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An analysis of some of the issues raised in the liquidity-preference loanable funds interest rate controversy

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**AN ANALYSIS OF SOME OF THE ISSUES RAISED IN THE LIQUIDITY-
PREFERENCE LOANABLE FUNDS INTEREST RATE CONTROVERSY**

Iowa State University

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An analysis of some of the issues raised in the
liquidity-preference loanable funds interest
rate controversy

by

Mark Alan Nadler

A Dissertation Submitted to the
Graduate Faculty in Partial Fulfillment of the
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TABLE OF CONTENTS

| | Page |
|--|------|
| I. INTRODUCTION | 1 |
| II. THE LIQUIDITY-PREFERENCE LOANABLE FUNDS INTEREST RATE CONTROVERSY - A SELECT REVIEW | 16 |
| A. Introduction | 16 |
| B. J. M. Keynes' Liquidity-Preference Theory of Interest | 16 |
| C. Some Macroeconomic Models Utilizing the Liquidity-Preference Approach to the Determination of the Interest Rate | 22 |
| D. Some Overall Conclusions Concerning the Liquidity-Preference Theory of Interest in Both a Partial and General Equilibrium Setting | 29 |
| E. Some Comments on Keynes' Liquidity-Preference Theory of Interest in Both a Partial and General Equilibrium Setting | 33 |
| F. Some Overall Conclusions Concerning the Liquidity-Preference Loanable Funds Interest Rate Controversy | 65 |
| III. THREE SIDE ISSUES IN THE LIQUIDITY- PREFERENCE LOANABLE FUNDS INTEREST RATE CONTROVERSY | 69 |
| A. Are the Money and Loanable Funds Markets as Commonly Specified Substitutable Under Static General Equilibrium Conditions? | 69 |
| B. Are the Money and Loanable Funds Markets as Commonly Specified Substitutable Under Dynamic Conditions? | 78 |
| C. Is It Possible to Make Sense of a Money Demand Function as Expressed in Its " <u>General Theory</u> " Form? | 84 |
| D. Some Overall Conclusions Concerning Chapter III | 87 |

| | Page |
|--|------|
| IV. ARE THE LIQUIDITY-PREFERENCE AND LOANABLE FUNDS THEORIES OF INTEREST DIFFERENT? | 88 |
| V. LIQUIDITY-PREFERENCE OR LOANABLE FUNDS? | 99 |
| A. The Views of Alex Leijonhufvud | 99 |
| B. Another Look at the Sequencing of Events Associated With These Two Interest Rate Approaches | 102 |
| C. The Effect of Savings on Real Output and the Choice Between the Liquidity-Preference and Loanable Funds Views | 103 |
| D. Some Conclusions | 104 |
| VI. SOME FINAL CONCLUSIONS | 106 |
| VII. BIBLIOGRAPHY | 108 |
| VIII. ACKNOWLEDGMENTS | 113 |

I. INTRODUCTION

From its very first publication in J. M. Keynes' General Theory of Employment, Interest, and Money, the liquidity-preference theory of interest has been the subject of a long, sometimes bitter, and always confusing controversy between itself and the loanable funds approach to the determination of the interest rate. While in many respects this controversy has waned from view today, and one might add not because it has been necessarily resolved, there still exist even now some skirmishes on or related to this topic among academic economists. For example, S. C. Tsiang has argued in a series of three recent papers (1956, 1966, and 1980) that while he accepts the generally held belief among economists (see Hicks 1936, Robertson under Ohlin, Robertson, and Hawtrey 1937, Lerner 1938, Fellner and Somers 1941, and Patinkin 1958) that if correctly specified, the liquidity-preference and loanable funds approaches to the determination of the interest rate really amount to the same thing, he adamantly disagrees with the traditional specification of the money demand function as depending on nominal income and the rate of interest. Instead, Tsiang argues that in order to make these two interest rate approaches truly compatible you must first respecify the money demand function as depending on ex-ante expenditures. As I will demonstrate later in my dissertation, after digesting Tsiang's arguments one is left not with the substitutability between the liquidity-preference and loanable funds theories of interest, but with the identity between

the money and loanable funds markets. And as we will see as we progress into the specifics of the liquidity-preference loanable funds debate, this error of confusing theories with markets is commonly made or hinted at by many of the other participants to this controversy.

In addition to Tsiang's three papers, there exists a new work by the Keynesian scholar A. Leijonhufvud (1981) called Information and Coordination, where he suggests in his chapter seven, "The Wicksell Connection: Variations on a Theme," that one of the worst and misbegotten turns ever taken in macroeconomics was the adoption of Keynes' interest rate approach à la the General Theory over D. H. Robertson's loanable funds view. In fact, Leijonhufvud considers Keynes' liquidity approach to the determination of the interest rate to be a step backwards vis-à-vis the interest rate theory he advocated in his Treatise on Money, which included both stock and flow effects (that is, both old and new bonds) as the determinants of the interest rate. Ultimately what Leijonhufvud advocates is the reconstruction of macroeconomic models that combine Keynes' income-expenditure mechanism, which he considers to be the real contribution of the General Theory, with a Robertsonian type of loanable funds market. Unfortunately much of what Leijonhufvud argues for is marred by his interpretation of the liquidity-preference theory of interest as consisting of a given stock of money and a money demand function which is solely dependent on the rate of interest. This version of Keynes' interest rate theory is what

Hicks (1937) called his "special theory" of interest as opposed to Keynes' "General Theory" of interest, which includes the argument of nominal income in addition to the rate of interest. While both of these versions of the liquidity-preference theory of interest may be found in the General Theory, it is this more complex version which has come down to us historically.

But more on these two economists and others later on, where we will subject Tsiang's beliefs to a more detailed treatment since they follow in the natural historical line of the liquidity-preference loanable funds discussion. Leijonhufvud's attack on the liquidity theory of interest will be given a more cursory treatment since it is motivated by an entirely different set of historical problems and issues. Let us now turn to the real purpose behind this dissertation.

It is the primary goal of this work to distinguish among and solve some of the major issues which were raised in the interest rate controversy following the publication of the General Theory between liquidity-preference and loanable funds scholars. But before entering into some of the nitty details of the various combatants in this quarrel, let me begin by describing some of my motivations for choosing this as a dissertation topic and then attempt to relate it to the task set out at the beginning of this paragraph.

There are certain aspects surrounding the standard presentation of the macroeconomy by way of ISLM types of models which have always

left me a bit puzzled and confused. Let us begin by looking at the almost exclusive use that is made of the money and product markets (often in conjunction with a labor market) by economists for pedagogical purposes. In the normal course of presenting the foundations of ISLM analysis some form of Walras' law either within a three or four market general equilibrium setting is usually first set out. Because the excess demands or supplies of these markets sum to zero--assuming an end-of-period model--it is then emphasized to the student how any one of these markets are otiose (i.e., functionless) for the purpose of economic analysis. In the majority of cases it is the loanable funds (or bond or credit) market which is banished from view in the name of simplicity. Of course the student is then reassured that you could just have easily have eliminated the money or in fact any other single market without affecting the outcome of any analysis which is to be performed later on. Now what I find so curious in all of this is, why do we almost always find the loanable funds market playing the role of the odd-man-out (for exceptions see Patinkin 1965 and Crouch)? Surely on the grounds of intelligibility alone you would expect to see more analysis conducted from the angle of the credit market than you find in actuality. To demonstrate my point, let me cite two common examples of economic analysis which I think would profit (at least from the perspective of the reader) by being studied from a loanable funds slant.

Assume an economic environment which is end-of-period in nature and in which real output is demand determined. This would leave us

with a three market economy comprised of a product market, a money market, and a loanable funds market. By Walras' law any one of these markets may be eliminated for the purpose of economic analysis.

I will begin with the case of the household sector in the economy experiencing an exogenously induced increase in its marginal propensity to save. Assuming that all economic variables do not adjust simultaneously, what series of economic events would you expect to see occur in a macroeconomic model comprised of a product market and a loanable funds or bond market? The increase in the marginal propensity to save among households would first lead to a situation of excess demand in the bond market and excess supply in the product market. This would then imply a fall in the rate of interest, correcting the existing imbalance in the credit market. The fall in the interest rate by reducing the opportunity costs of holding money balances would then lead to an excess demand in the money market. And finally, the contraction of real output brought about by the excess demand in the money market and excess supply in the product market would bring into equilibrium these two markets.

Now let us take the same case and run it through a model comprised of a product market and a money market. The increase in the marginal propensity to save among households would first lead to a situation of excess supply in the product market and excess demand in the loanable funds market. The excess supply in the product market would first cause real output to decline. The decline in real output would then lead to an excess supply in the

money market. And finally, the drop in the rate of interest brought about by the excess supply in the money market and excess demand in the bond market would bring into equilibrium these two markets.

Now it strikes me that this second scenario of what takes place in the economy following an increase in the desire to save among households (that is, savings $\uparrow \rightarrow$ output $\downarrow \rightarrow$ interest rate \downarrow) has historically muddled the distinction between savings as unconsumed product (that is, the slice of the real pie made available for investment) and savings as an available supply of liquid finance or credit. No wonder the student and sometimes even the instructor is left wondering concerning the whereabouts of this attempted increment in household savings which affects real output before changing the height of the interest rate. Does this imply that the economy's financial institutions are in such poor condition that any attempt on the part of households to increase their marginal savings rate comes to naught initially? Is this what is meant when textbooks refer to savings as a leakage out of the circular flow of income? Even if you could fight your way out of this tangle to develop a coherent set of responses to some of the issues that have been raised, it all seems to beg the question, why bother when we are in possession of a market (that is, the loanable funds market) which if properly nurtured can make all of this analysis easily understandable and intuitively compatible with the existing beliefs of most students of economics -- especially the notion that a rise in the rate of savings should impact directly

on the interest rate -- without affecting the ultimate outcome of our analysis, at least if one so desires?

A second example of an economic exercise which I think would benefit by being studied from a loanable funds view is the case of a rise in the level of governmental expenditures unmatched by any increase in tax receipts or money supply (that is, an increase in the supply of government bonds).

This time I will begin with the model consisting of a product market and a money market. All assumptions as previously stated are assumed to hold. What would you expect to occur in this sort of economic environment following a rise in the level of governmental expenditures unmatched by a tax increase or an increment in the supply of money? First there would occur an excess demand in the product market accompanied by an excess supply in the bond market. The excess demand in the product market would first cause real output to rise. This increase in real output would then lead to a situation of excess demand in the money market. The excess demand in the money market along with the excess supply in the bond market would then cause the rate of interest to rise, clearing both of these markets.

Now, as I have done once before, let us route this new scenario through our alternative model consisting of a product market and a loanable funds market. Again all modeling assumptions hold. What would we expect to occur? The increase in governmental expenditures would imply an excess demand in the product market and an excess

supply in the bond market. Given the implied dynamics associated with this model, the rate of interest would first rise. This increase in the rate of interest by increasing the opportunity of holding money balances would then lead to a situation of excess supply in the money market. And finally, the excess supply in the money market in union with the excess demand in the product market would then cause real output to expand, eliminating the imbalances in both of these markets.

From a logical point of view the problem with the first-mentioned case is, how could the government incur and spend its incremental deficit without first going to the loanable funds well for its nourishment? In other words, it does not seem to make sense for government expenditures to rise along with real output before the rate of interest increases! How is one to explain this to a first year student in economics? In fact, how is one to explain this sort of reasoning at all?

But even more startling than the failure to utilize the loanable funds market on the part of economists for pedagogical purposes is the partial use it receives at the hands of some authors of intermediate money and banking textbooks. There we find the use of the credit market in the early phase of the text when the author is trying to relate to the student the partial equilibrium determinants of the interest rate, only to have a switch pulled on the reader when the serious business of macroeconomic analysis is to begin at the end of the book. Then we find ourselves back in the world of models

comprised of the product market and the money market; and again, we see the loanable funds market pushed to the side with very little explanation given. Why is this so? Doesn't it make more sense to maintain the overall coherence of the text and construct macro-economic models that take explicit account of the loanable funds market?

To some extent the non- and partial use made of the loanable funds market by economists in their analysis may be ascribed to historical circumstances and imperfect knowledge. It seems reasonable to suggest at this point that the part of economic history relevant for understanding the non-use made of the loanable funds apparatus in macroeconomic modeling may be connected with the perceived outcome of the liquidity-preference loanable funds interest rate controversy. It might be believed by economists that Keynes and other liquidity-preference scholars bested D. H. Robertson and those of his ilk under the loanable funds banner. If these two interest rate schools fought to a draw, it does not matter whether you exclude the bond market from your analysis. Since the economics profession has adopted enmasse Keynes of the General Theory, why not also utilize the liquidity approach to the determination of the interest rate? I hope to show later on why this line of reasoning is hopelessly confused; but more on this after we have inspected some of the arguments put forth by the various discussants to this controversy. The problem of imperfect knowledge is somewhat easier to deal with and is, I believe, related to the partial or incomplete use that is

made of the loanable funds apparatus in intermediate money and banking texts. This being the case, it will be an indirect goal of this dissertation to familiarize the reader with the crude outlines of a loanable funds type of macroeconomic model assuming an end-of-period framework.

Before letting go of the question dealing with the non- or partial use made of the loanable funds paradigm among economists, it is worth noting one additional curiosity which has been lurking in the background of everything that has been said so far. We began this whole exercise by implicitly assuming through Walras' law that the loanable funds and money markets were substitutable. Otherwise it would have made no sense in comparing the pedagogical worth of the model composed of the product market and the money market with the model composed of the product market and the loanable funds in the manner it was done. Now the question that arises is this: if in fact these alternative models are substitutable as Walras' law implies, what accounts for the differences in the implied sequence of events associated with these two models following some economic shock? Is Walras' law wrong? Are my stories incorrect? Are the loanable funds and money markets really substitutable?

Let us now switch tracks and focus on an entirely different set of issues and concerns. As suggested earlier, many economists believe and have attempted to prove the equivalency between the loanable funds and liquidity-preference theories of interest. Note the distinction between this issue and what has been discussed

previously. We are now talking about the substitutability between interest rate theories and not economic markets. Now a riddle arises when you attempt to perform economic analysis from the perspective of these two interest rate approaches. Assume again that an exogenous increase in the marginal propensity to save takes place among households. From a loanable funds theory of interest view the first thing you would expect to occur would be a lowering in the rate of interest. But now comes the surprise. Even in the face of unemployment it is possible that this reduction in the rate of interest might in fact lead to an increase in real income. This result would depend on how the aggregate money demand function is specified - in particular, the arguments that make up the idle balance function. What would occur in a model that utilized the liquidity-preference theory of interest? As suggested earlier, the first thing that would occur following a rise in the marginal propensity to save would be a decline in nominal and real income followed by a reduction in the rate of interest.

Thus the question arises, what accounts for the differences between these two interest rate approaches? In this case not only are we dealing with a different sequence of events but a totally different potential outcome. Then in what sense can these two interest rate approaches be considered equivalent? Are the past proofs dealing with the substitutability between the liquidity and loanable funds theories of interest wrong? Are my descriptions of the economic events surrounding these two approaches misguided?

Along similar lines let me cite one additional example.

Assume that the level of taxes rises in the economy. From a liquidity interest view what would you expect to occur? The rise in the level of taxes by reducing the level of disposable income available to the household sector and acting through the product multiplier would first cause real income to fall in the economy. The fall in real income then acting through the money demand function would then lead to a drop in the rate of interest. How might these events be modified when viewed from a loanable funds perspective? First, the rise in the level of taxation by reducing real consumption causes the rate of interest to fall. The decline in consumption along with the drop in the interest rate then acting through the money demand function will affect real income. As I will demonstrate later, it is quite possible, again depending on how the money demand function is specified, that real income might in fact rise following an increase in the level of taxation.

So again we are faced with the problem of explaining the differences in the implied or possible outcomes associated with these two different interest rate approaches following a change in some exogenous variable.

Let me finish my comments concerning the relationship between ISLM models and the loanable funds market and the loanable funds theory of interest by looking at the model's behavior when out of equilibrium.

It always struck me as an odd feature of ISLM models that they leave with you the impression that the first order difference equation of the interest rate is intimately linked with both the money and loanable funds markets. This is liable to lead to all sorts of mischief. For example, assume a disequilibrium situation in which there exists an excess supply in both the money and bond markets together with an excess demand in the product market: How would the economy adjust to the new equilibrium position? The excess supply in the money market would imply a fall in the rate of interest, whereas the excess supply in the bond market would imply a fall in the price of bonds or a rise in the rate of interest. How could this be? Which is correct? Assuming that you choose either the money or bond market as the primary two-dimensional determinant of the rate of interest, what role would the other market play?

Before relating what I have said to the loanable funds liquidity-preference interest rate debate, let me condense my observations into a set of five questions which will act as a guide for the rest of this dissertation:

1. Under static general equilibrium conditions, is the loanable funds market substitutable with the money market assuming end-of-period analysis?

2. Under dynamic conditions, is the loanable funds market substitutable with the money market assuming end-of-period analysis? And furthermore, what is the relationship between this analysis

and the liquidity-preference loanable funds interest rate controversy?

3. Under static general equilibrium conditions, is the loanable funds theory of interest equivalent to the liquidity-preference theory of interest assuming end-of-period analysis?

4. What is the relationship between the loanable funds market, the money market, the loanable funds theory of interest, and the liquidity-preference theory of interest assuming end-of-period analysis?

5. What accounts for the limited use that has been made of the loanable funds market in modern macroeconomic analysis? Assuming period analysis, does the non-use of the loanable funds market make sense from a pedagogical view?

Of these five questions, question five will be given the least emphasis. In addition to trying to answer the above questions, as mentioned earlier, I will also be concerned with familiarizing the reader of this dissertation with the crude outlines of the loanable funds approach.

But how does any of this relate to the loanable funds liquidity-preference interest rate debate? Simply this: Almost every issue I have raised so far has been part of the composition of this interest rate controversy.

It is my intention to use this interest rate discussion as a vehicle in answering the five questions that have so far been raised. No attempt at historical completeness will be sought

Instead, I will pick and choose from those scholars who have contributed to this discussion the ones I think might bear fruit.

Now let us turn to the actual controversy itself.

II. THE LIQUIDITY-PREFERENCE LOANABLE FUNDS
INTEREST RATE CONTROVERSY - A SELECT REVIEW

A. Introduction

The ideas of J. M. Keynes, J. R. Hicks, B. Ohlin, D. H. Robertson, D. Patinkin, and S. C. Tsiang will be presented in this chapter as they relate to the liquidity-preference loanable funds interest rate controversy. Quite naturally, I will begin with Keynes' presentation of the liquidity-preference theory of interest and his attacks against classical interest rate theory as it appears in the General Theory. The other economic scholars mentioned will appear in approximately historical order.

B. J. M. Keynes' Liquidity-Preference
Theory of Interest

1. Keynes' critique of the classical theory of interest (1964, pp. 175-185)

a. The classical theory of interest as stated by Keynes in the General Theory For Keynes, the classical theory of interest is simply the proposition that the rate of interest will adjust in such an automatic way so as to bring into balance the supply and demand schedules for investable resources, where the demand curve may be thought of as a marginal efficiency of capital schedule which is solely a function of the rate of interest, and the supply curve is a savings schedule which is a function of the rate of interest and income, where income is considered a constant. These

schedules may also be thought of as demand and supply schedules of loanable funds.

From this view of the classical theory of interest, the following two important implications follow: one, if the marginal propensity to save on the part of society increases, then the rate of interest will fall and the quantity of investment will rise, and if the marginal propensity to save on the part of society declines, then the rate of interest will rise and the quantity of investment will fall; and, two, if the marginal efficiency of capital increases, the rate of interest will rise, and so will the quantity of savings. If the marginal efficiency of capital declines, the rate of interest will fall and so will the quantity of savings forthcoming.

In conclusion, we might say that the factors of thrift and productivity have an intimate link in determining the height of the interest rate within the classical model of the interest rate as described by Keynes in his General Theory.

b. Keynes' criticism of the classical approach to the determination of the interest rate Quite surprisingly, Keynes has no problem in accepting the previously described classical theory of interest as long as one begins by assuming that the level of income is considered a given. Where Keynes begins to part roads with the classical paradigm is when it attempts to perform some comparative-static types of exercises. For example, it was stated earlier how a rise in the marginal efficiency of capital will cause the rate of interest to move upward which will induce an increase in the quantity

of savings offered in the market or how an increase in the marginal propensity to save will induce a fall in the rate of interest and a rise in the quantity of investment. Keynes considers all of this to be pure "nonsense theory".

He argues that any shift in these schedules implies a change in the level of income which the classical theory of interest is incapable of embodying in its analysis. Since the classical theory of the interest rate leaves out this income effect, we cannot depend on its implications in terms of where the rate of interest might end up, or what the new level of savings and investment might be following some exogenous shock to the system.

c. Some secondary criticisms raised by Keynes against the classical theory of interest Keynes also suggests three additional arguments to the ones already mentioned against the classical theory of interest: first, since it is uncertain that the savings supply schedule has a positive slope, and we know that the demand schedule for investible resources has a negative slope, it is quite possible that these two schedules may never intersect at a positive interest rate; secondly, while it is common for economists to believe that changes in the supply of money affect the rate of interest, the classical presentation of the interest rate offers us no mechanism by which changes in the quantity of money may affect the savings or investment schedules, thus eliminating the possibility within the classical framework of money affecting the rate of interest; and, thirdly, to derive the demand schedule for loanable

funds, one must already know something about the current level of investment, but to know something about the current level of investment you must already have to know something about the rate of interest, and thus there exists circular reasoning in using the demand schedule as a force in the determination of the interest rate.

d. Some conclusions concerning Keynes' critique of the classical theory of interest We may summarize Keynes' major criticisms of the classical approach to the determination of the interest rate by saying that he believed it to be incomplete in the sense of ignoring income effects and changes in the quantity of money, besides being circular in reasoning and possibly dysfunctional in the sense of the supply of savings and demand for investment schedules not intersecting at a positive rate of interest.

2. Keynes' liquidity-preference theory of interest (1964, pp. 165-175, 194-209)

a. Microfoundations Each economic agent in the economy is presumed to make two sets of decisions in order to fulfil their psychological time-preference profiles. Decision one involves the choice of how to divide their income between present and future consumption. Decision two involves determining in what form of wealth the individual will carry his postponed consumption: money or bonds. The desire to hold wealth in the form of money is known as liquidity-preference. Three factors motivate liquidity-preference: the transactions demand for money, the precautionary demand for money, and the speculative demand for money. It is assumed that the

speculative demand for money is most sensitive to the rate of interest, while the transactions and precautionary demand for money are most strongly related to the level of nominal income and the general level of economic activity.

b. Keynes' "special theory" of interest (besides Keynes, see Hicks 1937) For each individual and for the economy as a whole, the speculative demand for money implies a smooth and negatively sloped schedule between the rate of interest and the quantity demanded of speculative money balances. This is because every drop in the rate of interest causes some "bull", that is an investor who thinks interest rates will fall in the future, to become "bearish", that is an investor who believes that interest rates will rise in the future. This switch from the "bull" to the "bearish" position leads to an increase in the quantity demanded of speculative balances.

If we subtract from the total money supply the demand to hold money for transactions and precautionary reasons, then we can say that the rate of interest adjusts so that society is just willing to hold this speculative or hoarded stock of money. That is, in final equilibrium the demand schedule for speculative or hoarded stocks of money just equals the existing supply.

1) Two implications of Keynes' "special theory" of interest First, the rate of interest is a reward for not hoarding (that is, not holding speculative balances) as opposed to not spending. According to Keynes, classical interest rate theory makes

the mistake of focusing upon the first psychological time-preference decision of how much to spend now and how much to defer or save for a later period, whereas Keynes' "special theory" emphasizes the second time-preference decision concerning what form to hold these savings in - money or bonds. It is Keynes' belief that it is this second decision which is critical in determining the rate of interest.

Secondly, the height of the interest rate has little if anything to do with savings (as stated above, it is the second time-preference decision that is relevant in determining the rate of interest) or the marginal efficiency of capital curve. The interest rate is simply a product of the supply and demand for speculative or hoarded balances. Thus Keynes' "special theory" version of the liquidity-preference theory of interest has eliminated the forces of thrift and productivity from playing a role in the determination of the interest rate.

c. Keynes' "General Theory" of interest (besides Keynes, see Hicks 1937) The "General Theory" version of the liquidity-preference theory of interest widens the scope of phenomena that might influence the level of the interest rate. Mathematically, the "special theory" of interest can be represented by $\bar{M}_t = L(r_t)$, where \bar{M} represents the available supply of speculative balances, $L(r_t)$ is the speculative demand for money, and r_t is the rate of interest. In the "General Theory" version of the liquidity-preference theory of interest, we have $\bar{M}_t = L_1(r_t) + L_2(Y_t)$. Where \bar{M}_t stands for the total money stock, $L(r_t)$ again represents the speculative demand

for money, r_t the rate of interest, $L(Y_t)$ the precautionary and transactions demand for money, and Y_t nominal income. While not explicitly included, nominal income is also functionally related to the rate of interest. It is this version of Keynes' theory of interest which has come down to us today relatively unscathed.

1) An important implication of Keynes' "General Theory" of interest Within Keynes' "General Theory" of interest, the rate of interest is no longer just a reward for not hoarding. By allowing for the effects of nominal income on the rate of interest, Keynes has reintroduced the classical margin of time back in as a determinant of the interest rate. While I believe it is still correct to think of the speculative demand for money as the primary explanation of the rate of interest, at least with the presence of nominal income in Keynes' money demand function the forces of thrift and productivity are reintroduced as partial determinants of the interest rate.

C. Some Macroeconomic Models Utilizing the Liquidity-Preference Approach to the Determination of the Interest Rate

1. A macroeconomic model assuming the "special theory" of interest

While Keynes rejects the supply and demand approach for investible resources as the primary explanation for the rate of interest, he still finds a constructive use for this apparatus. Let me quote from Keynes what I think he has in mind in terms of how these schedules might be used when viewing the "forest" as

opposed to the "trees" of the economic landscape:

"Moreover, this proposition--that is, that the demand and supply for investible resources determines the rate of interest given the level of income--would lead naturally to another proposition which embodies an important truth; namely, that, if the rate of interest is given as well as the demand curve for capital and the influence of the rate of interest on the readiness to save out of given levels of income, the level of income must be the factor which brings the amount saved to equality with the amount invested." (Keynes 1964, pp. 178-179)

This quote implies a macroeconomic model comprised of Keynes' "special theory" of interest and the savings investment schedules of the classical theory of interest. (See Keynes 1964, pp. 245-247, 181, and Hicks 1937.) More exactly, we have

$$\bar{M}_t = L(r_t), \quad L_{r_t} < 0, \quad (\text{II.1})$$

$$S_t = s(y_t, r_t), \quad s_{y_t} > 0, \quad s_{r_t} > 0, \quad (\text{II.2})$$

$$I_t = i(r_t), \quad i_{r_t} < 0, \quad (\text{II.3})$$

and $S_t = I_t. \quad (\text{II.4})$

Where \bar{M}_t is the economy's given stock of speculative balances, $L(r_t)$ is the speculative demand for money, r_t the rate of interest, $s(y_t, r_t)$ the savings schedule, y_t the level of nominal income, and $i(r_t)$ the demand schedule for investible resources or the marginal efficiency of capital function.

Within this system of four equations and four unknowns, Keynes considers \bar{M}_t , $L(r_t)$, s (that is, the functional form for S_t) and i

(that is, the functional form for I_t) to be the "determinants" of the system and the quantity of savings, investment, and national income to be the "determinates" of the system. (See Keynes 1964, pp. 183-184.) The model works by \bar{M}_t and $L(r_t)$ first determining r_t in a bloc recursive manner. With r_t established, y_t adjusts in such a manner so as to equate the level of savings in the economy with the level of investment compatible with the already established level of r_t .

Before performing some comparative static exercises on this model, two additional points should be made. First, the manner in which I have presented Keynes' liquidity-preference theory of interest suggests that it preceded the concept of using the savings and investment schedules as the primary determinants of national income. But such is not the case. In fact, Keynes first decides to use the savings and investment curves as the major explanation for the level of income in the economy. He then needs an interest rate theory which would be compatible with this savings and investment approach, thus the birth of the liquidity-preference theory of interest, (see Keynes 1937b, pp. 250). Second, this model totally reverses the classical sequence of events which thought of the money stock as determining the level of money income and the savings and investment schedules as determining the rate of interest. As we will see shortly, this has important ramifications for economic analysis.

a. Some economic implications of a macroeconomic model assuming the "special theory" of interest

1) Assume an exogenously induced increase in the marginal propensity to save If the desire to save among households increases, this would imply that the savings schedule would shift to the right. At the interest rate established in the money market, there would exist an excess supply of commodities. This excess supply of commodities would cause the economy to contract. The fall in the level of nominal income would then cause the savings schedule to shift back to the left, so that equality would again exist between the level of planned savings and planned investment at the existing level of the interest rate. Thus an increase in the desire to save among households is destructive in the sense of causing a drop in nominal income. And, of course, a reduction on the part of households to save would lead to just the opposite conclusion. (See Keynes 1964, pp. 184-185, and 210-213.) Furthermore, savings has no effect on the rate of interest.

2) Assume an exogenously induced increase in the marginal efficiency of capital If the productivity of capital rises, this would be reflected as an upward shift in the marginal efficiency of capital schedule. At the existing level of the interest rate, there would exist an excess demand for commodities. This would cause the economy to expand outward and thus increase the level of nominal income. The rise in nominal income would then cause the savings schedule to shift to the right, restoring the equality between

planned savings and planned investment at the original level of the interest rate. An increase in the level of planned investment has a positive effect on nominal income. It also causes the quantity of savings in the economy to rise. But it has no effect on the height of the interest rate.

b. Some conclusions concerning a macroeconomic model constructed along the lines of the "special theory" of interest The supply of money, which is a given, along with the liquidity-preference function determines the rate of interest in a bloc recursive manner. Once the interest rate is established, the level of investment is known from the marginal efficiency of capital schedule. Through the product market multiplier, a level of nominal income is then created such that planned savings equals planned investment.

Any attempt at raising the level of planned savings in the economy causes a contraction of nominal income. Any attempt at raising the level of planned investment in the economy causes nominal income to expand outward. In either case, the rate of interest is never affected by the forces of thrift and productivity. And finally, any act of investment creates the savings necessary to pay for itself.

2. A macroeconomic model assuming the "General Theory" of interest (See Keynes 1964, pp. 245-254)

This is the model made famous by Hicks' in his journal article "Mr. Keynes and the 'Classics': A Suggested Interpretation". It maintains most of the flavor of the "special theory" approach (that

is, the destructiveness of savings and the notion that the act of investing creates savings necessary to pay for itself) without subjecting itself to the charge of being totally unrealistic in the sense of not allowing for the forces of thrift and productivity to affect the rate of interest. Mathematically, we have

$$\bar{M}_t = L_1(y_t) + L_2(r_t), \quad L_1' > 0, \quad L_2' < 0, \quad (\text{II.5})$$

$$S = s(y_t, r_t), \quad s_{y_t} > 0, \quad s_{r_t} < 0, \quad (\text{II.6})$$

$$I = i(r_t), \quad I_{r_t} < 0, \quad (\text{II.7})$$

and $S_t = I_t. \quad (\text{II.8})$

The only new terms in the above model are \bar{M}_t which equals the economy's total stock of money and $L_1(y_t)$ which represents both the transactions demand for money and the precautionary demand for money.

In terms of the rate of interest, this model is no longer bloc recursive. In order to determine the level of the interest rate, one now has to take account of the desire to save and invest on the part of society.

a. Some economic implications of a macroeconomic model assuming the "General Theory" of interest

1) Assume an exogenously induced increase in the marginal propensity to save An increase in the marginal propensity to save among households will cause nominal income to decline. The fall in nominal income acting through the transactions demand for money will then cause the rate of interest to fall, which by way of the

marginal efficiency of capital schedule will cause the quantity of investment to rise. The net effect of all of this is a drop in the level of nominal income, a fall in the rate of interest, and an increase in the quantity of investment.

2) Assume an exogenously induced increase in the marginal efficiency of capital A rise in the efficiency of capital would cause an expansion of nominal income. This increase in nominal income acting through the transactions demand for money would then cause a rise in the rate of interest. Both the increase in nominal income and the rise in the rate of interest would induce an increase in the quantity of savings in the economy. And, of course, just the opposite would hold assuming a reduction in the marginal efficiency of capital.

b. Some conclusions concerning a macroeconomic model constructed along the lines of the "General Theory" of interest In order to determine both y and r requires the use of the money and product markets in a non-bloc recursive manner. Again, any attempt at increasing the level of savings in the economy leads to an economic contraction, while any attempt at increasing the level of investment in the economy leads to a rise in nominal income. In either case, the rate of interest would be affected. And finally, we still have the notion that an act of investing creates the savings necessary for its payment.

D. Some Overall Conclusions Concerning the Liquidity-Preference Theory of Interest in Both a Partial and General Equilibrium Setting

1. A partial equilibrium setting

a. The classical theory of the interest rate is wrong since it fails to take account of changes in the level of income following some change to either the savings or investment schedules or both. In addition, using the marginal efficiency of capital schedule as a determinant of the interest rate involves circular reasoning. And finally, there exist the problems within the classical paradigm of the possibility of the savings and investment curves not crossing in the positive quadrant in two dimensional space and the important issue of how money affects the rate of interest.

b. What actually underlies the problems with the classical approach to the determination of the interest rate is the emphasis it gives to the first decision households must make in terms of dividing their income between consumption and savings, as opposed to the Keynesian or liquidity-preference view which focuses upon the second household decision concerning how its chosen level of savings will be allocated between holding idle money balances and bonds. The primary implication of the classical focus on the first household decision is that savings plays an important role in determining the interest rate and that interest is a reward for waiting. The primary implication of Keynes' liquidity-preference view is that the decision to hoard or not to hoard is of

primary importance in determining the rate of interest, and one might say that interest is a reward for not hoarding as opposed to not spending or waiting.

c. In its "special theory" form, the liquidity-preference theory of interest states that the interest rate will adjust in such a manner so that society is just willing to hold its speculative balances. In its "General Theory" form, the liquidity-preference theory of interest states that the interest rate will adjust in such a manner so that society is just willing to hold all of its monetary balances.

d. The "special theory" version of the liquidity-preference theory of interest excludes the effects of thrift and productivity on the rate of interest, while the "General Theory" form of the liquidity-preference theory of interest allows for the forces of thrift and productivity to affect the rate of interest.

e. Summarizing one through four, we may say that the liquidity-preference theory of interest, whether in its "special" or "General Theory" forms, is unique and different from the classical theory of interest.

2. A general equilibrium setting

Combining the "special theory" version of the liquidity-preference theory of interest with a supply and demand schedule for investible resources yields the following results:

a. The rate of interest is determined in a bloc recursive

manner within the speculative demand for money market. Given the rate of interest, the level of investment in the economy is then determined. Through the product market multiplier, a level of income is then generated such that the quantity of savings forthcoming in the economy equals the planned quantity of investment given the rate of interest previously determined in the money market.

1) Changes in the supply and demand schedules for investible resources have absolutely no effect on the rate of interest.

2) An increase in the propensity to save among households causes nominal income to fall in the economy, while a decline in the propensity to save among households causes nominal income to expand outward.

3) An increase in the marginal efficiency of capital will cause nominal income and savings to both increase. And of course, a decline in the marginal efficiency of capital will cause both nominal income and savings to fall. Furthermore, the act of investing itself creates the savings necessary to finance itself.

Combining the "General Theory" version of the liquidity-preference theory of interest with a supply and demand schedule for investible resources yields the following results:

b. The rate of interest and nominal income are determined simultaneously in both the money and savings/investment markets.

1) Changes in the supply and demand schedules for investible resources now have an effect on both nominal income and the rate of interest.

2) An increase in the propensity to save among households causes nominal income to fall, the rate of interest to decline, and the level of investment to increase. And of course, just the opposite hold true for a decline in the propensity to save. So again, even within a macroeconomic model that utilizes the "General Theory" approach to the determination of the interest rate, savings represents a destructive force in the economy.

3) A rise in the marginal efficiency of capital will cause nominal income to increase, the rate of interest to rise, and the level of savings to increase. And for a fall in the marginal efficiency of capital, nominal income will decline along with the rate of interest and the level of savings. In addition, it is worth noting that the act of investment within this model creates the savings necessary to finance or pay for itself.

4) While it is correct to believe within the context of this model that changes in the levels of savings and investment affect the rate of interest, these effects manifest themselves only indirectly through changes in the level of income which then, and only then, affect the rate of interest. When the marginal propensity to save among households increases, first nominal income falls, and then, acting through the transactions demand for money, the rate of interest declines. Or for another example, assume that the marginal efficiency of capital increases, first nominal income expands outward, which again acting through the transactions component of the money demand function would cause the rate of interest to rise.

E. Some Comments on Keynes' Liquidity-Preference
Theory of Interest in both a Partial and
General Equilibrium Setting

1. J. R. Hicks

a. Hicks' comments on Keynes' criticisms of classical economics
(Hicks 1937, pp. 147-150) In Hicks' article "Mr. Keynes and the
'Classics': A Suggested Interpretation," Hicks argues that Keynes'
attack on classical interest rate theory is fallacious. He suggests
a model of the following form to demonstrate his points:

$$\bar{M}_t = ky_t, \quad (\text{II.9})$$

$$S_t = s(r_t, y_t), \quad (\text{II.10})$$

$$I_t = i(r_t), \quad (\text{II.11})$$

and $S_t = I_t. \quad (\text{II.12})$

Where equation (II.9) is a Cambridge quantity equation. All the
other symbols and equations have been previously defined.

In this model, the existing money stock (i.e., \bar{M}_t) determines
money income (i.e., y_t) through the velocity term k . Given y_t , the
savings and investment schedules then determine the rate of interest
(i.e., r_t). Theoretically, there is absolutely nothing wrong with
this model. The savings schedule and the investment schedule can
shift around in any manner possible without affecting the level of
income in the economy. Thus Keynes' criticism of the classical
approach to the determination of the interest rate as being 'nonsense

theory' because it fails to take account of income effects is incorrect.

Secondly, contrary to what Keynes believed, the classical approach to the determination of the interest rate does provide a mechanism by which money may influence the rate of interest. For example, by the money stock affecting money income, and money income then affecting the savings curve, there exists the linkage by which money affects the rate of interest.

In conclusion, we may say that Keynes' arguments, at least his criticisms dealing with the failure of classical interest rate theory to allow for the effect of changes in the levels of income on the interest rate following some change in the savings and investment schedules, and his observation that the classical approach to the determination of the interest rate makes no allowances for the impact of money on the height of the interest rate, are themselves wrong. This is not to say that the classical theory of interest is correct, but only to note that the wounds that Keynes attempted to inflict upon it fell short of their marks.

b. Hicks' proof of the nonuniqueness of the liquidity-preference approach to the determination of the interest rate vis-à-vis the loanable funds view (see Hicks 1936, pp. 246-247). Besides trying to disembowel Keynes' criticism of the classical theory of interest, Hicks attempts to demonstrate why Keynes' liquidity-preference theory of interest was in fact not really unique and different than the classical or loanable funds view of the determination of the interest

rate. Quoting from Hicks,

"This looks like a most revolutionary doctrine" [that is, the liquidity-preference theory of interest] "but it is not, I think, as revolutionary as it seems. For over any short period, the difference between the value of the things an individual acquires (including money) and the value of the things he gives up (including money) must, apart from gifts, equal the change in his net debt--his borrowing and lending. The same will apply to a firm. If, therefore, the demand for every commodity and factor equals the supply, and if the demand for money equals the supply of money, it follows by mere arithmetic that the demand for loans must equal the supply of loans (when these latter are interpreted in a properly inclusive way). Similarly, if the equations of supply and demand hold for commodities, factors and loans, it will follow automatically that the demand for money equals the supply of money" (Hicks 1936, p. 246).

Furthermore,

"The ordinary method of economic theory would be to regard each price as determined by the demand and supply equation for the corresponding commodity or factor; the rate of interest as determined by the demand and supply for loans. If we work in this way, the equation for demand and supply of money is otiose--it follows from the rest; and fortunately, too, it is not wanted, because we have determined the whole price-system without it. But we could equally well work in another way. We could allot to each commodity or factor the demand and supply equation for that commodity or factor, as before; but we could allot to the rate of interest the equation for the demand and supply of money. If we do this, the equation for loans becomes otiose, automatically following from the rest..." (Hicks 1936, p. 246).

And finally,

"This latter method [that is, allotting the rate of interest to the money market] is the method of Mr. Keynes. It is a perfectly legitimate method, but it does not prove other methods to be wrong. The choice between them is purely a question of convenience" (Hicks 1936, p. 246).

In somewhat more modern terms, we have the following: Assume a general Walrasian framework. Let there exist $N+1$ markets of which N are independent. Out of these $N+1$ markets, $N-1$ are product markets, the N th being the money market, and the $N+1$ th being the loanable funds market. Any one of these markets is otiose. If you eliminate the N th market, you have a loanable funds framework. If you eliminate the $N+1$ th market, you have a liquidity-preference model. Either the loanable funds or liquidity-preference models will yield identical analytical results. Thus, Keynes is wrong in saying that the liquidity-preference theory of interest is really something unique and different than the traditional loanable funds or classical view of the interest rate. Or is he?

c. Some criticisms of Hicks' remarks concerning the substitutability between the liquidity-preference and loanable funds theories of interest We might begin with the quip ascribed to A. P. Lerner, where he supposedly asked, "What kind of interest rate theory do you have if you eliminate the market for peanuts?" In other words, Lerner was suggesting that you cannot use the Walrasian framework as a classificatory scheme. At a slightly more sophisticated level, but in principle no different than Lerner's remark, D. Patinkin (1985) has demonstrated that logically you cannot use Walras' law to classify theories according to which equations you include or exclude, since in a general equilibrium static framework, all markets acting simultaneously are needed to determine all prices.

But none of this denies the issue of whether or not the liquidity-

preference theory of interest is really substitutable with the loanable funds approach to the determination of the interest rate, but only that Hicks' method is invalid.

But even more important than the failure of Hicks' scheme to correctly classify interest rate theories according to which market is included or excluded is the fact that Hicks' way of looking at the liquidity-preference loanable funds interest rate controversy includes two "red-herrings". First, Keynes of the General Theory attempted to distinguish between the classical theory of interest and his own approach. What this has to do with the substitutability between the money and loanable funds market is really minimal. As I will demonstrate later on, one must distinguish between the substitutability between interest rate theories and the substitutability between the money and loanable funds markets. This confusing twist, first introduced by Hicks, was one of the most unfortunate turns taken in this whole interest rate question. And secondly, as stated earlier, Hicks attempts to demonstrate that whether one theorized using the money market or the loanable funds market, the end result would remain constant. Unfortunately, it would seem from what was stated earlier when we studied Keynes' arguments, Keynes himself was attempting to distinguish between having an interest rate theory based on money demand and supply versus one based on savings and investment. Now Keynes of the General Theory may have given his readers some reason to think that he considered the savings/investment market to be identical with

the loanable funds market (see Keynes 1964, p. 165); but in his post General Theory writings he distinguished sharply between the notions of savings, investment, and the supply and demand for loanable funds (see Keynes 1937b, pp. 247-48). Thus, Hicks' attempt at refuting Keynes' claim concerning the uniqueness of the liquidity-preference approach relative to the classical approach concerning the determination of the interest rate by showing how the money and loanable funds markets are substitutable in a general equilibrium setting is a non sequitur. In fact, Keynes could agree with everything that Hicks argued without in the least sacrificing his own approach, at least in terms of the differences embodied in thinking of the interest rate as being primarily determined by money supply and demand versus the savings and investment view.

d. Some conclusions concerning Hicks' comments Hicks is correct in refuting Keynes' claims that the classical approach to the determination of the interest rate is illogical and inadequate because it fails to take account of income changes due to changes in the level of savings and investment; and that furthermore, it fails to introduce a pathway for the influences of the money stock on the interest rate.

Hicks also succeeds in demonstrating a method for testing the substitutability between the money and loanable funds markets. He fails though in using this procedure as an argument in demonstrating the substitutability between the liquidity-preference and loanable funds theories of interest. In fact, he may be admonished for

introducing a confusing twist into the loanable funds liquidity-preference interest rate controversy. In addition, Hicks interprets Keynes' arguments in such a manner as to assume the identity between the loanable funds market and the savings/investment market, which is incorrect.

2. Bert Ohlin

a. Bert Ohlin's criticisms of Keynes' liquidity-preference theory of interest Ohlin disparages Keynes' liquidity approach to the determination of the interest rate as being too focused on money. While Ohlin believes that in final equilibrium society in some sense will be just willing to hold the existing monetary stock, he also believes that in this final equilibrium state, society will be willing to hold all other assets as well. B. Ohlin then queries why money should play a more important role in the determination of the interest rate than any other asset. Quoting from his article "Some Notes on the Stockholm Theory of Savings and Investment,"

"Let me add a few words about the market which is given a special position by Keynes, the demand and supply for cash and claims 'quickly' convertible into cash. It goes without saying, that the interest rates existing at any given moment fulfil the condition that they make people willing to hold as cash--which term in the following includes the last-mentioned claims--the total amount outstanding. But the same is true of all other claims and assets" (B. Ohlin 1937, p. 225).

Some aspects of B. Ohlin's criticism of Keynes' liquidity-preference approach to the determination of the interest may be modified by noting that Ohlin's interpretation of Keynes' interest

rate theory would be of its "special theory" form. Again quoting from his article dealing with the Stockholm theory of savings and investment,

"whereas Keynes' construction--unless it is interpreted in a way which he probably does not accept--seems to regard the rates of interest as determined largely 'outside' the price system, or at least as having almost no connection with the system of mutually interdependent prices and quantities" (B. Ohlin 1937, p. 225).

As I have tried to emphasize when discussing Keynes' liquidity-preference theory of interest, one can find at least two versions of his interest rate approach within the General Theory: Its "special" and "General Theory" versions. That B. Ohlin chose its "special theory" form is not surprising; since much of the General Theory is written from the slant of the "special theory" format of the liquidity-preference theory of interest, especially the chapters in the General Theory dealing with the determination of the interest rate. Nevertheless, one must recognize the existence of the liquidity-preference theory of interest in its broader version, that is, in its "General Theory" form, and when one does this, some of B. Ohlin's critique of Keynes' interest rate theory as being too focused on money becomes somewhat deflated.

b. Bert Ohlin's approach to the determination of the interest rate All of this begs the question though of what sort of interest rate approach does B. Ohlin opt for? Ohlin wants to substitute for Keynes' liquidity-preference theory of interest the

"Stockholm" or "Swedish" theory of interest.¹ This is the proposition that "the rate of interest is simply the price of credit, and that it is therefore governed by the supply of and demand for credit"

(B. Ohlin 1937, p. 221). Or more extensively,

"To explain how the rates of interest are actually determined, we need, however, a causal analysis which runs chiefly in ex-ante terms. What governs the demand and supply for credit? Two ways of reasoning are possible. One is net and deals only with new credit, and the other is gross and includes the outstanding old credits. The willingness of certain individuals during a given period to increase their holdings of various claims and other kinds of assets minus the willingness of others to reduce their corresponding holdings gives the supply curves for the different kinds of new credit during the period. Naturally, the quantities each individual is willing to supply depend on the interest rates. In other words, the plans are in the nature of alternative purchase and sales plans. Similarly, the total supply of new claims minus the reduction in the outstanding volume of old ones gives the demand--also a function of the rates of interest--for the different kinds of credit during the period. The prices fixed on the market for these different claims--and thereby the rates of interest--are governed by this supply and demand in the usual way" (B. Ohlin 1937, pp. 224-225).

c. J. M. Keynes' response to B. Ohlin's credit theory of interest

While the preceding quote by B. Ohlin generated a flurry of arguments (see Keynes 1937b) and counter-arguments (see Ohlin, Robertson, and Hawtrey 1937) concerning relationship between the supply and demand for

¹This was Keynes' name for the interest rate approach that Ohlin adopted (see Keynes 1937b, p. 241). Ohlin himself never claimed that his colleagues at the various Swedish academies endorsed his interest rate approach.

loans and the supply and demand of savings and investment, its critical value was in sparking in Keynes the realization that in its present form the liquidity-preference theory of interest ignores the needs of businessmen who desire finance in order to expand investment. That is,

"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. It is, so to speak, as though a particular piece of saving had to be earmarked against a particular piece of investment before either has occurred, before it is known who is going to do the particular piece of saving, and by someone who is not going to do the saving himself. 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" (Keynes 1937b, p. 246).

For example, what about the existence of a loanable funds market?

Again quoting from Keynes,

"This service may be provided either by the new issue market or by the banks; which it is, makes no difference" (Keynes 1937b, p. 246).

Keynes considers this demand for cash or "finance" as resting between the active transactions demand for money and the demand for idle balances. But more importantly from the perspective of the loanable fundists, this acceptance by Keynes for the need to take account of "finance" opened the door in Keynes' whole interest rate scheme and his view of the macroeconomy to the belief in a loanable funds market, where buyers and sellers of credit affect the rate of interest and where investment requires its financial provision

before it is actually carried out. No more of the silliness that investment creates savings, at least when we are inclined to think of savings or some part of savings as finance. Keynes considers this new component (that is, "finance") of his money demand function to be nothing less than the "coping-stone" (Keynes 1937c, p. 667) of the liquidity-preference theory of interest, and this new component is nothing less and nothing more than the market for loanable funds. Quoting from Keynes,

"It follows that, if the liquidity-preference of the public (as distinct from the entrepreneurial investors) and of the banks are unchanged, an excess in the finance required by current ex-ante output (it is not necessary to write 'investment', since the same is true of any output which has to be planned ahead) over the finance released by current ex-post output will lead to a rise in the rate of interest; and a decrease will lead to a fall. I should not have previously overlooked this point, since it is the coping-stone of the liquidity theory of the rate of interest. I allowed, it is true, for the effect of an increase in actual activity on the demand for money. But I did not allow for the effect of an increase in planned activity, which is superimposed on the former, and may sometimes be the more important of the two, because the cash which it requires may be turned over so much more slowly. Just as an increase in actual activity must (as I have always explained) raise the rate of interest unless either the banks or the rest of the public become more willing to release cash, so (as I now add) an increase in planned activity must have a similar, superimposed influence" (Keynes 1937c, p. 667).

d. Some conclusions So now we need to recognize by Keynes' own admittance a third variation of the liquidity-preference theory of interest, one which recognizes a demand for "finance" alongside the already established demands for transactions and speculation.

One wonders at first blush whether a money demand function comprised of these three categories of demand makes any sense? We will see shortly that D. H. Robertson considered Keynes attempt to integrate a "finance" demand component into his money function a monstrosity of the first magnitude. But more on this later when we formally discuss Robertson's comments in greater detail. But at this point in our analysis one must admit that some of the gloss of Keynes' new interest rate approach must be considered partially tarnished if it requires the concept of loanable funds to establish its legitimacy.

3. D. H. Robertson

a. D. H. Robertson's criticisms of Keynes' liquidity-preference theory of interest . One of the earliest and by far best known antagonists of Keynes' liquidity-preference approach to the determination of the interest rate is D. H. Robertson. Of great surprise to the reader of the loanable funds liquidity-preference interest rate controversy is the fact that Robertson never did reject Keynes' "new" interest rate approach, at least in its "General Theory" form. For example,

"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" (D. H. Robertson 1936, p. 183).

And one year later we have,

"Thus I remain of the opinion that Mr. Keynes' apparatus and the 'loanable funds' apparatus are not 'radically opposed to one another' (p. 241) but are alternative pieces of machinery; and that what can be (truly or falsely) asserted in terms of the other" (Ohlin, Robertson and Hawtrey 1937, p. 432).

And finally,

"Nevertheless, when we have picked our way through these verbal tangles, we are left, I think, in no doubt about the relation between the two methods of approach. Essentially they are two different ways of saying the same thing. Mr. Keynes' long-maintained determination to treat them as 'radically opposed' has been to me from the beginning the most baffling feature of this whole controversy" (D. H. Robertson 1966, pp. 158-159).

Since Robertson agrees with Keynes on the legitimacy of the liquidity-preference approach, then what is all the fuss about between these two scholars? Why did Robertson feel it necessary to write numerous articles distinguishing between the loanable funds and liquidity-preference view of the interest rate?

1) D. H. Robertson's comments on Keynes' "special theory" of interest a) We saw earlier when studying Keynes' arguments for the liquidity-preference view of interest, especially in its "special theory" form, that one reason Keynes rejected the possibility of the marginal productivity of capital affecting the rate of interest is that it embodies circular reasoning. Quoting from Keynes,

"Nor are those theories more successful which attempt to make the rate of interest depend on the 'marginal efficiency of capital'. It is true that in equilibrium the rate of interest

will be equal to the marginal efficiency of capital, since it will be profitable to increase (or decrease) the current scale of investment until the point of equality has been reached. But to make this into a theory of the rate of interest or to derive the rate of interest from it involves a circular argument, as Marshall discovered after he had got half-way into giving an account of the rate of interest along these lines. For the 'marginal efficiency of capital' partly depends on the scale of current investment, and we must already know the rate of interest before we can calculate what this scale will be" (Keynes 1964, p. 184).

This leads Keynes to argue that,

"The schedule of the marginal efficiency of capital may be said to govern the terms on which loanable funds are demanded for the purpose of new investment; whilst the rate of interest governs the terms on which funds are being currently supplied. To complete our theory, therefore, we need to know what determines the rate of interest" (Keynes 1964, p. 165).

Robertson then counter argues,

"The schedule of the marginal utility of tea may be said to govern the terms on which tea is demanded: whilst the price of tea governs the terms on which tea is being currently supplied! From the fact that to the individual borrower the hiring price of loanable funds is a thing to be taken for granted, Mr. Keynes appears to proceed, in a way in which he would never do if he were speaking of an ordinary commodity, to the inference that the price is independent of the level of the collective demands of the whole body of borrowers; those who reject this inference are regarded as guilty of some kind of circular reasoning and as victims of some kind of elementary confusion between a schedule and a price, between a curve and a point on a curve..." (D. H. Robertson 1966, p. 160).

b) As stated earlier, for Keynes, one of the central fallacies of the classical theory of interest, (see Keynes 1964, pp. 166-167, 174) at least relative to the liquidity-preference theory of interest in its "special theory" format, was the belief that the payment of interest is a reward for saving or not spending. Keynes wanted to make the payment of interest a reward for not hoarding. This was in accordance with Keynes' attempt to play down the force of thrift as a determinant of the interest rate.

Not surprisingly, Robertson attacks this sort of view of what economic margins of decision making are relevant in terms of the rate of interest by the following sort of reasoning,

"In the first place it seems to be suggested that the proposition that the marginal convenience of holding money is equated with the rate of interest necessarily excludes and invalidates the proposition that the marginal inconvenience of refraining from consumption is equated with the rate of interest. Such phrases as that interest is not the reward of not-spending but the reward of not-hoarding seem to indicate a curious inhibition against visualising more than two margins at once. A small boy at school is told that if he wins a race he may have either an apple or an orange: he wins the race and chooses the orange. When his mother asks him how he got it, must he reply 'I got it for not eating an apple?' May he not say proudly 'I got it for not losing a race?'" (D. H. Robertson 1966, p. 165)

c) And finally, we have Robertson's direct attack on the "special theory" variation of the liquidity-preference theory of interest, where this interest rate approach amounts to the proposition that the rate of interest is determined by the demand and

supply of hoards with the supply of hoards a given while the demand for hoards is considered a negative function of the rate of interest. In final equilibrium, the rate of interest adjusts so that society is just willing to hold the existing stock of hoards or idle balances. Any increase in the quantity of hoards drives the rate of interest down by causing some "bull" to become "bearish" on interest rates. That is, some speculator goes from believing that the rate of interest is going to fall in the future to believing that the rate of interest is going to rise in the future.

In possibly one of the most biting lines ever uttered in the history of economics against the thoughts of another scholar, we have Robertson's view of Keynes' "special theory" version of the liquidity-preference theory of interest: "Thus the rate of interest is what it is because it is expected to become other than it is; if it is not expected to become other than it is, there is nothing left to tell us why it is what it is. The organ which secretes it has been amputated, and yet it somehow still exists--a grin without a cat" (D. H. Robertson 1966, p. 174). And, "Mr. Plumptre of Toronto, in an unpublished paper, has aptly compared the position of the lenders of money under this theory with that of an insurance company which charges its clients a premium, the only risk against which it insures them being the risk that its premium will be raised. If we ask what ultimately governs the judgment of wealth-owners as to why the rate of interest should be different in the future from what it is today, we are surely led straight back to

the fundamental phenomena of Productivity and Thrift" (D. H. Robertson 1966, p. 174).

2) Some conclusions on D. H. Robertson's comments concerning Keynes' "special theory" version of the liquidity-preference theory of interest Anything of praise we say concerning Robertson's observations about the "special theory" form of Keynes' liquidity-preference theory of interest must be tempered by the fact that no one, including Keynes, accepted the basic tenets of this approach shortly after the publication of the General Theory. Nevertheless, Robertson must be considered essentially right on both the issue that the classical theory of interest does not necessarily embody circular reasoning and Keynes' refusal to recognize more than two margins of choice in his model of decision-making as it relates to the determination of the interest rate. In addition, I think the quote I made of his biting remark concerning the "special theory" form of the liquidity-preference theory of interest summarizes Robertson's belief in the emptiness of this sort of interest rate approach.

3) D. H. Robertson's comments on Keynes' "General Theory" of interest a) One of the major tasks that D. H. Robertson feels obliged to accomplish in his diatribes against Keynes' liquidity view of the determination of the interest rate is to point out how the forces of thrift and productivity are as involved in determining the rate of interest in Keynes' story as they are in the classical theory of interest. In particular, he attempts to combat

statements made by Keynes which imply that the forces of savings and investment have absolutely no effect on the rate of interest.

For example,

"If we mean by 'hoarding' the holding of idle balances, then my theory of the rate of interest might be expressed by saying that the rate of interest serves to equate the demand and supply for hoards--i.e., it must be sufficiently high to offset an increased propensity to hoard relatively to the supply of idle balances available. The function of the rate of interest is to modify the money-prices of other capital assets in such a way as to equalize the attraction of holding them and of holding cash. This has nothing whatever to do with current saving or new investment" (J. M. Keynes 1937b, p. 250).

D. H. Robertson responds to statements like these by pointing out how through the transactions demand for money both the forces of thrift and productivity do in fact affect the rate of interest by or through their effects on income. But much of Robertson's comments on this are really besides the point. When Keynes argues that savings and investment do not affect the rate of interest he was still arguing for the "special theory" version of his interest rate approach. This was soon dropped by Keynes and most everyone else for either the "General Theory" approach or the "General Theory" approach plus a "finance" demand for money component.

b) D. H. Robertson is one of the few participants of the liquidity-preference loanable funds interest rate controversy who concerns himself with the issue of pedagogy. In particular, Robertson feels that the loanable funds interest rate paradigm "accords with the ordinary language of the marketplace; I do not

believe that the bill-broker or the impecunious schoolboy will ever believe that, whatever be the deeper causes of its behavior, the rate of interest is anything other than what people have always supposed it to be--the price of the use of loanable funds" (D. H. Robertson 1966, p. 159).

And secondly, Robertson worries whether or not the "General Theory" version of the liquidity-preference theory of interest did not hide from the economist how the forces of thrift and productivity affect the rate of interest. Quoting Robertson on this matter,

"I have suggested that even from the momentary market view the Keynesian formulation tends to obscure unduly the parts played by Productivity and Thrift. Much more is this true when we pause to consider the trend of events over considerable stretches of time. I remain of opinion that from the long-period point of view the most important things to be said about the rate of interest are not things about 'liquidity-preference' and the supply of money, but things about what Marshall calls productiveness and prospectiveness" (D. H. Robertson 1966, pp. 173-174).

c) Robertson considers Keynes' attempt at integrating a "finance" demand for money into his money demand function to be a mistake. Robertson considers the notion of "finance" to be tied or linked intimately with the flow of time. He also believes that the demand for money function should be associated with a point in time. He then queries how these two concepts could ever be linked together in a single function. Quoting from Robertson,

"In certain more recent writings, to which I shall allude further later, Mr. Keynes has again rendered clear discussion difficult by introducing a number of hybrid concepts, such as 'the supply of finance' and the 'supply of liquidity', are neither identical with the 'supply of money' in his sense, since others than the banks are conceived of as contributing to them, nor identical with the 'supply of loanable funds' in my sense, since he attempts to bring them into touch not with a flow of demand during an interval of time but with a state of demand existing at a moment of time" (D. H. Robertson 1966, p. 158).

d) And finally, we have Robertson's attempt at reformulating the sequence of events associated with certain changes in the economy. For example, assume there takes place an increase in the marginal propensity to save among households. What would occur? From a Keynesian perspective you would first expect income to fall. The fall in income operating through the money demand function would then lead to a lowering in the rate of interest. D. H. Robertson disagrees with this sequence of events. He believes that it makes more sense to think of the increase in the propensity to save to first cause the rate of interest to fall, and then through the money demand function and in particular the velocity term of the money demand function to then cause income to fall due to the decrease in the velocity of money following the fall in the interest rate.

4) Some final conclusions concerning D. H. Robertson's comments on Keynes' liquidity-preference theory of interest One might suppose after all of this that Robertson would have absolutely nothing to do with Keynes' liquidity approach to the

determination of the interest rate. But, as stated earlier, such is not the case. Robertson considers Keynes and his own approach to the determination of the interest rate to be formally equivalent. Of course we are now talking about the liquidity-preference theory of interest in its "General Theory" format. Robertson will have absolutely nothing to do with the "special theory" variation of Keynes' liquidity theory of interest or that variation of the "General Theory" of interest that includes a "finance" component.

Robertson does disagree with the sequence of events implied by the liquidity-preference theory of interest following some shock to the system, in particular, how a change in the rate of savings sequentially works its way through the economy. He also feels that from a pedagogical point of view the loanable funds theory of the interest rate is superior to Keynes' approach. And finally, he believes Keynes to be wrong in downplaying the forces of thrift and productivity in the liquidity approach to the determination of the interest rate.

4. D. Patinkin

D. Patinkin makes three contributions to the liquidity-preference loanable funds interest rate controversy. First, he demonstrates formally why one cannot use Hicks' scheme to classify interest rate theories. Secondly, Patinkin proves that in a discrete time model it makes no sense to distinguish among interest rate approaches by claiming that one approach is stock in nature (i.e.,

liquidity-preference approach) while the other is flow in nature (i.e., loanable funds approach). And thirdly, he demonstrates in a dynamic setting that if you make the first order difference equation of the rate of interest a function of excess demand in the money market it is possible to conceive of situations in which the money market implies that the interest rate should move in one direction, whereas the bond market implies that the interest rate should move in another. For Patinkin, this is an illogical situation that should not be allowed to happen.

a. D. Patinkin's argument against Hicks' interest rate classificatory scheme Patinkin begins by stating in a formal manner Hicks' proof of the equivalency between the loanable funds theory of interest and the liquidity-preference theory of interest:

1. Assume an economy consisting of N goods. Assume that $N-2$ of these goods are commodities. Where the $N-1$ th good are bonds and the N th good is money. By Walras' law only $N-1$ of the markets associated with these goods are independent.

2. In a general equilibrium analysis of the economy, a model consisting of all of the commodity markets and the money market will yield the same results as a model consisting of all of the commodity markets and the bond market. This follows from Walras' law.

3. The model consisting of the commodity markets and the money market when determining the rate of interest will be called the liquidity-preference approach to the determination of the interest rate. The model consisting of the commodity markets and the bond

market when determining the rate of interest will be called the loanable funds approach to the determination of the interest rate.

4. Since we have already demonstrated that the model consisting of all of the commodity markets and the money market is formally equivalent to the model consisting of all of the commodity markets and the bond market, then it follows that the liquidity-preference and loanable funds approaches are also equivalent.

Patinkin then points out that the problem with this scheme is when one queries about the interest rate theory being used when one of the commodity markets is dropped from analysis. Or to repeat Lerner's quip: "And what kind of interest rate theory do we have if we eliminate the equation for peanuts?" That is, this classification system breaks down if you retain both the bond and money markets in your model. For Patinkin, the conclusion to be drawn from all of this is not that Hicks is totally incorrect in the procedure he utilizes, but just that in a general equilibrium static setting there exists one theory of interest, which can only be represented by the full set of N markets.

But in final conclusion, Patinkin states: "Correspondingly, if we insist on classifying theories as 'loanable funds' or 'liquidity preference' according to the equation 'dropped' (though the irrelevance of this classification has been demonstrated above), then we have demonstrated the equivalency of these two theories" (Patinkin 1958, p. 302).

b. D. Patinkin's comments on the stock/flow controversy surrounding the liquidity-preference loanable funds interest rate controversy Following the publication of Fellner and Somers' proof of the equivalency of the liquidity-preference and loanable funds approaches (Fellner and Somers 1941), which follows rather closely the methodology pioneered by Hicks, there arose among academic economists a debate on whether or not the real difference between these two interest rate approaches was one of stocks versus flows.² In particular, some economists argue that the Hicksian approach or the Fellner and Somers approach to proving the equivalency of these two interest rate approaches treat the money market as if it is a flow market, when in fact Keynes' thought of the money market in stock terms thus rendering the proofs offered by Hicks and Fellner and Somers immaterial.

What Patinkin attempts to demonstrate relative to this controversy is that in a general equilibrium setting, assuming end-of-period analysis, the determination of all the market clearing prices may be analysed in terms of the excess demand equations in the system. This being the case, then whether one conducts their analysis in terms of stocks or flows is irrelevant. Quoting from Patinkin,

²See Fellner and Somers 1949, 1950a and 1950b; Brunner 1950, Klein 1950a and 1950b; and Patinkin 1958.

"We also note that the excess demand for money as a stock has the dimensions of a flow. For it is the difference between the stock of money at two points of time: the end and beginning of the week, respectively. This is as it should be. For this excess demand can then be properly equated--as in equation (5)--to the flows of money payments during the week. Furthermore, it can readily be shown that this relationship holds even after we drop the simplifying assumption that the quantity of money in existence at the end of the week equals that at the beginning, and permit the existence of a monetary authority which can change the stock of money during the course of the week. To summarize, though the flow demand F^d " [where F^d is the demand for money as a flow] "is entirely different from the stock demand M^d " [where M^d is the demand for money as a stock] "and though F^s is different from M^s , the excess demands $F^d - F^s$ and $M^d - M^s$ are identical. Hence any set of prices and interest which equilibrates the money market when viewed as consisting of flows, must also equilibrate it when viewed as stocks, and vice versa. In so far as equilibrium analysis is concerned, no difference can arise from this difference in viewpoints" (Patinkin 1958, pp. 303-304).

c. D. Patinkin on the dynamics of various interest rate adjustment rules As suggested earlier, Patinkin accepts the equivalency between the liquidity-preference and loanable funds approaches to the determination of the interest rate assuming a static general equilibrium setting. Where he begins parting company with the belief in the equivalency of these two approaches is when one has to begin specifying rules of dynamic change. I also believe that one may argue that not only did he reject the equivalency of these two interest rate approaches in a dynamic setting, but that he opted for the loanable funds view as being at least intuitively more realistic.

Let us begin with the first proposition that under a dynamic setting these two interest rate approaches are not necessarily equivalent. Patinkin suggests a comparison between a model in which the first order difference equation of the interest rate is a positive function of excess demand in the money market and the first order difference equation of the price level is a positive function of excess demand in the product market (that is, the liquidity-preference approach), with a model in which the first order difference equation of the interest rate is a positive function of excess bond supply in the loanable funds market and the first order difference equation of the price level is a positive function of excess demand in the product market (that is, the loanable funds view). Patinkin then asserts that clearly the dynamics associated with these two sets of adjustment rules are not equivalent. Thus, in a dynamic setting, the liquidity-preference theory of interest is not substitutable with the loanable funds theory of interest.

Patinkin then tries to demonstrate the fundamental implausibility of the liquidity-preference school by studying the following situation: Assume a circumstance in which "an excess supply of money may be accompanied by such a large excess demand for commodities that individuals will attempt to finance their additional purchases not only by using up all their excess cash, but also by selling part of their bond holdings. In this way, an excess supply of money might be accompanied by an excess supply of

bonds and hence by an increase in the rate of interest" (Patinkin 1958, p. 310). "For it is difficult to understand why an excess supply of money should drive up the price of bonds even when there exists an excess supply of the latter" (Patinkin 1958, pp. 311-312).

d. Some conclusions concerning D. Patinkin's comments

Patinkin makes four contributions to the liquidity-preference loanable funds interest rate controversy. First, he demonstrates that Hicks' classificatory scheme is incorrect in a general equilibrium setting. This is not to say that you cannot use Hicks' method to test for the substitutability between the money and loanable funds markets, but only that you cannot classify interest rate approaches according to which market is left out of your story at least as a general principle of methodology. Secondly, Patinkin demonstrates within an end-of-period model that it makes absolutely no sense to try to differentiate between interest rate approaches from the perspective that one is a stock theory of interest while one is a flow theory of interest. Thirdly, Patinkin proves that in a dynamic setting the loanable funds and liquidity-preference theories of interest are not equivalent. And fourthly, he shows the potential implausibility of the liquidity-preference theory of interest.

5. S. C. Tsiang

a. S. C. Tsiang's proof of the equivalency between the liquidity-preference and loanable funds approaches to the determination of the rate of interest Tsiang, like Hicks, Robertson, Fellner and Somers,

and to some degree Patinkin, accepts the identity between the liquidity and loanable funds approaches to the determination of the interest rate. For Tsiang, this identity requires that we be able to demonstrate

"that the two sets of demand and supply functions, i.e., the demand for and the supply of loanable funds, and the demand for money to hold and the stock of money in existence [determine] the same rate of interest in all circumstances, if both sets of demand and supply functions are formulated correctly in the ex-ante sense" (Tsiang 1956, p. 539).

Tsiang's proof of this proposition is rather interesting in itself. He begins by first expanding Keynes' demand for "finance", which Keynes considers to be his "coping-stone" of the liquidity-preference theory of interest, to cover all active money demand balances. Tsiang states,

"And we must contend that Keynes was confused in adding after his concession as to the demand for 'finance', almost as a second thought, that this demand for 'finance' is quite distinct from the demand for active balances which will arise as a result of the investment activity while it is going on (presumably by which he meant the transaction demand for money proper). These requirements for finance for all planned expenditures actually constitute the whole transaction demand for money for the day" (Tsiang 1956, p. 547).

In Tsiang's world the demand for transactions balances are all in the form of a demand for "finance". This translates into a money demand function of the following form:

$$M_t^d = P_t C_t + P_t I_t + H_t, \quad (\text{II.13})$$

where P_t is the price level, C_t is real planned household expenditures, I_t is real planned investment, and H_t is planned nominal idle balances, so that the demand for money is all in the form of ex-ante uses.

Nominal planned consumption and investment expenditures represent Tsiang's demand for finance, while H_t is planned holdings of hoards. For the money market to be in equilibrium, the following condition must be met:

$$M_t^S = M_t^d. \quad (\text{II.14})$$

Substituting (II.13) into (II.14) we have,

$$M_t^S = P_t C_t + P_t I_t + H_t. \quad (\text{II.15})$$

For Tsiang the liquidity-preference theory of interest may be represented by equation (II.15).

What about the loanable funds theory of interest? Let us begin with the supply of loanable funds. For Tsiang, the supply of loanable funds is equal to the money supply minus nominal household expenditures and minus nominal idle balances. This gives us a relationship of the following form:

$$LF_t^S = M_t^S - P_t C_t - H_t, \quad (\text{II.16})$$

where LF_t^S represents the planned supply of loanable funds.

The demand for loanable fund balances is equal to planned nominal investment expenditures, so that

$$LF_t^d = P_t I_t, \quad (\text{II.17})$$

where LF_t^d is the demand for planned loanable funds.

In final equilibrium we have

$$LF_t^s = LF_t^d. \quad (\text{II.18})$$

Substituting (II.16) and (II.17) into (II.18) yields, after transposing terms,

$$M_t^s = P_t C_t + P_t I_t + H_t. \quad (\text{II.19})$$

The loanable funds theory of interest may be represented by equation (II.19).

By inspection, equations (II.15) and (II.19) are identical. Thus the liquidity-preference and loanable funds theories of interest are identical.

b. Some implications of S. C. Tsiang's proof I believe that Tsiang has raised some interesting points concerning the nature of the money demand function. If the demand for money function is in fact meant to represent a demand for money that society is planning to spend, then why shouldn't it be made equal to planned ex-ante expenditures? It does not seem to make sense to equate the transactions demand for money to nominal income, which doesn't have to equal planned ex-ante expenditures. But then we are left with two puzzling phenomena: one, there appears to be absolutely no difference between the loanable funds market and the money market, which is fine with Tsiang, but I think it would leave most other economists a bit uncomfortable; and, secondly, Walras' law, at least as it is commonly understood in period analysis, has to be rejected.

To better understand this second point, let me explain the sort of time framework that Tsiang is working within. Tsiang first assumes that all economic decisions are being made within a discrete time period framework. Secondly, he assumes that all economic decisions are being made at the beginning of the time period, including the decision concerning how much money to hold for transactions and idle balance purposes. During any time period the plans that are made at the beginning of the period are simply carried out. Now the question we are left with is how to interpret the money balances that are held as of the end of the period? For Tsiang, these end-of-period monetary balances are meaningless. They cannot be considered in Tsiang's world a true demand for money since they are not being held to finance anything, which is Tsiang's criteria for a true transaction balance. What does all of this have to do with Walras' law? Tsiang and I believe most other economists interpret Walras' law at least relative to the money market and, in particular, the money demand component of the money market to mean the difference between cash balances held at the end of the period by the whole community minus what was held by the whole community at the beginning of the period. But for Tsiang, money held at the end of the period is a meaningless entity. For Tsiang, the demand for money is a beginning period phenomenon, and not the difference between the holdings of money at the end of the period minus money holdings at the beginning of the period. Thus, Walras' law as it is commonly understood within

a period framework is rejected. Tsiang substitutes a form of Walras' law which is more commonly found in continuous time models, in particular, where excess demands among bonds and money sum to zero regardless of the condition in the product market.

This version of Walras' law in a discrete time model also solves two of the problems first recognized by Patinkin. First, no longer do we have to face the somewhat uncomfortable thought of the money market implying that the rate of interest will move in one direction while the bond market implies that the rate of interest will be moving in another direction when the model is out of equilibrium. This is due to the fact that under Tsiang's version of Walras' law an excess demand in one of these markets implies an excess supply in the other, thus eliminating any ambiguity in the directional change taken by the rate of interest. And secondly, the dynamic version of our story remains constant whether we theorize using the product market and the money market or the product market and the bond market.

One additional important point has to be made. While Tsiang has demonstrated the equivalency of the liquidity-preference and loanable funds theories of interest, he also argues that the loanable funds sequence of events following some shock to the system is the correct one to follow. Tsiang draws our attention to either equations (II.15) or (II.19) to demonstrate for example that an increase in the propensity to save must first affect the rate of interest before it has any effect on income, which runs counter to the sorts of stories told by Keynesians.

c. Some conclusions concerning Tsiang's comments Tsiang provides us with an interesting bit of analysis. First, he demonstrates not only the equivalency of the loanable funds liquidity-preference theories of interest approach, but also the identity of the loanable funds and money markets. Of course, in order to accomplish this task he must rewrite the generally accepted form of Walras' law in a discrete time period framework. Once all of this is accomplished, Tsiang then demonstrates that the sequencing of economic events associated with any shock to the system follows the loanable funds story. This would also imply that the disequilibrium behavior of a model would not be affected by the fact of including or excluding either the loanable funds or money markets. And finally, because of how Walras' law is specified, there can never exist a situation in which the money market implies a movement in the rate of interest which would be in disagreement with what is occurring in the loanable funds markets. Of course all of these results are dependent on the belief that the money and loanable funds markets are one and the same.

F. Some Overall Conclusions Concerning the Liquidity-Preference Loanable Funds Interest Rate Controversy

Let us begin by first trying to clear the deck of all obvious wreckage produced by the arguments put forth in this chapter. We can begin by rejecting the two primary sources of this interest rate controversy: (1) Keynes' attacks against the classical

paradigm of interest, and (2) Keynes' "special theory" version of the liquidity-preference theory of interest. (Within Chapter II of this dissertation, see Hicks E.1.a., Ohlin E.2.a., E.2.c., and Robertson E.3.a., E.3.a.1), E.3.a.2), E.3.a.3).) This then allows us to reject sections C.1.a., C.1.b., D.1., and D.2.a. of Chapter II dealing with some of the implications of the "special theory" of interest. In addition, we can reject Hicks' approach to proving the identity of these two interest rate theories by demonstrating through Walras' law the substitutability of the money and loanable funds markets.

Now let us turn to the problems that still exist. At this point in my study, even before we deal with the question of whether the liquidity and loanable funds approaches to the determination of the interest rate or, more broadly, the macroeconomy, are substitutable, we have to decide at least crudely on what the money demand function looks like. In particular, we must still solve the problem of whether Keynes or Robertson is correct concerning the specification of the money demand function. If you remember, Keynes wants to add a "finance" component to his transactions and precautionary demands, with Robertson arguing that it is not necessary.

There also exists the problem first introduced during the stock/flow controversy surrounding the question of whether the liquidity-preference and loanable funds theories of interest are in fact substitutable (see footnote 2), and then formalized by Patinkin, dealing with the possibility of the money market implying that the rate of interest will move in one direction, while the

loanable funds market implies that it should move in just the opposite direction. For Patinkin, this is a real possibility that suggests that one should opt for making the first order difference equation of the interest rate a positive function of excess bond supply in the loanable funds market when building macroeconomic models. I will demonstrate later on that, not only is this a distinct possibility, but it constitutes the essence of the approach that makes the time path of the interest rate a positive function of excess demand in the money market as opposed to excess bond supply in the loanable funds market.

And finally, of the scholars that we have studied, we are still left with the arguments put forth by Tsiang. He advocates that the only way that these two interest rate approaches (that is, the money and loanable funds markets) can be made compatible is by rethinking the specification of the money demand function so that it is ultimately identical with the loanable funds market. This will be an interesting case for us to analyse.

Furthermore, at this point I do not think it is far-fetched to still query whether and under what conditions the liquidity-preference and loanable funds approaches are or are not substitutable. To this ultimate end, and for the purpose of answering the questions raised in this conclusion, the following issues will be dealt with in the next chapter:

1. Are the loanable funds and money markets as normally specified (that is, minus Keynes' "finance" component" substitutable

in a static general equilibrium setting assuming an end-of-period model? The settlement of this issue will throw the necessary light on whether the money demand function should or should not carry with it a "finance" component. It will also partially address Tsiang's charge that in order to make these two interest rate approaches truly substitutable, the money market must be respecified.

2. Under dynamic conditions, again assuming an end-of-period framework, are the loanable funds and money markets substitutable? In addition, what are some of the implications, if any, if they are not substitutable? Here, we will be trying to address the points raised by Patinkin and Tsiang's arguments.

3. And finally, we will take up Tsiang's challenge that only a money demand function comprised of ex-ante nominal consumption, investment, and idle balance holdings makes any sense.

And now to the next chapter.

III. THREE SIDE ISSUES IN THE LIQUIDITY-PREFERENCE

LOANABLE FUNDS INTEREST RATE CONTROVERSY

A. Are the Money and Loanable Funds Markets
as Commonly Specified Substitutable Under
Static General Equilibrium Conditions?

Let me begin by assuming an end-of-period macroeconomic model comprised of three markets: a product market, a loanable funds market, and a money market. What I will be trying to accomplish in this section is to address the question of whether the money and loanable funds markets as commonly thought of are substitutable for the purpose of economic analysis within a static general equilibrium framework.

There are at least two ways of proceeding to answer this question. Probably the easiest and most direct method would simply be to substitute any two of our three markets into Walras' law and see what it implies for the shape of the third market. If the implied market agrees with our beliefs concerning its form, then we could say that any two of these may serve as a model for our analysis. The second method of proceeding, which is a bit more time consuming, but I believe alot more interesting, is to compare the multipliers between different groups of two markets. For our problem, the natural comparison would be between the product and money market and the product and loanable funds market. But what would these multipliers tell us about the substitution between the money and loanable funds markets? Well, if the money and loanable

funds markets as specified are in fact compatible, then their respective multipliers must be the same. At this point, I will leave undefined what the expression 'the same' means. Let me go forward with this second procedure.

I'll assume the following two models of the macroeconomy:

Model I

$$Y_t = C_t + I_t + G_t, \quad (\text{III.1})$$

$$M_t^S = kP_t Y_t + IB_t, \quad (\text{III.2})$$

and Model II

$$Y_t = C_t + I_t + G_t, \quad (\text{III.3})$$

$$(M_t^S - IB_t) \frac{1}{k} - P_t C_t - P_t T_t = P_t I_t + P_t G_t - P_t T_t. \quad (\text{III.4})$$

And the following auxiliary relationships:

$$C_t = C_0 + \gamma_0 Y_t - \gamma_0 T_t + \gamma_1 r_t, \quad C_0 > 0, \quad 0 < \gamma_0 < 1, \quad \gamma_1 < 0, \quad (\text{III.5})$$

$$I_t = I_0 + \gamma_2 r_t + \gamma_3 \theta_t, \quad I_0 > 0, \quad \gamma_2 < 0, \quad \gamma_3 > 0, \quad (\text{III.6})$$

$$IB_t = IB_0 + \gamma_4 r_t, \quad IB_0 > 0, \quad \gamma_4 < 0, \quad (\text{III.7})$$

$$T_t = t Y_t, \quad 0 < t < 1, \quad (\text{III.8})$$

$$G_t = \bar{G}_t, \quad (\text{III.9})$$

$$P_t = \bar{P}_t, \quad (\text{III.10})$$

$$M_t^S = \bar{M}_t^S, \quad (\text{III.11})$$

and $\theta_t = \bar{\theta}_t, \quad (\text{III.12})$

where $Y_t \equiv$ real product,
 $P_t \equiv$ price level,
 $C_t \equiv$ real household consumption,
 $I_t \equiv$ real business investment,
 $G_t \equiv$ real government expenditures,
 $\theta_t \equiv$ business expectations,
 $M_t^S \equiv$ nominal money supply,
 $IB_t \equiv$ nominal idle balances,
 $t \equiv$ tax rate,
 $T_t \equiv$ real taxes.

Equations (III.1) and (III.3) are simply the equilibrium condition in the product market. Equation (III.2) is the equilibrium condition in the money market. And equation (III.4) is the equilibrium condition in the loanable funds market. (In support of this specification, see Robertson 1933, Tsiang 1956, and Kohn 1981b.) Where $(M_t^S - IB_t) \frac{1}{k}$ of equation (III.4) represents the effective nominal stock of money during t . When we subtract from $(M_t^S - IB_t) \frac{1}{k}$ nominal household expenditures $(P_t C_t)$ which are presumed to be internally financed by the household sector and nominal taxes $(P_t T_t)$, we're left with the supply of finance that households offer to sell (or loan) to the credit market through bond market purchases. The right side of (III.4) represents the supply of new bonds to the credit market or the demand for finance by the business sector for investment purposes $(P_t I_t)$ and the government sector to pay for its deficit $(P_t G_t - P_t T_t)$.

At this point one has to be a bit careful. A loanable funds market may be thought of as a bond market. But not all bond markets are loanable funds markets. For example, both Patinkin (1965) and Crouch (1972) think of bond demand as being positively related to real output. But from a loanable funds perspective, bond demand is negatively related to real output.

Let us begin by looking at the business expectations expenditure multiplier in Model I. After substituting (III.5) through (III.12) into (III.1) and (III.2) we are left with

$$Y_t = C_0 + \gamma_0 Y_t - \gamma_0 t Y_t + \gamma_1 r_t + I_0 + \gamma_2 r_t + \gamma_3 \bar{\theta}_t + \bar{G}_t, \quad (\text{III.13})$$

and
$$\bar{M}_t^S = k\bar{P}_t Y_t + IB_0 + \gamma_4 r_t. \quad (\text{III.14})$$

Differentiating (III.13) and (III.14) with respect to Y_t , r_t , and $\bar{\theta}_t$ yields:

$$dY_t = \gamma_0 dY_t - \gamma_0 t dY_t + \gamma_1 dr_t + \gamma_2 dr_t + \gamma_3 d\bar{\theta}_t \quad (\text{III.15})$$

and
$$0 = k\bar{P}_t dY_t + \gamma_4 dr_t. \quad (\text{III.16})$$

Rearranging the terms in (III.15) and (III.16) gives us

$$(1 - \gamma_0 + \gamma_0 t) dY_t + (-\gamma_1 - \gamma_2) dr_t = \gamma_3 d\bar{\theta}_t, \quad (\text{III.17})$$

and
$$(-k\bar{P}_t) dY_t + (-\gamma_4) dr_t = 0. \quad (\text{III.18})$$

From (III.17) and (III.18) the implied business expectations expenditure multiplier is

$$\frac{dY_t}{d\bar{\theta}_t} = \frac{\gamma_3}{(1-\gamma_0+\gamma_0 t + \frac{k\bar{P}_t}{\gamma_4}(\gamma_1+\gamma_2))} > 0. \quad (\text{III.19})$$

Before trying to dissect this multiplier, it is worth remembering what type of information we can extract from its form.

Instead of working with my own language, let me quote from

L. H. Meyer's textbook, Macroeconomics: A Model Building Approach:

"[Multipliers indicate] the role of each parameter in conditioning the response of output to a given disturbance. The response of output to any policy action or nonpolicy disturbance reflects the interaction of direct impacts and the basic model multiplier, and the basic multiplier, in turn, reflects the interaction of positive and negative feedback responses. The direct impact refers to the initial effect of the exogenous change on aggregate demand and hence on output and income. The basic multiplier summarizes the income-induced responses which then augment or dampen (i.e., multiply) the initial effect on income" (Meyer 1980, p. 174).

Before applying this approach to understanding (III.19) let me simply substitute $-\frac{dr_t}{dY_t}$ for $\frac{k\bar{P}_t}{\gamma_4}$ in (III.19), where $-\frac{dr_t}{dY_t}$ equals $\frac{k\bar{P}_t}{\gamma_4}$ and is simply an internal balance condition in the money market.

Rewriting (III.19) to take account of $-\frac{dr_t}{dY_t}$ gives us

$$\frac{dY_t}{d\bar{\theta}_t} = \frac{\gamma_3}{(1-\gamma_0+\gamma_0 t) - \frac{dr_t}{dY_t}(\gamma_1+\gamma_2)} > 0 \quad (\text{III.20})$$

The γ_3 in the numerator is the direct impact on Y_t due to a change in $\bar{\theta}_t$, $(1-\gamma_0-\gamma_0 t)$ is the positive feedback effect due to the simple product market multiplier, and $-\frac{dr_t}{dY_t}(\gamma_1+\gamma_2)$ is the

negative feedback effect generated by the financial market (i.e., the money market).

Now let us calculate the same multiplier for Model II. After substituting (III.5) through (III.12) into (III.3) and (III.4) we have

$$Y_t = C_0 + \gamma_0 Y_t - \gamma_0 t Y_t + \gamma_1 r_t + I_0 + \gamma_2 r_t + \gamma_3 \bar{\theta}_t + \bar{G}_t, \quad (\text{III.21})$$

and $(\bar{M}_t^S - IB_0 - \gamma_4 r_t) \frac{1}{k} - \bar{P}_t (C_0 + \gamma_0 Y_t - \gamma_0 t Y_t + \gamma_1 r_t)$

$$- \bar{P}_t t Y_t = \bar{P}_t (I_0 + \gamma_2 r_t + \gamma_3 \bar{\theta}_t) + \bar{P}_t \bar{G}_t - \bar{P}_t t Y_t. \quad (\text{III.22})$$

Differentiating (III.21) and (III.22) with respect to Y_t , r_t , $\bar{\theta}_t$, and cancelling $\bar{P}_t t Y_t$ from both sides of (III.22) yields:

$$dY_t = \gamma_0 dY_t - \gamma_0 t dY_t + \gamma_1 dr_t + \gamma_2 dr_t + \gamma_3 d\bar{\theta}_t, \quad (\text{III.23})$$

and $-\frac{\gamma_4}{k} dr - \bar{P}_t \gamma_0 dY_t + \bar{P}_t \gamma_0 t dY_t - \bar{P}_t \gamma_1 dr_t$

$$= \bar{P}_t \gamma_2 dr_t + \bar{P}_t \gamma_3 d\bar{\theta}_t. \quad (\text{III.24})$$

After rearranging (III.24) we have

$$\begin{aligned} (-\bar{P}_t \gamma_0 + \bar{P}_t \gamma_0 t) dY_t + \left(-\frac{\gamma_4}{k} - \bar{P}_t \gamma_1 - \bar{P}_t \gamma_2\right) dr_t \\ = \bar{P}_t \gamma_3 d\bar{\theta}_t. \end{aligned} \quad (\text{III.25})$$

Redefining and signing the following terms gives us

$$H_1 = -\bar{P}_t \gamma_0 + \bar{P}_t \gamma_0 t < 0, \quad (\text{III.26})$$

and $H_2 = -\frac{\gamma_4}{k} - \bar{P}_t \gamma_1 - \bar{P}_t \gamma_2 > 0.$ (III.27)

Substituting (III.26) and (III.27) into (III.25) implies

$$H_1 dY_t + H_2 dr_t = \bar{P}_t \gamma_3 d\bar{\theta}_t. \quad (\text{III.28})$$

Now we are ready to calculate the business expectations expenditure multiplier in Model II. Combining (III.17) and (III.28) gives us

$$(1-\gamma_0+\gamma_0 t) dY_t + (-\gamma_1-\gamma_2) dr_t = \gamma_3 d\bar{\theta}_t, \quad (\text{III.29})$$

and
$$H_1 dY_t + H_2 dr_t = \bar{P}_t \gamma_3 d\bar{\theta}_t. \quad (\text{III.30})$$

And the business expectations expenditure multiplier from (III.29) and (III.30) yields

$$\frac{dY_t}{d\bar{\theta}_t} = \frac{\begin{matrix} (-) \\ \gamma_3 + \frac{\bar{P}_t \gamma_3}{H_2} (\gamma_1 + \gamma_2) \end{matrix}}{\begin{matrix} (+) \\ (1-\gamma_0 + \gamma_1 t) + \frac{H_1}{H_2} (\gamma_1 + \gamma_2) \end{matrix}} \begin{matrix} > \\ < \end{matrix} 0. \quad (\text{III.31})$$

Before comparing (III.31) with (III.20) let us remind ourselves what we are trying to accomplish. We want to see if the money and loanable funds markets as commonly specified are substitutable under static general equilibrium conditions. This is a question of curiosity in itself, but more importantly, it will tell us if Keynes was correct in introducing a loanable funds component into his money demand function, and if Tsiang is correct in rejecting the idea of equation (III.2) being substitutable with equation (III.4) at least under static general equilibrium conditions.

Our first surprise in viewing (III.31) is our inability to establish a sign on it. The numerator has both a positive (γ_3) and a negative term $\left[\frac{\bar{P}_t \gamma_3}{H_2} (\gamma_1 + \gamma_2) \right]$, while the denominator is positive. This ambiguity in the sign of (III.31) is a direct result of the loanable funds effect $\left[\frac{\bar{P}_t \gamma_3}{H_2} (\gamma_1 + \gamma_2) \right]$. Thus we see that (III.31) exhibits an additional direct impact effect (that is, the loanable funds effect) relative to (III.20) which influences real output in a negative manner. This loanable funds effect is exactly what Keynes had in mind when he introduced his "finance" component into his money demand function to complement his transactions ($k\bar{P}_t Y_t$) and idle balance (IB_t) components. Thus Keynes appears to be correct in that specifying the money demand function as $M_t^d = k\bar{P}_t Y_t + IB_t$ leaves out that demand for money which constitutes the financial provision of an investment which is included though in the loanable funds market. Tsiang also appears to be right on the mark in rejecting the compatibility of equation (III.2) with equation (III.4). This is, to say the least, quite a surprising result. Remember, though, this result does not say that the money and loanable funds markets are not compatible, but just that how they are commonly specified by liquidity-preference and loanable funds scholars makes them nonsubstitutable. But is this result really correct?

Let us perform another check on the substitutability on these two markets as specified before giving the green light to this result. As mentioned earlier, we should be able to plug into Walras'

law any two markets in a three market economy and generate the third market in its commonly agreed upon form.

Performing this task for the product and loanable funds markets as specified in this chapter implies:

$$\begin{aligned} & (P_t Y_t - P_t C_t - P_t I_t - P_t G_t) + (P_t I_t + P_t G_t - \frac{\bar{M}_t^S}{k} \\ & + \frac{IB_t}{k} + P_t C_t) + (M_t^S - M_t^d) \frac{1}{k} = 0. \end{aligned} \quad (\text{III.32})$$

After cancelling like terms and transposing them we have

$$(M_t^S - M_t^d) = (M_t^S - kP_t Y_t - IB_t). \quad (\text{III.33})$$

(III.33) tells us that equations (III.1), (III.2) and (III.4) are compatible. In particular, it tells us that in static terms the money market and loanable funds markets as stated are in fact substitutable. What is going on here?

Let us return to equation (III.31) and substitute (III.26) and (III.27) for H_1 and H_2 . This yields

$$\frac{dY}{d\bar{\theta}_t} = \frac{\gamma_3}{(1-\gamma_0 + \gamma_{0t}) + \frac{k\bar{P}_t}{\gamma_4}(\gamma_1 + \gamma_2)} > 0, \quad (\text{III.34})$$

which is the same as the multiplier in Model I. Thus in fact the money and loanable funds markets are compatible as traditionally specified.

What conclusions might we reach from this? First, Keynes is wrong in believing that his "General Theory" specification of the money market needs a loanable or financial funds component to counter B. Ohlin's remarks. In a static general equilibrium setting, the "General Theory" format of the money market already embodies a loanable funds effect at least in terms of ultimate impacts on endogenous variables. Robertson's rejection of Keynes' "finance" component must be judged correct.

There is also another issue that is swimming around here. One of Robertson's complaints against the money market as a device for economic analysis is that it is too compact or dense with information, so that it might mislead those who are using it. This appears to be a legitimate indictment if the originator of the market in its modern form was himself misled.

And finally we can say to Tsiang, that at least in a static setting, these two markets (that is, the money and loanable funds markets) as commonly specified are in fact compatible.

B. Are the Money and Loanable Funds Markets as
Commonly Specified Substitutable
Under Dynamic Conditions?

We earlier stated that one problem that Patinkin found with the money market, and in particular with making the first order difference equation of the rate of interest a function of excess demand in the money market, was the possibility of a situation arising in which there might be an excess supply of money along with an excess

supply of bonds coupled with an excess demand in the product market. In this case, the money market would imply a fall in the rate of interest. Patinkin then wonders if it ever makes sense to have the rate of interest falling while there exists an excess supply of bonds - which would indicate a rise in the rate of interest.

What I will demonstrate in this section is that these sorts of cases are not peculiarities of a dynamic model in which the first order difference equation of real output is made a function of excess demand in the product market and the first order difference equation of the interest rate is made a function of excess demand in the money market, but instead represent the very essence of this case.

Also in this section we will still be on the trail of Tsiang's rejection of the compatibility between the money and loanable funds markets as usually specified. We will want to check if these two markets are in fact substitutable in a dynamic environment.

Let us begin with the straightforward question dealing with the substitutability between the money and loanable funds markets in a dynamic setting. What we will want to do is compare the following two dynamic models:

Model III

$$(Y_{t+1} - Y_t) = K_1 (Y_t - C_t - I_t - G_t), \quad K_1 < 0, \quad (\text{III.35})$$

$$(r_{t+1} - r_t) = K_2 (M_t^S - kP_t Y_t - IB_t), \quad K_2 < 0, \quad (\text{III.36})$$

and Model IV

$$(Y_{t+1} - Y_t) = K_1(Y_t - C_t - I_t - G_t), K_1 < 0, \quad (\text{III.37})$$

$$(r_{t+1} - r_t) = K_3 \left[P_t I_t + P_t G_t - \frac{M_t^S}{k} + \frac{IB_t}{k} + P_t C_t \right], K_3 > 0. \quad (\text{III.38})$$

Are these two models identical? Or in other words, are the money and loanable funds markets substitutable in a dynamic setting? Let us begin by looking at how a change in the level of government expenditures might impact on Y_t and r_t in the early stages of the evolution of both of these variables within these two dynamic frameworks.

Beginning with Model III, how would an increase in the level of government expenditures affect Y_t and r_t ? To begin with, an increase in G_t will impact directly on the product market causing an excess demand to exist. We know by Walras' law there has to exist an excess supply somewhere else. Since government expenditures are not a direct argument in the money market it cannot affect an excess supply here, and rightfully so, for this would imply a fall in the rate of interest associated with a rise in government spending, which is a situation that is not very convincing. So where is our excess supply? It has to be in the loanable funds market. Keep in mind that in Model III, the loanable funds market is still in existence, but represents a background player.

This gives us an initial situation of excess demand in the product market and excess supply in the loanable funds market. The

excess supply in the loanable funds market cannot generate any interest rate changes based on Model III. Thus, the first thing that must occur is an expansion in real output. This would then lead to a situation of excess demand in the money market which would then begin putting upward pressure on the rate of interest.

What early sequence of events might we expect to see in Model IV following an increase in governmental expenditures? To begin with, the rise in government expenditures will impact directly in both the product and loanable funds markets, creating an excess demand in the product market and an excess supply in the loanable funds market. But more importantly, in this case the interest rate will rise along with the increase in real output. This differs substantially from the sequence generated in Model III.

Thus we can conclude that these two dynamic models are not substitutable, and that the money and loanable funds markets as specified are not compatible under dynamic circumstances. Tsiang appears to be correct in insisting that the money market should be rewritten in order to guarantee its compatibility with the loanable funds market, at least from a dynamic perspective. But is he?

Let us go back to Walras' law again and substitute (III.37) and (III.38) into it. This would imply

$$(M_t^s - M_t^d) \frac{1}{k} + \frac{r_{t+1} - r_t}{K_3} + \frac{Y_{t+1} - Y_t}{K_1} = 0. \quad (\text{III.39})$$

Rewriting (III.39) so that

$$r_{t+1} - r_t = - (M_t^s - M_t^d) \frac{K_3}{k} - \left(\frac{Y_{t+1} - Y_t}{K_1} \right) K_3. \quad (\text{III.40})$$

Combining (III.40) with (III.37) and making the necessary substitutions will yield the same dynamic sequence by Walras' law that (III.37) and (III.38) implies (see Patinkin 1958). Let us test this statement. Again assume an increase in governmental expenditures. Equation (III.37) implies an excess demand in the product market. Furthermore, since K_1 is negative and K_3 is positive, and $(M_t^s - M_t^d)$ equals zero if we assume we are starting from an overall point of equilibrium, then $(r_{t+1} - r_t)$ will be positive simultaneously with the expansion in real output. Thus we see that the money and loanable funds markets as commonly specified are substitutable in a dynamic setting if the appropriate adjustment mechanisms are specified. So again we may reject Tsiang's arguments dealing with the non-compatibility between the money and loanable funds markets as typically expressed.

Let us now turn to Patinkin's case of the possibility of the loanable funds market implying that the rate of interest should move in one direction while the money market tells us that in fact it will move in just the opposite direction. When you specify the first order difference equation of the interest rate in a manner like

equation (III.36), this case is not just a peculiar possibility, but represents the very essence of Model III. The loanable funds market can be out of equilibrium every which way, but the interest rate will not change if the money market is clearing.

The preceding analysis also allows us now to clarify some of the issues that were raised in the introduction to this dissertation. If you remember I compared a model comprised of a product market and a money market with one consisting of a product market and a loanable funds market. At that point I described some shocks to both of these models and queried in what sense could the money and loanable funds markets be considered substitutable if they generate different sequences of events. We see now that the differences in the stories told between these two models really had nothing to do with which markets we included or excluded, but only with the dynamic structures assumed. In particular, in the model consisting of the product market and the money market, I assumed a dynamic structure like Model III. And in the model composed of the product market and the loanable funds market I assumed a dynamic structure in which the first order difference equation of output is a positive function of excess supply in the money market and the first order difference equation of the interest rate is a positive function of excess supply in the loanable funds market.

In addition, again in the introduction to this dissertation, I wondered about the impression that many ISLM model builders give in terms of associating the change in rate of interest with both the

money and loanable funds markets, and how this procedure might generate ambiguous results. We now see that this can be done if one is careful in specifying their dynamic interest rate equation. In particular, equations (III.38) and (III.40) are perfectly compatible.

C. Is It Possible to Make Sense of a Money
Demand Function as Expressed in Its
"General Theory" Form?

I think Tsiang would give us a resounding no to the title of this section. He would argue that not only are the money and loanable funds markets not substitutable under all conditions (in particular, when we look at the dynamic sequencing of economic events), but that the money demand function when specified as depending on nominal income and the rate of interest makes almost no sense. Since we have proven that the money and loanable funds markets are in fact substitutable under all conditions, we can concentrate on this second issue which has been raised.

Let us rehash briefly Tsiang's argument. The demand for money is a demand primarily to hold cash balances which society is planning to spend. These planned expenditures are comprised of nominal household, business, and government spending (that is, $P_t C_t + P_t I_t + P_t G_t$). Now comes the subtle point. Ex-ante, planned social spending does not have to equal nominal income. Rewriting the money demand function to reflect all of this gives us

$$M_t^d = P_t C_t + P_t I_t + P_t G_t + IB_t. \quad (\text{III.41})$$

Is Tsiang correct? His argument appears sound. But is it? We should also be keeping in mind that if we accept Tsiang's analysis, we are reduced to viewing the money and loanable funds markets as basically one and the same.

Since Tsiang claims to be operating within a Robertsonian framework, let us see if we can make sense of the money demand function as normally specified within this same framework.

Assume the following Robertsonian model:

$$\bar{Y}_{t-1} = C_t + I_t + \bar{G}_t, \quad (\text{III.42})$$

$$\bar{W}/P_t = f_N, \quad (\text{III.43})$$

$$\bar{M}_t^S = P_t \bar{Y}_{t-1} + IB_t, \quad (\text{III.44})$$

and $Y_t = f(N_t). \quad (\text{III.45})$

Equation (III.42) is the condition for equilibrium in the product market, where the supply of available commodities (\bar{Y}_{t-1}) within a Robertsonian framework represents an inheritance from the preceding period. Equation (III.43) represents equilibrium in the labor market, while equation (III.44) represents equilibrium in the money market, and finally, (III.45) is the economy's aggregate production function. Now the real issue is whether the term $P_t \bar{Y}_{t-1}$ in (III.44) has some meaningful content. First note that there is no velocity symbol associated with $P_t \bar{Y}_{t-1}$. This is because in a Robertsonian framework the period under study has a velocity of money other than idle balances equal to one. This really poses no problem for us. One

could just as easily extend the story to include a velocity term greater than one. But again, what does $P_t \bar{Y}_{t-1}$ represent? According to Tsiang, it cannot really mean anything. But I don't think this is really correct. In this framework, the product available for sale during the period under inspection was produced in the preceding period. The product being produced during this period will be available next period. Business firms, though, must make resource payments on the product being produced today. The money they use to make these payouts from is $P_t \bar{Y}_{t-1}$. That is, $P_t \bar{Y}_{t-1}$ can be considered an end-of-period demand for money by business firms for the purpose of paying their wage and profit bills. Of course, someone might note that $P_t \bar{Y}_{t-1}$ is not exactly the term used in most money demand functions. This can be corrected by rewriting (III.42) through (III.45) as

$$Y_t = C_t + I_t + \bar{G}_t, \quad (\text{III.46})$$

$$\bar{W}/P_t = f_N, \quad (\text{III.47})$$

$$\bar{M}_t^S = P_t Y_t + IB_t, \quad (\text{III.48})$$

and $Y = F(N). \quad (\text{III.49})$

Where (III.46) through (III.49) represents a longer run version of (III.42) through (III.45). In particular, it represents the medium run of the Robertsonian framework. And again, $P_t Y_t$ represents the demand for money balances by business firms to pay off its resource commitments.

D. Some Overall Conclusions
Concerning Chapter III

First, the money and loanable funds markets as traditionally specified are substitutable in both a static and dynamic framework. Secondly, making the first order difference equation of the interest rate a function of solely excess demand in the money market leads to a different implied sequencing of events than if the first order difference equation of the interest rate is made a function of solely excess bond supply in the loanable funds market. But this has nothing to do with which markets are included or excluded explicitly in our models. And finally, Tsiang is wrong in arguing that the money demand function when expressed as depending on nominal income makes little sense, if the nominal income component of the money demand function is interpreted as a business demand for money in order to pay its resource bills for the period under discussion.

IV. ARE THE LIQUIDITY-PREFERENCE AND LOANABLE
FUNDS THEORIES OF INTEREST DIFFERENT?

Our answer to this question depends on how we perceive, or, more appropriately, what we perceive these two theories to mean. If, like so many of the participants to the liquidity-preference loanable funds interest rate controversy, we think of these two interest rate approaches as being tied into which market is included or excluded from our analysis, then these two competing interest rate theories are one and the same.

But if we consider the implied sequencing of economic events associated with these two interest rate approaches following some exogenous change in the economy, then I think obviously the liquidity-preference and loanable funds theories are not substitutable. Traditionally, it has been common to associate with the liquidity-preference theory of interest a dynamic structure that makes the time path of the interest rate solely a function of excess demand in the money market, and to relate the loanable funds theory of interest to a dynamic setting which makes the time path of the interest rate solely a function of excess bond supply in the loanable funds market. Certainly, when we then combine both of these dynamic equations with the appropriate dynamic equation in the product market we end up with two distinct models as explained earlier. But I do not believe that this really represents the difference between these two interest rate approaches.

If we take D. H. Robertson as our representative of the loanable funds school, let me quote from him concerning his perceived sequence of events following a change in the marginal propensity to consume assuming that the idle balance function depends solely on the interest rate,

"If there exists for the community as a whole a negatively inclined curve of 'liquidity-preference proper' (LL., Fig. II), 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, desires to hold an increased quantity of money. Thus the fall in the rate of interest and the stimulus to the formation of capital will be less than if LL were a vertical straight line, and the stream of money income will tend to contract" (Robertson 1936, pp. 188-189).

The dynamic model behind this quote is one in which the rise in the rate of interest is a negative function of excess demand in the bond market and the rise in output is a negative function of excess demand in the money market, so that a decrease in the marginal propensity to consume leads to an excess supply in the product market and an excess demand in the bond market. The excess demand in the bond market causes the interest rate to fall. At this point, output has not been affected. The decline in the interest rate by decreasing the opportunity costs of holding money leads to an excess demand in the money market. The excess demand in the money coupled with the excess supply in the product market then causes output to decline. This is my interpretation of the loanable funds sequence. All changes (except in the money supply) in the economy affect output by

first affecting the rate of interest.

In conclusion, we can say that the liquidity-preference theory of interest from a dynamic perspective associates the time path of real output with excess demand in the product market and the time path of the interest rate with excess demand in the money market, while the loanable funds approach makes the time path of real output a function of excess demand in the money market and the time path of the interest rate a function of excess bond supply in the loanable funds market. These dynamic models imply important differences concerning not only the sequencing of events in the economy, but the role of the interest rate in transmitting shocks to the real economy.

The question I would like to now ask is whether we can imagine a meaningful difference between these two interest rate approaches that might manifest itself in a static environment? I believe the answer to this question is yes. For example, from a loanable funds slant the idle balance component of the loanable funds market [see equation (III.4)] does not necessarily have to be solely a function of the interest rate (see Kohn 1981b). This change in the specification of the idle balance function can lead to some interesting results. To see this, let us compare the following two models after a change in the marginal propensity to consume takes place, where Model V we'll associate with the liquidity-preference theory of interest and Model VI will represent the loanable funds approach. Stating these two models we have

Model V

$$Y_t = C_y + I_y + G_t, \quad (\text{IV.1})$$

$$\bar{M}_t^S = kP_t Y_t + IB_t, \quad (\text{IV.2})$$

and Model VI

$$Y_t = C_y + I_t + G_y, \quad (\text{IV.3})$$

$$\bar{M}_t^S = kP_t Y_t + IB_t'. \quad (\text{IV.4})$$

Now we see that the only difference between these two models will be how the idle balance term is specified. Let me first rewrite Model V assuming that it's equivalent to equations (III.13) and (III.14). After making all the appropriate substitutions we have

$$\begin{aligned} Y_t = C_0 + \gamma_0 Y_t - \gamma_0^f Y_t + \gamma_1 r_t + I_0 + \gamma_2 r_t \\ + \gamma_3 \bar{\theta}_t + \bar{G}_t, \end{aligned} \quad (\text{IV.5})$$

$$\text{and } \bar{M}_t^S = k\bar{P}_t Y_t + IB_0 + \gamma_4 r_t. \quad (\text{IV.6})$$

Let us now differentiate (IV.5) and (IV.6) with respect to Y_t , r_t , and γ_0 . This implies

$$\begin{aligned} dY_t = d\gamma_0 Y_t + \gamma_0 dY_t - d\gamma_0^f Y_t \\ - \gamma_0^f dY_t + \gamma_1 dr_t + \gamma_2 dr_t, \end{aligned} \quad (\text{IV.7})$$

$$\text{and } 0 = k\bar{P}_t dY_t + \gamma_r dr_t. \quad (\text{IV.8})$$

Rearranging terms in (IV.7) and (IV.8) gives us

$$(1-\gamma_0 + \gamma_0 t)dY_t + (-\gamma_1 - \gamma_2)dr_t + Y_t d\gamma_0, \quad (\text{IV.9})$$

and $(-k\bar{P}_t)dY_t + (-\gamma_4)dr_t = 0. \quad (\text{IV.10})$

From (IV.9) and (IV.10), the marginal propensity to consume output multiplier is

$$\frac{dY_t}{d\gamma_0} = \frac{Y_t}{(1-\gamma_0 + \gamma_0 t) + \frac{k\bar{P}_t}{\gamma}(\gamma_1 + \gamma_2)} > 0. \quad (\text{IV.11})$$

This result, that an increase in the rate of savings (or a decrease in the marginal propensity to consume) in the face of unemployment leads to an economic contraction, is so well grounded in the economics literature that it is hard to imagine a situation where it would not hold true. The sign on (IV.11) is also closely linked with Keynes' General Theory and the liquidity-preference theory of interest.

Now let us turn to the loanable funds model. As I stated earlier, from a loanable funds perspective there really is no reason for making the idle balance component of the money demand function depend solely on the rate of interest. In Model V, the idle balance component is usually thought of as a speculative component of money demand, and thus its association with the liquidity approach to the determination of the interest rate. Let me rewrite the idle balance function from a possible loanable funds view:

$$IB_t = IB_0 + \gamma_4 r_t + \gamma_5 \bar{P}_t C_t, IB_0 > 0, \gamma_4 < 0, \gamma_5 > 0. \quad (IV.12)$$

In this case, the idle balance function is also positively related to nominal consumption. We can think of this as a "rainy day" reserve.

After substituting (III.5) into (IV.12), and (IV.12) into (IV.4), and rewriting (IV.5) we have

$$Y_t = C_0 + \gamma_0 Y_t - \gamma_0^t Y_t + \gamma_1 r_t + \gamma_2 r_t + \gamma_3 \bar{\theta}_t + \bar{G}_t, \quad (IV.13)$$

$$\begin{aligned} \text{and } \bar{M}_t^S &= k \bar{P}_t Y_t + IB_0 + \gamma_4 r_t + \gamma_5 \bar{P}_t C_0 \\ &+ \gamma_5 \bar{P}_t \gamma_0 Y_t - \gamma_5 \bar{P}_t \gamma_0^t Y_t + \gamma_5 \bar{P}_t r_t. \end{aligned} \quad (IV.14)$$

Differentiating (IV.13) and (IV.14) with respect to Y_t , r_t , and γ_0 yields

$$\begin{aligned} dY_t &= d\gamma_0 Y_t + \gamma_0 dY_t - d\gamma_0^t Y_t \\ &- \gamma_0^t dY_t + \gamma_1 dr_t + \gamma_2 dr_t, \end{aligned} \quad (IV.15)$$

$$\begin{aligned} \text{and } 0 &= k \bar{P}_t dY_t + \gamma_4 dr_t + \gamma_5 \bar{P}_t d\gamma_0 Y_t \\ &+ \gamma_5 \bar{P}_t \gamma_0 dY_t - \gamma_5 \bar{P}_t d\gamma_0^t Y_t - \\ &\gamma_5 \bar{P}_t \gamma_0^t dY_t + \gamma_5 \bar{P}_t dr_t. \end{aligned} \quad (IV.16)$$

Rearranging terms, we get

$$(1 - \gamma_0 + \gamma_0^t) dY_t + (-\gamma_1 - \gamma_2) dr_t = Y_t d\gamma_0, \quad (IV.17)$$

$$\begin{aligned}
\text{and} \quad & (-k\bar{P}_t - \gamma_5\bar{P}_t\gamma_0 + \gamma_5\bar{P}_t\gamma_0 t) dY_t + (-\gamma_4 - \gamma_5\bar{P}_t) dr_t \\
& = (\gamma_5\bar{P}_t Y_t - \gamma_5\bar{P}_t t Y_t) d\gamma_0. \quad (\text{IV.18})
\end{aligned}$$

From (IV.17) and (IV.18) the implied marginal propensity to consume output multiplier is

$$\begin{aligned}
& (+) \quad ? \quad (-) \\
& Y_t(-\gamma_4 - \gamma_5\bar{P}_t) + \gamma_1\gamma_5\bar{P}_t Y_t(1-t) + \\
\frac{dY_t}{d\gamma_0} = & \frac{\gamma_2\gamma_5\bar{P}_t Y_t(1-t)}{(-\gamma_4 + \gamma_0\gamma_4(1-t) - \gamma_5\bar{P}_t + \gamma_0\gamma_5\bar{P}_t(1-t))} \begin{matrix} (-) \\ (+) \end{matrix} \begin{matrix} (-) \\ (-) \end{matrix} \begin{matrix} (-) \\ (+) \end{matrix} \begin{matrix} (-) \\ (+) \end{matrix} > < 0. \quad (\text{IV.19}) \\
& -\gamma_4 + \gamma_0\gamma_4(1-t) - \gamma_5\bar{P}_t + \gamma_0\gamma_5\bar{P}_t(1-t) \\
& \quad (+) \quad (+) \quad (+) \\
& -k\bar{P}_t(\gamma_1 + \gamma_2) - \gamma_0\gamma_1\gamma_5\bar{P}_t(1-t) - \gamma_0\gamma_2\gamma_5\bar{P}_t(1-t)
\end{aligned}$$

This is not an illusionary result like (III.31). Even after performing stability analysis on Model VI, the best one can do is say that in order for Model VI to be stable, the denominator in (IV.19) must be positive and so must $(-\gamma_4 - \gamma_5\bar{P}_t)$. This still leaves us with an ambiguous sign. So from a loanable funds specification of the idle balance function, an increase in the rate of savings even in the face of unemployment might prove expansionary.

I believe that this represents a powerful and important difference between the liquidity-preference and loanable funds views. Let me quote Keynes on this matter,

"The reader will readily appreciate that the problem here under discussion is a matter of the most fundamental theoretical significance and of overwhelming practical importance.

[Keynes' is referring to his attack on classical interest rate theory.] For the economic principle, on which the practical advice of economists has been almost invariably based, has assumed in effect, that cet. par., a decrease in spending will tend to lower the rate of interest and an increase in investment to raise it.... A decreased readiness to spend will be looked on in quite a different light if, instead of being regarded as a factor which will, cet. par., increase investment, it is seen as a factor which will, cet. par., diminish employment" (see Keynes 1964, pp. 184-185).

Let us inspect one more additional multiplier that might prove interesting within the loanable funds framework. It is a well established result of Model V that an increase in the tax rate level will prove contractionary. Let us see how this result might differ within Model VI.

First differentiate (IV.13) and (IV.14) with respect to Y_t , r_t , and t . This implies

$$dY_t = \gamma_0 dY_t - \gamma_0 dtY_t - \gamma_0 t dY_t + \gamma_1 dr_t + \gamma_2 dr_y, \quad (IV.20)$$

and $0 = k\bar{P}_t dY_t + \gamma_4 dr_t + \gamma_5 \bar{P}_t \gamma_0 dY_t$

$$- \gamma_5 \bar{P}_t \gamma_0 dtY_t - \gamma_5 \bar{P}_t \gamma_0 t dY_t +$$

$$\gamma_5 \bar{P}_t dr_t. \quad (IV.21)$$

Rearranging terms in (IV.20) and (IV.21), we get

$$(1 - \gamma_0 + \gamma_{0t}) dY_t + (-\gamma_1 - \gamma_2) dr_t = -\gamma_0 Y_t d_t, \quad (IV.22)$$

$$\begin{aligned} \text{and} \quad & (-k\bar{p}_t - \gamma_5^p \bar{p}_t \gamma_0 + \gamma_5 \bar{p}_t \gamma_0 y) dY_t + (-\gamma_4 - \gamma_5 \bar{p}_t) dr_y = \\ & = \gamma_5 \bar{p}_t \gamma_0 Y_t dt. \end{aligned} \quad (\text{IV.23})$$

The tax rate output multiplier from (IV.22) and (IV.23) implies

$$\begin{aligned} \frac{dY_t}{dt} = & \frac{\begin{matrix} (+) & & (+) & & & & & & (-) \\ \gamma_0 Y_t \bar{p}_t & (\gamma_5 - \gamma_1 \gamma_5 - \gamma_2 \gamma_5) & + & \gamma_0 \gamma_4 Y_t & & & & & \end{matrix}}{\begin{matrix} (-) & & (-) & & & & & & (+) \end{matrix}} > < 0. \\ & -\gamma_4 + \gamma_0 \gamma_4 (1-t) + \gamma_0 \gamma_5 \bar{p}_t (1-t) - \\ & \quad \quad \quad (+) \quad \quad \quad (+) \\ & -\gamma_1 \gamma_5 \bar{p}_t \gamma_0 (1-t) - \gamma_2 \gamma_5 \bar{p}_t \gamma_0 (1-t) \\ & \quad \quad \quad (+) \quad \quad \quad (-) \\ & - k\bar{p}_t (\gamma_1 + \gamma_2) - \gamma_5 \bar{p}_t \end{aligned} \quad (\text{IV.24})$$

Again the sign on (IV.24) is ambiguous.

In conclusion to the arguments put forth so far, we can say that there exist at least two major differentiating factors between the liquidity-preference and loanable funds schools. First, in a dynamic setting, as one might expect from the loanable funds approach, the loanable funds market and the interest rate are placed squarely in the center of all analysis. Almost every nonmonetary event affects the real economy by first changing the level of the rate of interest. This is in contradistinction with the liquidity-preference view, which I would argue makes the product market the key player in its story. Let me cite an example to demonstrate this difference. Assume that for whatever reasons, the marginal efficiency of capital rises.

From a liquidity-preference view, this change would first impact directly on the product market, causing real output to increase. The rise in real output then operating through the money market would cause the rate of interest to rise. How might these events be modified in a loanable funds setting? First, the rise in the marginal efficiency of capital operating through the loanable funds market would first cause the interest rate to increase. It is then this rise in the interest rate which proves to be the vehicle of economic expansion by increasing the opportunity costs of holding money. From a loanable funds perspective, the increase in real output following the rise in the efficiency of capital is due to the increase in the interest rate, at least in the short run. Secondly, we noted that even in a static environment one could visualize a meaningful difference between these two interest rate approaches. From a loanable funds view, there really is no reason to exclude all arguments besides the interest rate from affecting idle balances. We studied briefly the implications of including nominal household expenditures in the idle balance function and demonstrated how this rather innocuous-looking change could potentially turn some of the implications of the liquidity-preference approach on its head.

Before leaving this chapter, there is one more additional issue that must be dealt with, and that is the formal relationship between the two interest rate approaches we have been studying and the money and loanable funds markets. The answer to this question depends on what we mean by the expression "formal relationship".

Historically, economic scholars have intimately linked together these competing interest rate theories and the explicit inclusion or exclusion of the money and loanable funds markets in these models. From my perspective, the linkage between the liquidity-preference theory of interest, the loanable funds theory of interest, and the explicit utilization of the money and loanable funds markets respectively in the model-building process is nonexistent. Of course, as I stated earlier, in a dynamic setting the loanable funds market plays a major role in the loanable funds theory of interest which cannot be found in the liquidity approach. But this has nothing to do with which markets are explicitly written down in one's model.

V. LIQUIDITY-PREFERENCE OR
LOANABLE FUNDS?

A. The Views of Alex Leijonhufvud

The most recent entry into the liquidity-preference loanable funds controversy is A. Leijonhufvud (1981) (see in particular his chapter seven). Leijonhufvud considers the theory of the interest rate mechanism to be central to much of the confusion that exists in economics between the Wicksellian (of which Keynes' General Theory is an offshoot) and Monetarist schools of thought. Quoting Leijonhufvud,

"In Wicksell's theory of the cumulative process, the maladjustment of the interest rate--the discrepancy between the market rate and the natural rate--is the central idea. It is also the idea that motivates the analysis of changes in the price-level (or in nominal income) in terms of saving and investment. It is a simple but fundamental point. Use of the saving-investment approach to income fluctuations is predicted on the hypothesis that the interest rate mechanism fails to coordinate saving and investment decisions appropriately. This is where all the Wicksell Connection Theories [including the General Theory] differ from Monetarism. In Monetarist variants of the Quantity Theory, saving and investment have to do with the allocation of output but nothing to do with the determination of aggregate income or the price level. This is true because Monetarist theory assumes that the interest rate mechanism can be relied upon to coordinate the intertemporal decision of households and firms. Some twenty years of IS-LM exercises and applied econometrics failed to isolate this point as fundamental to the Monetarist controversy" (Leijonhufvud 1981, p. 132).

But what exactly is this Wicksellian idea and how does it relate to the liquidity-preference theory of interest?

"The original idea is simple. In allocation theory, we learn that household savings decisions and entrepreneurial investment decisions are to be coordinated by the interest rate mechanism. In money and banking, we learn that 'the' interest rate is governed by the supply and demand for securities (or of 'credit'). Imagine a situation where the interest rate cannot do both jobs at once, i.e., in which that level of real interest that equates the supply and demand for securities does not serve to equate saving and investment. What could be the causes of such a maladjustment? What might be its consequences?" (Leijonhufvud 1981, p. 133)

According to Leijonhufvud, Keynes' liquidity-preference theory of interest so "obfuscated" the interest rate mechanism that this Wicksellian theme was lost sight of. But this begs the question of why we should care? So we lost sight of this Wicksellian theme. What does it really matter?

For Leijonhufvud, the only meaningful alternative to Monetarist economics is the construction of macroeconomic models that uses this Wicksellian theme. Quoting from Leijonhufvud,

"Most obviously, perhaps, the failure to grasp the role of the Wicksellian maladjustment of interest rates in Keynes' theory of unemployment has caused the Keynesians more difficulty than necessary in marking out for themselves a theoretically justifiable answer to the Natural Rate of Unemployment doctrine. A 'Keynesian' answer to this doctrine would be that unemployment will not converge to its natural level unless the interest rate goes to its natural level - and that the latter condition will not always be fulfilled [This position has recently been refuted by Kohn]" (Leijonhufvud 1981, p. 135).

[And] another consequence of [this interest rate] muddle is the, at least, occasional failure of Keynesians to come to Monetarist conclusions under the appropriate conditions. Whenever the market rate of interest keeps to its natural level--and, surely, they do not always diverge?--the Keynesian Model should reduce to a Monetarist one. In failing to bring this out, Keynesians have allowed the simplest and most important lessons of monetary experience to come to be regarded as quintessentially Monetarist insights" (Leijonhufvud 1981, pp. 135-136).

At this point, we might want to ask what it is exactly that Leijonhufvud sees in the liquidity-preference theory of interest that "obfuscates" the interest rate mechanism. For Leijonhufvud, the liquidity-preference theory of interest is the notion that it's the excess demand for idle or speculative balances that governs the rate of interest. This notion, in combination with his beliefs that Keynes of the General Theory totally eliminated the loanable funds market from his analysis and always assumes the identity between savings and investment, totally eliminates the Wicksellian problem.

This forces Leijonhufvud to reject the liquidity-preference approach and adopt "a basic D. H. Robertson Loanable Fund Theory" which in conjunction with the other standard markets of a macro-economic model allows Leijonhufvud to argue that

"Unless the real rate of interest goes to its natural level [a concept made foreign by Keynes' liquidity-preference theory of interest], unemployment will not home in on its natural level. This is true also of a system with an operative labor market mechanism. If and when the system fails to coordinate intertemporal activities by adjustment of intertemporal prices, the 'flexing' of money wage rates in response to excess supply of labor will not

guarantee a return to full employment. This is ground on which the Keynesians could base their opposition to the Monetarist doctrines of strong stability of the system in its real variables, the 'vertical' Philips curve at the natural rate of unemployment and to the associated structures against discretionary policy actions" (Leijonhufvud, p. 185).

Thus, Leijonhufvud could be said to opt for the loanable funds approach. But as stated earlier, one is troubled with Leijonhufvud's interpretation of Keynes' liquidity-preference theory of interest. He (Leijonhufvud) interprets the liquidity theory of interest primarily in its "special theory" form. I think that this must force us to downplay or at least cause us to rethink his rejection of Keynes' interest rate approach. In addition, what Leijonhufvud considers the loanable funds approach is simply the explicit inclusion of a loanable funds market in one's analysis. As I have tried to argue, this is really a meaningless exercise.

B. Another Look at the Sequencing of Events Associated With These Two Interest Rate Approaches

In Chapter IV I suggested that one way of differentiating between the liquidity-preference and loanable funds views was in the implied sequence of events generated by these two approaches following some shock to the economy. In addition, in Chapter III I attempted to broaden Patinkin's criticism of the liquidity-preference approach by demonstrating how it always ignores the impact of imbalances in the loanable funds market on the time path of the interest rate. The question I want to ask now is whether the same sort of criticism

might also be leveled against the loanable funds school? I think the answer to this question is yes. From a loanable funds view, imbalances in the product market have no effect on real output until they manifest themselves in the money market. This strikes me as unappealing as the thought of ignoring the effect of imbalances in the loanable funds market on the rate of interest. What then is the solution to this issue?

At least at the introspective level (which might be completely wrong), what appeals to me are models that make real output a function of excess demand in the product market, and the interest rate a function of excess demand in the loanable funds market. This would imply a rejection of both the liquidity-preference and loanable funds theories, at least in a dynamic setting.

C. The Effect of Savings on Real Output and the
Choice Between the Liquidity-Preference and
Loanable Funds Views

In this case I would have to opt for the loanable funds paradigm. Not that I necessarily believe that an increase in the level of savings will prove expansionary in the face of unemployment, but I have a lot less belief in the proposition that savings is always destructive in the presence of unemployment. It seems to me that the loanable funds school takes a more sensible intermediate position in this matter.

D. Some Conclusions

We began by reviewing Leijonhufvud's rejection of the liquidity-preference theory of interest. Leijonhufvud considers these two approaches to be radically different. He opts for the loanable funds approach because it represents to him a meaningful alternative to Monetarist theory. Unfortunately, Leijonhufvud's attacks on the liquidity-preference theory of interest is somewhat marred by his immature view of Keynes' belief concerning the determination of the interest rate. As we saw earlier, Keynes had reached the point in his own thinking where he advocated the introduction of a loanable funds component in his own money demand function. This is a far cry from the "special theory" form of the liquidity-preference theory of interest that Leijonhufvud tries to hang around Keynes' neck.

We then noted how the loanable funds sequence, like the liquidity-preference sequence, embodies a somewhat implausible assumption concerning the inability of imbalances in the product market to directly impact on real output. This led me to reject both the liquidity-preference and loanable funds approaches. Instead I chose a hybrid model composed of the product and loanable funds markets as being most plausible.

And finally, I suggested that specifying the idle balance component of the money demand function from a loanable funds perspective at least provides for the opportunity of an increase in the level of savings proving to be expansionary. This would seem

to be a more reasonable position than one that closes the door permanently on savings ever playing a constructive role in terms of expanding real output in the short run.

VI. SOME FINAL CONCLUSIONS

In the first chapter of this dissertation I wondered "why" and "whether" the observed habit by many economists to exclude the loanable funds market from their writings really made any sense from either a historical, logical or pedagogical view. We can now see that this question was a bit misphrased. More correctly, I should have wondered "why" and "whether" the observed habit by many economists to exclude the loanable funds approach from their writings really made any sense from either a historical, logical, or pedagogical view.

As stated earlier, almost all of Keynes' diatribes against classical reasoning as it related to the determination of the interest rate may be rejected. To the extent that the classical and loanable funds approaches to the determination of the interest rate overlap, one may also reject these arguments as they might apply to loanable funds theory. But more importantly, what I attempted to bring out in my review of the liquidity-preference loanable funds interest rate controversy was how Keynes himself was beginning to gravitate towards the loanable funds position. Thus from a historical perspective, there really is no reason to reject loanable funds reasoning, at least within the confines of the liquidity-preference loanable funds debates.

On issues of logic, at least from a dynamic perspective, I rejected both the liquidity-preference and loanable funds approaches.

Neither view makes much sense to me. The liquidity approach fails because it ignores the effects of imbalances in the loanable funds market on the time path of the interest rate, while the loanable funds view is unsatisfactory because it ignores the effects of imbalances in the product market on the time path of real output. For me, the most sensible position is one that makes the time difference of real output solely a positive function of excess demand in the product market, and the time difference of the interest rate solely a positive function of excess bond supply in the loanable funds market. In a static setting, I believe one has to choose the loanable funds alternative, which at least allows for the possibility of savings playing a constructive role in society even in the short run.

This then leaves us with the issue of pedagogy. From all that has been argued so far, I would recommend the construction of models that utilize both the product market and the loanable funds market. Note that from a formal point of view, one could just as easily have said the product market and the money market. But given that the underlying dynamics of the stories we are going to tell makes the time path of the interest rate a function of loanable funds imbalances, it seems to me to make more sense to include this market over the money market.

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