Blackford (1983-5;) and especially (2016). It should be noted that Leijonhufvud (Chapter II) also discusses this problem, but, unfortunately, the theme of his discussion is that Keynes' methodology is subject to the limitations of this kind of analysis. That this is false should be clear from the fact that what Keynes actually said in *The General Theory* is pure nonsense from the perspective of the methodological straight jacket into which Leijonhufvud attempts to force it. Keynes' methodology is that of continuous time analysis and is dynamic, and there can be no doubt that Keynes fully understood the inadequacies of Robertson's methodology as witnessed by Keynes' 1936 evaluation of Robertson's approach to economic theory within the context of his (i.e., Keynes') general theory:

> Mr. D. H. Robertson has defined to-day's income as being equal to *yesterday's* consumption *plus* investment, so that to-day's saving, in his sense, is equal to yesterday's investment *plus* the excess of yesterday's consumption over to-day's consumption. On this definition saving can exceed investment, namely, by the excess of yesterday's income (in my sense) over to-day's income. Thus when Mr. Robertson says that there is an excess of saving over investment, he means literally the same thing as I mean when I say that *income is falling, and the excess of saving in his sense is exactly equal to the decline of income in my sense. If it were true that current expectations were always determined by yesterday's realized results, to-day's effective demand would be equal to yesterday's income* [*emphasis* added]. Thus Mr. Robertson's method might be regarded as an alternative attempt to mine (being, perhaps, a first approximation to it) to make the same distinction, so vital for causal analysis, that I have tried to make by the contrast between effective demand and income. [Keynes (1936, p. 57)]

This passage is of particular relevance to the above, for Keynes defined effective demand as the "*income* (or proceeds) which entrepreneurs *expect* [*emphasis* added] to receive" (1936, p. 42), and it is effective demand that is assumed to determine employment and output decisions in Keynes' general theory. (See Keynes (1936, Chapter 3 and 6).) Within this context, the assumption that the value of output produced as perceived by decision-making units is equal to the value of output sold, is not only equivalent to the assumption that expectations are unit elastic and adjust instantaneously to changes in sales, it is also equivalent to the assumption that each period's effective demand is equal to the previous period's realized results. (See Blackford (1984; 1985).) It is clear from the above passage that Keynes' fundamental objection to Robertson's methodology rests with this assumption.

It should also be noted that others who have in one way or another attempted to utilize Robertson's methodology (e.g., Tsiang, Horwich, and Kohn) have, for the most part, ignored the complications that arise as a result of this assumption. Kohn, for example, seems to realize (only "seems" because this problem is only likely to arise in the very situations in which Kohn argues that it is not likely to arise) that if firms are faced with an unexpected fall in demand, they may be unable to meet their wage payments given the assumptions of his analysis. Kohn assumes this problem away (p. 866n), but at no point does he explain why he assumes firms are willing to sell at a loss today when their expectations are such that they can borrow to accumulate inventories today and sell the same goods at a profit tomorrow. There is no way to avoid this assumption within the context of the Robertsonian methodology, and there is no way to make sense out of it as was pointed out to Robertson by Hawtrey in 1933 as quoted in footnoted 17 above.

[23] It should also be noted that even in the hypothetical case in which the fall in sales leads to a fall in precautionary balances or to a decision by firms to forego a portion of their income payments before their expectations changed, *it would be the implicit fall in the demand for money that is the direct cause of the concomitant fall in the rate of interest in this hypothetical situation and not the increase in thriftiness itself*. Even in this case the increase in thriftiness must work through its effect on the demand for money. (See Keynes in footnote 9 above and 25 below.) This point is important because it brings out a potential source of confusion in an otherwise beautifully written paper by Hugh Rose (1957). In this

paper Rose identifies the loanable funds theory of interest with a fall in precautionary balances held by firms in response to unintended inventory accumulations. This, I believe, is a mistake, for what Rose has done through this identification is to define the behavior of the loanable funds so as to be determined by the supply and demand for money. The resulting potential for confusion is very great, for this definition obscures the issues that separated Robertson and Keynes in that it provides a *semantic* rationalization of the loanable funds theory that obscures the *substantive* absurdity of this theory. (See Blackford (1983; 1985))

Keynes argued that the rate of interest is determined exclusively by the demand and supply of money and that an increase in thriftiness can affect the rate of interest only indirectly through an effect on the supply or demand for money. Robertson argued that an increase in thriftiness "lowers the rate of interest quite directly through swelling the money stream of demand for securities?" (1940, p.19) The fact that an increase in thriftiness leads to unintended inventory changes which firms choose to finance through a reduction in their demands for precautionary or transactions balances which, in turn, leads to a fall in the rate of interest is perfectly consistent with the theoretical framework of Keynes' liquidity preference theory since the fall in the rate of interest is brought about through a fall in the demand for money, not the increase in thrift as such. (This situation was explicitly examined by Keynes in September 1931 (1931c, pp.417-8) quoted in 9 above.) In addition, as is demonstrated below, it does not justify Robertson's position on this issue, nor does it justify the loanable funds theory of interest as defined by Ohlin and Robertson. See Blackford (1985) and cf. Robinson.

[24] Keynes explained the demand money in anticipation of planned investment expenditure as "a special case of the finance required by any productive process" (1937b, p.247). According to Keynes, transactions balances associated with expenditures of all kinds must be financed as well as holdings of precautionary and speculative balances, and investment expenditures are no exception:

> Planned investment—i.e. investment *ex-ante*—may have to secure its "financial provision" before the investment takes place; that is to say, before the corresponding saving has taken place . . . . There has, therefore, to be a technique to bridge this gap between the time when the decision to invest is taken and the time when the correlative investment and saving actually occur.
>
> This service may be provided either by the new issue market or by the banks;—which it is, makes no difference.[1] Even if the entrepreneur avails himself of the financial provision which he has arranged beforehand *pari passu* with his actual expenditure on the investment . . . it will still be true that the market's commitments will be in excess of actual saving to date and there is a limit to the extent of the commitments which the market will agree to enter into in advance.[2] But if he accumulates a cash balance beforehand . . . then an accumulation of unexpected or incompletely executed investment-decisions may occasion for the time being an extra special demand for cash. To avoid confusion with Prof. Ohlin's sense of the word, let us call this advance provision of cash the 'finance' required by the current decisions to invest. . . . [Keynes (1937b, pp. 246-8)]

Keynes used the term "finance" to describe this special kind of transactions demand for money that may arise from the accumulation of money balances in anticipation of the need to finance planned expenditures in the future. See Blackford (1983; 1984; 1985).

[25] See footnotes 2, 7, 16, 19, and 20, above and Keynes:

> If saving consisted not merely in abstaining from present consumption but in placing simultaneously a specific order for future consumption, the effect might indeed be different. . . . [H]owever, an individual decision to save does not, in actual fact, involve the placing of any specific forward order for consumption, but merely the cancellation of a present order. Thus, since the expectation of consumption is the only *raison d'être* of employment, there should be nothing paradoxical in the conclusion that a diminished propensity to consume has *cet. par.* a depressing effect on employment. [Keynes (1936, p. 134)]

Cf. Robertson:

> Let me state in my own language what I believe the Keynesian is trying to convey. Suppose that I decide to spend £100 of my income on securities, instead of as hitherto on fine clothes. My action destroys £100 of the income of my tailor and his employees and depletes their money balances by £100. It also raises the price of securities, i.e. lowers the rate of interest. This fall in the rate of interest tempts some people to sell securities and to hold increased money balances instead. Thus the fall in the rate of interest is checked, and not all of my £100 succeeds therefore in finding its way through the markets for old securities and new issues, on to the markets for labor and commodities. Thus

> owing to the existence of this siding or trap, my act of thrift does not succeed, as "classical" theory asserts that it will, in creating incomes and money balances for builders and engineers equal to those which it has destroyed for tailors. The net result of the whole proceeding is a fall in the rate of interest and an increase, perhaps, in capital outlay[1] but a net decrease in the total of money incomes and (probably) of employment.
>
> The argument is formally perfectly valid; and the practical inference that, if existing money is going to ground in this way, it is *prima facie* the duty of the banking system to create more money. . . . Here I will only say that it seems to me a most misleading way of expressing the causal train of events to say, as is sometimes done, that the act of thrift lowers the rate of interest through lowering total incomes. I should say that it lowers the rate of interest quite directly through swelling the money stream of demand for securities; that this fall in the rate of interest increases the proportion of resources over which people wish to keep command in monetary form; and that this increase in turn is a cause of there being a net decline in total money income, i.e. of money incomes not expanding in one sector to the extent that they are contracting in the other. [Robertson (1940, pp. 18-9)]

This is, clearly, not what Keynes was trying to convey. Robertson's action does not destroy £100 of the tailor's income. It only destroys £100 of the tailor's *sales* as it depletes his money balances by £100. The tailor's income will not change until his expectations change. In the meantime, *unless the tailor's demand for money changes* he will be forced to sell an additional £100 of securities or assets in order to restore his money balances to meet his payment obligations, and there is no reason for the price of securities to change *if his demand for money does not change*. If his demand for money does change there will, of course, be a change in the rate of interest in this situation, but *it is the change in the demand for money, not the increase in saving*, that will *cause* the rate of interest to change.

On at least four separate occasions Robertson considered Keynes' argument as to the nature of this transitional situation [Robertson (1936, p.178; 1937b, p. 435; 1940, p.18; 1957, p.68-9)], and on each of these occasions Robertson admitted the validity of Keynes' argument as he (Robertson) dismissed it out of hand. Robertson was simply incapable of understanding the importance of the *causal* effects of expectations on the choices of decision-making units. This intellectual blind spot in Robertson's vision was clearly pointed out by Hawtrey in 1933 in the passages quoted in footnote 17 above, and, Robertson's response to Hawtrey's criticism indicates the extent to which Robertson was simply incapable of seeing the light in this regard.

[26] See Blackford (2016) and Keynes:

> The object of our analysis is, not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organized and orderly method of thinking out particular problems; and, after we have reached a provisional conclusion by isolating the complicating factors one by one, we then have to go back on ourselves and allow, as well as we can, for the probable interactions of the factors amongst themselves. This is the nature of economic thinking. Any other way of applying our formal principles of thought (without which, however, we shall be lost in the wood) will lead us into error. It is a great fault of symbolic pseudo-mathematical methods of formalizing a system of economic analysis . . . that they expressly assume strict independence between the factors involved and lose all their cogency and authority if this hypothesis is disallowed; whereas, in ordinary discourse, where we are not blindly manipulating but know all the time what we are doing and what the words mean, we can keep 'at the back of our heads' the necessary reserves and qualifications and the adjustments which we shall have to make later on, in a way in which we cannot keep complicated partial differentials 'at the back' of several pages of algebra which assume that they all vanish. Too large a proportion of recent 'mathematical' economics are merely concoctions, as imprecise as the initial assumptions they rest on, which allow the author to lose sight of the complexities and interdependencies of the real world in a maze of pretentious and unhelpful symbols." [Keynes (1936, p. 188)]

The typical Keynesian models of the 1960s and 1970s took the form of various simultaneous equation, static equilibrium models spread throughout the literature and found in one form or another in almost any macroeconomic text book. These models have very little to do with Keynes and are, for the most part, extensions of Walras. (See Rose, Clower, Leijonhufvud, and Davidson.)

[27] While this paper is about the long-period problem of saving, it is important to at least acknowledge that what may be called "the long-period problem of capital formation" is equally important. See Keynes:

It may be convenient at this point to say a word about the important schools of thought which maintain, from various points of view, that the chronic tendency of contemporary societies to under-employment is to be traced to under-consumption;—that is to say, to social practices and to a distribution of wealth which result in a propensity to consume which is unduly low.

In existing conditions . . . where the volume of investment is unplanned and uncontrolled, subject to the vagaries of the marginal efficiency of capital as determined by the private judgment of individuals ignorant or speculative, and a long-term rate of interest which seldom or never falls below a conventional level, these schools of thought are, as guides to practical policy, undoubtedly in the right. For in such conditions there is no other means of raising the average level of employment to a more satisfactory level. If it is impracticable materially to increase investment, obviously there is no means of securing a higher level of employment except by increasing consumption.

Practically I only differ from these schools of thought in thinking that they may lay a little too much emphasis on increased consumption at a time when there is still much social advantage to be obtained from increased investment. . .

Moreover, I should readily concede that the wisest course is to advance on both fronts at once. Whilst aiming at a socially controlled rate of investment with a view to a progressive decline in the marginal efficiency of capital, I should support at the same time all sorts of policies for increasing the propensity to consume. For it is unlikely that full employment can be maintained, whatever we may do about investment, with the existing propensity to consume. There is room, therefore, for both policies to operate together;—to promote investment and, at the same time, to promote consumption, not merely to the level which with the existing propensity to consume would correspond to the increased investment, but to a higher level still. [Keynes (1936, p. 202-3)]

Cf. Blackford (2014, Chapter 12).

[28] Cf. Keynes:

> If there is an increased investment in any given type of capital during any period of time, the marginal efficiency of that type of capital will diminish as the investment in it is increased, partly because *the prospective yield will fall as the supply of that type of capital is increased* [*emphasis* added], and partly because, as a rule, pressure on the facilities for producing that type of capital will cause its supply price to increase; the second of these factors being usually the more important in producing equilibrium in the short run, but *the longer the period in view the more does the first factor take its place* [*emphasis* added]. [Keynes (1936, p. 88)]

And:

> We have seen that capital has to be kept scarce enough in the long-period to have a marginal efficiency which is at least equal to the rate of interest for a period equal to the life of the capital, as determined by psychological and institutional conditions. What would this involve for a society which finds itself so well equipped with capital that its marginal efficiency is zero and would be negative with any additional investment; yet possessing a monetary system, such that money will 'keep' and involves negligible costs of storage and safe custody, with the result that in practice interest cannot be negative; and, in conditions of full employment, disposed to save?
>
> If, in such circumstances, we start from a position of full employment, entrepreneurs will necessarily make losses if they continue to offer employment on a scale which will utilise the whole of the existing stock of capital. Hence the stock of capital and the level of employment will have to shrink until the community becomes so impoverished that the aggregate of saving has become zero, the positive saving of some individuals or groups being offset by the negative saving of others. Thus for a society such as we have supposed, the position of equilibrium, under conditions of *laissez-faire*, will be one in which employment is low enough and the standard of life sufficiently miserable to bring savings to zero. More probably there will be a cyclical movement round this equilibrium position. For if there is still room for uncertainty about the future, the marginal efficiency of capital will occasionally rise above zero leading to a 'boom', and in the succeeding 'slump' the stock of capital may fall for a time below the level which will yield a marginal efficiency of zero in the long run. Assuming correct foresight, the equilibrium stock of capital which will have a marginal efficiency of precisely zero will, of course, be a smaller stock than would correspond to full

> employment of the available labor; for it will be the equipment which corresponds to that proportion of unemployment which ensures zero saving. [Keynes (1936, p. 138)]

[29] See Blackford (2014) for an examination of the way in which the economic policies supported by mainstream economists over the past fifty years have transformed our economic system such that we can no longer achieve potential output and employment with the given state of mass-production technology in the absence of a continual increase in debt relative to income.

[30] See Keynes (1936, Chapter 24) and cf. Blackford (2014, Chapter 12).