Loanable Funds and Liquidity Preference Theories: An Attempted Dynamic Reconciliation

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Abstract:

The thesis of this study is that the Keynesian liquidity preference theory of interest determination can be reconciled with the loanable funds view by distinguishing the former as technically static economics and the latter as implicitly dynamic in nature. No value judgement is involved in distinguishing static economics from dynamic economics: static systems frequently require a supplementary description of their out-of-equilibrium states whereas dynamic systems may sometimes be observed to tend toward a position capable of static description.

In the first chapter of this study, an attempt is made to set out for inspection the two theories which constitute the raw material of succeeding chapters. At this stage, some of the differences in emphasis and approach of the important loanable funds theoriests (Ohlin, Haberler, Robertson) are set down and discussed to clear the way for a statement of loanable funds doctrine comparable in simplicity to the standard versions of Keynes' interest theory.

Introductory to the main synthesis of the two theories, Chapter Two presents what the writer calls a semi-classical model of interest determination similar to a theory that did, in fact, appear after publication of Keynes' General Theory of Employment, Interest and Money. This model leads into the discussion of reconciliation central to the second chapter in which the Keynesian model is integrated with a dynamic loanable funds (or neo-classical) version of interest rate determination.

Auxiliary problems of interpretation of the 'multiplier' and stock-flow distinctions occupy the remainder of Chapter Two; the longest chapter of the study.

Chapter Three sets down various past attempts to draw together liquidity preference and loanable funds theories. In a number of respects, the approaches employed by the various writers differ from the method used in Chapter Two in significant respects. It can be said however that since the early 1938 syntheses of Lerner and Hicks, the treatment of the theories has evolved toward the view that the theories are complementary; this is particularly evident in the work of S. C. Tsiang and Warren Smith. It is difficult to give these last two writers enough credit for the synthesis attempted in the present study.

The concluding chapter presents two additional aspects of interest theory which raise wider questions. The first section discusses extant definitions of dynamic economics and relates the model of Chapter Two to these definitions. The second section indicates that the rate of interest may be interpreted as equating saving and investment in longer run systems exploring the problems of growth economics.

Prefatory Note

The study following grew out of a term paper and additional reading in connection with an advanced course in Money and Banking given by Professor C. L. Barber during the University of Manitoba's 1965-66 session. The writer owes particular thanks to Professor K. J. Charles for inspiration and advice unstintingly given during preparation of this thesis. Professor R. Simkin read and discussed sections of Chapter Two as well.

Note

Abbreviations have been avoided in most cases; those which are employed include:

General Theory for Lord Keynes' General Theory of Employment, Interest and Money (London: MacMillan, 1936) pp. 403,

L_2-curve for Lord Keynes' liquidity preference demand curve for idle balances developed in the General Theory,

IM-IS analysis to refer to Professor John R. Hicks' diagrammatic construction of the complete Keynesian system in his "Mr. Keynes and the Classics, A Suggested Interpretation" Econometrica vol. 5, 1937, pp. 147-159, and,

's' to denote the average propensity to save out of income, that is saving/income.

Other notations are identified in the text or by footnotes when they are employed.

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I.

Introduction: Two Theories of the Rate of Interest

This study concentrates attention on one market in the complex of all interdependent economic markets. The analysis is aggregative however in the sense that problems of debt segmentation and the term structure of interest rates are ignored. Economists seeking to explain the dynamic of capitalism have been drawn toward aggregative examination of 'the' market for financial debt because of its key role in carrying forward investment activities which are the cause, in large measure, of the wealth of nations. Two important characteristics of modern capitalist production tending to give securities markets a fundamental place in economic analysis ought to be recorded; first, activities of wealth accumulation are frequently undertaken by those who have not the means to finance such investment and, second, expenditures on commodities for the purpose of producing commodities are not self-liquidating in the immediate sense that production for day-to-day consumption is self-liquidating. These characteristics of the economy in turn determine the characteristics of securities markets. The inability of those directly responsible for the engines of production to finance their increase means reliance on the unconsumed income of other individuals and involves flows of securities in exchange for purchasing power. The inability of producers to liquidate their debts promptly, gives rise to the existence of old securities representing past flows of purchasing power into investment and which await amortization. Thus, the securities market as a whole has two aspects - the flow aspect relating to current investment finance, and the stock aspect, re-

lating to the accumulation of past wealth. Taking extremes, it is possible to say that the rate of interest, as an average of all securities and abstracting from segmentation and speculation among maturities, seeks a level such as to equate the demand and supply of securities as a flow or as a stock. Neither emphasis is wholly correct - the flow emphasis is associated with what Keynes called the classical doctrine whereas the stock view constitutes a rather bald statement of the Keynesian position itself except that the holding of previously issued securities was envisaged by Keynes specifically as an alternative to holding cash. At the time of Keynes' culminating work, the classical doctrine was changing into what he himself has called the neo-classical approach wherein, without abandoning the basic flow characteristics of the rate of interest determination, economists like Robertson and Haberler took account of effects on the rate of interest emanating from the existence of stocks of money and securities. In the middle of this gentle modification of old ideas stepped the revolutionary prophet of the New Economics disparaging the old ideas as, collectively, a "nonsense theory", declaring that the neo-classical progression has "led to the worst muddles of all", and, above all, erecting for all to consider, a new theory of the rate of interest apparently free and clear of all the baggage of past wrong thinking on the subject. One of his most professed disciples has remarket that the Keynesian theory of the rate of interest stands as the first acceptable attempt to explain the phenomenon. "I deny the existence of the alleged orthodox theory," he says, "and claim that the Keynes theory ought properly to be re-

garded as an attempt to fill a void."[1]

While the present writer grants incompleteness as inherent in classical and neo-classical interest theory, the thesis of this paper is rather that both Keynesian and neo-classical interest theory complement each other in filling any interest theory "void": viewed synthetically, they are not alternatives but different and supporting expressions potentially leading to a unified explanation. It is the purpose of the second chapter to describe this unified explanation as the writer conceives it. Past writings, since 1936, have contributed immeasurably to this reconciliation and they will be given what is hoped is their proper due in the third chapter. The present chapter and the final fourth chapter are shorter accounts. The latter picks up some loose ends and problems associated with the middle two chapters and presents conclusions. The chapter on which we are now engaged is partly by way of introduction but must be mainly concerned with setting out the interest theories as a prelude to their manipulation in the following sections. Without further comment then, we can go into the task of describing the independent interest theory contributions which serve as data for the ensuing discussion.

i.

Because of its presumed familiarity, the Keynesian theory will be summarized first. Following his division of the money supply in the Treatise on Money, between the industrial and financial circulation, Keynes distinguished between active or transactions balances employed in the

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1. Sir Roy Harrod, Towards a Dynamic Economics (London: MacMillan, 1948) p. 67

exchange and production of goods and services and passive, idle, or speculative balances hoarded by the public. Precautionary balances held to meet quite unexpected contingencies constitute a third division in the stock of money but one which received less emphasis in discussion of the General Theory. Of prime importance are the motives behind the holding of speculative balances - these being held for the purpose of taking advantage of future changes in the price of securities. Holders of speculative balances have come to terms with the securities trade as a market characterized by shifts due to mass psychology over which the individual participant has no appreciable amount of control. And the individual has learned to attempt to protect himself and take advantage of shifts in the market price of securities by adjusting his stock of money and securities to minimize the chance that future price changes will involve him in realized or book losses. The possibility of price changes is related to the aggregate opinion about what level the rate of interest ought to stand at - the demand for money as an alternative to income-yielding securities increases as the rate of interest declines below 'normal' or expected levels because individuals taking a bear position increase at the expense of individuals taking a bull position. The former, expecting that rising security prices must shortly be followed by falling security prices to restore the 'normal' interest rate level, are determined to take a position in securities in the future when it will be more profitable to do so while maintaining a present position in cash in anticipation of the projected switch to securities. Conversely, bears are turned into bulls as the rate of interest rises. Based on this speculative motive for liquidity, Keynes envisaged a "smooth curve" relating the demand for idle money to the level of the rate

of interest (General Theory of Employment, Interest and Money, p. 171). This demand function together with the volume of money remaining after the satisfaction of transactions (and precautionary) demand determines the market rate of interest: "...the liquidity preference theory of the rate of interest which I have set forth in my General Theory of Employment, Interest, and Money makes the rate of interest depend on the present supply of money and the demand schedule for a present claim on money in terms of a deferred claim on money."[1]. In his writings, Keynes wished to make it quite clear that savings and investment do not affect the rate of interest directly through the capital market but rather the rate of interest is affected by these factors via the transactions demand for balances associated with the level of income attendant on a given level of saving and investment. Keynes conceded in the journal discussion[2]., however, that planned investment could exert an influence on the rate of interest if investors demanded funds in advance of actual requirements thus increasing the demand for money currently. This was the only direct effect of saving-investment flows on the rate of interest he was prepared to admit: "saving does not come into the

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1. John M. Keynes - "Alternative Theories of the Rate of Interest" Economic Journal 1937, vol. 47, p. 241
2. By the journal discussion or controversy, the writer means in particular the articles by Keynes, Ohlin, Robertson and Hawtrey in the Economic Journal, vol. 47, 1937. Related articles appear in the Quarterly Journal of Economics, vols. 51, 52 for the same year.

picture at all".[1] When asked why savings and investment flows have no direct effect on the determination of the rate of interest in the capital market, Keynes would advance two separate replies. In the General Theory he argued from the proposition that the rate of interest does not equate saving-investment flows to the proposition that saving-investment flows do not affect the rate of interest directly. This first defence is clearly fallacious when stated this way (General Theory, pages 165 and 179). A second line of argument appeared in the journal discussion: "Obviously the rate of interest cannot - with the terminology used... - be determined by the condition that it equalizes the supply of and demand for savings or in other words equalizes savings and investment. For savings and investment are equal ex definitione whatever interest level exists in the market."[2] Keynes' argument in favour of such a definition was framed in static terms - the unconsumed fraction of the value of total output is investment while expenditure on consumption deducted from income gives saving, so that if income equals the value of output then saving and investment can never diverge. (General Theory, p. 63.) Looked at this way, the equality of saving and investment is a rather useless version of Say's Law; certainly, as a classical theorist might

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1. J. M. Keynes - "The Ex-ante Theory of the Rate of Interest" Economic Journal vol. 47, 1937, p. 668
2. J. M. Keynes - "Alternative Theories of the Rate of Interest" Economic Journal vol. 47, 1937, p. 245. Keynes is quoting Ohlin in this passage, the original appearing in Ohlin's "Some Notes on the Stockholm Theory of Saving and Investment" Economic Journal vol. 47, 1937, part II, p. 221.

argue, the rate of interest could well be the price that ensures this equality so that the statement that equality of the two flows precludes the possibility of their affecting the rate of interest and the capital market mechanism becomes nonsense. Apparently what Keynes in fact envisaged was that the equilibrating variable for saving and investment would be income and made a distinct contrast between his own and "traditional analysis" which "has been aware that saving depends on income but...has overlooked tha fact that income depends on investment, in such fashion that, when investment changes, income must necessarily change in just that degree which is necessary to make the change in saving equal to the change in investment."[1]. It is then in the sense that income advances to equate savings with any level of investment that the Keynesian identity is intended to hold and it is the advance of income in this way, apparently, that exerts whatever effects are observed on the rate of interest due to diminution of the supply of idle balances. All this has been conveniently summarized by Professor Hicks in his now famous LM-IS diagram which demonstrates conditions of equilibrium in the money and goods markets and isolates a unique equilibrium common to both markets. The method is that of comparative statics. Keynes had largely confined his discussion of transition positions from one (Hicksian) equilibrium to another to the problem of 'finance' for an increase in planned investment. Although he states that the effect of the finance motive on the rate of interest "is the coping stone of the liq-

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1. J. M. Keynes - General Theory of Employment, Interest, and Money (London; MacMillan 1936) p. 184

uidity theory of the rate of interest"[1], it remains problematical as to how this "coping stone" permits one to derive a full-fledged theory of transitional disequilibrium states...

ii.

If the Keynesian theory be interpreted as centring attention on equilibrium positions wherein income shifts have permitted the onlooker to speak of ex definitione equality between savings and investment, the observer might hope to interpret the neo-classical or loanable funds doctrine in the same manner. But this hoped-for point of agreement between loanable funds and liquidity preference formulations does not exist, in fact. The neo-classical explanation of the rate of interest determinants is, as the name suggests, a development from the classical system[2] in which the interaction of saving and investment curves set the interest rate. It should be admitted that at the time of writing the General Theory, the loanable funds position was unclear indeed. Keynes was aggravated in the jounal controversy by the dearth of any precise statement of the neo-classical theory which he had apparently so offended. Robertson then, in reply, listed what he understood to be the sources of the loanable funds statement as "...the account which I had just attempted to give myself and in which Mr.

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1. J. M. Keynes - "The Ex-ante Theory of the Rate of Interest" Economic Journal vol. 47, 1937, p. 667
2. from the statements by, among others, Ricardo, Marshall, and Pigou: see J. M. Keynes, General Theory of Employment, Interest, and Money (London: MacMillan, 1936), Appendix to Chapter 14, pp. 186-193

Keynes has found no space to comment...I had also in mind the more elaborate analysis of Dr. Haberler which was not, I admit, then generally accessible."[1.] Professor Robertson might have also added Ohlin's contributions as the source of the neo-classical approach since Haberler's discussions depend heavily, as Haberler admits in several places, on the journal articles of Ohlin.[2.]

When three writers - Ohlin, Haberler, and Robertson - of considerable originality are grouped together for the sake of convenience, it is not thereby perfectly appropriate to gloss over differences in their methods of analysis. Following the development of Swedish dynamic economics, Ohlin employed ex-ante - ex-post concepts and in describing it to English-speaking readers, said that "ex-post and ex-ante analysis amounts simply to this: after a description of actual events during a certain finished period and of the differences between these events and the expectations which existed at the beginning of the period, follows an account of those expectations for the future which more or less governs actions during the next period. The registration of events during this second period reveals again that expectations do not all come true, a fact which influences expectations and actions during the third period, etc."[3.] Elsewhere Ohlin made it

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1. D. H. Robertson - "Alternative Theories of the Rate of Interest" Economic Journal vol. 47, 1937, p. 428. Works cited are his "Some Notes on Mr. Keynes' General Theory of Unemployment" Quarterly Journal of Economics 1936, pp. 168-191 and Haberler's Prosperity and Depression (London: Allen and Unwin, rev. ed.) 1958
2. in Economic Journal vol. 47, 1937, cited
3. B. Ohlin - "Some Notes on the Stockholm Theory of Savings and Investment" Economic Journal (cont'd)

clear that ex-ante terminology would refer to supply and demand curves in the usual sense, while ex-post terminology would summarize the outcome of the interaction and market reconciliation of the ex-ante curves; that is, as the solution of the implicit equation system. The present writer feels that the latter description by Ohlin tends to obscure the true originality and significance of the Swedish approach to dynamics; that this statement in terms of curves represents too considerable a concession to static ways of thinking. To see this, it appears worthwhile to set out the above quotation from Ohlin in terms of period analysis; not only will this clarify the Swedish method of thought, it will also provide an important link between ex-ante, ex-post methodology and the sequence technique of Robertson employing dated variables with the 'day' as time-unit. Consider the flow of saving - the Swedish contention was that saving is related to expected income while according to the description involved in Ohlin's quotation, expected income would depend on realized income, perhaps with a time lag. Suppose such a time lag is admitted, being of one period's duration and the assumption is made that expected income affects saving flows immediately, that is within the same period however defined. Then two functional relations are involved, first, $Yt = f(Yt - 1)$ where Yt is expected income currently depending on last period's income $Yt - 1$, and second, $St = g(\overset{e}{Yt})$, showing saving, St, in the current period as dependent on current income expectations. The functional relation in the first equation represents a coefficient or elasticity of ex-

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....vol. 47, 1937, p. 59

pectations.[1] The second function denotes a particular type of consumption function in which the propensity to save depends on expected income. Taking, for these equations, the composite function of g by f and denoting the composite by F, the consumption function is converted to $-St = F(Yt - 1)$ - that is $St = g(f(Yt - 1))$. This composite of the two Swedish equations (if accepted as such) yields the Robertsonian form of consumption function with the difference that expectational problems are built right into the composite Swedish function whereas Robertson's main consideration would be the expenditure lag with problems of expectations included as a verbal commentary. The Swedish function - $St = F(Yt - 1)$ - could have been arrived at with different lag assumptions: saving could have been lagged on expected income with income expectations unlagged on realized income. Interpreting the Swedish method by equations similar to the ones given, the exact lag structure is not of the first order of importance since specification of lags is inevitably an empirical question in the end, to be settled with as direct reference as possible to the relationship involved in real life. The point here is that the Stockholm method is not in conflict in any sense with the Robertsonian period analysis which has become refined with the work of Hicks, Kaldor, Duesenberry, Kalecki and others into contemporary models of economic growth and

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1. See L. Metzler - "The Nature and Stability of Inventory Cycles" Review of Economics and Statistics vol. 23-25, 1941 pp. 113-290 and J. R. Hicks - Value and Capital (London: Oxford, 1939) p. 205. Metzler describes the relation between his coefficient and Hick's elasticity in a footnote, p. 119, of his article.

business cycles.

A second point of difference between Ohlin and (in this case) Robertson - Haberler centred on the actual formulation of the neo-classical theory of interest determination. Ohlin claimed, in the articles mentioned, that the rate of interest equated the supply and demand for credit or claims while Robertson and Haberler, and in particular, Robertson, looked at the setting of this price in terms of money flows; of funds offered by savers and the banking system on the supply side and of money demanded by investors and by those desiring to augment hoards, on the demand side. The theorists involved did not view the difference as important, since in large measure, the transactions affecting the rate of interest in the neo-classical theory involved the exchange of money and claims so that, as long as the goods market was correctly defined and excluded, a study of either the flow of claims or money would be sufficient to establish the looked-for price. Thus, saving and investment involves demand and supply curves for claims or supply and demand curves for money depending on which side of the market one prefers to look at. The same conditions may be applied to hoarding or dishoarding desires if choice is restricted to claims and money, with commodities as assets, or for immediate consumption purposes, omitted from the objects of choice.[1] This prevents the possib-

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1. Thus a curve meant to relate to 'hoarding', 'additions to claims', 'demand for money as idle balances' or 'demand for stocks of claims', must be understood as a substitution curve reflecting a money-claim exchange not merely an acquisition or reduction of money or bonds, if both neo-classical expressions are to hold when such a curve or function (cont'd)..

ility of changes in consumption and changes in commodity assets proceeding via hoarding or dishoarding - such an event would reflect itself in a shift of the propensity to consume (Robertsonian, Swedish or a third definition). Symmetry of the money flow-credit flow approaches must also involve the assumption that the creation of new money involves an equal and opposite demand for claims by those supplying the additional cash to the system. This will be so if reserves are supplied to the banking system by demanding bonds in exchange for money claims on the central bank and if non-reserve banking assets are claims, the total of assets being held against demand deposits defined as money, consisting of claims, and cash reserves. Subject then, to these assumptions, the neo-classical or loanable funds theory states that the rate of interest is the price that equates the supply of loansble funds in the form of saving and new money to the demand for loanable funds in the form of net hoarding and investment.[1] The main contrasts between this and the Keynesian expression centres on the influence of current savings and investment on capital market equilibrium and the insistence of the neo-classical writers on a flow method of analysis for determining the rate of interest. It should be noted that any ex-post equality of savings and investment is an unnecessary embellishment of loanable funds analysis since equilibrium is of the market variety as between two interrelated supply-demand

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....is employed. The liquidity preference curve will be viewed this way throughout and the matter raised again briefly in the comments on the stock-flow controversy of Chapter Two...

1. Robertson's detailed statement of his version appears as a prelude to Chapter Two...

relations so that it is sufficient to apply Walras' Law to the effect that excess demands must add to zero. Ohlin was inclined to say that saving would equal investment but by a trick of definition whereby income unspent because of a decision lag would be regarded as saved. Robertson on the other hand believed that this sort of definition was not "a very suitable instrument for the analysis of economic change".[1] Perhaps the best known loanable funds description was made by Haberler, based on Ohlin's thinking very largely, and is represented here diagrammatically in figure Ia below. All curves in the diagram refer to flows so that the 'M' curve indicates an increase in the supply of money over the period for which the flows apply and the 'L' curve shows scheduled increase in hoards (demand for additional idle balances during the period).[2] The saving curve (S) and the investment curve (I) have the usual significance though they denote a flow of funds so that the time period employed in measuring all the flows of figure Ia cannot be arbitrarily set. (See Chapter Two, page 30.) The

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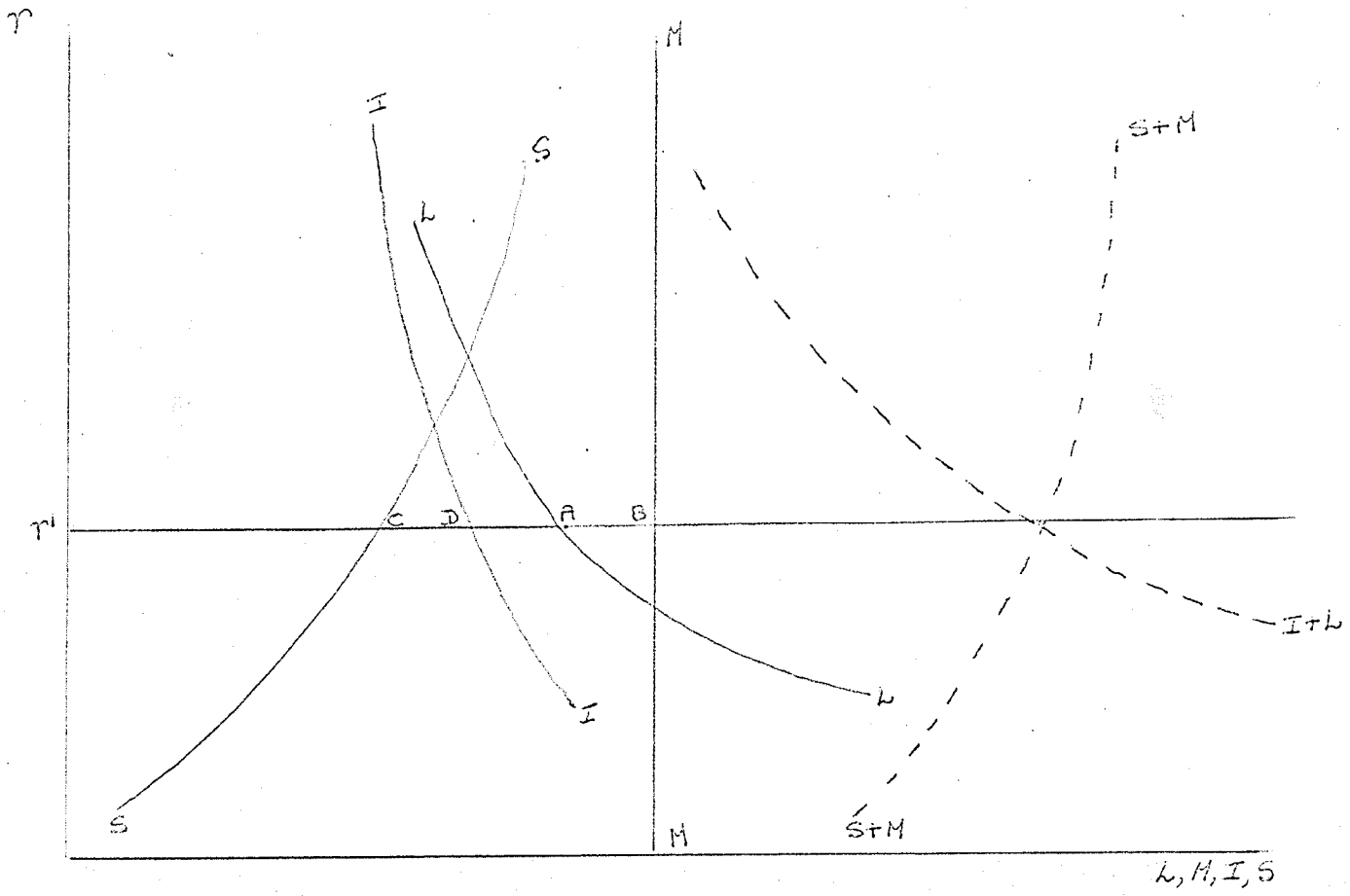
1. D. H. Robertson - "Alternative Theories of the Rate of Interest" Economic Journal vol. 47, 1937, p. 429
2. Mrs. J. Robinson ("The Concept of Hoarding" Economic Journal vol. 48, 1938, pp. 231-236) distinguishes six main usages of the word 'hoarding'. The definition embodied in Haberler's 'L' curve, shown in diagram Ia contains "...the conception of saving as well as the conception of acquiring money," according to Mrs. Robinson (p. 233) "The individual in question is saving and using the increment of his wealth to acquire money. The amount of money which he holds is then increasing continuously through time."

Fig. Ia



total supply of funds, in the schedule sense, is given by the 'S + M' curve consisting of savings out of current income together with the period's change in the money supply, regarded as positive in the diagram. Correspondingly, the total demand for funds given by the schedule 'I + L' is made up of demand for investment expenditure plus the demand for additional idle balances, shown as positive here. The rate of interest for the period being considered moves to r' at which total supply and demand are equal, so that the only condition involved in satisfying neo-classical market equilibrium involves the condition that excess demand for money (-AB in the figure) equals the excess supply of savings (-CD in the figure). Professor Haberler's hoarding function is not in harmony with the Keynesian position that the demand for idle balances as a stock (not as flow) is elastic to the interest rate via the speculative demand curve. Robertson did not, however, formulate a specific hoarding function in his presentation and neither did Professor Ohlin. Haberler obtained his 'L' curve from Lerner's article to be discussed in Chapter Three when past liquidity preference and loanable funds reconciliations are examined. Lerner's discussion, it may here be said, is not a first-rate example of impartiality on the part of the Keynesians toward non-Keynesian approaches to macroeconomics. In making the hoarding curve elastic to the rate of interest, Lerner's intention was to treat the case as fallacious and convert this formulation into the Keynesian liquidity preference schedule. Being as Lerner was not a loanable funds exponent and because of the destructively critical nature of his article[1], it is

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1. A.P. Lerner - "Alternative Formulations of the Theory of Interest" Economic Journal vol 48,1938 pp. 211-230

tempting to disregard the definite 'neo-classical' form of ex-ante hoarding illustrated by figure Ia's 'L' curve but the rub here would be that Haberler has repeated Lerner's construction without critical comment while Robertson classified Haberler as being in his own camp as regards interest rate determination. Notwithstanding these reasons for retaining the 'L' curve as part of neo-classical theory, it will prove necessary to transform it into its Keynesian counterpart in Chapter Two if basic reconciliation between the two theories is to be approached. At the same time however, every attempt will be made to preserve what is valid about the loanable funds exposition in the light of the 'Keynesian' revolution'.

iii.

"Keynes' work," J. M. Clark remarked, "leads beyond itself, until one is challenged to fit this line of inquiry together with the truth that remains in more conventional lines, perhaps remaking both in the process."[1] The contention here is that there is an important truth embodied in the neo-classical approach to interest theory and that it is not necessary to regard this element of truth as standing in conflict with the Keynesian version advanced in the General Theory. Much of the contrast will proceed in terms of statics and dynamics: to quote again from Professor Clark's work, "...there are two outstanding approaches ... [to macroeconomics]...one emphasizing the process of adjustment to change; the other, conditions of equilibrium in which adjustment would be complete. D. H. Robertson, exemplifying the first method, chops time up into arbitrary or symbolic periods, through

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1. John. M. Clark - Alternative to Serfdom (New York: Vintage edn., 1960) p. 99

which successive adjustments are traced. Keynes, exemplifying the second method, defines equilibrium by simultaneous equations and "propensities" or functional relations, which are, at least provisionally, treated as timeless. Like most divergent approaches, these should come together if each is carried far enough. They appear, in fact, to be complementary..."[1]. Most of the next chapter will be devoted to demonstrating this alleged complementarity and the static-dynamic contrast should emerge clearly. The contrast between stock and flow analysis in dynamics will also be pointed up at several places in the paper, particularly with regard to the operation of the liquidity preference function.

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1. J. M. Clark - Alternative to Serfdom (New York: Vintage edn., 1960) p. 97

II.

Loanable Funds Theory and Keynesian Equilibrium

The core of this chapter constitutes an attempt to bridge the gulf between loanable funds theory and the liquidity preference theory of Lord Keynes. Professor D. H. Robertson insisted during the course of the debate touched off by the General Theory, that his view was essentially similar to Keynes' and economic literature records a succession of attempts to show whether or not Robertson's assertion could be taken as correct.

The loanable funds theory has received a variety of interpretations and formulations - one of the most complex having been set out by Conard.[1] For the present purpose, the simple formulation advanced by Lerner[2] and endorsed (with some reservation as to application) by Haberler[3], will be employed, as described in the last chapter. This formulation holds, simply, that a difference between saving and investment in any period can be offset by the creation or destruction of new money or by changes in idle balances. So stated, the components of loanable funds are more highly aggregated than they appeared in Robertson's own statement, for

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1. J. Conard - An Introduction to the Theory of Interest (Los Angeles: University of California Press, 1963) pp. 203-235
2. A. P. Lerner - "Alternative Formulations of the Theory of Interest" in the New Economics (New York: Knopf, 1948) ed. Harris pp. 634-654
3. G. Haberler - Prosperity and Depression (London: Allen and Unwin, 1958) p. 520

example. He set down the following scheme ("Mr. Keynes and the Rate of Interest" American Economic Association Readings in the Theory of Income Distribution):

Supply of Loanable Funds

1) current savings effected during the period being discussed, plus

2) "disentanglings" (depreciation allowances and circulating capital 'released' continuously in the repetitive process, enabling non-expansive perpetuation of the circular flow, plus

3) net dishoarding, plus

4) new bank loans (net of repayments)[1].

Demand for Loanable Funds

1) investment in new fixed or working capital, plus

2) investment in maintenance and replacement of fixed and working capital, plus

3) consumption demand in excess of current income.

The simplifications involved in applying the Lerner-Haberler definition amount to assuming that items (2) cancel without entering the market while item (3) on the demand side is ignored in the first approximation. During the comparison in its early stages, a fixed supply of bank money will also be assumed so that item (4) on the supply side does not appear. In Chapter Three, however, changes in the supply of money will be considered explicitly. Denoting savings by $S(t)$, investment by $I(t)$ and idle balances by $M_2(t)$, the loanable funds formulation is simply,

$$S(t) + \Delta M_2(t) = I(t) \qquad (1)$$

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1. that is, in the spirit of the explanation of (2), funds newly added to the turnover process.

i.

Bringing the theory summarized by equation (1) as close as possible to its classical antecedents, investment and saving may be made elastic to the rate of interest; yet the equation set down as (1) cannot, even with this addition, provide a theory of interest determination since the second term, representing changes in idle balances, is not elastic to anything unless the Lerner interpretation of the 'L' curve illustrated in the last chapter is employed. To provide a closed model, and anticipating some future discussion, something like a liquidity preference function is required to explain such changes (ΔM_2). Suppose it is accepted that the demand for idle balances as a stock is related functionally to the prevailing rate of interest in an inverse manner as the Keynesian liquidity preference schedule shows. If this relation holds for several periods being considered together, then changes in idle balances will be associated with changes in the rate of interest, the latter changes being required to ensure that the changed quantity of idle cash finds 'firm holders'. When the Keynesian relation between the interest rate and idle money impinges in the loanable funds system, a determinate model of the interest rate can be constructed. Re-writing equation (1) in the light of this addition and taking account of the classical elasticity of savings and investment to the rate of interest, a difference equation in the rate of interest (r) emerges:

$$S(r_t) + \Delta L_2(r_t) = I(r_t)$$

$$\text{or } S(r_t) + L_2(r_t - r_{t-1}) = I(r_t) \qquad (2)$$

Equation (2) has a dynamic flavour to it[1]. To make sense, the system must have a stable 'classical' solution wherein the interest rate has no tendency to shift: $r_t - r_{t-1} = 0$. If this were not so, then equilibrium solution of equation (2) might involve continuous one-way movements in idle balances, interest rates and the other variables. This possibility is untenable as an equilibrium solution if for no other reason than that unlimited decline in the rate of interest will be halted at zero while decline in idle balances will be halted at the same impassable floor. Therefore, a plausible equilibrium solution of (2) sees the rate of interest equating investment and saving in the classical manner while at the same time standing at a level so that idle money finds firm holdess in the financial markets. The rate of interest is performing a dual function; it equates the flow of saving to the flow of investment and it stands at a level equating the demand for money to hold with the supply of idle balances. The out-of-equilibrium behaviour of equation(2) sees a transfer of cash

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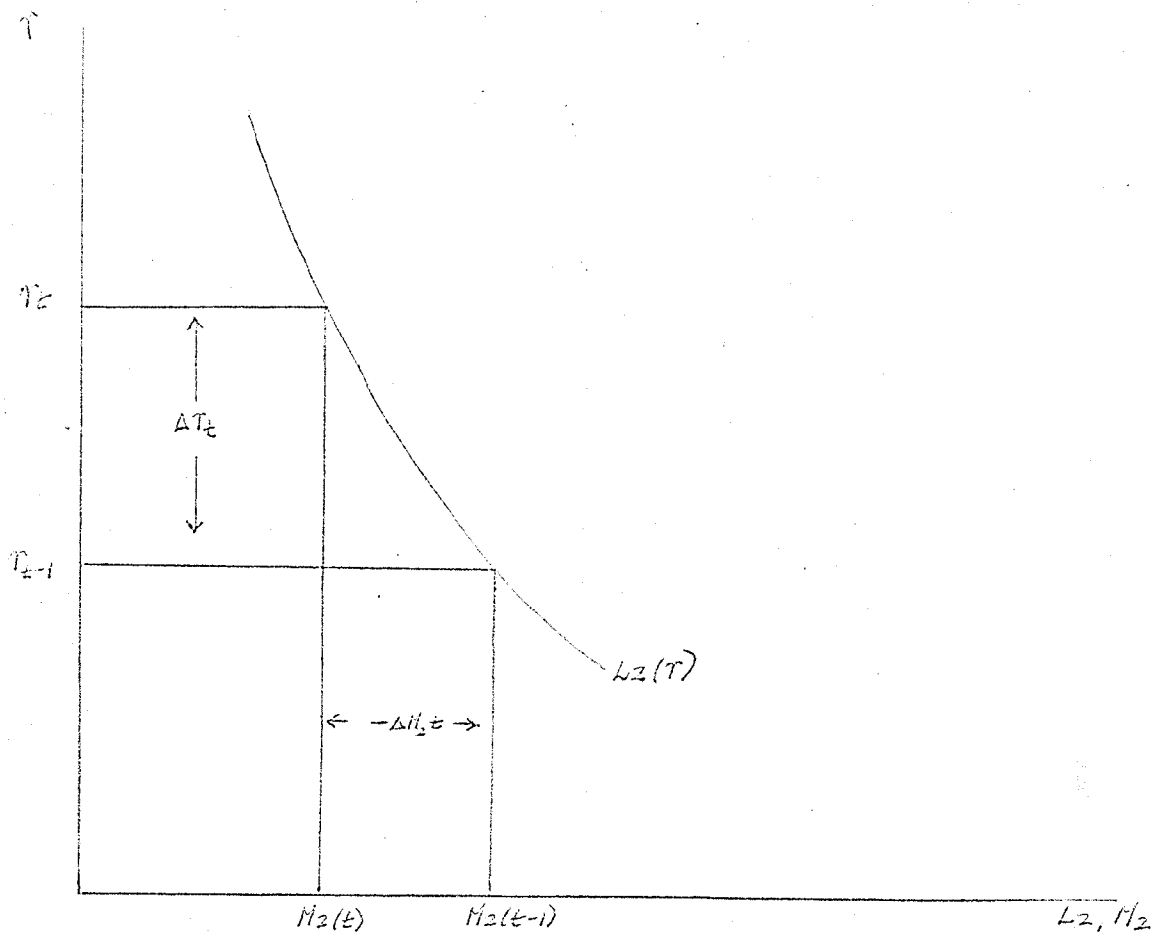
1. A manageable difference equation of the 1st order results if the functions (I, S, L_2) are assumed linear. While this may (and usually is) assumed for $S(r_t)$ and $I(r_t)$, a strict Keynesian approach to $L_2(r_t - r_{t-1})$ demands the use of a non-linear function to describe the market's view toward r_{t-1} (or whatever rate movement was initiated from). A linear approximation of $L_2(r_t - r_{t-1})$ would only be reasonable for movements in $L_2(r)$ (Fig. Ib) which were reversed before the linear approximation represented a serious distortion of Keynes' opinions about market opinions.

Fig. Ib



into (or out of) the idle sphere and out of (or into) the active transactions sphere via inequality of savings and investment. In this model, the classical savings and investment functions determine the equilibrium rate of interest, this rate of interest together with the demand curve for idle money $(L_2)(r)$ in Figure Ib) determines the requisite volume of idle balances (M_2). Knowledge of the total supply of money (M) gives the volume of active money (M_1) as a residual. The quantity theory of money becomes applicable to M_1 so that income is given in monetary terms. So is the price level if it is assumed to be flexible in the degree required to permit full-employment output for the system. Consumption expenditure is determined as a residual when savings (or investment), already known, is deducted from total income.[1.]

Except for its liquidity preference function, this model is non-Keynesian. It does not contain a consumption function or the theory of the multiplier. The proportion of income devoted to savings-investment depends on the rate of interest and the demand curve for idle money. A uniform price relation between investment goods and consumption goods means that output is divided in the same proportion for the two categories. The average propensity to consume, defined as C/Y has been determined by the other conditions of the system rather than assisting in determining the result. This is shown diagramatically by Figure Two (part c). This model just set out has a certain resemblance to the 'Modligliani model' which has been subject to some study since its inception

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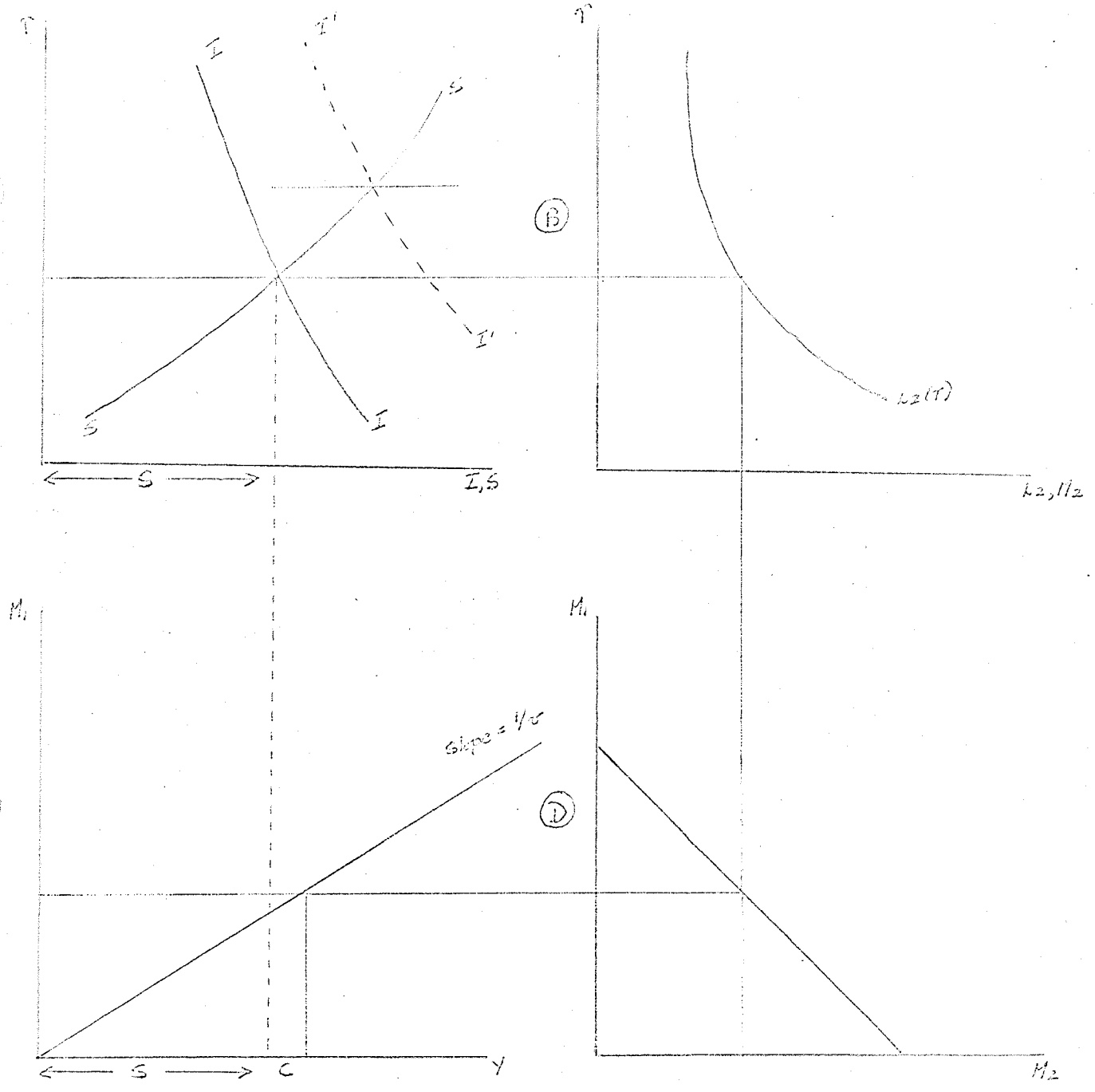
1. see Fig. Two (page following)

Fig. II



eight years after publication of the General Theory[1]. It was Modligliani's argument that saving and investment flows determine the rate of interest while the commodity price level gets determined by the liquidity preference schedule. His model included a mechanism for continuous full-employment output, a mechanism not included explicitly in the system under present discussion. The analagous summary of this present model is that the rate of interest gets determined by saving and investment while money income (not prices) is determined by the liquidity preference curve. In Figure II, part a) shows the determination of the interest rate. The position of $L_2(r)$ in part b) determines required idle balances. The remainder of the money supply determines the level of money national income given as the sum of savings and consumption in part c).

In this semi-classical model[2], income does depend on the level of investment, though not in the way that was postulated in the Keynesian Theory. Imagine a shift in the investment function in part a) from II to I'I' as shown. If $L_2(r)$ is inelastic in part b), the shift does not change total income at all and savings rises immed-

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1. Franco Modligliani - "Liquidity Preference and the Theory of Interest and Money" Econometrica vol. 12, 1944, pp. 45-88 and commentary by F. H. Hahn - "The Rate of Interest and General Equilibrium Analysis" Economic Journal vol. 65 1955, pp. 52-66
2. The term is due to Ackley (Macroeconomic Theory (New York: MacMillan, 1961) p. 205). This model is similar to his in that both include a liquidity preference function and exclude a Keynesian consumption function. Their workings are different though.

iately to equality with a higher level of investment, consumption being reduced in the same degree that saving is increased. It could be assumed ex hypothesi that the shift works out on an intra-period basis reflecting the potential speed of interest rate adjustments in modern financial markets as well as flexible plans for income disposal and investment as secondary assumptions. The most likely possibility is that $L_2(r)$ possesses some elasticity so that a shift in II entails (when, as in this case, investment increases) a transfer of money balances from the idle to the active function. The exact method of transfer depends on the lag structure of the savings function. If the savings function is lagged viz.

$$St = S(r_{t-1}) \qquad (3)$$

while investment and demand for idle balances respond to interest rate shifts without lag, then the movement from one point of equilibrium to the next must be visualized in the manner described by loanable funds theorists. The dynamic adjustment proceeds according to:

$$S(r_{t-1}) + L_2(r_t - r_{t-1}) = I(r_t) \qquad (4)$$

which is simply the appropriate modification of (2). How does this change, then, come about?

In the market period, savings arrive in capital markets inelastically in response to 'yesterdays' rate of interest as equation (3) indicates. The autonomous shift in II ruptures saving-investment equilibrium and forces investors to rely on a source of funds which can be made available in the market period - those which are held in idle balances. Idle balances have short-run elasticity but like savings, they can only be drawn from "their lairs" (in Robertson's phrase) by increasing costs. The rate of interest rises, idle balances are reduced and investment is damped down, though its level remains higher than previously. The activated balances are added

to the income stream as factor payments associated with this additional investment spending. The rate of interest stands at a new higher level. When saving and consumption plans are made for the following period, the new level of interest will dominate saving plans such that the flow of savings arriving on the capital market in the second period will be larger than previously.[1] Some dishoarding may still be required and the rate of interest will rise in successive periods until saving and investment are brought into equality and dishoarding is eliminated. At this point, the picture shown statically in figure II holds again until a new disturbance creates a similar adjustment pattern.

When the Keynesian formulation is set out, it will be clearer why this semi-classical model has been treated with a lagged saving function. On its own terms, the present model does not require the lag assumption for discussion of its inter-equilibrium behaviour to proceed using loanable funds techniques - it is possible to employ equation (2) rather than (4) as a description of transition processes. Suppose savings do adjust instantaneously (in the market period) to interest rate shifts. Continuing to assume a once-for-all move of the investment curve from II to I'I', in the first period, the new higher level of investment is financed most cheaply by drawing on savings and idle balances in a proportion depending on the relative slopes of SS (in part a) and $L_2(r)$ (in part b). The rate of interest rises. In the second period savings offset investment to a greater extent and

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1. Possibility of an oscillating approach to the new equilibrium has been ignored. Subsequent formulation of the Keynesian system will comment on this sort of behaviour.

'excess' investment is financed again by an increase in savings and new dishoarding. Savings assume a larger and larger share of new investment in each subsequent period, until, when the new equilibrium arrives, no changes in balances at all occur and investment at the new level implied by a) part of figure II is financed period after period by new saving.[1.]

With either a lagged or an unlagged saving function, the definition of a period (several of which being required to move from one equilibrium to another) is allowed to be arbitrary at this stage. With the lagged saving function the period involved is clearly the time lapse between one planning date for savings and the next planning date, with the unlagged function, the lag is much more difficult to define - a period is virtually instantaneous so that the description of the process by a difference equation (equation 2) becomes unrealistic. It would still be possible to employ a meaningful period approach if the capital market is assumed to 'meet for business' at discrete intervals, remaining 'open for business' for a very short time. This sort of assumption

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1. A third, less plausible description of inter-equilibrium movement would see immediate (market) adjustment of savings and investment with 'excess' idle balances at the new higher interest rate being used for the purchase of consumption goods. In this case, a loanable funds rationale is excluded. As the Introductory chapter explained, however, the savings-consumption and cash-securities dichotomization of choice is being maintained in this paper so that such a third case does not crop up..1

was employed, it may be recalled, by Professor Patinkin (Money, Interest and Prices - 1956) in discussing dynamic adjustments.

ii.

To ensure determinacy of the loanable funds system it has already been necessary to introduce a Keynesian liquidity preference function to describe the dependence of dishoarding on changes in the interest rate reflecting idle balance holders' unwillingness to revise their opinions, collectively held, about the future course of interest rates. The resulting model was called 'semi-classical'. To bring the loanable funds theory into consonance with the view of the General Theory however, further modifications are required. In setting out these modifications, it should be clear that, for the present, the specific comparison being attempted is between the Keynesian and simplified Robertsonian visions[1]. Thus, an income-expenditure lag (the Robertsonian 'day') is the important time interval in what follows.

In a 1956 article[2], Professor Tsiang undertook to show the identity of the loanable funds and liquidity

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1. the comparison to follow adheres to the general line taken by the writer in a money and banking term paper submitted to Professor C. L. Barber in March 1966 and entitled "Loanable Funds and Liquidity Preference Theories: An Attempted Dynamic Reconciliation" (parts III and IV, pp. 4-13.)
2. S. C. Tsiang - "Liquidity Preference and Loanable Funds Theories...A Synthesis" American Economic Review vol. 46, 1956 , pp. 350-368. (See also Chapter Three.)

preference theories employing the Robertsonian lag of expenditure behind income, this lag having in the background of its operation, the period for a single turnover of active money. Referring to the Robertson lag as a 'day', this scheme implies that today's expenditure results from decisions applied to yesterday's income while at the same time, today's expenditure creates today's income (not tomorrow's income as would be the case with a Metzler-Lundberg lag period). This choice of periods in the sequence analysis is employed here because of its simplicity as well because it follows most closely Professor Robertson's own views.

Taking note of these problems, the analysis will be allowed to proceed on the lines suggested by Tsiang. Tsiang's analysis involves following flows of money through the economic system rather than flows of income as the Keynesian approach emphasizes. This apparent discrepancy need not have uncomfortable overtones: in a graphical portrayal of the Keynesian system, the only rigidity introduced is that the so-called L_1-curve (relating demand for active balances to the level of income) must have a 45-degree slope so that income velocity equals unity. No restrictiveness is implied as a result since the size of an income <u>flow</u> relates in a simple way to the <u>period</u> chosen to measure that flow. In summary, the relevant period for the sequence analysis is the turnover period for active money and this period, being mechanical, is of secondary importance relative to the Robertsonian income-expenditure lag in the discussion to follow.[1] Breaking

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1. Since constancy in the velocity of money will be assumed as a datum in the derivation to follow, the structural lag of income behind expenditure flows remains implicity rather than explicit in the ensuing equations (cont'd..)

into the circular monetary flow at time (t), active balances are identified as income, that is,

$$Y(t) = L_1(t) \qquad (5)$$

Applying the Keynesian restriction that active and idle demands for money must be satisfied from the available money supply as determined in the banking system, the second equation in the system is given as

$$M(t) = L_1(t) + L_2(r_t) \qquad (6)$$

where $M(t)$ = money stock, assumed constant in this derivation, $L_2(r_t)$ = demand for idle balances as a function of the interest rate prevailing at the beginning of the decision period bounded by 't' and 't+1'. To these equations must be added the Robertsonian version of the consumption function whereby consumption expenditure occurring at the close of the decision period (t+1) is related functionally to income at the beginning of the period (t):

$$C(t+1) = C(Yt) = Y(t) - S(t) \qquad (7)$$

Income and expenditure of period (t+1) are equal to active balances at (t+1) and the components of this income are investment at (t+1) and consumption at the same date,

$$L_1(t+1) = Y(t+1) = C(Yt) + I(r_{t+1}) \qquad (8)$$

where $I(r_{t+1})$ = investment expenditure elastic to the interest rate at time (t+1). The final equation simply repeats equation (6) for period (t+1) with the implication,

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....and attention is focussed on the Robertson lag. Inclusion of an inflexible expenditure-income lag would only alter the dating procedure in a non-essential way. See Chapter Four, section one. Decision functions which render velocity of circulation of money variable would have to be added to models of this type in a second approximation.

as well, that money supply does not alter as the model works itself out,

$$M(t) = M(t+1) = L_1(t+1) + L_2(r_{t+1}) \qquad (9)$$

Tsiang's object was to show that such a system including a lagged consumption function could be shown to yield a loanable funds result. Setting (6) and (9) equal,

$$L_1(t) + L_2(r_t) = L_2(t+1) + L_2(r_{t+1}) \qquad (10)$$

Substituting from (5) for $L_1(t)$ and from (8) for $L_1(t+1)$,

$$Y(t) + L_2(r_t) = -S(Yt) + I(r_{t+1}) + L_2(r_{t+1}) \qquad (11)$$

And substituting for D(Yt) from equation (7) and cancelling Y(t) from both sides,

$$L_2(r_t) = -S(Yt) + I(r_{t+1}) + L_2(r_{t+1}) \qquad (12)$$

Rearranging equation (12) and recognizing that liquidity preference postulates an <u>inverse</u> relationship between balances and the rate of interest one has,

$$S(Yt) + L_2(r_{t+1} - r_t) = I(r_{t+1}) \qquad (13)$$

This function is closely comparable to the out-of-equilibrium description of the semi-classical model first discussed and characterized by equation (4). Shifting the dating of (13) back a single period, the resemblance is most easily seen by comparing equation (4) against (14) following,

$$S(Yt-1) + L_2(r_t - r_{t-1}) = I(r_t) \qquad (14)$$

Seemingly, the only difference between (14) and (4) is the substitution of Yt-1 for r_{t-1} in the first term. The semi-classical model presented a difference equation, given by (4) in which the interest rate was the only variable; equation (14) however involves <u>income</u> explicitly. In the semi-classical model it was indicated verbally and diagramatically that a transition from one stable equilibrium to another entailed movements of money income owing to the transfer of funds into or out of, idle hoards. But this movement in income could be discussed in an

auxiliary way since the dynamics of the rate of interest was wholly determined by saving, investment and liquidity preference, without reference to current changes in income. The Keynesian system is not so constructed, as Hicksian LM-IS analysis has so pointedly emphasized for the static model. Early commentaries, including those of Robertson, viewed the rate of interest as a purely monetary phenomenon in Keynes' theory. Correct interpretation of the General Theory indicates that this is not the case - Robertson's 'productivity and thrift' play their parts, as well. as current textbooks make clear.[1.] Interest rates and income are co-determinate in the modern static theory of interest given by the LM-IS equilibrium and the modern theory in a dynamic form ought to possess the same unique interrelatedness. The dynamic determination of income can be derived quite readily from the foregoing system - subtracting Yt from (8),

$$Y(t+1) - Y(t) = C(Yt) + I(r_{t+1}) - Y(t) \qquad (15)$$

and substituting (7) for C(Yt),

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1. Ackley forcefully states that in modern theory "we are analysing the rate of interest as part of a complete macroeconomic model, which is the only analysis of the rate of interest that is worth the paper it is written on" (Macroeconomic Theory (New York: MacMillan, 1961) p. 206) Professor Newlyn sets the modern theory of interest determination in Hicks' terms as quite distinct from the initial Keynesian formulation in the General Theory and calls it 'neo-Keynesian' (Theory of Money (Oxford: Clarendon, 1962) pp. 93-109). Hicks' original statement was contained in "Mr. Keynes and the Classics: A Suggested Interpretation" Econometrica vol. 5, 1937, pp. 147-159

$$Y(t+1) - Y(t) = I(r_{t+1}) - S(Yt) \qquad (16)$$

Equation (16) can be lagged back one period to correspond with (14) so that,

$$Yt - Y_{t-1} = I(r_t) - S(Y_{t-1}) \qquad (17)$$

Equations (14) and (17) constitute the basic system for discussion in this chapter. Equation (14) is the loanable funds description of the present (Keynesian) model's inter-equilibrium behaviour and is equivalent to the semi-classical model's equation (4). Equation (17), on the other hand, shows the process of income creation in the Keynesian model - it has a counterpart in the semi-classical model as well which would be given as

$$Yt - Y_{t-1} = I(r_t) - S(r_{t-1}) \qquad (18)$$

In talking about the behaviour of (14) and (17), it is clear, at the outset, that the system permits of Keynesian equilibrium - if $Yt = Y_{t-1}$, then from (17), savings and investment are in equality and, from (14), dishoarding is zero. But does the disturbed system tend to approach this position after a once-for-all change in one of its components?

This important question can be answered affirmatively by a descriptive approach as was employed for the semi-classical model, though the present description must be a great deal more explicit about money income changes since the level of income has a good deal to do with interest rate determination according to equation (14). Begin with the existence of a Keynesian equilibrium wherein savings and investment are equal, associated with some particular income level (according to the propensity to save). The rate of interest stands at a level such that money not demanded for active use is willingly held as idle balances. This interest rate also evokes the requisite amount of investment for equilibrium. Imagine, as before, an upward shift in the investment demand function.

In the current period, saving is fixed at the income level determining it and set at the beginning of the period. As with the semi-classical model where saving is lagged on the rate of interest, this excess investment demand curve faces the L_2-curve in the latter's capacity as a supply curve of active money. The diagram, Figure III, illustrates the outcome in the market period. The EL_2 curve is the supply curve of active balances (inverse of the demand curve for idle balances) beginning at the interest rate prevailing before the shift in investment - r_0. The EI curve represents excess investment demand - i.e., the total investment curve minus investment expenditure satisfied out of the savings flow pertaining to (equilibrium) income at the beginning of this, the first, period. According to equation (17) however, then, idle balances are activated to the extent ΔL_1 and income is augmented to this extent immediately since the Metzler-Lundberg lag is being ignored. Shifting now to the second period, the new income ($\Delta Y = \Delta L_1$) elicits additional savings according the saving function so that the excess investment schedule is located, to this extent, further to the left in Figure IV. In other words, if α measured its location on the abscissa in Figure III and new savings amounts to (say) $S\Delta Y$, then its Figure IV location is measured by ($\alpha - S\Delta Y$) as the diagram indicates. Note that the EL_2 curve in Figure IV begins at the interest rate (r_1) set by the outcome of the first period's events. The outcome of the second period's dealings wherein EI faces EL_2 involves another rise in the rate of interest - from r_1 to r_2 - and another increment to income - ΔL_1. This increment meansthat the savings flow of the third period is again expanded so that the excess investment demand of next period is alleviated again to this degree. One might add a Figure V to illus-

Fig. III

1st period

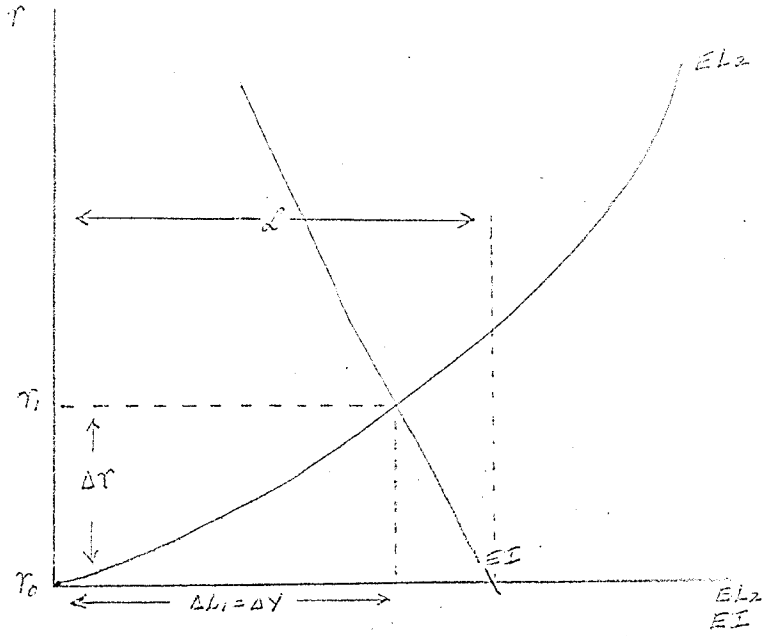
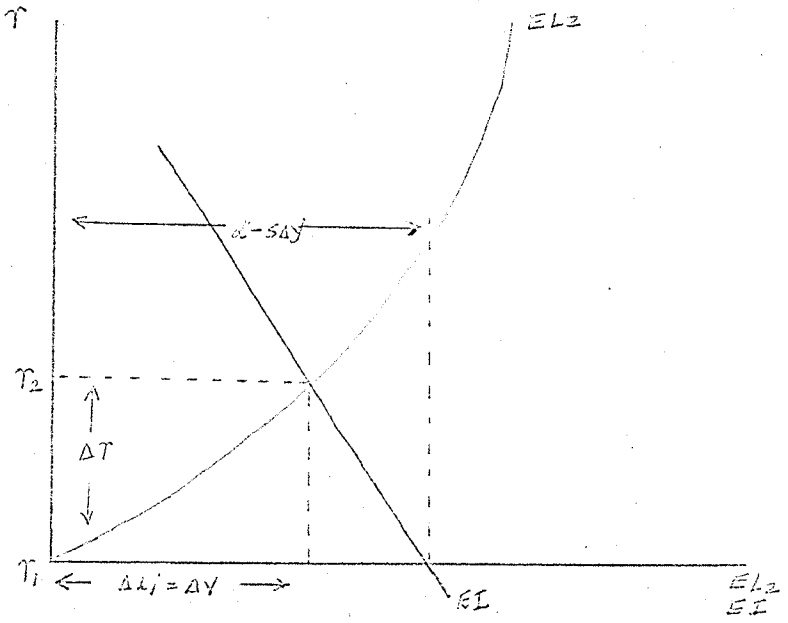


Fig. IV

2nd period



trate the third stage but the process continues strictly analogously to the two preceeding diagrams under present assumptions.[1] These diagrams show an increase of income in a diminishing sequence so that equilibrium at new values of the variables is a gradual tendency. Addition of all the values of ΔL_1 beginning from the first period yields the final change in income, depending for its actual value on,

a) the shape of the $L_2(r)$ curve in its relevant range.
b) the slope of the $I(r)$ curve in its relevant range.
c) the size of the propensity to save (s).

The final change in the rate of interest $[(r_1 - r_0 + (r_2 - r_1) \ldots + (r_n - r_{n-1})]$ depends on these factors as well and is co-determined with the final change in income, this being, of course, the static message of the LM-IS technique.

What is being implied in this approach is the view that the Keynesian system represents a static- or comparative static - view, while loanable funds theory, properly formulated in a modern Keynesian way, can serve to rationalize what happens between Keynesian equilibria when dynamic analysis is desirable. Underlying the analysis as here presented is the view that short-run adjustment takes place continuously in the financial markets during the transition from one Keynesian equil-

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1. The writer conveys, at this point, his apology for whatever difficulty arises in following the diagrams relating to this model. These seemed the simplest possible, however, for the purpose. If the reader finds them at all useful it is a simple matter to construct a similar arrangement to describe the semi-classical system with a lagged savings function.

ibrium to another with the interest rate constrained to move along the $L_2(r)$ schedule,[1] when the model is in motion. Professor Hicks has remarked that,

> "...the financial markets, which are the main haunts of liquidity preference, are notoriously sensitive parts of the economy. The speed with which the liquidity effect can therefore be supposed to act is no doubt one of the reasons why it has become customary since the appearance of Keynes' book, to think of the rate of interest as being determined on the monetary side instead of being governed by the interaction of real and monetary factors, as the equilibrium analysis shows it to be."[2]

The market (inter-period) equilibrium is achieved via movements in the relatively sensitive interest rate but this equilibrium is incomplete for it represents one step on the road to the more complete equilibrium visualized in the Keynesian analysis. For Joseph Conard, a complete interest theory may involve

> "...a market equilibrium that is likely to be achieved rapidly, with its interest rate determined by the forces described in monetary theory... with a ...longer run and more complete equilibrium which is achieved more slowly, as adjustment takes place in slow-moving variables like the level of income and in which the rate of interest is consistent with that de-

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1. this assumption has been questioned by Ackley; see the section on modern reconciliations in Chapter III.
2. J. R. Hicks - A Contribution to the Theory of the Trade Cycle (Oxford: Clarendon, 1950)p. 145

scribed in non-monetary theories."[1]

The system outlined as an incorporation of Robertsonian analysis into the Keynesian model involves Conard's vision of the temporary and the ultimate equilibrium but not precisely in this sense - the Hicksian conclusion that monetary and real factors determine the interest rate is valid and important throughout.[2] It is not here suggessted, as Conard's passage seems to suggest that monetary determination is more or less significant depending on the period of time taken into consideration. Nor is this implied in respect of the real factors: productivity and thrift, as Robertson characterizes them. It should at the same time be clear that the rationale for using the loanable funds theorem as an explanation of movements between Keynesian equilibria rests with the argument that the 'L-M sphere' is in essentially continous equilibrium via rapid changes in the rate of interest while the savings-investment equilibrium is approached by a process in which a shifting L-M equilibrium plays an integral role. Diagram Five purports to show, in a static frame, the trajectory by which equilibrium is fulfilled. The tenor of the argument has been that money-market equilibrium is persistently maintained but that equilibrium in the 'goods market' is temporarily ruptured in the process of achieving a new ultimate equil-

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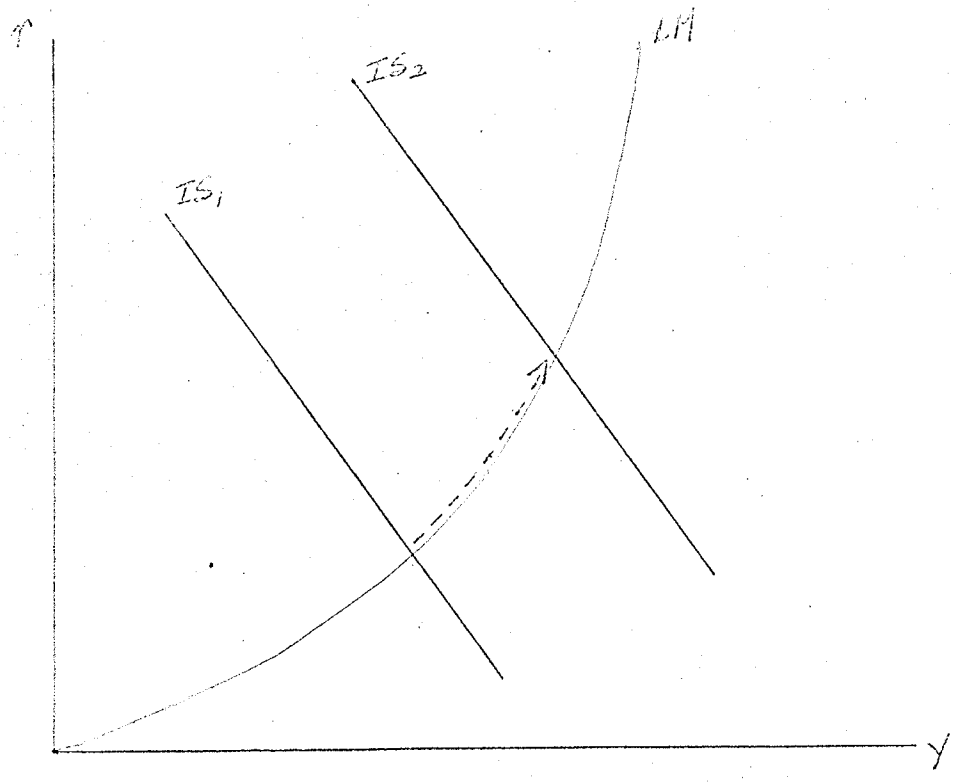
1. J. Conard - An Introduction to the Theory of Interest (Los Angeles: University of California Press, 1963) p. 156
2. The term "ultimate equilibrium", used often in the present paper to describe the Keynesian position shown by LM-IS presentations, is due to Professor H. G. Johnson, "Some Cambridge Controversies in Monetary Theory", Review of Economic Studies vol. 17-19, 1951-52, p.91

Fig. V



ibrium. The remainder of the chapter will be devoted to discussing some additional details of the model and to answering some self-imposed questions about its realism as representative of the thinking of loanable funds exponents...

iii.

Two different models have been presented in the first two sections of this chapter. The first was a simple classical model; the second a simple Keynesian model. It would, at this stage, be possible to build up a composite system linking savings in a lagged fashion to both income and the interest rate but it is not clear that the effect would be worth it: comparisons can be continued without a third model.

The dynamic adjustment mechanism just described demonstrates the multiplier[1]. in its sequential, rather than its logical, operation. Keynes usually linked one equilibrium level of income to another simply in terms of relative sizes and for such a comparison, the logical multiplier was a natural tool. The dynamic analysis however emphasizes the properties of the multiplier process. As Professor Tobin has shown[2]., the multiplier does not reach its full theoretical value in the absence of supporting monetary policy unless $L_2(r)$ is infinitely elastic - unless the economy resides in the 'liquidity trap'. In terms of the dynamic Keynesian model and assuming initial equilibrium as established

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1. R. F. Kahn - "The Relation of Home Investment to Unemployment" Economic Journal vol. 41, 1931, pp. 173-198
2. James Tobin - "Liquidity Preference and Monetary Policy" Review of Economics and Statistics vol. 29-31, 1947, pp. 124-131

well within the liquidity trap, dishoarding to finance a spurt of investment occurs with no change in the interest rate and the new level of investment can therefore be sustained (that is, additional public spending does not put pressure on financial markets in any significant way because the community possesses excess money balances and will disgorge these freely so that private investment spending can go forward at the old rate). Income is augmented to the extent of dishoarding (equal to the spurt of new investment) and next period's savings are accordingly larger, occasioning a slighter need, to this degree, for dishoarding to finance the same volume of investment expenditure. The dishoarding which the second period does require proceeds ex definitione at constant interest cost. The first period's change in income equals the burst of investment (say ΔI) for dishoarding into the active sphere has proceeded to this amount. This change in income - ΔI - elicits savings (equal to $s\Delta I$) in the second period so that maintenance of the new level of investment requires in this second slice of time, dishoarding equal to $\Delta I - s\Delta I$. But this latter represents a change of income eliciting in the third period a volume of new savings equal to $s(\Delta I - s\Delta I)$. New investment is now offset to the extent of s I (due to period two) and $s(\Delta I - s\Delta I)$ (due to period three). The expansion can as usual be written as,

$$\sum_{1}^{n} \Delta Y = \left[\Delta I + (\Delta I - s\Delta I) + \Delta I(1 - s)^2 + \Delta I(1 - s)^3 + \ldots\ldots \Delta I(1 - s)^{n-1}\right] \qquad (19)$$

Ignoring the difference between marginal and average savings propensities, the summation can be given by:

$$\sum_{1}^{n} \Delta Y = \Delta I/s \quad \text{or} \quad \sum_{1}^{n} \Delta Y/\Delta I \text{ (the 'multiplier')} = 1/s \qquad (20)$$

It is clear that in the present framework, each round of

the multiplier - each augmentation of income indicated in (19) - occurs during the income-expenditure period. Like material subject to radioactive decay which is never wholly exhausted so the multiplier is never absolutely complete. When the economy does not reside in the liquidity trap then, in the case of expanded expenditure, new money would be required for equation (20) to be fulfilled. In other words, the LM curve would have to be shifted downward at each step in the expansion so as to keep the rate of interest constant. Figure VI demonstrates the pattern in an exaggerrated fashion. In each period, say at the end, the money supply is augmented just sufficiently to restore r_0 after dishoarding has proceeded - alternatively the new money is handed directly to those who require it for investment. The path of income and the interest rate might follow a saw-tooth shape as the diagram suggests. The total change in income (equal to $Y_1 - Y_0$) will be just equal to the total change in the money supply, the whole of the latter being employed as active balances. "I venture to retell the story in my own language as follows," Robertson commented in discussion of the multiplier, "taking provisionally as my unit of time that interval in which on the average each unit of money enters once into income....in each period the authority is conceived of as acting only partly (and decreasingly) by increasing the supply of money, partly (and increasingly) by maintaining the income velocity of the previously issued supply, i.e., by causing the savings of the public to generate income in circumstances in which they would otherwise have failed to do so."[1].

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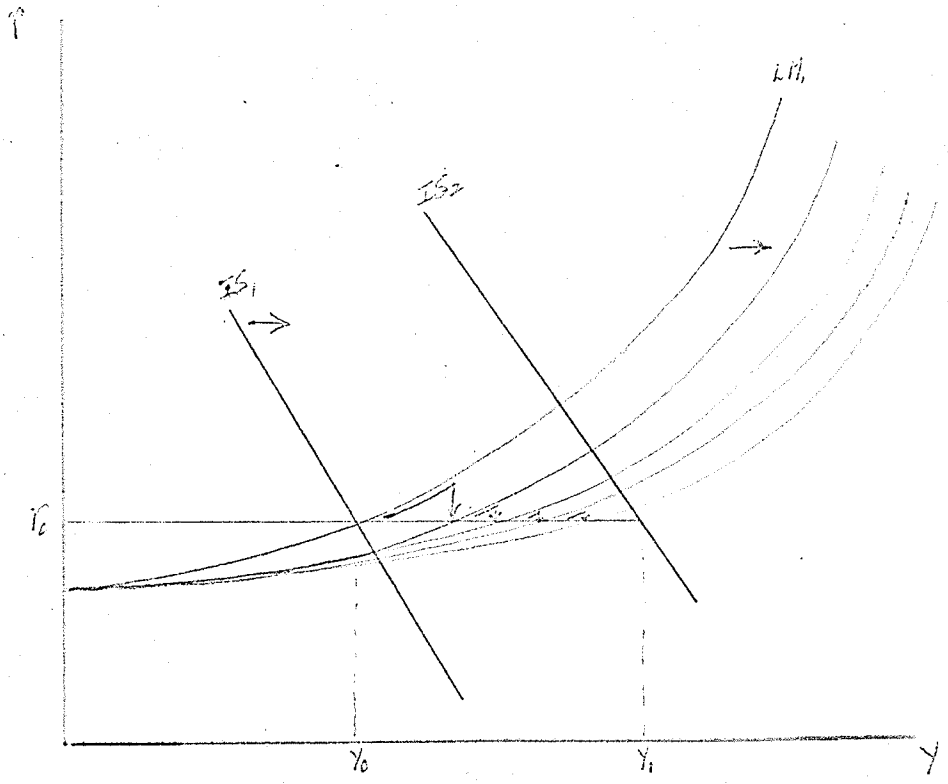
1. D. H. Robertson - "Some Notes on Mr. Keynes' General Theory of Employment" Quarterly Journal of Economics, vol. 51, 1936.

Fig. VI



It would be a mistake to imply that Keynesian and Robertsonian positions can be wholly reconciled via construction of a dynamic system converging on a steady (i.e., sequentially repetitive) equilibrium position. The nature of the model just outlined was indicated by a verbal discussion which masked the possiblity, so important in D. H. Robertson's thinking, that the system might not, due to changes in parameters, evolve to a position of 'statid' equilibrium. For Sir Dennis, the most important way of looking at the model was in its transitional, disequilibrium condition for, in his view, this condition corresponded most nearly to reality. He is careful "...not to deny that, as a result of monetary expansion, a position of stable equilibrium at an enhanced level of income may be reached, in which...the rate of saving and the rate of investment per unit of time are equal, and no further net money creation or dishoarding, or the converse, is taking place."[1] But the final equilibrium was not, for Robertson, the important attribute of capitalism - its true nature was turbulence, as Schumpeter phrased it, "creative destruction" and economic Darwinism. Change is heaped upon change and even the parameters of the model can be unreliable: about the consumption function on which the multiplier depends, he added "...in this so-called marginal propensity to save (not very happily called, as I think, for the propensity to save depends on other things besides recently acquired income - on capital wealth for instance, and especially perhaps on the proportion of capital wealth which is ready to hand and easy to spend), we have a potentially useful little trick, but not yet a very firm foundation for that imposing edifice of com-

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1. D. H. Robertson, op. cit. p. 186

bined prosperity and stability which we would all like to build if only we knew how."[1]. Robertson also visualized the accelerator as preventing the attainment of stable equilibrium; savings, he used to remark, might well "walk off" to finance new induced investment which had no part in creating the income from whence these savings were derived. The relatively static marginal efficiency of capital curve of Keynesian models contrasts sharply with Robertson's vision of the shifting, restless productivity of capital when innovations are frequent and important, when expectations are buoyant and reenforcing...equilibrium is an impossible assumption in such a world. It is an impossible assumption for any economist like Robertson, Schumpeter or Spiethoff, for whom the essence of capitalism is the change wrought by the irregular ebb and flow of investment opportunities and the attendant irregular ebb and flow in the demand for credit. In such a system it is not difficult to see the ascendency of the loanable funds approach arising from the considerations of disequilibrium; of anti-tranquility. "There is much to be learned," Mrs. Robinson has allowed, "from a priori comparisons of equilibrium positions, but they must be kept in their logical place. They cannot be applied to actual situations; it is a mortal certainty that any particular actual situation which we want to discuss is not in equilibrium."[2]. And about the Keynesian system, Ohlin remarked: "I cannot find

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1. D. H. Robertson - Money (Chicago: Chicago Press, 1962) Chapter 10, p. 178
2. Joan Robinson - Essys in the Theory of Economic Growth (London: MacMillan, 1962) p. 25.

that the economic system tends toward a stable equilibrium described by simple reference to the change in the volume of investments. It is highly improbable that the system ever gets to a state where expectations are fulfilled...nor is there a tendency to move in the direction of some such position. And if the system should happen to get into such a position, this does not mean that it tends to remain there."[1] Ohlin does not admit even the magnetism of equilibrium but his postion, let it be said, is rather stronger than the one being taken here. The great power of equilibrium, albeit a seductive power, is its ability to act as a frame of reference for a dynamic analysis; its ability to demonstrate the system's likely behaviour between those shocks and dislocations whose absence would otherwise permit what is only a tendency to equilbrium to be transformed into the beautiful state itself.[2] A loanable funds theory which expresses the determinants of the rate of interest in a system which is forever approaching and seldom, if ever, reaching a Keynesian equilibrium is an accurate and important description of reality. Description of equilibrium as that state which a turbulent system is becoming is significant in its own right. Sometimes equilibrium may even be temporarily realized...so it may have seemed to the author of the General Theory in

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1. B. Ohlin - "Some Notes on the Stockholm Theory of Saving and Investment, II" Economic Journal vol. 47, 1937, p. 238
2. c.f. Ragnar Frisch - "Propagation Problems and Impulse Problems in Dynamic Economics" in Economic Essays in Honour of Gustav Cassel (London: Allen and Unwin, 1933) pp. 171-206

the depths of the Great Depression. Keynes certainly made it clear at one point at least in the General Theory that equilibrium ought to be regarded as a goal in the development of a rationally arranged simulation of economic reality although it is not capable of exactly describing the system at any chosen time; discussing Hume's contributions to the stream of monetary thought, he credits him with starting "...the practice amongst economists of stressing the importance of the equilibrium position as compared with the ever-shifting transition towards it, though he...[Hume]...was still enough of a mercantilist not to overlook the fact that it is in the transition that we actually have our being..."[1].

The statical impression of the General Theory and the statical interpretations of it cannot, apparently, be viewed as completely representative of Keynes' general method of thought. Six years prior to the General Theory stands the record of monetary theory given in the Treatise on Money and in the latter work, dynamics is central in Lord Keynes' thinking. A coherent monetary theory must "...treat the problem dynamically, analysing the different elements involved in such a manner as to exhibit the causal process by which the price-level is determined, and the method of transition from one position of equilibrium to another"[2]. The "fundamental equations" there set out are basically dynamic -

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1. J. M. Keynes - General Theory of Employment, Interest and Money (London: MacMillan, 1936) p. 343n.
2. J. M. Keynes - A Treatise on Money (London: MacMillan 1930) Vol. One, p. 134

take the second fundamental equation, being the most general:

$$\pi = \frac{E}{O} + \frac{I-S}{O} \qquad (22)$$

where π is the general price level, E is total money income, O is total output of goods, I is money value of new investment, and S stands for the money value of savings defined as the difference between money income in a unit of time and expenditure on consumption goods in the same period of time. Removing the emphsis from the price level through multiplication by 'O' and re-defining 'πO' as the current period's total money income (Yt), one has,

$$Yt = E + I - S \qquad (23)$$

Now 'E' corresponds to the previous period's income (Yt - 1) while 'I' and 'S' apply to the current period so that (23) can be re-written as

$$Yt - Y(t - 1) = I_t - S_t \,, \qquad (24)$$

an expression which is very similar to both equations (17) and (18) representing the dynamic process of income generation in the Keynesian and semi-classical models, respectively, as previously set down. Professor Ohlin also expressed faith in the ability of economists to modify a species of quantity equation into a dynamic analysis of income and prices. He observed the transition from Myrdal's formulation which "does not attempt to construct a dynamic price theory which considers the rate of change..." to Lindahl's interpretations involving "an analysis of a process in time, which is divided into different periods". And Ohlin specifically credits Robertson with an influence in this transition[1], as does

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1. B. Ohlin - "Some Notes on the Stockholm Theory of Savings and Investment, I" Economic Journal vol. 47, 1937, pp. 54-5

Keynes himself in the preface to his Treatise. In the Treatise, Keynes introduces the constraint that the rate of interest must lie on the public's demand curve for idle balances - he says: "The price level of investments as a whole, and hence of new investments, is that price level at which the desire of the public to hold savings deposits is equal to the amount of savings deposits which the banking system is willing and able to create."[1] An excess of investment over saving involves a transfer of deposits from the savings-deposit sphere to the business-deposit sphere and would, in the absence of compensating action on the part of the banking system to increase savings deposits in the hands of the public, depress the prices of securities. The public can be induced to move along its demand curve for savings deposits: "...the amount by which the creation of a given quantity of deposits will raise the price of other securities above what their price would otherwise have been depends on the shape of the public's demand curve for savings deposits at different price-levels of other securities."[2] Keynes could perfectly well have expressed his relations in terms of a loanable funds theory at this stage of his rapid advance toward the statement of the General Theory, for alteration in the mix between idle and active money clearly plays a role in this dynamic theory. Hoarding and dishoarding had not as yet become, for him, repugnant terms. He also makes it clear that "...in equilibrium...the public is neither bullish nor bearish of securities...and...the volume of saving is equal

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1. J. M. Keynes - Treatise on Money (London: MacMillan, 1930) Vol. One, p. 143
2. J. M. Keynes , ibid., p. 142.

both to the cost and to the value of new investments..."[1]. The exact method of transition from one such equilibrium to another is not plainly stated although it involves this change in the mix of idle and active balances which can be characterized as hoarding or dishoarding. The later argument that savings and investment are necessarily continuously equal was a bugaboo...a condition only applicable to equilibrium: David McC. Wright comments that, "...Keynes has shown that it is always possible to arrange the national accounts so that the net saving and investment of the periods are equal. For example, if actual investment exceeds planned savings because it has been financed either by more bank credit or the transfer of idle funds from speculative balances there will be windfall profits. We add the windfall profits to the planned saving and the total 'saved' will then equal the amount of investment. Reverse the case and the reverse will be true...in this sense the equality of saving and investment is a mere logical quibble."[2].

There are, of course, any number of ways of forcing identity between savings and investment - "windfall profits" is just one method, implying rising prices. If prices do not rise but stocks of finished goods are depleted at last period's prices, then the identity can be preserved by including a positive change in inventories as investment. A combination of both definitions may be used. Or, the immediate passage of dishoarded finds into the income stream leaves one open to interpret this new, and as yet unspent, income as unintentional savings to be added to the actual flow of saving vol-

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1. ibid., p. 146
2. D. McC. Wright - The Keynesian System (New York: Fordham, 1962) p. 42

untarily offered in the period considered. A rise in the price level may be looked on as 'forcing savings' in some sense by reducing real consumption. All these possibilities have, at one time or another, been suggested in satisfaction to the god of continuous saving-investment equality.

Now it can be said, as Professor Tsiang apparently did,[1] that complete reconciliation of the Keynesian and loanable funds theories is achieved by the understanding that Keynes was concerned with a point of inter-equilibrium transition while Robertson was describing an interval (defined above) of time in a disequilibrium system. The undated nature of the 'fundamental equations' would support this view together with the absence in the Treatise of a loanable funds equation in any way comparable to equation (14) listed above. Keynes was viewing a dynamic system at a point of time in a strictly 'stock' manner - observing the determination of the rate of interest by the supply and demand for inactive funds, the size of windfall profits and inferring the latter as the difference between two recent flows: those of saving and investment. But while stocks are clear-cut at a point of time, flows don't exist at all; they require an interval to become economic observables. It was the interval that Professor Robertson insisted upon when he pointed out that "there are inevitable difficulties in expressing in statically-framed terms the situation existing at a moment of time during a period of change; it is precisely for this among other reasons

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1. in his article "Liquidity Preference and Loanable Funds Theories...A Synthesis" (American Economic Review vol. 46, 1956, pp. 539-564) in which the early section of the second model derived depends so heavily.

that Mr. Keynes' photographic formulation seems to me to need supplementing by a cinematographic one".[1] This question is, of course, entirely separate from the question as to whether the General Theory was expressed in terms of ultimate equilibrium - equality not only of supply and demand for money but also of savings and investment - as opposed to an expression and description of transition between such states. The question at hand has rather to do with alternative views of the transition period only: the Robertsonian view involving an interval of time and the view imputed to Keynes (of the Treatise at least) by Robertson and Tsiang wherein a process of change can be looked at using a "moment of time" rather than an interval. The present writer inclines to look at such snapshots as deceiving when an essential part of the system is flow analysis; intervals are not optional gear when flows are deemed important in a model. To the extent therefore that Keynes may be said to apply statical concepts to a transition period by looking at the interest rate determination model at a point of time, he sacrifices a complete picture of how the system attains its ultimate equilibrium shown in the Hicksian LM-IS formulation and suggests, unreasonably, that a serious rift exists between liquidity preference and loanable funds methods; a rift which Robertson did not believe to exist at the time of the original dispute.

Before this line of criticism gets out of hand, it ought to be added that its content is largely unimportant in terms of the reconciliation here attempted.

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1. D. H. Robertson - "Mr. Keynes and the Rate of Interest" American Economic Association Readings in the Theory of Income Distribution ed. Fellner and Haley (Homewood: Irwin, 1951), p.440

The reason is that it is not wholly clear that Keynes viewed fleeting inter-equilibrium states in the same static terms as he viewed what has here been called the ultimate (or Hicksian) equilibrium. It is this last as a tendency which we identify here as the Keynesian theory of interest (and income) determination. The other question asks whether or not Robertsonian methodology provides a valuable and accurate method of discussing transitional behaviour and the second of the above two models has answered this, it is hoped, affirmatively. There may well be other methods of looking at the process described in loanable funds analysis and these methods are not hereby ruled out.

iv.

Recent controversy about the liquidity preference and loanable funds approaches centres on what has been called the 'stock-flow' problem.[1.] This problem is indeed a complex one; it might be useful at the outset to point up two fundamental questions relating to any economic market:

a) are the participants in the market aiming at possessing a stock of the good in question, depending on

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1. for lists of the articles involved in this somewhat voluminous debate see H. G. Johnson- "Monetary Theory and Policy" American Economic Review, vol. 52,1962, pp. 335-84, and G. Shackle - "Recent Theories Concerning the Nature and Role of Interest", Economic Journal, vol. 71, 1961, pp. 209-254 (both reprinted in Surveys of Economic Theory (vol. one), London: MacMillan, 1965). The present paper notes some contributions as well in the bibliography following.

the price, or are they aiming at achieving some flow of the good in question relative to some particular period? b) once property a) has been decided upon, to what extent do the market participants fulfill their aims in any particular period and if they fall short (or possibly exceed) these aims, what subsequent action is taken by way of compensation for such a miscalculation or incompletion?

For any particular market - be it for bonds, food or old masterpieces - the answers to the two questions posed are a question of fact. Economic theory, when describing any particular market, alone or as a section of general equilibrium analysis, must simply do its best to approximate, in a fairly convenient manner for a model system, the stock-flow properties of the market as it operates in reality. In what follows, these strictures ought to be remembered; the criteria in judging the market mechanisms of the second model (above) will be in terms of manageability and realism.

Clearly, the two questions posed are wide enough to permit a considerable variety of economic markets to exist, not to mention the possibility that different sections of the same 'market' may reflect differing aspirations on the parts of the respective groups of participants. Such markets have been classified as 'stock-flow' markets (by Clower and Bushaw[1]), the price determined being due to the interplay of both stock desires and flow desires treated in an additive fashion. This

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1. R. Clower and Bushaw - "Price Determination in a Stock-Flow Economy" Econometrica vol. 22, 1954, pp. 328-343, and Clower - "Productivity. Thrift and the Rate of Interest" Economic Journal vol. 64, 1954, pp. 107-115

is the type of market one has to worry about in the loanable funds-liquidity preference reconciliation. The Keynesian model is concerned with the stock of money to hold and the flow of money going into current purchases of securities by way of savings: the stock-flow relations for securities is implicit in the model. Money is the key variable. For consistent comparison, this must also be so of the loanable funds theory and has been assumed to be the case in the preceding discussion. But alternative interpretations of the loanable funds model have sometimes been proposed: chapter one has already noted that Professor Ohlin preferred to treat supply and demand for credit, i.e., financial obligations. Hicks, in 1938, reconciled the theories by arguing that the loanable funds theory referred to the demand for bonds as a stock as determining the rate of interest[1], and it is clear that Ohlin's terminology, that is, his tendency to emphasize credit flows rather than monetary flows, could lead to an interpretation of the loanable funds theory in terms of stocks of securities. Hicks' view, when combined with the Keynesian approach - that the interest rate depends on the demand for money as a stock - in the context of a general equilibrium suggests that in solving the general system, one or the other demand function can be removed. Whether one is left with a loanable funds or liquidity preference theory of the rate of interest then would depend simply on which demand function were discarded. This approach is valid only provided

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1. J. R. Hicks - Value and Capital (Oxford: Clarendon, 1939) pp. 153-162. More detailed discussion of Professor Hicks' reconciliation of liquidity preference and loanable funds theories follows in Chapter Three.

the definition of loanable funds employed is considered reasonable...most succeeding writers have not thought so, believing adamantly that the loanable funds approach is, instead, strongly flow oriented. A second alternative formulation was that loanable funds theories must be referring to flows of securities rather than monetary flows and it is clear that these flows must indeed be kept in mind...more will be said about such flows in a moment.

Assuming that monetary stocks and flows are the most important touchstone of both theories, what properties of these stock-flow variables are required to produce the sort of reconciliation attempted here? True to Keynesian thinking, the influence of stocks is profound; in fact, the stock equilibrium characterized by the liquidity preference schedule cannot be ruptured, it is continuously maintained on an intraperiod basis. The stock itself is, however, changing to reflect (temporary) disequilibrium in the flow section of the market consisting of saving and investment. Professor Johnson has described the action of a stock-flow market in the following terms as one possibility: "...price is determined at every moment by the demand for the existing stock, but at this price, there may be a net flow demand or supply which gradually changes the existing stock and therefore the price; and full equilibrium requires a price which both equates the stock demand and supply and induces a zero net flow".[1] This is precisely

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1. H. G. Johnson - "Monetary Theory and Policy" American Economic Review vol. 52, 1962, p. 363, intended as a description of K. Brunner's approach in "Stock and Flow Analysis: Discussion" Econometrica vol. 18, 1950, pp. 247-251

the way the Keynesian adjustment has been looked at as it moves toward ultimate equilibrium; if and when the latter has asserted itself, the net flow into, or out of, idle funds is zero. The flow of savings and investment is of course positive in ultimate equilibrium but utilizes not idle balances, by definition, but rather a fraction of transactions balances depending on the propensity to consume.

Provided the flow into or out of idle balances reflects the exigencies of continuous stock equilibrium in the demand for money and provided saving and investment flows can be properly defined and are unrelated to questions of stock equilibrium in the balance holding sphere, the model here advanced does not run into trouble from the new stock-flow debate. Klein[1] strongly objected to the implication that, because in some instances, a flow may be regarded as a change in stock, the two concepts always stand in this relation to one another. Professor Gardner Ackley in particular takes a strong stand against the view that the hoarding-dishoarding flows of the loanable funds formula can be interpreted as changes in stocks occurring on the locus of the L_2-curve. He regards hoarding as a decision relating specifically to flows in the current period. If however, these flow decisions can be related to the difference between actual idle balances and balances desired according to the liquidity preference schedule, then the path to ultimate equilibrium, in the Hicksian LM-IS sense, is modified though the achievement of this state is not precluded. Under

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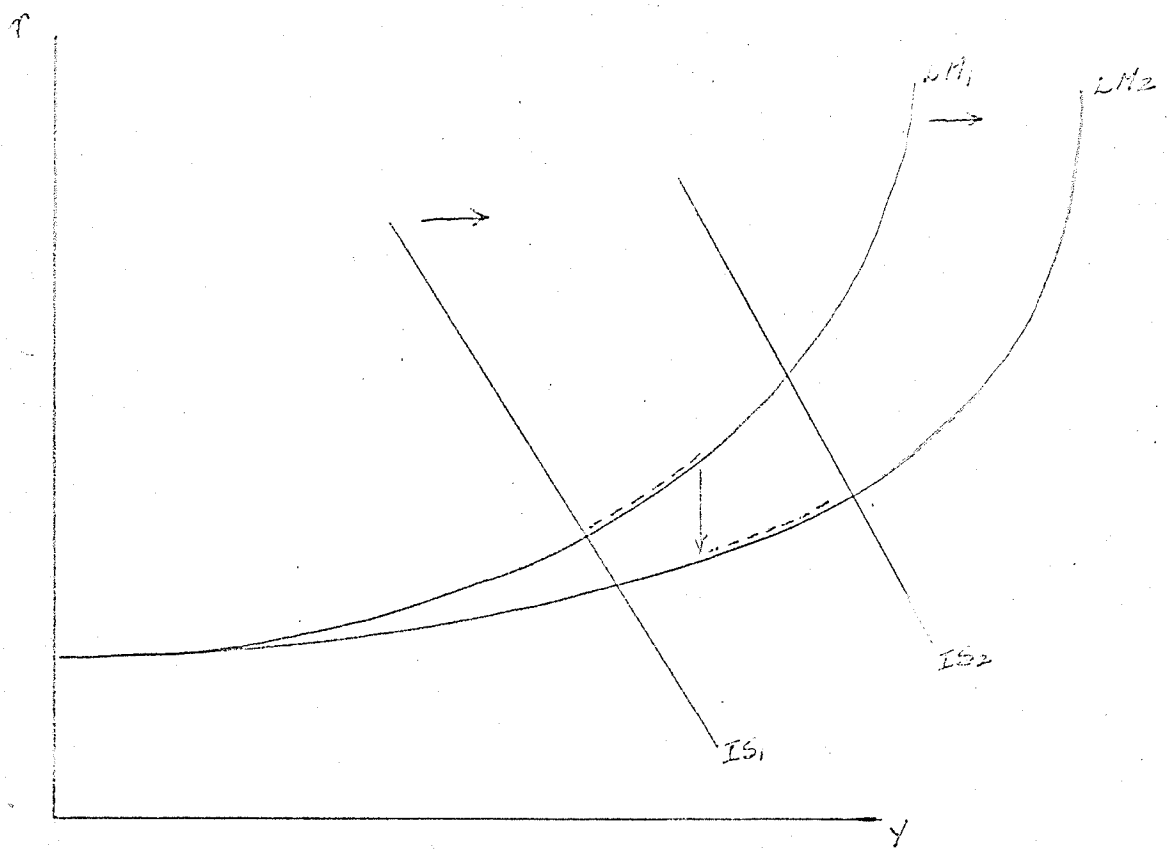
1. Lawrence Klein - "Stock and Flow Analysis in Economics" Econometrica vol. 18, 1950, pp. 236-241

Ackley's assumptions, the L-M function loses its constraining property during the transition from one Keynesian equilibrium to the next. The formulation of this alternative opinion about the reaction speed of money market participants is reserved for Chapter Three which discusses various historical attempts to synthesize Keynesian and loanable funds doctrines as well as mentioning critiques of these syntheses. Identity of stock and flow analysis is definitely not being assumed in the present discussion - it is only being assumed that in this particular market, the aspirations of the participants express themselves in stock demands while the nature of the particular market is such that price changes occur rapidly so that stock equilibrium is continuously in effect - the L_2-curve is a constraint, that is, visually, the economy may slide along the L_2-curve but may not find itself temporarily off the curve. The dominant aspect of this stock equilibrium in the process of adjustment can be most easily seen by the effects of a shift in the liquidity preference curve. Should it transpire that a shift in liquidity preference occur (say during a period of disequilibrium adjustment following a shift in the investment demand function), instantaneous market equilibrium occurs via a change in the interest rate: instability of stock equilibrium changes the initial conditions under which the flow adjustment operates and, in fact, sets up its own flow adjustment as does any other shift in the basic functions (see figure seven). This sort of instability in the demand for idle balances was important in the original Keynesian formulation and lends a further reason (additional to the volatility of investment demand) to suppose that ultimate equilibrium is the tendency while transitional disequilibrium states are the

Fig. VII



realistic norm. In any event, diagram seven brings out clearly the dominance of the demand for money as a stock of idle balances in defining the nature of both temporary and ultimate equilibria and it is in the sense that the rate of interest must always adhere to the L_2-curve (or the LM curve) that it is reasonable to declare that monetary factors are the key to understanding the actual rate of interest as "...the price which equilibrates the desire to hold wealth in the form of cash with the available quantity of cash...[represented by]... a smooth curve which shows the rate of interest falling as the quantity of money is increased."[1.]

It would be possible to discuss this sort of system including lags and distributed lags with respect to the monetary sphere or with respect to savings and investment schedules. The effects thereby achieved on the equilibrium tendency remain yet to be explored although two contributions in this line ought to be noted: in his discussion of monetary factors in A Contribution to the Theory of the Trade Cycle, Professor Hicks chose to lag investment decisions on the rate of interest reflecting a gestation or decision lag. In terms of his own famous diagram from earlier analysis, the only change is that the IS curve is elastic to yesterday's interest rate and this produces a familiar cobweb form of adjustment (illustrated in figure eight) according to Professor Hicks. He suggests that this is a form of monetary trade cycle but not only is the exact mechanism of adjustment absent in this model but the cycle it pro-

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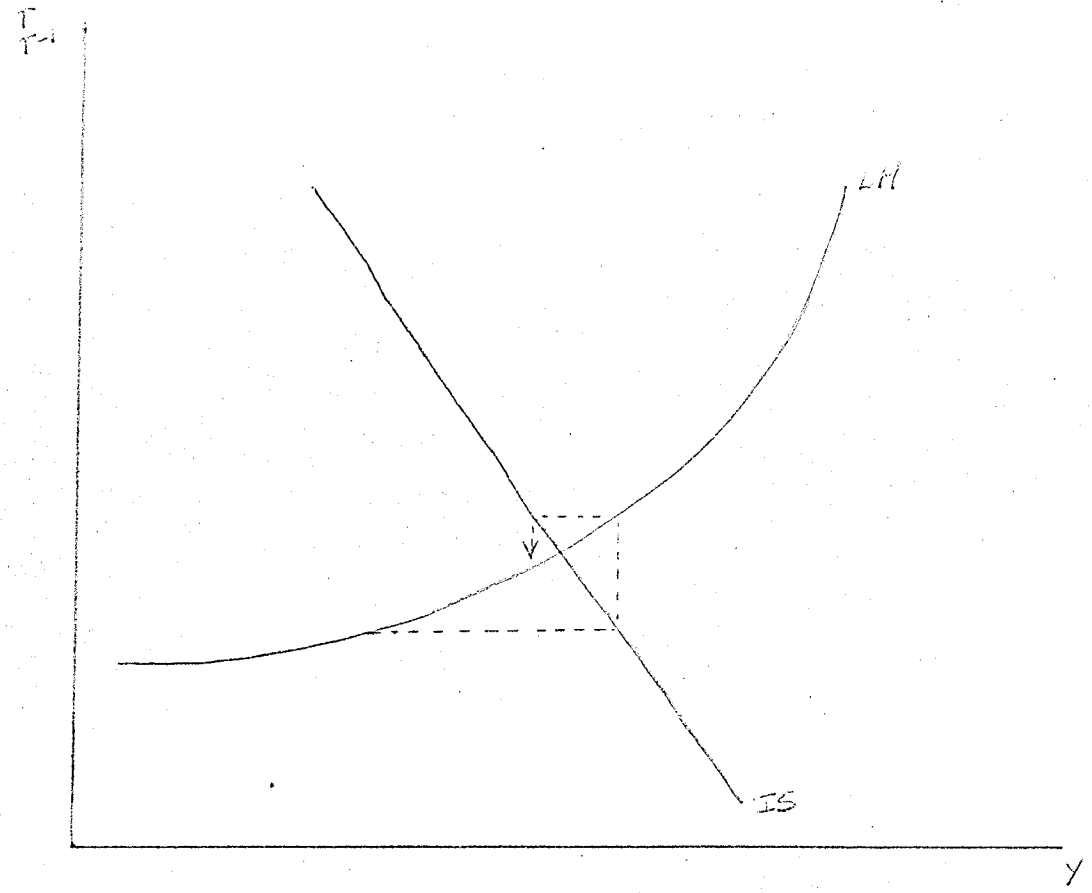
1. J. M. Keynes - General Theory of Employment, Interest, and Money (London: MacMillan 1936) pp. 167-171

Fig. VIII



duces is a wierd one with income and interest rate movements occurring in alternation, an effect which past business cycles do not confirm.[1] In another contribution, D. Smyth began with the same assumption that investment spending is lagged on the rate of interest and went on to add an accelerator as well.[2] Smyth's article, and a precursor by H. Minsky (footnote below) accept the emptiness of strictly non-monetary approaches to business cycle theory (and, one might add, growth theory). The ultimate Keynesian equilibrium is not employed in their analyses for the obvious reason that it is never attained and they require a dynamic monetary theory which utilizes, at the same time, the basic contributions of Keynesian theory. This is a direction in which theoretical economics is surely headed - we have dynamic theories of cycles and growth involving intricate spiderwebs of real variables sequentially related in ingenious ways and to this it seems highly probable that a dynamic monetary theory will be added containing its own problems of lagged or unlagged adjustment and at the same time generating problems of real versus monetary relations in a moving economy.

Returning to more direct questions of stock-flow relations, some difficulties have evolved around the choice between bonds or money as the key variable in

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1. J. R. Hicks - A Contribution to the Theory of the Trade Cycle (Oxford: Clarendon, 1950) Chapter Eleven, p. 201
2. D. J. Smyth - "Monetary Factors and Multiplier-Accelerator Interaction" Economica vol. 30-31 1963, pp. 400-407, also the earlier article "Monetary Systems and Accelerator Models" by H. Minsky(American Economic Review vol. 47,1957) pp. 859-83

interest theory. The present discussion has been carried on in terms of money since both Keynesian and Robertsonian theory can be interpreted as being mainly concerned with this variable, as regards interest determination at least. A wider theory will however take more explicit note of stocks and flows of securities; the basic problem, leading to a theory involving multiple asset-holdings, has been pointed out, in independent contributions, by Turvey and by Gurley and Shaw.[1] Turvey draws Keynesian liquidity preference curves as dependent on the stock of bonds required to be held in conjunction with the idle money-stock. Comparing different Keynesian equilibria as in figure nine, it was Turvey's contention that an economy with a 'small' stock of bonds (but a stock of money equal to M) would have an equilibrium interest rate of r while another economy, alike in all respects, with the same stock of money, but having a 'large' stock of bonds would reside, in equilibrium, at a higher interest rate - r'. The differences in equilibrium conditions are meant to reflect a theory of asset choice whereby a rate of interest equilibrates not only the demand and supply of bonds (the approach has been expanded by Tobin and others recently to the point of Walrasian generality[2]). Concentrating on the traditional liquidity preference curve obscures the fact that saving-investment flows add to the stock of securities to be held although only

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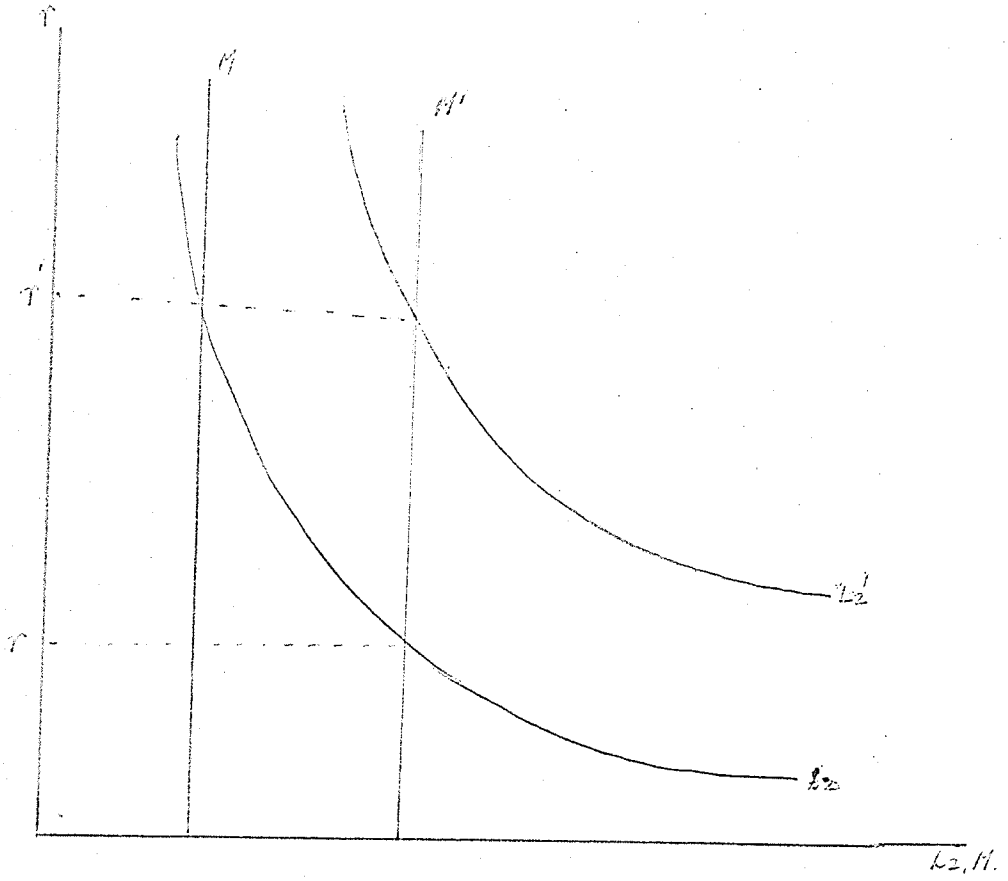
1. Ralph Turvey - Interest Rates and Asset Prices (London: Allen and Unwin, 1960) Chap. Two
   Gurley and Shaw - "Financial Aspects of Economic Development" American Economic Review vol.45, 1955 esp. pp. 523-32
2. for example, Brainard - "Financial Intermediaries and a Theory of Monetary Control" Yale Economic Essays vol. 4, 1964, pp. 431-82

Fig. IX



inequality of savings and investment flows makes an impression on the stock of money to be held inactive. Thus there is an assymetry. Suppose equilibrium has obtained at r in figure nine in the sense that savings and investment are equal while the public is just prepared to hold the existing stock of money and bonds at the bond price implied by the level of r. But the going forward of saving and investment adds to the stock of bonds to be held in the following period, depending quantitatively on the degree of external finance so that the Keynesian equilibrium appropriate to the second period in such an anlysis may involve interest rate r' rather than r, the rise being necessary to induce the public to hold bonds in place of money or rather, bonds without the compensation of an additional supply of money equal to M'-M. Gurley and Shaw remark that "...an ample supply of money implies in the Keynesian model that the taste for liquidity is relatively sated. With bonds in short supply to spending units, the taste for interest is relatively unsated and the price of bonds in terms of money is high. If bonds are not held by banks but by the public, money and liquidity are in short supply. Then the taste for interest income is relatively sated, bond prices are low in terms of money and the interest rate is high."[1]. They go on to affirm that the external finance of investment spending by the issue of securities is likely to create a deflationary influence on investment spending itself unless active money creation offsets the resulting period by period upward shifts in the L_2-curve. Their interpretation of

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1. J. G. Gurley and E. S. Shaw - "Financial Aspects of Economic Development" American Economic Review vol. 45, 1955

the demand for balances is not Keynesian however: it is "diversification" demand (to use their own term), not speculation, which defines the postion and shape of the demand curve for idle balances. Both influences must be reckoned on in a complete theory and the addition of diversification aspirations to the speculative element of the General Theory requires the explicit attention to stocks and flows of securities that is being evolved in the present literature. In an economy whose subjects are prone to diversify portfolios between money and a range of securities (here referred to by the all-embracing and inadequate term 'bonds'), a constant supply of money cannot be expected to maintain static equilibrium if saving and investment involve the piling up of new securities period by period. Growth of the money supply becomes an organic condition for 'staying in the same place'.

With the exception of this problem surrounding the accumulation of illiquidity in Keynesian 'equilibrium', the stock-flow discussion with respect to bonds has centred on points similar to the discussion with respect to money. Since the present commentary assumes that the choice between idle money and old securities is taken in separation from the decision to save or consume current income, the comments of writers on the nature of the bondholders' aspirations will be largely the converse of the nature of idle balance holders' aspirations as summarized in the liquidity preference schedule (with possible modifications to allow for the diversification nature of demand for money and securities by the public). Clower's 1954 article[1] on the stock-flow relations

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1. R. Clower - "Productivity, Thrift, and the Rate of Interest" Economic Journal vol.64,1954 pp. 107-115

making up a theory of interest determination is phrased in terms of security holdings and the changes in these holdings. Clower tackles the problem from the point of view of diversification demand rather than from the pure liquidity preference side - liquidity preference is introduced as a particular case of price expectation: "...an individual will distribute his holdings in such a way as to equalize the marginal advantages of holding a dollar's worth of any one asset with the marginal advantages of holding an equal value of any other asset. That is to say, given expected future prices and given the current prices of all other goods, an individual's demand for bonds will be a function of current bond prices."[1] The demand curve for bonds so conceived is demand for a stock of bonds and the equilibrium is achieved continuously as the price intersection of this demand function and the fixed supply of old securities available to hold. But the price hereby prescribed probably induces flow disequilibrium whereby net new issues are positive or negative (positive or negative investment) and this flow disequilibrium produces, period by period, change in the stock of old bonds which must find holders and, according to the elasticity of the demand for securities curve, change in the price of bonds. Flow disequilibrium in Clower's sense covers both temporary and ultimate equilibrium in the model given above: in temporary equilibrium both the stock of bonds and the stock of money to hold is changing and exerting a double-barreled effect on the rate of interest (the price of securities), in the ultimate or Keynesian equilibrium, Clower's flow disequilibrium applies only to a changing stock of bonds for saving and investment are

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1. ibid, p. 107

in equality. In both cases, the rate of interest does not maintain a steady level. Unless it is posited that the public desires to augment its old bond stock by each period's saving without balancing the increase by holdings of money (a view that may well be accurate), the only persistent equilibrium with an unchanging money stock is zero saving and investment (net).[1] In conditions of flow disequilibrium, Clower grants a tendency for dual (stock and flow) equilibrium to be established via the gradual mechanism that, with respect to the liquidity preference 'side of the picture', has been identified with the operation of the Kahn-Keynes multiplier in terms of money income. But he echoes the approach of Robertson: "...changes in productive techniques occur almost constantly, and individual expenditure patterns are subject to ceaseless development over time. If considerations of this sort are introduced into the model, it is apparent that its behaviour

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1. The suggestion that the willingness to add to the stock of bonds, that is save rather than consume is likely to depend on additional money being created to 'balance' (in the portfolio-liquidity sense) the addition to security holdings can most economically be expressed by returning to a classical dependence of savings on the rate of interest (as well as income following Keynesian rules). But with this notion savings varies inversely rather than directly, with the interest rate, because, the lower is the rate of interest, the greater is the supply of idle balances available to balance additions to security portfolios. This would be in part offset by the usual unattractiveness of highpriced securities...

will be different from that outlined... Bond prices will still tend towards a stationary...[ultimate]... equilibrium level, but the stationary equilibrium position will itself shift with the passage of time so that the market may 'develop' indefinitely..."[1].

According to Clower's interpretation which agrees with the view presented in the model of section ii, the stock equilibrium is the dominant determinant of the level of the rate of interest at any point in time. Both Brunner and Shackle[2]. are in basic agreement with Clower's views on this point, though Shackle asks what price conditions are required if non-zero flow equilibrium must persist alongside stock equilibrium when both segments of the market are sensitive to the price in question. No such equilibrium is possible with positive flows if the flow is conceived of as adding to stock continuously unless stock demand rises period by period paripassu with the addition to stock generated by the most recent flow into the market. If stock-flow equilibrium is to be a possibility, the flow demand schedule must be interpreted as an 'increase in stock' demand schedule in the dyhamic Keynesian model sketched above. The liquidity preference schedule is a speculative sub-

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1. R. Clower - "Productivity, Thrift, and the Rate of Interest" Economic Journal vol. 64 1954, p. 114
2. K. Brunner - "Stock and Flow Analysis: Discussion" Econometrica vol. 18, 1950, pp. 247-251
   G. Shackle - "Recent Theories Concerning the Nature and Rate of Interest" Economic Journal vol. 71, 1961, pp. 209-254.

stitution curve, that is, movements along the L_2 locus imply an exchange of money for bonds; otherwise Turvey's method of multiple liquidity preference functions would be required. The nature of the market is such that the speculative substitution curve is always adhered to as the model develops. A more complete model would include in the liquidity preference schedule the motives for diversification as between the public's holdings of money and all securities as Clower and Gurley-Shaw emphasize. Saving also involves exchange of money for securities, and as a decision, is regarded as separate from the one implied by the liquidity-preference schedule. Hoarding income is admissable, for example, by admitting an upward shift in the liquidity-preference function simultaneously with a downward shift in the propensity to save during the period considered. The desired saving flow as a proportion of last period's receipts is fully realized; recalling that, by a period, is meant the necessary time lapse for a unit of money of average income velocity to pass from one income recipient to the next. The dynamic Keynesian model presented here has ignored the buildup of securities occasioned by the act of saving and the effects of this growth in stock on the liquidity preference schedule over time: in summary, three interpretations are possible, either the rate of interest is driven upward by this accretion of securities, represented by a rightward movement of the L_2-curve (Turvey, Gurley-Shaw), or the public is construed as demanding a steadily larger amount of securities alongside the same stock of idle balances so that the L_2-curve remains steady in spite of saving, or, as a last possibility, the saving-flow may be interpreted as too small relative to the stock of outstanding securities for the effect of additions to stock from this source to be regarded as significant.

v.

The Keynesian suggestion that the forces of productivity and thrift play only an indirect role in setting the overall level of the rate of interest represents an overly radical break from the stream of traditional economic theory. Keynes' theory of interest determination has effectively won the field by cutting off progress in the classical-neo-classical camp. Yet the latter formulations have something to contribute, even in a monetary approach to interest theory and macroeconomics in general. In the market period, the rate of interest reconciles the forces of a complex market, residing, as Keynes indicated, at a level so that all idle balances find willing holders while moving to permit a change in idle balances sufficient to resolve positive or negative excess demand for investment funds reflecting goods market disequilibrium. The market rate represents a resolution of forces including not only those described in Keynesian monetary theory, but also including productivity and thrift interactions. The resolution of saving-investment inequality in the market for loanable funds by hoarding and dishoarding may well change the conditions in which changes in idle balances are accomplished by altering the position and shape of the liquidity preference function itself, if expectations held by the public as to the normal level of interest rates in the economy depend on an average of recently experienced interest rates. If, as Keynesian theory suggests, the liquidity preference function is centred on the normal rate, then the dynamic development of the loanable funds market toward an ultimate (stable) Keynesian equilibrium involves gradual shifting of the conditions attendant on hoarding and dishoarding since the L_2-curve itself will alter in

inter-equilibrium transition.[1] The main purpose of this chapter has been to link the statical Keynesian formulation of macro-economic equilibrium with its emphais on money holdings to the neo-classical dynamic approach to interest determination. The theory presented is a distillate of a number of contributions in the last thirty years since the appearance of the General Theory. There are a number of important strands in these contributions which deserve further consideration, therefore, the next chapter will set about surveying past attempts at liquidity-preference, loanable funds synthesis with a view to relating them to the composite model just presented and discussed.

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1. see in particular, H. G. Johnson, "Some Cambridge Controversies in Monetary Theory" Review of Economic Studies vol. 17-19, 1951-52, pp. 101-102, where he discusses the fundamental significance of productivity and thrift in longer period interest rate determination...

III.

A Survey of the Liquidity Preference and Loanable Funds Debate

In the introductory chapter beginning this paper, the liquidity preference theory according to Keynes and the Hicksian refinement of it was set out. In the same chapter, an outline of a composite loanable funds approach was presented in contrast to the Keynesian method. Chapter Two attempted an exposition of what the writer regards as a fruitful reconciliation of the two expressions of interest rate theory with a view to maintaining the spirit of both contributions while welding them into a fuller theory of interest and income determination - a theory which has its static aspect useful for purposes of comparative equilibrium study but which also builds in a dynamic aspect useful for the study of growth and cycles. The present chapter fills in a historical gap between the first two chapters; showing the evolution from the apparently disparate statements of loanable funds and liquidity preference theories of the first chapter to the unified expression of the second chapter. This section, it is hoped, will also assist in clarifying further the reconciliation of the last section, particularly with reference to money market reactions.

i.

Conceptually, the earliest attempt to prove equivalence of the loanable funds and liquidity preference theories was that of J. R. Hicks in 1939.[1] He des-

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1. J. R. Hicks - Value and Capital (Oxford: Clarendon, 1939) pp. 331, Chapter Twelve

cribed the opposition of the two theories as a "sham dispute within the ranks of those who adhere to the monetary approach to interest theory ".[1] To demonstrate the uselessness of the argument, Professor Hicks employed Walrasian general equilibrium analysis and its corollary viz. that: if overall equilibrium (zero excess demand) is implied by the solution of such an n-equation system while at the same time equilibrium (zero excess demand) is implied as the solution for each of the system's component markets, then the equilibrium of one of the component markets must follow simply by definition so that the equation of supply and demand pertaining to this market (whatever it may be) can be conveniently dropped from the analysis as otiose. Hicks regarded the economic system as composed of n-2 goods markets, a money market, and a loan (or bond) market. In his view, accurate if his interpretation is accepted, the decision to eliminate the money market equation gives a loanable funds flavour to the determination of the rate of interest since his understanding of the loanable funds theory is that the supply and demand for bonds sets the rate of interest. The decision, on the other hand, to eliminate the bond market equation would leave the supply-demand relation for money as essential in solving the general equilibrium and would lend a liquidity preference flavour to the Walrasian system. The question to be asked here is: in what respects is this description consistent or inconsistent with the approach outlined in Chapter Two? Most obviously, the model of the last chapter differs in generality from the system proposed for study by Professor

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1. J. R. Hicks - Value and Capital (Oxford: Clarendon, 1939), p. 153

Hicks; instead of containing 'n' markets, it contains only three and even the interactions of this relatively small number are restricted. The goods market under consideration here has been aggregated in the sense that a potential number of goods markets equal to n-2 has been consolidated into a single market for all goods. This consolidation accomplished, so that the general system is condensed into a particular system of only three markets (money, bonds and goods in the aggregate), the prices which affect the supply and demand relations of the goods market ought theoretically to be two in number: the rate of interest and the price of all goods expressed as some sort of average. The latter effect is then neglected[1]. while the effect of the rate of interest on demand-supply relations is largely confined to only a portion of the goods market - that is, the supply and demand for productive goods rather than consumption goods.[2]. With respect to

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1. alternatively the price level in the aggregate goods market can be regarded as dependent on money wages which, in turn, are assumed sticky (constant in the short period) so that introducing prices in the goods market is just a question of adding a parameter not a variable to the analysis. When looked at this way, perhaps the word "neglect" is not an unreasonable way of describing Keynes' methodology...
2. elasticity of the savings schedule to the rate of interest (see the first model of the previous chapter) means that consumption demand is elastic to the rate of interest in addition to the investment demand. Supply in the goods market is infinitely elastic at the (parametric) price level due to unemployment in original versions of Keynes.

the remaining markets for money and bonds, the effects of the average commodity price level in decisions of the participants is wholly ignored[1]. while the supply of money is inelastic to both commodity prices and the interest rate. The Walrasian system envisaged in Hicks' analysis has indeed been drastically simplified! But to a purpose. Keynes has requested the student of monetary economics to put questions of general equilibrium aside, take up a microscope and bear in upon the demand function for money: a single side of a single market, yet of sufficient importance to affect the pos-

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1. Professor Patinkin (Money, Interest and Prices, Evanston: Row-Peterson, 1956, p. 510) believes that ignoring this effect of commodity prices on holdings of money and bonds and ignoring inelastic supply relations for goods (preceding footnote) constitutes a fundamental error inimical to the insight of Classical economic theorists. His book is concerned to advance the generality of the consolidated Keynesian model to the point where these effects are taken account of in describing economic reality. Previously, Professor Ohlin had remarked that "...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 mutually interdependent prices and quantities." (Ohlin - "Some Notes on the Stockholm Theory of Savings and Investment, II" Economic Journal vol. 47, 1937, p. 227

ition of the entire system of markets in an essential way. Any other market, conceptually, has the same potential for disturbance but for Keynes, in the early Thirties, it was the money demand function that exercised this power in a manner that was worth calling attention to, that was worth all the simplifications involved in bringing out its prominence in the general model; in the General Theory. The money market could not be left to pass as merely a market among markets; events contradicted such an ivory tower interpretation of reality. Our microscope brought to bear on the demand for money equation, this relation can be elaborated to allow not only for the effect of spot interest rates on the demand for cash, but also to allow for the effect of future rates on the public willingness to absorb money. Symbolically,

$$L_2 = f(r, r_e) \qquad (25)$$

Here again, the Keynesian power of consolidation comes to bear in reducing equation (25) to a two dimensional relation wherein the current rate of interest (r) acts as a norm, as a predictor of the expected rate of interest (r_e). The demand for money to hold (L_2-demand) is hereby summarized by the famous L_2-curve which places money at the core of the general equilibrium analysis in a simple and understandable way, as a link between the present and the future.[1.]

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1. the dynamic Keynesian system outlined previously shows the importance not only of the present-future relationship but also of the past-present dependence. See later comments on the articles by Tsiang, "Liquidity Preference and Loanable Funds Theories...A Synthesis" American Economic Review vol. 46, 1956, pp. 539-564, and Warren Smith, "Monetary Theo-

(cont'd...)

We have, then, that the clearest difference between Hicks' reconciliation and the one described in Chapter Two, centres around the generality of the assumptions made about the economic system. Generality is further impaired by the assumption of continuous zero excess-demand in the bond market (a problem discussed without suggested solution in Chapter Two) so that the money and goods markets only remain to be considered as the final distillate of the Walrasian system. That this is the standard approach to Keynes' contribution can be inferred from normal textbook approaches following the Hicksian IM-IS exposition.[1.] Effectively, then, the minimum number of markets remains for any meaningful discussion: as Hahn reminds us: "...unless some very special assumptions, not usually found in the literature, are made, we shall normally require at least two excess-demand equations to determine any one price, or the equilibrium quantity of any asset. If this is correct, it will be impossible for us to find one particular market relation (excess-demand equation) which will be sufficient to determine the equilibrium rate of interest. It is the attempt to do this, nonetheless, which may be responsible for the continued controversy in this field, especially the liquidity preference versus loanable funds dispute."[2.] Demand and supply relations for bonds

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....ries of the Rate of Interest, A Dynamic Analysis" Review of Economics and Statistics vol. 39, 1957

1. eg. Ranlett - Money and Banking (New York: Wiley and Sons, 1965) pp. 300-313
2. H. Hahn - "The Rate of Interest and General Equilibrium Analysis" Economic Journal vol. 65, 1955, p. 54

are either ignored or assumed to enter the system in a trivial way in the sense that the rate of interest consistent with equilibrium in stocks and flows of money establishes, ex hypothesi, equilibrium in stocks and flows of securities. Appropriate assumptions, then, about the supply and demand functions for bonds in the Keynesian system would permit of the elimination of the money functions so that equilibrium would be resolved in terms of the goods market consolidated and the bond market (consolidated) and the interest rate so determined would stand at the same level as the rate determined by the usual expression of the Keynesian system in terms of the money and goods markets. Hicks would presumably regard the former method of determining the rate of interest as the loanable funds procedure, that is as simply an alternative way of describing what the previous chapter referred to as ultimate equilibrium. Stated this way, a loanable funds theory of interest determination is simply redundant; it adds nothing to the Keynesian description of economic equilibrium. Most writers have refused to accept Hicks' interpretation of loanable funds analysis - Smith writes, "...the validity of Hicks' analysis can scarcely be questioned if we accept his interpretation of the two theories. However, the writer does not believe that Hicks construes the loanable funds theory correctly. This theory, as presented by its proponents, differs from the liquidity preference theory not by virtue of the fact that the one is developed in terms of the supply of and demand for money. The difference lies rather in the fact that the liquidity preference theory employs the total stock of money and the offsetting demands against that stock, while the loanable funds relates entirely to flows of money (funds) into (supply) and out

of (demand) the capital market. It is a question not of a money theory versus a bonds theory, but of a stock theory versus a flow theory."[1]. The present writer agrees with Professor Smith's objection to Hicks' reconciliation; the Walrasian model was never equipped to handle questions of dynamic adjustment to the equilibrium it describes and disequilibrium behaviour, it has been contended, lies at the heart of the problem of merging loanable funds and liquidity preference models. Although modern theory may take exception to the Hicksian interpretation of loanable funds, his emphasis on security holdings achieved by elimination of the liquidity preference equation in the general equilibrium model serves to draw attention to effects on the interest rate sometimes ignored in Keynesian theory. He remarks that "...Mr. Keynes' method loses something in convenience when we leave the spot economy, with its one rate of interest and begin to concern ourselves with the system of interest rates"[2]. In a sense, this comment parallels the recent move back toward general equilibrium analysis of portfolio assembly (Chapter Two, p. 65).

We may permit this critique of Hicks' method to apply to the discussion by Fleming[3]. as well. He isolates

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1. Warren Smith - "Monetary Theories of the Rate of Interest, A Dynamic Analysis" Review of Economics and Statistics vol. 39, 1957, pp. 17-18. See the flow-of-money interpretation attributed to Robertson in Chapter One.
2. J. R. Hicks - Value and Capital (Oxford: Clarendon, 1939) p. 161
3. Fleming - "The Determination of the Rate of Interest" Economica vol. 5, 1938, pp. 333-41

three types of "property": goods, claims, and money involving two prices: the price level of goods and the price level of bonds. Each type of property involves a market with supply and demand functions related to the goods price level and the rate of interest and the clearing of these markets together with clearing in the overall system leaves, as in Hicks' analysis, which Fleming mentions approvingly, a redundant market clearing relation for elimination. Fleming discusses some of the simplifications necessary in bringing the Wasrasian system as three markets into line with the Keynesian version: they parallel the above observations. Thus Fleming reaches the same conclusions as Hicks by much the same type of reasoning and by much the same unsatisfactory interpretation of the loanable funds doctrine as representing resolution of stock demand and supply of bonds (or claims).

ii.

A second full-scale attempt to reconcile the two theories was made by Professor Lerner and the following discussion is based on an article written by him in a book of readings on Keynes' work published in 1948.[1.]

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1. Abba P. Lerner - "Alternative Formulations of the Theory of Interest" in The New Economics (ed. Harris) (New York: Knopf, 1948) pp. 634-654. Prior to Lerner's exposition was an attempted reconciliation by Fellner and Somers ("Alternative Monetary Approaches to Interest Theory" Review of Economics and Statistics vol. 23, 1941, pp. 43-48). Whereas Hicks' attempt dealt with a stock equilibrium and involved a misunderstanding of the loanable funds argument, Fellner and Somers tried a flow argument but this involved misunderstanding of... (cont'd...)

Lerner, unlike Hicks, Fleming, and Fellner-Somers, was perfectly clear that the loanable funds theory was phrased in terms of money flows or security-flows not stocks of money and bonds while the liquidity preference theory dealt with stocks of money in one sphere and flows of money in the other, the transactions sphere. He held however that the flow of money into or out of, hoards in any period of time would be elastic to the level of the interest rate (see the discussion of Haberler's presentation in Chapter One) and this interpretation, since it leads to the result that only a zero interest rate can induce zero flows of hoarding or dishoarding (assuming the 'hoarding curve' to begin at the origin), had to be altered later in his present-

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....the liquidity preference theory for they appeared to construe a flow of money against securities expressed by demand and supply schedules elastic to the rate of interest as representative of Keynes' liquidity preference contribution. They mention that "...the essential suggestion of the Keynesians... [is] ...that the desire to hoard is a significant determinant of the interest rate ..." (Fellner and Somers - "Alternative Monetary Approaches to Interest Theory" Review of Economics and Statistics vol. 23, 1941, p. 48) but this is inaccurate representation of Keynes' tool. The authors argued that Keynes' theory saw the rate of interest determined at the supply-demand junction for the entire stock of money while loanable funds theorists saw the interest rate as framed on the bond market so that reconciliation involves assumption of equilibrium in the goods-money flow mechanism. Little else will be said about the effort; most writers cite it as a failure.

ation to the Keynesian view that the demand for money as a stock, rather than a flow, only has interest elasticity. Having switched from flow to stock analysis in the demand and supply of money, Lerner went ahead to face the problem of disequilibrium between savings and investment flows by postulating that savings and investment must always be identical in magnitude so that they can be amalgamated into a single "SI curve". He justified this procedure by pointing out that "...for any particular rate of interest there is a particular scale of investment...corresponding to that rate of interest on the investment curve, and a particular supply schedule of savings showing how much would be saved at different rates of interest if income were at the level corresponding to the particular rate of interest, so that the two curves will have this point in common. All other points in the particular supply schedule of saving are illegimate and may be left out of the picture, because they contradict themselves in assuming a rate of interest other than that which forms the postulate on which the whole curve is constructed... The only legitimate point on the supply curve of saving is the one which falls on the investment curve and shows that at that particular rate of interest the amount saved will be equal to the amount invested."[1] Lerner's purpose, then, is to indicate ultimate equilibrium and his apparatus is inferior to Professor Hicks' LM-IS approach in meeting the task. He cannot argue that his is a picture of the market period in the Robertsonian sense for no explanation is offered to explain how income magically leaps to the

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1. A. P. Lerner - "Alternative Formulations of the Theory of Interest", The New Economics, ed. Harris, (New York: Knopf, 1948). p. 640

level required to justify defining investment and savings as equal at any rate of interest - there is insufficient time for the multiplier to work out and the operation of the multiplier, as Chapter Two tried to show, is intimately dependent on savings and investment inequality resolved by a shift of funds into, or out of, idle balances subject to the liquidity preference constraint. Except in the sense of ultimate or Keynesian equilibrium, savings and investment are unequal provided these decisions are made in separation from one another and in response to different motives; there is, therefore, no point in defining them to be continuously equal and this paper has avoided what the writer regards as a sterile attempt to equate two flows whose inequality is an essential mechanism of change. In this, Robertson's (presently unorthodox) point of view is accepted.

Professor Lerner has attempted to discredit the loanable funds theory, it may be said, on two grounds. He justly argues that a theory in which flows of hoarding or dishoarding are elastic to the level of interest rates cannot be reconciled with the Keynesian approach. Less justly, in fact, quite wrongly, he suggests that a coherent loanable funds theory must provide for continuous equality of savings and investment whereas the Robertsonian explanation of dynamic disequilibrium outlined in the last chapter indicates that such an equality wipes out the explanatory value of a loanable funds theory of interest rate determination.

iii.

We come now to two attempts to synthesize these theories which bear considerable affinity to the discussion of Chapter Two and upon which the analysis there

rested in many places. The articles referred to are by S. C. Tsiang and W. Smith.[1] Tsiang's method will be first discussed; it appeared more than a year in advance of Smith's though there are a number of parallelisms. Tsiang is very careful about the stock-flow distinction in his analysis; he selects a time period in which the average velocity of active money is unity so that income, investment, saving and consumption flows can be regarded as flows of money. The writer wishes to summarize Tsiang's discussion of dynamics: during a day there are income-expenditure flows, involving flows of money in the circular style often shown to illustrate national income concepts. The beginning of a Robertsonian day is an infinitesimally short period in itself serving as a decision period in which contracts are made on the loan market and irreversible plans made for the income-expenditure day coming up next. The rate of interest is set in this short sub-period for investors decide on their monetary requirements for expenditure in the upcoming day and consumers do the same. A movement of funds may occur to satisfy both sets of decisions and money not earmarked for the day's use must be held and the rate of interest shifts to ensure that this is so. Then expenditures are made as planned, completing one income circuit to provide data for the next day's dec-

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1. S. C. Tsiang - "Liquidity Preference and Loanable Funds Theories, Multiplier and Velocity Analysis: A Synthesis", American Economic Review vol. 46, 1956, pp. 539-64
W. Smith - "Monetary Theories of the Rate of Interest, A Dynamic Analysis" Review of Economics and Statistics vol. 39, 1957, pp. 15-21

isions. Then, again, the bond markets open, consumers make decisions, investors make decisions and a new rate of interest gets determined resulting in the whole money stock being held after possible instantaneous movement of funds from holders (in the passive sense) to holders (in the active sense) or vice-versa.

This is a rather contrived description of sequence analysis but Tsiang finds in it what he believes to be complete synthesis of Robertsonian and Keynesian positions. The close of the brief period at the outset of each day sees the rate of interest set at a level equating demand and supply of money on the Keynesian fashion, while examination of period by period dynamics reveals shifts from idle to active uses and vice-versa as new contract (decision) periods pass by so that a loanable funds description of the model can be employed with equal truth but involving different emphasis. Although the writer has relied heavily on Tsiang's analysis, the description of dynamics given in Chapter Two is simpler than this one. The sequence structure employed there involved only a single time period for consideration chosen as equal to the decision lag involved in working out consumption expenditures, a bench-mark used by Professor Robertson in discussions of interest rate theory. Thus, expenditure of one period generates, by assumption, income in the same period and lags required in describing decisions, like the one-period income-consumption lag, can be expressed, in a first approximation, in terms of an integral number of periods. The liquidity preference curve serves as a sort of constraint indicating the price of changing the level, but not the nature of, the stock of passive money. The rate of interest always resides on the currently existing liquidity preference schedule because

this is assumed to be an instantaneously achieved, and therefore, in a sense, inviolable, stock equilibrium. Flows into or out of the idle sphere reflect a moving stock equilibrium; the judgement being that a) the demand for money to hold is summarized as a stock demand as Keynes suggested not as a flow demand, b) asset holders react with great speed in the correct direction without overshooting to adjust their money-interest position, and c) the financial markets are rapid sensitive transmitters of aggregates of individual decisions. These three characteristics of the idle money-bond relationship are all questions of fact. Gardner Ackley has criticized Tsiang on the grounds stated in judgement b) - that is, he believes that Tsiang has not specified the reaction timing of asset holders; has not indicated explicitly that the desired volume of idle hoards and the actual volume of idle hoards are always the same; and has not provided a rigourous description of asset-holders behaviour if and when desired and actual cash balances are observed to be out of kilter.[1] The present writer has indicated here, and previously, that Tsiang probably does imply an instantaneous theory of asset adjustment in his reconciliation: "...it seemed to me as reasonable an assumption as any that whatever changes in the stocks of idle cash may be desired can be carried out instantaneously..."[2]. The trouble here is that Tsiang says

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1. G. Ackley - "Liquidity Preference and Loanable Funds Theories of Interest: A Comment" American Economic Review vol. 47, 1957, pp. 662-673.
2. S. C. Tsiang - "Reply" (to Ackley's comment) American Economic Review vol. 47, 1957, p. 675

"can be carried out instantaneously" which really relates to judgement c) concerning the efficiency and convenience of the financial markets - Ackley was talking about decisions not their transmission once embarked upon. If the liquidity preference schedule is a curve of desired stocks then the adjustment mechanism of actual to desired magnitudes must also be known in order to establish the magnitude of hoarding or dishoarding flows and Professor Ackley sees this as the main problem in comparing Keynesian and neo-classical interest theory.[1.] The model to this point has assumed instantaneous attainment of full-stock equilibrium in asset holdings; it is however true that this adjustment problem "...is an empirical question about the behaviour of wealth holders that our stock analysis - normally framed only in equilibrium terms - never raises much less answers. But it is obviously not only relevant but indispensable for a loanable funds, disequilibrium analysis".[2]. Professor Ackley does not specify exactly what sort of hoarding function he has in mind but he does allow the existence of the liquidity preference function as representative of desired blanaces at every level of the interest rate so that, presumably, desired dishoarding would be linked to a discrepancy between desired and actual balances at any rate of interest. Equilibrium would be said to obtain in the money sphere when desired and actual balances had been brought into

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1. see also his Macroeconomic Theory (New York: MacMillan, 1961) Appendix to Chapter Nine, pp. 201-209
2. G. Ackley - "Liquidity Preference and Loanable Funds Theories of Interest" American Economic Review vol. 47, 1957

equality (by movements of balances into and out of the active circulation and by interest rate movements) so that the desire to hoard - the excess demand for idle money - becomes equal to zero.[1] Figure ten (page 92) illustrates a simple case of the kind of flow disequilibrium behaviour suggested by Ackley's criticisms. Imagine an interest inelastic investment function prevailing and a shift in the demand for idle balances, say upward, from L_2 to L_2'. Tsiang's way of looking at such an event and the method adopted in Chapter Two would be to see an immediate new equilibrium established with the rate of interest standing at D in the diagram (the inelastic investment function rules out a change in the idle money supply (M_2) so that attention can be confined to the process of adjustment in this one market). But if Ackley's strictures are borne in mind, the adjustment from B to D following the demand shift is not instantaneous but rather involves the sequential resolution of a flow disequilibrium: at the rate of interest appropriate to point B, actual balances are OM_2 while desired balances are equal to AC so that there is an excess demand for money equal to BC if asset holders attempt complete adjustment to the new situation represented by the new demand curve. Suppose, in general, that desired dishoarding is functionally related to the difference between desired and actual balances (-BC) in diagram nine, so that,

$$DHd = f(L_{2A} - L_{2D}),\ f' > 0,\ f(0) = 0 \qquad (26)$$

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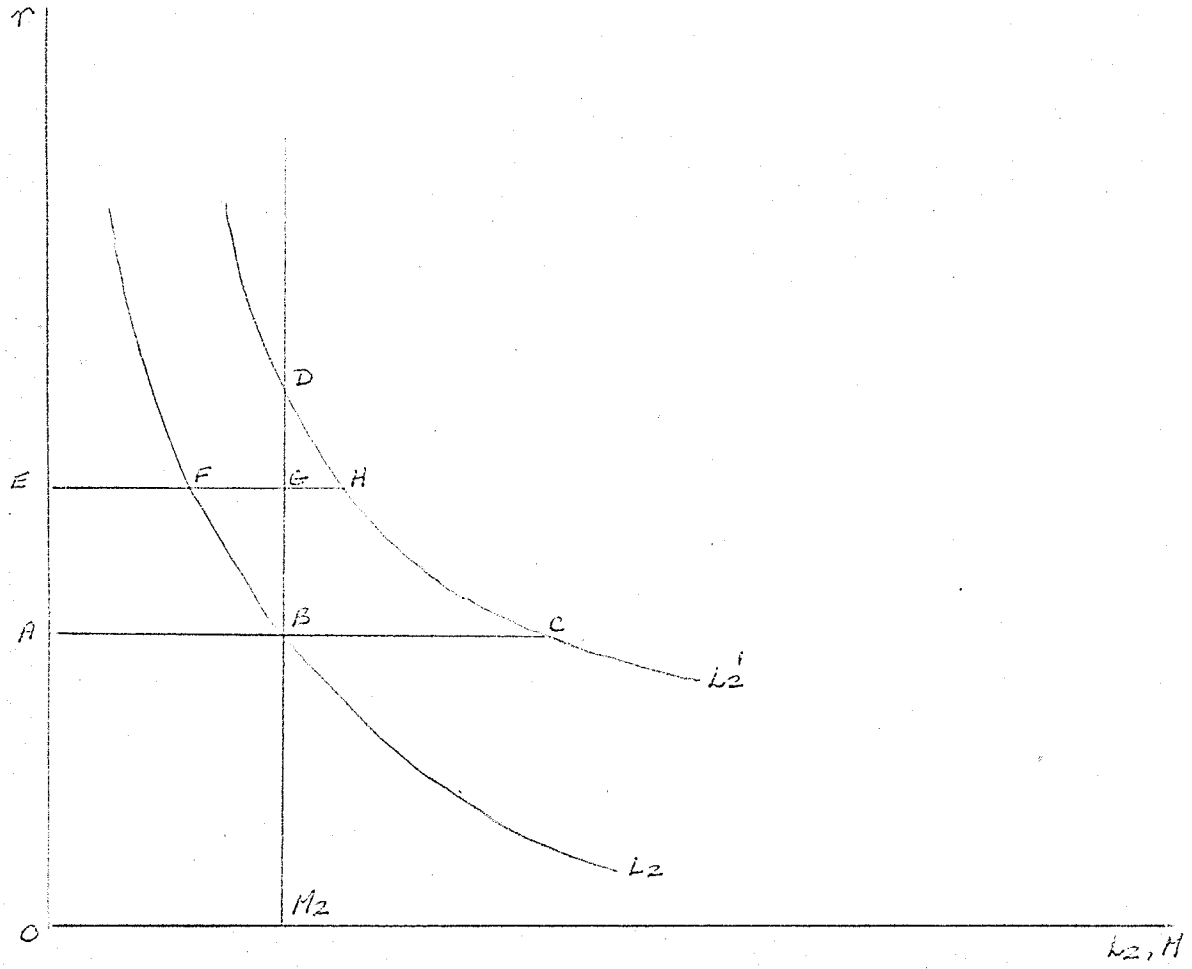
1. But the formulation of this kind of hoarding function (equation (26) below) is entirely distinct from the interpretation of the <u>hoarding</u> function given by Lerner and mentioned in the preceding section of this chapter.

Fig. X



where DHd = desired dishoarding, L_{2A} = actual balances available to satisfy idle demand, L_{2D} = desired idle balances, elastic in the Keynesian way, to the rate of interest.[1] Dishoarding is of course, a flow variable while actual and desired balances are stock variables. In general, desired dishoarding expressed by (26) has two effects: it produces a change in actual balances (L_{2A}) as interest rate movements cause a shift into or out of active balances via investment demand; it also produces a movement in interest rates altering the magnitude of desired balances. Only the latter effect is being considered explicitly in diagram ten so that,

$$r_t - r_{t-1} = g(\text{DHd}) \qquad (27)$$

where r_t represents the rate of interest at time 't' and $g' > 0$, $g(0) = 0$. In (26), when actual and desired balances are equal, desired dishoarding is zero and according to equation (27), the rate of interest stabilizes. Referring again to the figure, desired hoarding is related, functionally and by hypotheses, to the distance BC...this desire to increase idle balances exerts selling pressure in the securities markets driving the rate of interest upward as indicated functionally by (27). If the rise in the rate of interest

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1. the market behaviour equation represented in (26) has become a popular way of discussing adjustments to equilibrium. R. G. D. Allen (Mathematical Economics (New York: MacMillan, 1959) pp. 69-72) describes its operation. Originated (according to Allen) by A. Phillips, it has also been used by Bent Hansen (A Study in the Theory of Inflation, London: Allen and Unwin, 1951, 262 pp.) to describe the inflationary process.

can be represented as equal to EA in the diagram then the difference between desired balances (now EH) and actual balances (EG = AB) has been narrowed, by the outcome of period one's events, from BC to GH. The second period witnesses a similar reapplication of relations (26) and (27) and assuming stability conditions,[1.] the system converges infinitely on point D which represents the new equilibrium state between idle balances and the wish to hold them. Thus the model proceeds to its new equilibrium in a series of steps in the same way that the multiplier operates; though the approach may be more rapid than that of the income multiplier though it is not here accomplished in a sudden lunge of sufficient speed to justify referring to the money market equilibrium as, in a sense, inviolable or constraining.

In one sense, this view of the securities market as adjusting via a sequence movement is damaging to an attempt to reconcile the liquidity preference and loanable funds theories and in another sense it is not. Except for cases in which the money market is unstable, under the new assumptions the Keynesian equilibrium in the monetary sphere <u>is</u> finally attained after a once-

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1. it is possible that convergence to point D would involve overshooting to yield a stable cobweb cycle. Divergent movements or unstable cobwebs might briefly dominate a normally 'orderly' market characterizing it temporarily in terms of its latent unstable, speculative elements. For a brief discussion of some stability conditions see Clower - "Productivity, Thrift and the Rate of Interest" <u>Economic Journal</u> vol. 64, 1954, pp. 107-115

for-all shift in the economic schedules. Thus ultimate equilibrium as illustrated by the Hicksian LM-IS diagram would still be established as the end product of a once-for-all change in the basic functions. The time constraint on the re-establishment of equilibrium is moreover likely to remain centred on income generation necessary for savings-investment equality since the attainment of equilibrium between the demand for and supply of idle balances probably proceeds more rapidly than the income generation sequence. Therefore, in the sense that ultimate equilibrium is not precluded by less than instantaneous stock adjustment in the monetary sphere, the Keynesian discussionm as interpreted by Hicks' LM-IS equilibrium, remains perfectly valid as the outcome of a loanable funds model with flow hoarding aspirations. However, some writers, including Tsiang (in the articles under discussion) and E. S. Shaw[1]. have interpreted Keynes to mean that the LM equilibrium must be continuously fulfilled during disequilibrium adjustment. Thus the revision envisaged by writers like Ackley represents a break up of Keynes' essential contribution to monetary economics for these economists. While Chapter Two represented LM equilibrium as a constraint in the sense that it is a constraint for Tsiang, the present writer does not believe that viewing the monetary part of interest-income theory as a dynamic tendency to reach the Keynesian L_2-curve involves repudiation of Keynes' statements because comparative static procedure involving juxtaposition of ultimate equilibria was his main concern.

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1. E. S. Shaw - "False Issues in the Interest Theory Controversy" Journal of Political Economy vol. 46, 1938, c.f. p. 830

And imperfect dynamic adjustment of the LM sphere does not affect the eventual attainment of a new ultimate equilibrium to be compared, logically, with the previous ultimate equilibrium. To undermine the validity of the Keynesian comparative macro-statics from the money market side by this approach, it would be necessary to show that the public's behaviour is formulated so that unstable overshooting or one-way instability characterizes equations (26) and (27) or, alternately it would be necessary to show that the desired flows of dishoarding or hoarding do not, in fact, proceed from stock disequilibrium but are desired by the public in their own right and with no reference to a stock demand for idle balances - in this event, reconciliation is indeed an impossibility.

Turning to a second modern contribution, Professor Warren Smith begins his discussion with a clear statement of purpose; his object being "...to clarify the relation between the Keynesian liquidity preference theory and the loanable funds theory espoused by Robertson, Haberler, and others...to produce a clearer understanding of the relation between stock and flow analysis in monetary theory and...to develop an important distinction between (a) the determination of the rate of interest in a short period when the level of income is not in equilibrium and (b) the forces that explain the change that occurs in the rate of interest during a longer period as the level of income moves from one equilibrium position to another."[1]. Smith

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1. W. Smith - "Monetary Theories of the Rate of Interest: A Dynamic Analysis" Review of Economics and Statistics vol. 39, 1958, p. 15

chooses to formulate his model specifically as a linear system of difference equations- this system differs from Tsiang's and the reconciliation presented in Chapter Two in that savings of the current period are elastic to the current period's interest rate and in that investment depends not only on the current interest rate but also on the level of income lagged.[1] On these grounds, his model is more general than the ones so far discussed in that it incorporates elements of the last chapter as well as a form of the accelerator which has appeared frequently in business cycle and growth models since Samuelson's and Harrod's early contributions.[2] His equation system is as follows:

$$C_t = \alpha Y_{t-1} + \beta R_t + r \qquad (28)$$

$$I_t = aY_{t-1} - bR_t + c \qquad (29)$$

$$Y_t = C_t + I_t \qquad (30)$$

$$M_{2t} = dR_t + e \qquad (31)$$

$$M_{1t} = kY_t \qquad (32)$$

$$M_t = M_{1t} + M_{2t} \qquad (33)$$

$$S_t = Y_{t-1} - C_t \qquad (34)$$

where C = consumption, Y = income, R = rate of interest, I = investment, M_2 = idle balances, M_1 = active balances, M = money supply, S = saving, α, β, ...e, k = constants.

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1. see Kaldor - "A Model of the Trade Cycle" Economic Journal vol. 50, 1940, pp. 78-92
2. P. Samuelson - "Interactions Between the Multiplier Analysis and the Principle of Acceleration" Review of Economics and Statistics vol. 21, 1939, pp. 75-78
   Harrod - "An Essay in Dynamic Theory" Economic Journal vol. 49, 1939, pp. 14-33

The system is soluble provided M_t is given as a constant so that seven equations determine the equilibrium values of seven variables. Such a solution with constant money supply can show the Keynesian (ultimate) resting place of the model in the same way that the "...elegant graphical technique developed by Hicks can be used to show the simultaneous determination of the equilibrium values of income and the interest rate."[1]. In his graphical treatment of the two dimensional variety similar to that of Lerner and Haberler (see Chapter One), Profewwor Smith adopts the unitary income velocity assumption already familiar to the reader (velocity = 1/k = one, in equation (32)). In his mathematical discussion, however, Smith prefers to treat 'k' as a general parameter rather than assume it equal to unity and with this in mind, we may trace his discussion of the effects of creating new money in any period. It has already been mentioned that creation of additional money must be assumed, except under special conditions, if additional expenditure is to have full multiplier impact as the dynamics of the model are worked out (Chapter Two, diagram six and accompanying explanation). A change in the total money supply may be viewed either as an indicator of economic change, or it may be viewed as an event superimposed upon existing economic change occurring for other reasons. When the former occurs, it might appear that the full force of the shift in total money falls in the liquidity preference sphere inducing a later move of funds between the active and idle segments of the model - this is often the way monetary policy under the Keynesian assumptions is described.

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1. W. Smith - "Monetary Theories of the Rate of Interest: A Dynamic Analysis" Review of Economics and Statistics vol. 39, 1958

If, however, the model is in transition, with investment in excess of saving, say, then a change in the money supply may appear to be channeled entirely into the finance of new investment via "banks performing the primary function of banking i.e., lending money to people who want to use it for investment purposes as finance".[1] So much for appearances; the truth is that a change in the total money supply is parcelled out between active and idle balances by depressing the rate of interest below what it would otherwise have been whether or not 'what it would have otherwise been' means a Keynesian equilibrium interest rate or a rate which would have solved the market problem of the present, but not the future, slice of time. The interest rate moves swiftly (in the model of Chapter Two) to a position such that the sum of hoarding (which would not otherwise have occurred) and new investment just suffices to absorb the whole change in the money supply. The extent to which hoarding or new investment takes a greater or smaller share of new money depends on the relative elasticities of the L_2-curve and the investment function over the relevant intervals (see also figures three and four in Chapter Two).

When new money is injected into the model's mechanism during any period, it is sometimes convenient to state equation (14) in a modified manner as:

$$S(Y_{t-1}) + L_2(r_t - r_{t-1}) + [M_t - M_{t-1}] = I(r_t) \qquad (35)$$

suggesting that active balances are augmented in the current period [(t-1) to (t)] by the whole current

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1. D. H. Robertson - "Alternative Theories of the Rate of Interest" Economic Journal vol. 47, 1937, p. 432

change in the money supply $(M_t - M_{t-1})$.[1] What has implicitly occurred here is a netting operation: the second term representing dishoarding has had the fraction of new money added to hoards netted out in formulating equation (35). Potentially, two things are happening in equation (35): dishoarding is going on because the system is moving between ultimate equilibria and new money is being injected part of which adds to hoards and part of which goes into active circulation at once by the finance of new investment. Dishoarding, positive or negative, would have occurred, in the most general case, regardless of the new money created but if new money is added to the system in the current period, dishoarding which would otherwise have occurred must be adjusted downward by the amount of new money hoarded for equation (35) to be accurate. Perhaps this is a small point but it has seemed worthwhile setting it down for clarity - when stated it makes clear how changes in the money supply are superimposed onto equation (14).

Equation (35) lists the sort of statement made by Robertson and Haberler, Smith however prefers to measure saving and investment over a period other than that in which the turnover of active balances is unity. His equation system shows an income velocity equal to 1/k. Thus a loanable funds equation with this assumption needs to have saving and investment 'deflated' to account for this:

$$kS(Y_{t-1}) + L_2(r_t - r_{t-1}) + [M_t - M_{t-1}] = kI(r_t) \qquad (36)$$

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1. W. Smith - "Monetary Theories of the Rate of Interest: A Dynamic Analysis" Review of Economics and Statistics vol. 39, 1958

a formulation identical to the one offered by Smith as a solution to equations (28) to (34) above, viz.

$$kI_t + \Delta M_{2t} = kS_t + \Delta M_t \qquad (37)$$

where ΔM_{2t} stands for 'hoarding' of the current period.

Income generation functions comparable to (17) can easily be obtained as the difference between saving and investment.[1]

Smith makes it plain that in his reconciliation, the liquidity preference curve relates to both desired and actual stocks, thereby rejecting the loanable funds hypothesis of Ackley discussed and made explicit earlier in this section. The L_2-curve is for him a constraint, as it is with Tsiang, and flows are simply changes in stocks taken with respect to a specified

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1. One of the earliest statements of an income generation function, stated dynamically, that the writer has found is contained in an article by Richard Goodwin ("Secular and Cyclical Aspects of the Multiplier and the Accelerator" in Income, Employment and Public Policy, Essays in Honour of A. H. Hansen (New York: Norton, 1948), esp. pp. 112-118. Goodwin was not primarily concerned with conflicting interest rate theories but rather with the monetary mechanism of the multiplier - he writes $\dot{m}_1 + s(\dot{y}) = i$ where $s(y)$ = saving, i = investment and $\dot{m}_1$ = change in active money, indicating the need to finance differences in monetary saving and investment flows out of idle hoards or by new money. Compare this formulation with equation (17), where $\dot{m}_1$ is new income in the period for which velocity is unity.

time interval: "...the adjustment involved in our model is a stock adjustment. Corresponding to each interest rate there is a certain stock of cash balances that is desired. Whether we think of this adjustment directly in terms of stocks or indirectly in terms of the incremental changes necessary to attain the desired stock is of no real consequence."[1]. In this way, the satisfaction of the demand and supply of idle cash does not preclude the idea of continuous money market equilibrium shifting through time (according to the loanable funds formula outlined in Chapter Two) toward ultimate equilibrium of stock and flow variables.

iv.

Mr. Rose's analysis[2]., also a product of the mid-fifties, is rather complex and he side-steps the question of income generation, a matter which will occasion criticism after his approach has been described. He seems to have in mind a specifically dynamic adjustment of demand and supply of money in which "...excess demand for money...can be expressed either in terms of flows as the excess of planned hoarding over the planned increase in the supply of money, or in terms of stocks, as the excess of the public's demand for money to hold over the amount of money the banks wish the public to

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1. W. Smith - "Monetary Theories of the Rate of Interest..." Review of Economics and Statistics vol. 39. 1958, p. 20
2. Hugh Rose - "Liquidity Preference and Loanable Funds" Review of Economic Studies vol. 24, 1956, pp. 111-19

hold."[1]. Planned saving and investment will normally differ in magnitude and the excess demand in this (the goods) market will result in passive investment or disinvestment in stocks of finished goods. Rose interprets the loanable funds theorists to mean that the rate of interest responds to the sum of the excess demand for money and the excess demand for goods in any period. He also construes Keynes as suggesting that the rate of interest responds only to the excess demand for money and not to the excess demand for goods: saving and investment do not enter into interest determination at **all.** The latter interpretation is so in the sense that the effects of saving and investment flows on and off the capital market were not included in the Keynesian interest theory as they were in the loanable funds theory but it is not so in the sense that the level of transactions balances, which depend on investment, have been included in all refined versions of Keynesian interest determination since the General Theory. Having however, drawn this distinction between the loanable

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1. Hugh Rose - "Liquidity Preference and Loanable Funds" Review of Economic Studies vol. 24, 1956, pp. 111-112. Rose lists his Keynesian interest determination function as... $b^{dr}/dt = l(r,\bar{y}) - m$, which can be derived from our equations (26) and (27) and does not preclude intra-period full adjustment. In this function, b is a parameter, $^{dr}/dt$ shows the rate of change of the interest rate, $l(r,\bar{y})$ is the public's demand for idle balances while m is the actual supply of money available to hold.

funds and liquidity preference theories, a distinction which accords exactly with the system of Chapter Two if "excess demand for money" is resolved immediately and involves the problems surrounding Ackley's critique of Tsiang if it is not so resolved, Rose then introduces an assumption, allegedly due to Keynes, to clear up the difference in formulation. He argues that on excess of investment over saving involving the withdrawal of idle funds results in disinvestment of finished goods - capital equipment in this case - as the new active money is spent so that the holders of finished goods discover themselves in possession of "unwanted cash". This money is then returned to the securities markets in exchange for bonds by those whose stocks have been depleted. The demand for new active funds due to an excess of planned investment over saving is promptly offset by an equal supply of money in exchange for securities by those who next receive the funds; thus the excess demand for goods is neutralized in the market period by an excess supply of goods so that the demand and supply of money is unaffected from this source. Provided this pattern of behaviour is followed, Keynes could then ignore the excess demand for goods as a determinant of the market rate of interest and formulate interest determination as dependent strictly on the excess demand for money.[1.]

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1. Mrs. J. Robinson ("The Rate of Interest" Econometrica vol. 19, 1951, pp. 92-111...) has adopted an explanation of Keynes' thinking similar to Rose's and is able to focus her attention most closely on bonds and money in portfolios with reference to the term structure.

This system leaves the investigator free to concentrate on the shifting desires of the public to hold balances as these desires are reflected in excess demand for money. But this freedom of investigation is purchased at a heavy price for the assumption that the goods market does not affect the rate of interest - that productivity and thrift can be ignored - destroys the interdependence and uniqueness of the Keynesian system. What is really involved here is a subtle form of Say's Law - investment spending can never be in excess of saving because dishoarding to finance additional capital outlay is promptly channeled into the finance of said outlay via the purchase of securities (saving). The only disequilibrium that the model is required to resolve relates to the excess demand for money and the resolution of this function will affect the rate of interest and the volume of funds moving in and out of 'idle' balances as investors expand their borrowing while the recipients of the spent funds expand their lending pari passu. "A rise in the demand price of tea raises directly the market price of tea" Rose observes, "but a rise in the demand price of funds for capital outlay does not directly raise the market price of funds."[1] The income generation mechanism so important to the Keynesian doctrine has been brushed aside: there is no multiplier, there is no time-consuming transition from one conceptual ultimate equilibrium to the next except insofar as the excess demand for money is resolved by a step-wise sequence. Too much of Keynesian theory has been lost in reaching this particular

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1. H. Rose - "Liquidity Preference and Loanable Funds" Review of Economic Studies vol. 24, 1956, p. 115

reconciliation and Rose, at times, seems to recognize this, for he distinguishes his analysis from other approaches by arguing that he is referring to the "market" rate of interest rather than the "short-run equilibrium" rate. However, his "short-run equilibrium" rate seems to refer to what the present writer has called ultimate equilibrium and if this is the case, then his explanation of the "market" rate in the terms just outlined does not demonstrate how ultimate equilibrium is approached. Alternative or supplementary assumptions are necessary for such a demonstration and these ought to be supplied to yield a complete model.

In one sense, Rose's analysis has considerable value for it points up the sort of slippage in the generation of income that is important in reality and is likely to be obscured by the assumption that the exit of cash from idle balances will be mechanically added to the income stream such as to appear, probabilistically, one turnover period later as income. Rose shows that this is not necessarily a reasonable assumption: additional capital outlay may be followed by disappearance of the finance involved into hoards, possibly being employed to demand securities in the process. Income generation itself is subject to an uncertainty that has been glossed over in the mechanical descriptions of Chapter Two and of the contributions by Tsiang and Smith. But a model incorporating these slippages must not preclude income generation or make it a mystery as does Professor Rose's system.

V.

Of all contributions mentioned in this chapter as seeking resolution of the liquidity preference-loanable

funds polemic, the most recent was that of Patinkin.[1] Yet in a way, it is the oldest for the method of attack is closer to Hicks' and Fleming's methods than to the 'modern' approach produced by Tsiang and Smith and examined in the previous section. This is not to imply that Patinkin's procedure is incorrect but on the other hand it should be clearly understood that Patinkin is not a Keynesian in any normal sense of the word. Patinkin stands in the Walras-Pareto-Hicks (of Value and Capital) tradition, seeking economic generalization of the highest abstraction. The reader will recall the paragraph opening the first section of this chapter on the transformation of general static equilibrium into particularist Keynesian static equilibrium and the multitude of judgements about the economic behaviour of a particular (capitalist) society required to effect this transformation. But Patinkin, as distinct from Keynes (and Robertson)[2] prefers to deal with the problem of 'bond' price formation on an almost Walrasian level. At the same time, he will press forward into the newer field of dynamics as evi-

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1. Don Patinkin - "Liquidity Preference and Loanable Funds; Stock and Flow Analysis" Economica vol. 25, 1958, pp. 300-318
2. One might state the contrast as between institutional or policy systems like the Ricardian or Keynesian models and the generalized system containing "...the idea to lift, as it were, the logical core of the economic process above the ground of the institutional garb in which it is given to observation." (Schumpeter - Ten Great Economists (New York: Oxford Press, 1965) Chapter on Pareto, pp. 125-142

denced in Money, Interest, and Prices (1956) so that Walrasian equilibrium becomes 'Walrasian' disequilibrium. It is in this frqmework that Patinkin attacks the liquidity preference-loanable funds problem in his 1958 article. And attack he does: "...it is meaningless", Patinkin begins in Hicks' vein, "to classify interest theories by the nature of the equation chosen for elimination"[1]. His contention is that economic decision-making cannot be compartmentalized into convenient schedules involving simple two-dimensional alternatives like bonds versus money (liquidity prefererence) or goods versus bonds (consumption function) rather, bond purchases, commodity purchases and money purchases all relate to the general price level and to the price of bonds in the spirit of Walras. The rate of interest (and commodity prices) is determined by three excess demand equations summing to zero so that a complete description of interest determination requires two excess demand equations not simply one. In Patinkin's system, no single excess demand function is capable of indicating the direction of movement of the interest rate, for example, an excess supply of money may be reflected in an excess demand for goods and could have no effect on the level of interest rates. The Keynesian system on the other hand, is less general and implies specific effects on the money market due to the operation of the consumption function and the liquidity preference schedule. Patinkin's conclusion is that there can only be one general explanation of interest determination which applies to stock

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1. D. Patinkin - "Liquidity Preference and Loanable Funds; Stock and Flow Analysis" Economica vol. 25, 1958, p. 301

and flow analysis provided the excess-demand functions are appropriately formulated. Analysis by means of a bond equation only or a money equation only would be futile and it is for this reason that he condemns liquidity preference-loanable funds controversy as "not a chapter in the recent history of economic doctrine of which we should be particularly proud."[1.]

It is, perhaps, true to say that Patinkin's system resembling Hicks' analysis in Value and Capital as it does, cannot touch the original loanable funds-liquidity preference question. His system represents construction of an alternative and more general (not necessarily more useful) model of interest determination within which the Keynes-Robertson-Ohlin debate has very little place as a theoretical issue. Whether this move toward greater generality in interest rate study (including Tobin and others work in asset portfolio balance mentioned in Chapter Two, page 65) represents an advance in understanding or not, however, must be left to the judgement of the reader...

The last chapter of this study, to follow, returns to problems involved in what has been called here, the "modern synthesis" outlined in Chapter Two with contributions to its construction noted in the present chapter, particularly in the work of Smith and Tsiang. The model of Chapter Two will be placed in the context of the writers conception of general dynamic models and the visions of growth and change entertained by Harrod and Hicks. Links between the liquidity preference-loanable funds synthesis and traditional theory will be suggested.

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1. D. Patinkin - "Liquidity Preference and Loanable Funds; Stock and Flow Analysis" Economica vol. 25, 1958, p. 317

These comments will provide an opportunity to re-examine some of the simplifications involved in constructing the 'Keynesian loanable funds' model.

IV.

Further Problems of Dynamic Interest Theory

i.

In the realm of dynamic economics, it is possible to distinguish two main classes of essential linkage binding past, present and future into a self-contained sequential model. The first linkage purports to describe, perhaps by functional propensities, and in an aggregative manner, the decision-making processes of economic units in their various capacities of spender, saver, investor, asset-holder, employer, etc. These socio-psychological decisions may relate to observed past experience or may relate to the participants' expectations concerning future conditions. The future conditions to be expected are undoubtedly related, though perhaps loosely, to past experience.[1] Brilliant examples of summarization in the isolation of mass decision functions form main building blocks in Keynes' work and are, indeed, often cited as his most fundamental contribution - one immediately thinks of the propensity to consume, the propensity to hold idle balances, and the propensity to invest. In a dynamic system, these propositions would take on specific characteristics of dating. The second temporal linkage in dynamic economic models describes physical or institutional connections which are not direct products of human

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1. see the discussion, in Chapter One, of the difference between Professors Robertson's and Ohlin's formulation of the income receiver's saving-spending decision and the statical contrast offered by the Keynesian consumption function.

behaviour, in the sense that they supply the background or boundaries within which temporal linkages of the first type operate. It is not implied that institutional linkages are invariant without exception, only that they can conveniently be employed as data in short-run models of the type discussed in Chapter Two. Examples that come to mind include the technology of production, gestation lags in the construction of plant and equipment and the structure of the payments mechanism. Normally, linkages of this second kind are time consuming and demand dating of the variables involved.

The overall lag structure of an economic model therefore consists, in general, of a mixture of lags denoting decisions and lags denoting the time consuming structure of economic reality. Of all structural and socio-psychological lags considered as relevant to any particular dynamic problem, there exists, logically, one lag which is as short as, or shorter than, all other lags, and it is this particular space of time which must serve as the basic building block for the formalized system. All other lags involved would then be expressed as multiple of the one selected as shortest in constructing a difference equation model of the inter-related phenomena. For the purposes of constructing a simple illustrative model, the lag structure employed is likely to be fairly arbitrary in the interests of manageability; indeed, sometimes the dynamics of the real world can suggest the presence of actual lags which cannot be measured but can be assumed to exist, as hypotheses useful for the simulation of the real world observations. Reasonable business cycle theories can be built up from a wide variety of structural and psychological lag assumptions employed singly or in combinations. Any dynamic system must assume the

existence of time-consuming reactions as a premise of its own significance even if the time units involved as its building blocks are expressed in differential rather than difference calculus. Without the specification, by direct observation or by inference, of functional lags, an economic model is static, descriptive of equilibrium, or just logical. The Keynesian system has been variously described in all three ways. It would be possible to express the model in Chapter Two (equations (14) and (17)) in terms of differentials and then argue that for any finite time period, the position of LM and IS intersection would have to hold i.e., Keynesian 'equilibrium' would continuously be in effect. But the two equations are still required for formal (Robertsonian) dynamization of the Keynesian position and it seems unsatisfactory to avoid contact with transitional states by glibly ignoring an economic system's propensity to consume time in its operation. Dynamization by the use of the infinite calculus has its advantages for exposition, for certain essential time relations can thereby be introduced while retaining some of the advantages of equilibrium economies. The result is a system which we might call logical dynamics and the prime example of this methodology resides in Harrod's growth model[1]. Harrod's statement has sometimes been looked at as a moving Keynesian equilibrium: in some respects this is a puzzling description but it can be seen that it follows quite naturally from Harrod's method. This section has earlier argued that meaningful economic

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1. Sir Roy Harrod - "An Essay in Dynamic Theory" Economic Journal vol. 49, 1939, pp. 14-33 and Towards a Dynamic Economics (London: MacMillan, 1948) Chapter Three, pp. 63-100

systems must have a dynamic aspect by virtue of the time consuming nature of decisions and processes - it is in this sense that models like those of Chapter Two and business cycle models like those of Hicks, Kalecki, Tinbergen, and Samuelson are dynamic. But Harrod has a more philosophical view of dynamics.

It is Professor Harrod's contention that it is not time-using decisions and structural processes which render an economic system dynamic in essence, rather movement is inherent in the fundamental timeless formulation of the relationships. The implication is, that since static equilibrium can be framed in a purely logical manner, the same ought to be true of systems in which chage inheres. Time, for Harrod, is a medium in which inherent economic relations manifest themselves and explicit recognition of time-oriented reactions does not ensure the dynamical nature of a model, rather the relations of the model itself possess this fundamental power. "I do not myself think," he comments at one point, "that it is natural to regard lags as in essence dynamic phenomena. I think one might well find that we had one set of lags and one kind of cycle in a stationary economy and a different set of lags and a different kind of cycle in an expanding one, and that lag study will fall partly into each division."[1]. Harrod's intention is to expose laws of dynamics rather than to build an empirical model[2]. In his terms, the

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1. Sir Roy Harrod - Towards a Dynamic Economics (London: MacMillan, 1948) Chapter One, p. 13
2. Sir Roy Harrod - "Second Essay in Dynamic Theory" Economic Journal vol. 70, 1960, p. 277, para. two

difference between statics and dynamics represents a difference in basic mechanisms and tendencies as between the stationary and the expanding economy; lags of the two types mentioned above represent the addition of a second layer of problems serving to bring the static or dynamic framework into closer accord with reality. As distinct from what has been said above about time-consuming reactions and processes as being characteristic of economic dynamics in line with Hicks' thinking[1], Harrod would contend that the dynamic method is only superficially concerned with the consumption of time and more properly concerned with fundamental characteristics of the model. Harrod would view the dynamic nature of the acceleration principle as proceeding from the fact that investment depends on change in income rather than from the lagged manner in which the principle works (if it works) in reality. An investment friction like Kaldor's early expression in which investment spending was lagged on the level of income[2] would not be dynamic in Harrod's sense although it would be so in Hicks' sense since the variables involved in the formulation are dated so as to include time in a specific way.

Although a model which is Harrodian dynamic never includes a lag formulation, models involving decision lags and process intervals may well include elements of Harrod's dynamic conception; this is true for example

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1. see his Value and Capital (Oxford: Clarendon, 1939), Chapters Nine and Ten, and Capital and Growth (New York: Oxford Press, 1965) Chapter One.
2. N. Kaldor - "A Model of the Trade Cycle" Economic Journal vol. 50, 1940, pp. 78-92

in the lagged accelerator business cycle models first postulated by Samuelson and refined in Hicks' Contribution to the Theory of the Trade Cycle published in 1950.

In terms of lags of both types and Harrodian logical dynamics, how then can the model of Chapter Two be classified and characterized? In Harrod's sense, it is clear that the model is not dynamic[1]; the model does not inherently expand without outside influence and is by this definition, static. But it is dynamic in Professor Hicks' sense since the system is described by dated variables. Two lags have been mentioned and the dynamic Keynesian model involves both - a decision lag is involved in the Robertson planning period whereby consumption expenditures lags the receipt of income whereas a structural lag is implied in lagging income behind expenditure according to the active velocity of circulation of money.

Perhaps the writer should make clear that the model developed previously is a special and not a general reconciliation. It can be claimed that the method of synthesizing Keynesian and loanable funds analysis adopted here is general, but it cannot be claimed that

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1. One simple test for Harrodian dynamism might be to express a system involving dated variables in terms of infinite (differential) calculus. A Harrod dynamic system 'explodes' in finite time using this formulation - in fact, its existence is questionable. A model which is not dynamic in Harrod's sense would be in continuous equilibrium in finite time under these conditions. The latter is true of Chapter Two's model.

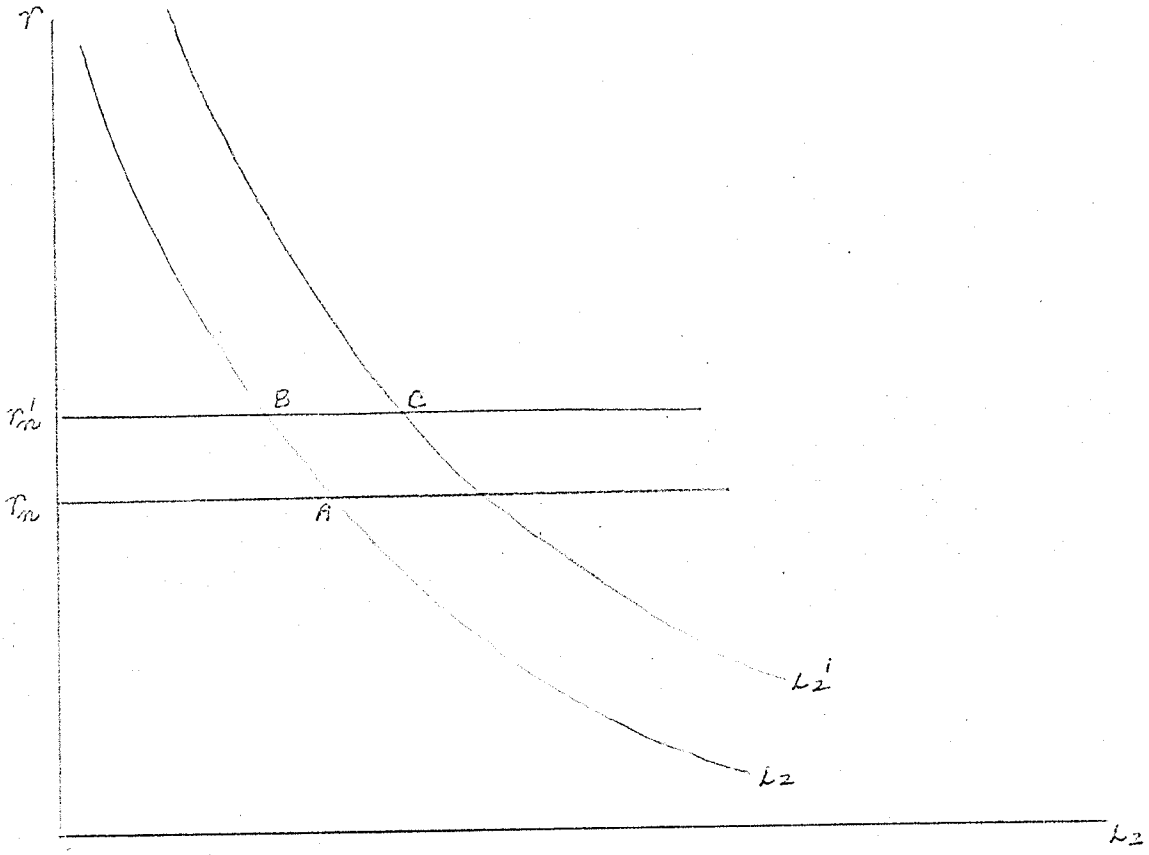
choice of structural and socio-psychological time lags is general. The lags employed - Robertson's consumption decision lag and the structural expenditure-receipts gap - might well be shown to be empirically false or secondary to other time-consuming reactions and mechanisms. But the methodology should hold, provided time consuming relations remain as part of the dynamic prototype (Hicks) chosen to elucidate interest theory. It may well be that consumption data indicate the so-called Robertson lag as unimportant; the model of Chapter Two may be revised then to eliminate this feature. On the other hand, one might choose to lag investment spending on the rate of interest or build in a gestation lag and an accelerator function and the model could be extended to cope with these additional relations. Some writers might say that the expenditure-income lag represented by the structure of the flow of funds, summarized by income velocity of active money, ought not to be emphasized. But time will be essential in all revised versions of dynamic economic theory with the exception of the scheme employed by Harrod though the consumption of it may be principally attributed to different, or new, linkages in the economic complex. Economists have advanced too far on the path "toward a dynamic economics" to view the loanable funds <u>method</u> of discussing interest theory as bad Keynesianism, primitive 'classical' economics or as any other mere intellectual outcast.

ii.

One of the observations reached in formulating a dynamic model in Keynesian terms was realization of the direct and perhaps overpowering influence of saving and investment flows on the rate of interest in the <u>short-</u>

run. The argument runs as follows by way of review: the normal Keynesian L_2-curve is a constraint telling, in itself, nothing about the rate of interest and everything about the set of interest rates which the public is prepared to associate with a set of various quantities of money to be held inactive. Movement along the constraint under constant total money supply conditions involves a transformation of bonds into money, or vice-versa and such movement with the associated substitution stems from inequality of the desire to save and the propensity to invest. Movement along the constraint would be modified, for the position of the L_2-curve depends on the normal rate of interest and the normal rate of interest depends on recent experience as to the level of the rate. In diagram eleven, the L_2-curve is centred on r_n (the normal rate established by experience). Now point A is stable (relatively) but movement along L_2 to B because of an excess investment demand for funds changes the public's experience of the interest rate from r_n to, after some finite time, r_n'. The view that r_n' is normal and not a reversible aberration of r_n, changes the centring of the L_2-curve, as shown, from L_2 to L_2' (the latter centred on point C). Verbally, the satisfaction of excess investment demand (excess relative to the level of saving associated with the prevailing income level) occurs relatively cheaply from idle balances because the public can be induced, under Keynesian assumptions, to supply money in exchange for securities at a slight discount on the latter provided they feel that the discount will shortly be reversed enabling a profit to be realized in capital gains. Once the new securities price assumes the stature of normality in the public mind however, so that the probability of speculative gain in falling interest rates is

Fig. XI



substantially reduced, the public will require a higher discount in securities to convince them to hold the mix of bank deposits and industrial-financial paper with which they have been endowed. The rate of interest is driven up by attempts to switch out of bonds and into cash and this movement is identified as a shift to a point on a different and higher L_2-curve centred on a different and higher normal rate of interest.

This possible tendency on the part of the L_2-curve to line itself up with experienced and time-worn rates of interest which in turn depend on the interaction of the excess investment function (Chapter Two, section ii) and the L_2-curve suggests a useful distinction between short and long run approaches to interest theory. The writer's approach to short-run interest theory has already been outlined and at least one remark added that the level of the rate of interest at any time depends on the interaction of the same factors included in Hicks' static expression of the Keynesian contribution.[1.] Such remarks stand, yet the variability of the liquidity preference curve for idle balances suggests that the level of the rate of interest in a longer run growth model context may have its principal function in equating the supply and demand of savings as traditional analysis used to emphasize. Figure eleven certainly indicates that movement of the rate of interest may be related very closely to the saving-investment relation, possibly sufficiently so to warrant exclusion of the L_2-curve from formalized

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1. J. R. Hicks - "Mr. Keynes and the Classics, A Suggested Interpretation" Econometrica vol. 5, 1937, pp. 147-159

problems of very long-run behaviour.[1] It may be true that in longer run situations the rate of interest has more profound effects on saving and investment flows than are generally allowed empirically and a priori for the short-run. Sir Roy Harrod has advanced a theory of saving based on the argument that the marginal utility of income declines so that a positive rate of interest elicits savings for old age, heirs, corporate expansion, etc...Harrod supposes that the propensity to save out of any income is elastic to the interest though he does not suggest what speed the reaction may have, or how it ought to be measured. Harrod builds the theory into his dynamic system begun in 1939 with the concept of warranted growth in a 1960 article[2] in which a rate of interest is aimed at by appropriate monetary-fiscal co-ordination with a view to obtaining the maximum growth rate for an economy, consistent with the expansion of its labour force and the broadening of its knowledge about labour-use. The long range effect of the rate of interest on the volume and capital-intensity of investment expenditures is plainly uncertain: most modern long-range models opt in favour of some kind of accelerator as the main explanatory variable of investment while some models, not-

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1. Once again, a long-run and short-run distinction has crept into the analysis though comments on pages 35-36 of Chapter Two suggested that this would be resolutely avoided. The distinction made here though is being made guardedly: all Hicks LM-IS factors play a role at any moment and in any period but one set of factors may set the dominant trend and condition the position and movement of the model...
2. R. Harrod - "Second Essay in Dynamic Theory" Economic Journal vol. 70, 1960, pp. 277-293

ably Solow's 1956 model[1.], posit functional dependence of capital-intensity on the rate of interest relative to wage costs though the relationship is unproven. Regardless of functional dependence of saving and investment on the rate of interest, these flows have profound direct effects on the rate, a point well recognized by businessmen and loanable funds theorists, but oftimes obscured in the Keynesian static analysis employed in theoretical economics. It may be worth noting that a flat liquidity-preference schedule denoting rather firm convictions about the future stability of the rate upon which the function is centred together with unwillingness to revise opinion about the normal rate provides a flexible background for the outside finance of investment expenditure since considerable switching of bonds versus money can be accomplished with moderate change in security prices. In a sense, capital formation is furthered by the public's willingness to bet on the stability of interest rates - absence of public surety would leave less room for bursts of investment activity since prohibitively expensive interest rate levels could be approached with only a mild flurry of 'excess' investment projects. In figure twelve, L_2 illustrates a curve where r_n is not held as firmly as a normal or expected rate relative to r_n on curve L_2'. From the growth point of view, the flat curve has greater permissiveness, however it is also true that relatively certain expectations about the rate of interest by money market participants would allow a greater decline in investment spending relative to the level

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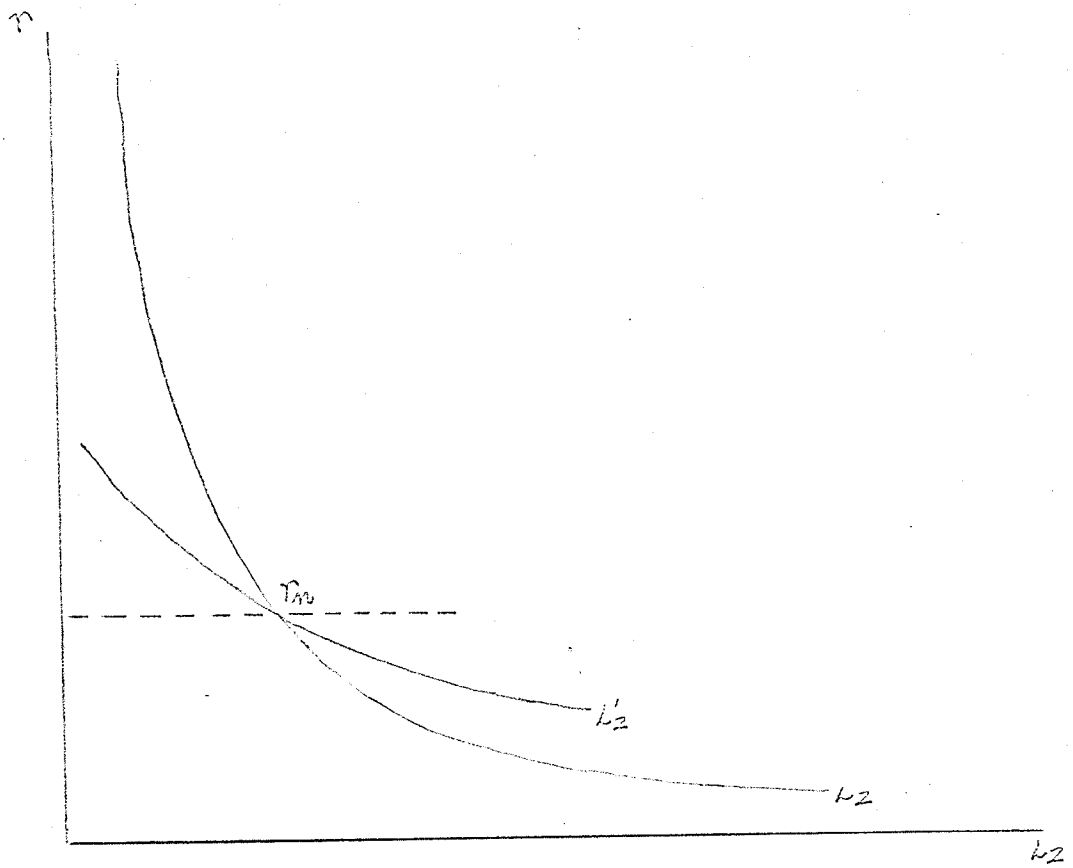
1. R. M. Solow - "A Contribution to the Theory of Economic Growth" Quarterly Journal of Economics vol. 70,1956

Fig. XII



of savings than would be permitted by curve L_2 in the diagram (assuming that investment outlay has some elasticity to the rate of interest).

Modifications of 'classical' theory such as these are important; clearly the statement that saving and investment determines the rate of interest cannot be accepted, yet on the other hand it is equally unacceptable to argue as if saving-investment flows have no direct effect on the rate of interest. Their direct effect on the rate of interest is just as traditional theory implies: through the money and bond markets. The supposition of Keynesian theory then, from this point of view, means the addition of new (specifically monetary) forces to the ancient theory. The demonstration that the Keynesian revolution can be made to mean the addition of new forces to the flow-oriented saving and investment model of rate of interest determination has been an essential theme of this thesis. The other basic theme, no less important, has been that the Keynesian elements permit of completion of the traditional system i.e., the conversion of the traditional model into an income-interest rate determining model of wider significance.

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