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THE DEMAND FOR MONEY: A THEORETICAL APPROACH

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One of the crucial issues both in monetary economics and the debate over the importance of monetary policy affecting the key variables in the economy is the stability of a functional relationship between money and important economic variables. The meaning and importance of a stable demand function for money has been a cornerstone of modern macroeconomics and has been subjected to considerable empirical analysis (1). The stability of this functional relationship has been examined and the evidence in support of a stable demand function has been "overwhelming" (2). The importance of these findings for a stable monetary policy consistent with stable prices cannot be overemphasized as it was indicated that "the stability of the money demand fuction, together with a capacity on the part of the monetary authority to influence closely the stock of assets corresponding to the theoretical concept of money empoyed in that function would seem to be necessary conditions for the successful implementation of monetary policy" (3).

The empirical testing of the theory of demand for money in the development of the monetary economics is a recent phenomenon. In

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(1) For a review of this research see the surveys and articles by David E. Laidler, **The Demand for Money: Theories and Evidence** (New York: International Textbook Company, 1969); J.T. Boorman, "The Evidence on the Demand for Money: Theoretical Formulations and Empirical Evidence", in J.T. Boorman and T.M. Havrilesky (eds.), Money Supply, **Money Demand and Macroeconomic Models** (Boston: Allyn and Bacon, Inc., 1972), pp. 248-291; S.M. Goldfeld, "The Demand for Money Revisited", in **Brookings Papers on Economic Activity** 3 (1973), pp. 577-638.

(2) M.S. Kahn, "The Stability of the Demand-For-Money Function in the U.S., 1901-1965", **Journal of Political Economy,** Vol. 82 (November/December, 1974), pp. 1205-1219.

(3) J.T. Boorman, "The Evidence on the Demand for Money: Theoretical Formulations and Empirical Evidenca," in J.T. Boorman and T.M. Havrilesky (eds.), **Money Supply, Money Demand and Macroeconomiec Models,** pp. 250-251.

order to understand the "new" approach, this study begins with the brief review of some stages of this development. After a brief historical survey of the monetary economics, three of the most significant approaches are analyzed.

The first approach to the theory of demand for money is the transaction and speculative demand for money. This approach analyzes the demand for money as an asset alternative to other assets in the development of Keynesian monetary theory.

The second approach is the neo-classical approach to estimating demand for money. It emphasizes permanent income as the primary determinant of the demand for money. This approach assigns the primary importance to the application of general demand theory to money.

The third approach to the demand for money is Deaver, Adolfo Cesar Diz and Cassuto's approach-a method that has been used successfully for a fragmented economy.

The Nature and Functions of Money

The controversy about the nature and functions of money was so great that in 1911 Irving Fisher was led to call it "scandal" that there is no agreement among the academic economists "over the fundamental propositions concerning money" because of "outside clamor" (4). Moreover, there has been disagreement thoughout history to the present day on the most fundamental of questions-what is money? What is the essential property that differentiates money from other goods? Is it a part of wealth of nations? Why do people try to hold money? Even at present, it is wrong to think we have consensus of opinion about the theory and practice of money. In the words of one economist, "Money remains a bone of contention (5).

However, money is an essantial instrument of economic organization in a society which has advanced from a nomadic way of life to that of a sedentary way of life. Nevertheless, economists like Von Mises state that "the phenomenon of money presupposes an economic order in which production is based on division of labor and in which private property consists not only in goods of the first order (consumption goods), but also in goods of higher orders (production goods)" (6). Mises believed in the need for the existence of money and state and the existence of private property. Where we have no private property and free exchange, then there is no need for

(4) Irving Fisher, **The Purchasing Power of Money** (New York: Macmillan, revised edition, 1920), p. VIII.
(5) A.A. Walters, "Introduction: Money and the Economy", in A.A. Walters (ed.), **Money and Banking** (London: Penguin Books Ltd., 1973), p. 7.
(6) Ludwing Von Mises, **The Theory of Money and Credit**, translated from the German by H.E. Batsun (New York: The Foundation for Economic Education, Inc., 1971), p. 29.

money (7). However, we can assert that the more the society becomes complex, the more the need for money appears because the lack of complete information necessitates the use of money even in a centralized economy. Hume succinctly concluded that money is "only the instrument which men have agreed upon to facilitate the exchange of one commodity for another" (8).

Ibn Khaldun, a fourteenth century economist, indicates that the quantity of money is of no significance for a country's wealth (9). John Locke (1623-1704) and David Hume (1711-1776) arrive the same conclusion. Adam Smith states that people hold money because of "convenience" (10). And it is necessary to provide money to further that "convenience" for trade. Ibn Khaldun and Hume understand that a large stock of precious metals is important for the government because with its mercenary troops can be hired, but for trade, in Hume's words, it is only "the oil which renders the motion of the wheels more smooth and easy" (11).

About the property of money, Irving Fisher says tat "any commodity to be called "money" must be generally acceptable in exchange, and and commodity generally acceptable in exchange should be called money" (12).

However, most economists agree that for a good to be money it has to perform four or five functions:

1. Money is a medium of exchange which increases specialization, minimizes the cost of transaction, generalizes the purchasing power and as a consequence facilitates exchange.

2. Money is a store of value, an asset, which is not demanded for itself but for the fact that it can be used to purchase other goods.

3. Money provides a standard of value in which all other values are measured.

4. Money is a standard for deferred payment, which makes it possible to transfer the purchasing power from one person to the other (13).

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(7) Ibid., pp. 28-31.

(8) David Hume, **Writings on Economics**, edited with an Introduction by Eugene Rotwein (Madison: The University of Wisconsin Press, 1970), p. 33.

(9) Ibn Khaldun, **"The Muqaddimah": An Introduction to History**, translated from Arabic by Franz Rosenthal, 3 vols., Bollingen series no. 43 (New York: Pantheon, 1948), Vol. II, pp. 245, 246, 285.

(10) Vincent Bladen, **From Adam Smith to Maynard Keynes: The Heritage of Political Economy** (Toronto: The University of Toronto Press, 1974), p. 58.

(11) David Hume, p. 33.

(12) Irving Fisher, **Purchasing Power of Money**, p. 2; James L. Pierce, **Menetary and Financial Economics.** (New York: John Wiley & Sons, Inc., 1984), pp. 1-29.

(13) W. Nelson Peach, **Principles of Economics** (Homewood, Ill.: Richard D. Irwin, Inc., third edition, 1965), pp. 183-192.

5. "Money is the most liquid of all 'liquid assets.' " (14).

Advantages of a Monetary Economy

We have witnessed the use of barter throughout history. However, the advantages of a monetary economy over a barter economy are: (15).

a) to avoid a double coincidence of wants;

b) to enable separation of sale of one object and purchase of another;

c) to allow the specialization of factors of production;

d) to minimize the cost of information; and

e) to increase efficiency.

The monetary system, in which there is a generally acceptable medium of echange, reduces the costs involved in economic activity and generates greater convenience. The reason why money is used in a monetary economy is because it is more efficient to organize exchange in this way rather than using the barter arrangement. If a monetary economy could become costly because of money instability, people would switch to barter if they thought their gain would try to minimize their cash holdings, but they would not get rid of it completely because avoiding double coincidence of wants is less costly than the barter arrangement (16).

The Demand for Money: A Historical Approach

The ideas about money and its effects on the economy have been with us since money has become a medium of exchange. Philosophers have written essays and books on money. Some of the ideas have been forgotten and some of them, after a period, have been "rediscovered".

We see the presentation of quantity theory by Locke and many others. However, the most systematic dynamic analysis of the theory is found with Hume, Wicksell and Irving Fisher (17).

Irving Fisher

Irving Fisher was interested in "the principles determining the purchasing power of money" and the dynamic analysis of a monetary economy,. He was aware of the role of money on the individual's behavior, on output and other variables such as prices and interest rates. In other words, he was not a "naive" monetarist.

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(14) A.A. Walters, "Introcduction: Money and the Economy", in A.A. Walters (ed.), **Money and Banking**, p. 7.
(15) Ibid., pp. 7-10.
(16) Cagan, "The Monetary Dynamics of Hyperinflation".
(17) H. Visser, **The Quantity of Money** (New York: John Wiley and Sons, 1974), p. 136.

He understood the short run and long run implications of money on the economy. If we double the money, this did not mean the prices would double and nothing would happen to output and interest rates. This is what he says about the quantity theory:

> The so-called "quantity theory" i.e., that prices vary proportionately to money, has often been incorrectly formulated, but (overlooking checks) the theory is correct in the sence that the level of prices varies directly with the quantity of money in circulation, provided the velocity of circulation of that money and the volume of trade which its is obliged to perform are not changed (18).

If we read these sentences correctly, we do not see a strict proportionality in a mechanical sence. However, Irving Fisher was the one who stated the quantity theory in the form of the equation of exchange, $MV = \Sigma PO = PT$, where M is the average quantity of money, V is the velocity of transactions, P is an average of all prices, O is the total quantity of goods purchased, and T is an aggregate of all goods and services that change hands over a given time period. Fisher's formulation of the equation of exchange is more comprehesive than the income version, since T includes all intermediate, final and financial transactions. The Fisher equation of exchange can be expressed in words as the total quantity of money times its velocity is equal to the total value of transactions.

Fisher states that "the velocities of circulation of money and of deposits" are affected by these changes:

1. Habits of the individual

a) As to thrift and hoarding
b) As to book credit
c) As to the use of checks

2. Systems of payments in the community

a) As to frequecny of receipts and of disbursements
b) As to regularity of receipts and disbursements
c) As to correspondence between times and amounts of receipts and disbursements

3. General Causes

a) Density of population
b) Rapidity of transportation (19)

These determinant variables of velocity are stable and change with changes in the institutional structure in the long run with the

(18) Irving Fisher, **Purchasing Power of Money**, p. 14.
(19) Irving Fisher, **Purchasing Power of Money**, p. 79.

exception of thrift and hoarding which "tends to decrease" or increase "the velocity of circulation" (20). Moreover, the rate of increase of decrease in prices and interest rates also affect the velocity of circulation.

If we count the demand deposits, M' and average velocity of circulation of checks, V' into the equation of exchange, then the equation of exchange becomes:

$$MV + M'V' = \Sigma pO = PT$$

The rest of the definitions keep their previous definition (21).

Fisher implicity postulated that the demand for money is a function of trade. Then, the aggregate demand for money by the economy is a function of volume of trade (22). Moreover, if we have a high rate of inflation of deflation, the demand for money has to be affected. In other words, the rate of prices is another function in the demand for money. Fisher notices the dynamic nature of a monetary economy on the behavior of the individual. The effect of the rise in prices on the individual demand for money is stated as follows: "... the rise in prices-fall in the purchasing power of money-will accelerate the circulation of money. We all hasten to get rid of any commodity which, like ripe fruit, is spoiling on our hands. Money is no exception; when it is depreciating, holders will get rid of it as fast as possible." (23).

The analysis of Fisher "implies thet the demand for money is a real demand" (24) Fisher applied the demand concept elicity to money with testable implications (25).

Furthermore, we see the development of a dynamic approach to the effect of money on the economy, expectations and other variables. He states that if the supply of money increases, this "may exert a psychological stimulus on trade, though a few unemployed may be employed, and some others in a few lines induced to work overtime", but this will cause a series of changes in the economy such that:

1. Prices rise.

2. Velocities of circulation (V and V') inrease; the rate of interest rises, but not sufficiently.

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(20) Irving Fisher, **Purchasing Power of Money,** p. 80.
(21) Ibid., p. 48.
(22) David E. W. Laidler, **The Demand for Money: Theories and Evidence** (New York: International Textbook Company, 1969), p. 47.
(23) Irving Fisher, **Purchasing Power of Money,** p. 63.
(24) Harry G. Johnson, **Macroeconomics and Monetary Theory** (Chicago: Aldine Publishing Company, 1972), ;. 60.
(25) Irving Fisher, **The Money Illusion,** (New York: Adelphi Company, 1928), pp. 45-54.

3. Profits increase, loans expand, and the O's inrease.
4. Deposit currency (M') expands relatively to money (M).
5. Prices continue to rise (26).

All these changes, states Irving Fisher, "are temporary changes, pertaining only to the transition period" (27). In other words, the use of monetary policy to obtain a trade off between unemployment and inflation is a temporary phenomenon. Such a policy is inoperational and dangerous in the long run since it causes the expectations of inreasing prices and exerts pressures on individuals to get rid of their cash holding as soon as possible (28).

Von Mises

Mises is another economist who has made an attempt to formulate the demand for real cash balances in terms of both the trnasactions and precautionary motives, motives that depend on "the subjective valuations of individuals" (29).

Mises states that "for every variation in the quantity of money introduces a dynamic factor into the static economic system, "where we no longer have the proportionality concept between money and prices (30). Mises implies that a higher quantitative variation in the supply of money will have effects "upon the subjective valuations of individuals" who attempt "to minimize their cash reserves, which are a source of continual loss" (31). He employs the hypothesis that the past behavior of prices affects the current planned cash holdings to explain why in "countries where inflation has been rapid, the decrease in the value of money has occurred faster than the increase in its quantity" (32).

Mises states that people form expectations according to the past behavior of prices and they hold money accordingly. The hypothesis that the past behavior is the basis on which people form their exceptations about future price behavior has been extremely valuable in empirical research about the demand for money, especially for the countries that have a high rate of inflation (33). Mises dealt with the complaint of "shortage of notes" while policy

(26) Irving Fisher, **Purchasing Power of Money**, pp. 62-63.
(27) Ibid., . 64.
(28) Irving Fisher, "A Statistical Pelation between Unemployment and Price Changes", **International Labour Review**, Vol. XIII, No. 6, June, 1926, pp. 785-792; see also Irving Fisher, **The Theory of Interest** (New York: Macmillan, 1930), pp. 399-452.
(29) Von Mises, **The Theory of Money and Credit**, p. 165.
(30) Von Mises, **The Theory of Money and Credit**, p. 145.
(31) Ibid., p. 227.
(32) Ibid., p. 227.
(33) Philip Cagan, "The Monetary Dynamics of Hyperinflation", in Milton Friedman (ed.), **Studies in the Quantity Theory of Money** (Chicago: University of Chicago Press, 1956), pp. 25-117.

makers were printing money. In short, he is more radical than the traditional monetarists such as Wicksell, Fisher, and Friedman. For him, "not only does money matter, but it matters all the time!" (34).

The Cambridge Equation

The Cambridge Equation was advanced by Alfred Marshall, A.C. Pigou and other "Cambridge" economists. Marshall did not produce a full statement of his theory. However, we see the impact to Mises and Irving Fisher on Marshal and the Cambridge school in formulating the Cambridge Equation and demand for money where the individual has a choice at the margin because **money is capable of yielding satisfaction in and of itself,** since it statisfies his needs both for convenience and security (35). The core of this approach is stated by Pigou as follows:

> ... everybody is anxious to hold enough of his resources in the form of titles to legal tender (money) both to enable him to effect the ordinary transactions of life without trouble, and to secore him against unexpected demands, due to a sudden need, or to a rise in the price of something he cannot easily dispense with (36).

Other things being equal (wealth, rate of interest, expectation), the quantity of money demanded varies proportionately with the level of money income; i.e.,

$M_d = kOP = kY$

where: M_d = nominal quantity of money demanded

k = a functional relationship representing the ratio of money people want to hold to their money income

O = output

P = price level

Y = level of money income = (OP)

In equilibrium we have:

$M_s = M_d$

Which gives us:

$M_s = kY$

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(34) Lawrence S. Moss, "The Monetary Economics of Ludwig Von Mises" in Lawrence S. Moss (ed.), **The Economics of Ludwig Von Mises** (Mission, Kansas: Sheed and Ward, Inc., 1976), p. 40.

(35) Harry G. Johnson, **Marcoeconomics and Monetary Theory,** pp. 58-62; also John T. Boorman and Thomas M. Havrilesky, Money Supply, **Money Demand, and Macroeconomic Models,** p. 168.

(36) A.C. Piguo, "The Value of Money", **The Quarterly Journal of Economics,** Vol. 32 (November, 1917), p. 41.

When we formulate the Fisherian Equation of exchange in terms of income we get:

$$MV = \Sigma PO = Y$$

$$MV = Y$$

and hence:

$$M_s \frac{1}{k} = M_s V = Y$$

where k is the reciprocal of Fisher's V, the income velocity of money. From the above reasoning, we are able to show the similarity of the Cambridge Equation to Fisher's Equation.

What is seen in the Cambridge version is a clear incorporation of Mises' view of individual choice-making behavior into the demand for money analysis. "The real advantage" of the Cambridge Equation over quantity theory in the formulation of demand for money, says Pigou, is that "it brings us at once into relation with volition-an ultimate cause of demand- instead of with something that seems at first sight accidental and arbitrary" (37).

The Cambridge k is not a constant. Given the institutional framework, it would change with changes in the (1) degree of preference for present consumption over future consumption, (2) expectations concerning the streams of return from investment and (3) expectations about price movements (38). On the last point, Pigou indicates that "... any expectation that general prices are going to fall increases people's desire to hold (money); and any expectation that they are going to rise has the contrary effect" (39). A point which is not far from what Mises stated earlier is that there is no proportionaltiy between money and prices.

In short, the Cambridge version inspired the economists to consider a utility analysis of the demand for money and consider money as simply one asset in a multi-asset portfolia. The development of the concept of uncertainty and the application of the general theory of demand to money balances and asset holdings led to the development of Keynes" Liquidity Preference Theory and the reformulation of the Fisherian model by Friedman (40).

Keynes

For John Maynard Keynes, money is essential because the future is uncertain and unpredictable. Money uprovides the most

(37) A.C. Pigou, "The Value of Money", p. 54.
(38) John T. Boorman and Thomas M. Havrilesky, **Money Supply, Money Demand, and Macroeconomic Models**, p. 171.
(39) Pigou, "The Value of Money", p. 45.
(40) John T. Boorman and Thomas M. Havrilesky, op. cit., p. 172.

important link between the present and the uncertain future since it is the most liquid and least risky of all assets availabla as stores of value over time. As a matter of fact, it is for this reason that people are willing to hold money for transaction purposes rather than physical goods, and to make all their purposes rather than physical goods, and to make all their contracts, debts and exchanges denominated in terms of money. As far as the demand for money is concerned, however, there is special emphasis on different variables in his analysis according to the economic situation of the time. If there is a high rate of inflation, the aim of Keynes is to formulate a theory for policy prescription, or if we have massive unemployment, then the theory is formulated to get rid of the problem of unemployment.

In Keynes' view, it is "needful to turn a penetrating gaze upon contemporary facts and glean from them, by science, by intuition, by political imagination, new types of remedies for new types of evils" (41). This kind of concern for current problems led him in formulating the demand function for money as a function of expected rate of inflation and wealth during the early 1920's. His analysis is an extension of Mises' work, **The Theory of Money and Credit.** He asserted that the public's demand for money is a behavior choice and the elasticity of demand for money is not unity. If the elasticity was unity, he said that "there would be no limit to the sums which the Governmant could extract from the public by means of inflation" (42). When there is a high cost on the holders of money, people "begin to change their habits and to economize in their holding of notes". The public, in order to protect themselves from the high cost of depreciation, decides to convert their money to (a) durable goods, (b) foreign hard currency and and carry as little cash as possible, "even at the cost of great personal inconvenience" (43). Moreover, he states that at the last stage of monetary mismanagement, the expected rate of inflation is greater than the rate of money supply pumped into the economy by the government which ignores the cumulative formation of expectation of the population. For Keynes, expectation formation is a slow process. Once it is formed, he states, it generates further expectations in the same direction. In Keynes' words, as a result of credit cycle, "price movements tend to be cumulative, each movement promoting, up to a certain point, a further movement in the same direction" (44).

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(41) R.F. Harrod, **The Life of John Maynard Keynes** (New York: Harcourt, 1951), p. 336.

(42) John Maynard Keynes, **Monetary Reform** (New York: Harcourt, 1924), p. 53.

(43) Ibid., p. 51.

(44) John Maynard Keynes, **Essays in Persuasion** (New York: Harcourt, 1932), p. 215;
See also Carlo Panico, "Straffa on Money and Banking" **Cambridge Journal of Economics,** Vol. 12 March 1988, pp. 7-28.

Eventually, this process of taxation through inflation not only "relaxes production, but leads finally to the waste and inefficiency of barter" (45). This kind of demand analysis is a short-run analysis in which other important functional variables do not change apreciably. The theoretical and empirical work developed by Cagan follows the same analysis of demand for money (46).

Keynes later dealt with the problem of real balances in **A Treatise on Money.** He stated that the public's demand for money in terms of read balances is related proportionately to the volume of transactions, the rate of discount and the expected future course of prices. The demand to hold money as a proportion of the volume of transactions occurs when "the rate of discount and the deposit rate of interest are low." However, "when the interest payable and obtainable on loans is high, then there will be a powerful motive to restrict balances to as low a level as is in any way practicable, even if this involves taking some risk in the provision made against contingencies" (47). In other words, the wealth-maximizing individual makes a rational decision to hold a certain amount of money in his portfolio. The sensivity of transactions demand for money to the opportunity cost of holding money had been worked by Pigou and Keynes long before Baumol and Tobin "formulated" their theories (48). Keynes had done brilliant work in his Treatise attempting to explain movements in the price level and its effects on the public's demand for cash balances. The modern empirical research on monetary phenomena is not something strange to Treatise, be it monetarist or Keynesian.

Keynes, however, switched from his earlier approach of Treatise to that of **The General Theory** which is seeking to explaion the determination of employment. For that reason, the money aspect of his analysis is neglected as Harrod succinctly indicated that "**The General Theory** is basically an analysis of the causes of unemployment" (49).

Nevertheless, the approach to the demand for money in the **General Theory** dominates the economic textbooks. For that reason,

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(45) John Maynard Keynes, **The Economic Consequences of the Peace** (New York: Harcourt, 1920), p. 240.

(46) See Philip Cagan, "The Monetary Dynamics of Hyperinflation", in Milton Friedman, ed., **Studies in the Quantity Theory of Money** (Chicago, Ill: University of Chicago Press, 1956), pp., 25-117.

(47) John Maynard Keynes, **A Treatise on Money**, Vol. II (New York: Harcount, 1930), p. 45.

(48) William J. Baumol, "The Transactions Demand for Cash: An Inventory Theoretic Approach", **Quarterly Journal of Economics,** Vol. 55, November, 1952, pp. 545-556; James Tobin, "The Interest-Elasticity of Transactions Demand for Cash", **Review of Economics and Statistics,** Vol. 38, August, 1956, pp. 241-247.

(49) Harrod, **The Life of John Maynard Keynes,** p. 453.

it is necessary to summarize the Keynesian theory of liquidity preference.

Keynes arguad that there are three motives why people demand money. These are (a) the transactions, (b) the precautionary, and (c) the speculative motives. Keynes states, in developing the concepts in detail to explain the motives for liquidity preference, that "the subject is substantially the same as that which has been sometimes discussed under the heading of the demand for money" (50).

Keynes asserts that the amount of money demanded by individuals and by the sum of the individuals for transactions purposes would be in stable relationship and proportional to the level of income. However, this proportionality is not absolute. In a later article, he states that "in a given state of expectation both the active and the passive demands depend on the rate of interest" (51). In other words, the individual makes a rational choice of how much money he could hold in his portfolio when there are alternative interest-earning assets. The individual, faced with lucrative returns from interest-earning assets, will economize the necessity of holding cash to bridge the gap between the receipts of payments and the disbursement of such proceeds.

The precautionary motive according to Keynes is related to the demand for balances in two aspects: (a) the demand for cash as a certain proportion of total resources "to provide for contingencies requiring sudden expenditure and for unforeseen opportunities of advantageous purchases, ..." (b) the demand to hold and asset whose "value is fixed in terms of money to meet a subsequent liability fixed in terms of money" (52). The demand for money arising from the precautionary demand would also be dependent, to a large extent, on the level of income.

Mises, Marshall and Pigou had indicated that uncertainty about the future was one of the motives that might be expected to influence the demand for money. Keynes' analysis of the speculative motive is a successful attempt to formalize this concept and draw conclusions from it. As Keynes states, "the aggregate demand for money to satisfy the speculative motive usually shows a continuous response to gradual changes in the rate of interest, i.e., there is a continuous curve relating changes in the demand for money so satisfy the speculative motive and changes in the rate of interest as given by changes in the prices of bonds and debts of various maturities" (53). Moreover, he continues to say that it is "important

(50) John Maynard Keynes, **The General Theory of Employment, Interest and Money** (New York: Harcourt, 1936), p. 194.
(51) John Maynard Keynes, "The 'ex-ante' Theory of the Rate of Interest", **The Economic Journal**, Vol. 47, December, 1937, p. 668.
(52) Keynes, **The General Theory**, p. 196.
(53) Ibid., p. 197.

to distinguish between the changes in the rate of interest which are due to changes in the supply of money available to satisfy the speculative motive, without there having been any changes in the liquidity function, and those which are primarily due to changes in expectation affecting the liquidity function itself" (54).

Consequently, the aggregate demand for money, Md, can be found by summing the individual's demand for transactions, precautionary and speculative balances. By following Keynes, we can write:

$$M = M_1 + M_2 = L_1 (Y) + L_2 (r),$$

where: M_1 = the transactions and precautionary demand for money, which is treated as a function of income.

M_2 = the speculative demand for money which is a function of the interest rate.

The distinction among transations, precautionary, and speculative balances is insignificant except as a help to clarify the individual's total demand for money. The important point is that the individual's demand for money is a function of his income (Y), his wealth (W), (55) the rate of interest (r), the expected rate of interest (r^e), the expected level of prices (p^e). (56) Restated,

$\frac{M^d}{P} = L (Y, W, r, r^e, p^e)$, where P is the price level. Keynes explained that the subdivision of the total demand for money was a matter of analytical convenience,

> Money held for each of the three purposes forms, nevertheless, a singe pool, which the holder is under no necessity to segregate into three water-tight compartments; for they need not be sharplmy divided even in his own mind, and the same sum can be held primarily for one purpose and secondaily for another ... we can ... consider the individual's agreegate demand for money ... as a single dicision ... (57).

This analytical improvement by Keynes is significant in that he places the demand for money in a behavioral framework consistent with the concept of rational choice in an uncertain world

(54) Ibid., p. 197.
(55) The amount of cash people wish to hold, Keynes states as early as 1923, "depends partly on the wealth of the community..." in John Maynard Keynes, **Monetary Reform**, p. 85.
(56) John Maynard Keynes, "Alternative Theories of the Rate of Interest", **The Economic Journal**, Vol. 47, June, 1937, pp. 241-252; also see "The 'ex-ante' Theory of the Rate of Interest", **The Economic Journal**, Vol. 47, December, 1937, pp. 663-669; and also see **A Treatise on Money**, Vol. II, pp. 42-47.
(57) Keynes, **The General Theory**, p. 195.

in which the individual's demand for money as a demand for a particular asset through the influence of expectations is firmly established.

The Demand for Money: The Transactions and Speculative Approach

Priveously, Pigou, Keynes and Hansen empasized the sensitivity of the transactios demand for money to the rate of interest; however, a systematic theory of this relationship was first worked out by William J. Baumol and later by James Tobin (58). They recognized that there is an opportunity cost for holding transactions balances idle: either interest foregone by holding money instead of financial instruments that give a return in the form of interest or dividend, or interest to be paid for borrowing money. In their opinion, the transactions demand for money is a problem of inventory theory. The formulation of this theory by Baumol seeks to minimize the costs of acquiring eand holding cash. The problem is similar to an entrepreneur's problem of how to minimize the costs of an inventory: with a large inventory interest is foregone; with a small inventory a large number of requent orders has to be made, which by itself can be a costly process.

Baumol advances by assuming that a stock af cash is the holder's inventory of the medium of exchange, and that a rational person will try to minimize the cost of holding this inventory by holding an appropriate amount of money and financial instruments such as bonds. He supposes that transactions are perfectly foreseen and occur in a steady stream over a given time period. His real income per period is T (Tobin uses Y) dollars, and by assumption, the individual will pay out all of his T dollars at a constant rate. As a result, he will be holding an ever diminishing stock of assets. However, he considers that the individual begins holding all of his income in bonds at the start of the period. The individual is assumed to withdraw cash in lots of C dollars evenly spaced, and each time he makes a withdrawal, he has to pay a fixed "broker's fee" of b dollars. When he obtains cash, he is foregoing interest opportunity cost, r, of holding bonds. He states that T, the value of transactions, is pretermined, and r and b are supposed to be constant.

Naturally he will make T/C withdrawals during the period at a cost equal to b . T/C which includes not only the explicit costs (brokerage fees) of selling assets to get money but also the implicit costs (the inconvenience) of doing so. At the same time, if cash is held instead of bonds, the foregone interest, r, must be considered as a

(58) William J. Baumol, "The Transactions Demand for Cash: An Inventory THeoretic Approach", **Quarterly Journal of Economics,** Vol. 66, November, 1952, pp. 545-556; James Tobin, "The InterestElasticity of Transactions Demand for Cash", **Review of Economics and Statistics,** Vol. 38, August, 1956, pp. 241-247.

part of the total cost. He considers the withdrawal of C dollars by the individual as expended at a constant rate and withdraws out a similar amount the moment it is spent, then his average cash balance will be C/2, whihc is half of the amount of his transactions from the sale of bonds. The cost of holding cash per period will then be r C/2, which is "interest opportunity cost".

The total cost of holding the inventory cash, where K is the cost, therefore, can be written:

$$K = b.\frac{T}{C} + r\frac{C}{2}$$

The problem then becomes that of finding the value of C that minimizes the total cost (transactions costs plus interest foregone) of holding the inventory of cash, which can be done by taking the derivative of K with respect to C, set it equal to zero (59):

$$\frac{dK}{dC} = \frac{-bT}{C^2} + \frac{r}{2} = 0$$

and solve for C. This gives us the expression:

$$C = \sqrt{2bT/r}$$

Since the optimal cash holdings over the period have an average value of C/2, then we have:

$$\frac{C}{2} = \frac{1}{2}\sqrt{2bT/r}$$

This expression is the same as the demand for real cash balances:

$$\frac{M^d}{P} = \frac{C}{2} = \frac{1}{2}\sqrt{2bT/r}$$

This shows that the rational individual, behaving as to minimize, the cost of holding eal transactions balances, will demand monay in proportion to the square root of the volume of his transactions and inversely proportional to the square root of the interest rate.

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(59) The second - order minimum condition is satisfied as well:

$$\frac{d^2K}{dC^2} = \frac{2bT}{C^3} > 0$$

The demand for nominal balances, then, becomes (60):

$$M^d = kr^{-1/2}T^{1/2}P \text{ where } k = \frac{1}{2}\sqrt{b}$$

Thus, in simple situation, the rational individual, given the price level, demands money in proportion to the square root of the value of his transactions. Baumol says nothing about the utility of holding cash for transactions purposes, or the trade off between such utility and interest rates. The strong point of his approach is that one does not need to find notions about the utility of demand for money necessary. All one needs to know is that we need cash as the means of exchange for transactions and there are costs involved in transforming bonds into cash, and the existence of a brokerage fee.

Moreover, the concept of the square root formula indicates that demand for cash rises less than in proportion with the volume of expenditures, so there should be economics of scale in management of money holdings which implies the importance of the monetary policy. In other words, with constant prices, an inrease or decrease in the supply of money will have a greater effect on employment than it would if the demand for money were proportional to income (61). The non-proportionality can be shown below (62):

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(60) $\frac{M^d}{P} = \frac{1}{2}\sqrt{2bT/r} = \frac{1}{2}\sqrt{2b/r}\ TP = \frac{1}{2}\sqrt{2b}\ T^{1/2-1/2}P$

This can be expressed as:

$$M^d = kr^{-1/2}T^{1/2}P \text{ where } k = \frac{1}{2}\sqrt{2b}$$

The inverse relationship to the rate of interest is noticed when we have a partial derivative of M^d to r such that:

$$\frac{\partial M}{\partial r} = -\frac{1}{2}\ kr^{-3/2}\ T^{1/2}P\ < 0$$

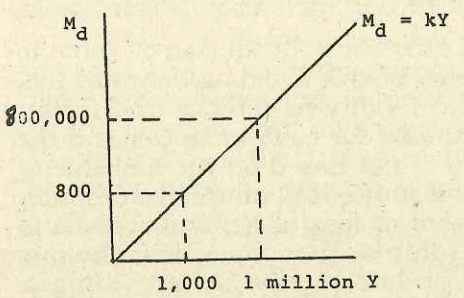
(61) Baumol, "The Transactions Demand for Cash: An Invertory Theoretic Approach," p. 551; also see Laidler, **Demand for Money**, p. 66.

(62) From $M^d = kr^{-1/2}T^{1/2}P$ it can be observed that:

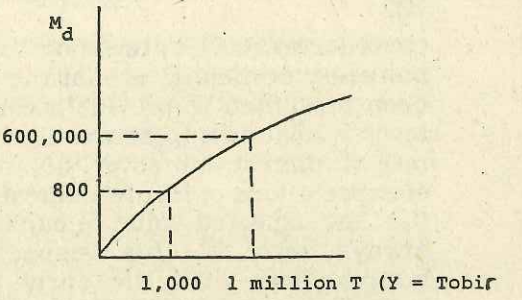
$$\frac{\partial M^d}{\partial T} = \frac{1}{2}kr^{-1/2}T^{-1/2}P \neq k \text{ and:}$$

$$\frac{\partial^2 M^d}{\partial T^2} = -\frac{1}{4}kr^{-1/2}T^{-3/2}P < 0$$

This shows that when T increases, the demand for money dous not increase by k.



Classical demand for money is proportional to income.



The demand for money is not proportional to income.

The concept of non-prportionality implies that the income elasticity of demand for money is less than unity, a point which has been stated by Keynes to indicate the importance of the individual's rational choice by deciding how much balances he should carry (63).

Tobin's approach emphasizes the maximization of the return from wealth portfolio. His expression can be shown as:

$$M^d = kr^{-1/2} y^{1/2} p \quad \text{where y is income.}$$

Tiegen's formulation of the demand for money is not different from the above development. We can write it as below (64):

$$M^d = kr^a y^b P \quad \text{where } a < 0, b > 0.$$

The inventory approach, however, seems not to be supported by empirical evidence because it refers to average cash holding where in fact data ascribed to cash held at a point of time is an accounting measure (65).

The transactions demand for money is just a part of Keynesian demand for money. Moraover, we have speculative demand for money. In order to get a downward sloping demand curve for money for the economy, Keynes assumed that individuals would hold bonds or money, but not both at the same time. Furthermore, he assumed inelastic interest rate expectations for different individuals. With these critical assumptions, he thought he got the "smooth" liquidity preference curve for the economy as a whole (66). However, if we look at individual behavior, we cannot get a smooth sloping demand

(63) John Maynard Keynes, **Monetary Reform**, p. 53.
(64) Ronald L. Teigen, "Demand and Supply Functions for Money in the United States: Some Structural Estimates", **Econometrica**, Vol. 32, October, 1964, pp. 476-509.
(65) Harry P. Johnson, **Macroeconomics and Monetary Theory**, p. 80.
(66) Keynes, **General Theory**, pp. 71, 202.

curve for money as proved by Tobin (67). The contribution of Tobin to monetary economics is that the theory of risk avoiding behavior has been presented to provide a case for liuidity preference and for an inverse relationship between the demand for cash balances and the rate of interest. Moreover, his model is not based on the inelasticity of expectations of future interest rates, but based on the assumption that the expected value of capital gain or loss of holding consols is always zero. In this respect, Tobin's theory is an obvious improvement over the early Keynesian theory by providing a logically more satisfactory foundation for liquidity preference.

Furthermore, he introduces risk into the problem and explains the holding of a diversified portfolio by the individual. Nevertheless, his analysis is based on the previous theory by assuming the same two-asset world, and on the assumption that money is not dominated by other assets as a means of holding assets.

The Demand for Money: A Neo-Classical Approach

The important role of monetary policy from 1936 to the early 1960's was de-emphasized. There was a widespread feeling that monetary control was rather unimportant. In other words, it was argued that changes in the supply of money are absorbed by corresponding changes in the velocity of circulation. Moreover, the rate of increase of the money supply would be closely connected with a decrease in velocity and prices, and outputs would not be changed. The effect of increasing the money supply, if any, was thought to generate lower interest rates and lower interest rates would induce additional investment. Thus, additional investment through the investment multiplier would increase income and employment. Keynes did not see a key in traditional quantity theory to solve the unemployment problem and he objected to it:

> Thus if it is practicable to measure the quantity, O, and the price, P, of current output, we have Y = OP, and, therefore, MV = OP ... For the purposes of the real world it is a great fault in the Quantity Theory that it does not distinguish between changes in prices which are a function of changes in output, and those which are a function of changes in the wage-unit. The explanation of this omission is, perhaps, to be found in the assumptions that there is no propensity to hoard and that there is always full employment. For in this case, O being constant and M_Z being zero, it follows, if we can take V also as constant, that both the wageunit and the price-level will be directly proportional to the quantity of money (68).

(67) James Tobin, "The Liquidity Preference Behavior Towards Risk", **The Review of Economics Studies**, Vol. 25, February 1958, pp. 65-86.
(68) Keynes, **General Theory**, p. 204.

Thus, that was the end of the role of money in policy analysis, and the end of quantity theory. The income-expenditure approach gave more hope and responsibilities to the authorities to cure unemployment with autonomous expenditures. The recollections of the deflation of the 1930's reinforced the emphasis on government expenditure to increase the aggregate demand.

However, the high rate of inflation after World War II, and during the Korean and Vietnam wars, gave an opportunity to economists to analyze and challenge the shortcomings of income-expenditure models in dealing with the problem of creeping inflation and monetary mismanagement. This led the profession to reexamine and study the impact of money on the economy. The neo-classical approach to the analysis of money was stated by Friedmand in "an elegant exposition of the modern portfolio approach to the demand for money which ... can only be seen as a continuation of the Keynesian theory of liquidity preference" (69). Thus, that is the "restatement" of the theory of money, the main aspect of which is a demand function for money, where the demand function is featured "as part of capital or wealth theory, concerned with the composition of the balance sheet or portfolio of assets" (70).

In plain language, the new quantity theory of money is nothing but the integration of Mises, Fisher, Pigou and Keynes' theories expressed in a more sophisticated fashion. For this very reason we do not have one "quantity theory of money". Rather, as Friedman states it, "The quantity theory of money is a term evocative of a general approach rater than a label for a well-defined theory" (71). Moreover, "the analytical framework" of this new approach is nothing but "Keynesian" (72). The basic features of the new approach in Friedman's words are:

1. The quantity theory is in the first instance a theory of the demand for money. It is not a theory of output, or of money income, or of the price level. Any statement about these variables requires combining the quantity theory with some specifications about the conditions of supply of money and perhaps about other variables as well.

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(69) Don Patinkin, "The Chicago Tradition, The Quantity Theory, and Friedman", **Journal of Money, Credit and Banking**, Vol. 1, February, 1969, p. 47.

(70) Milton Friedman, "A Theoretical Framework for Monetary Analysis", in Robert J. Gordon (ed.), **Milton Friedman's Monetary Framework** (Chicago: The University of Chicago Press, 1974), p. 11; Friedman first formulated his theory in "The Quantity Theory of Money - A Restatement", in **Studies in the Quantity Theory of Money** in 1956.

(71) Milton Friedman, "The Quantity Theory of Money - A Restatement", in **Studies in the Quantity Theory of Money**, p. 3.

(72) Don Patinkin, "Friedman on the Quantity Theory and Keynesian Economics", in Robert J. Gordon (ed.), **Milton Friedman's Monetary Framework**, p. 114.

2. To the ultimate wealth-owning units in the economy, money is one kind of asset, one way of holding wealth ... the theory of the demand for money is a special topic in the theory of capital...

3. The analysis of the demand efor money on the part of the ultimate wealth-owning units in the society can be made formally identical with that of the demand for a consumption service. As in the usual theory of consumer choice, the demand for money (or any other particular asset) depends on three major sets of factors: (a) the total wealth to be held in various forms - the analogue of the budget restraint; (b) the price of and return on this form of wealth and alternative forms; and (c) the tastes and preferences of the wealth-owning units (73).

In his restatement of the Quantity Theory, the demand for money in its most simplified form becomes:

$$M = f\left(P, r_b, r_e, \frac{1}{P}\frac{dP}{dt}, W; \frac{Y}{r}; u\right) \qquad (2.1)$$

Where: M = the nominal quantity of money

P = price level

r_b = the rate of return on bonds

r_e = the rate of return on equities

$\frac{1}{P}\frac{dP}{dt}$ = the rate of change of the price level

W = the ratio of non-human to human wealth

Y/r = wealth or permanent income

u = tastes and preferences

Then equation (1) is taken to be homogeneous in degree in both P and Y. With some simplification, it is written as follows:

$$\lambda M = f\left(\lambda P, r_b, r_e, \frac{1}{P}\frac{dP}{dt}; W; \lambda Y, u\right)$$

$$= \lambda f\left(P, r_b, \frac{1}{P}\frac{dP}{dt}; W; Y; u\right) \qquad (2.2)$$

where λ is some constant multiplier.

The demand for real balances can be inferred by letting $\lambda = 1/P$, that is,

$$\frac{M}{P} = f\left(r_b, r_e, \frac{1}{P}\frac{dP}{dt}; w; \frac{Y}{P}; u\right) \qquad (2.3)$$

(73) Milton Friedman, "THe Quantity Theory of Money - A Restatement" in Milton Friedman (ed.), **Studies in the Quantity Theory of Money**, p. 4.

where M/P is the real quantity of money demanded "as a function of 'real' variables independent of nominal monetary values" (74). Alternatively, when he lets $\lambda = 1/Y$, equation (2.2) becomes:

$$\frac{M}{Y} = f\left(r_b, r_e, \frac{1}{P}\frac{dP}{dt}, w, \frac{P}{Y}, u\right)$$

$$= \frac{1}{v\left(r_b, r_e, \frac{1}{P}\frac{dP}{dt}, w, \frac{Y}{P}, u\right)} \qquad (2.4)$$

which can be written as:

$$Y = v\left(r_b, r_e, \frac{1}{P}\frac{dP}{dt}, W, \frac{Y}{P}, u\right) \cdot M$$

"In this form the equation is in the usual quantity theory form, where v is income velocity" (75).

Lord Keynes attacked the quantity theory on the grounds that it neglected the impact of the rate of interest on velocity. In Keynesian theory,

$$M = [k(r)]\, Y = \frac{Y}{v(r)}$$

which is similar to Friedman's version, that is,

$$Y = [v(\,)]\, M.$$

"In a sence, Friedman is solidly in the Keynesian camp-or, more accurately, his theory is more a variation on a Keynesian rather than a neoclassical theme" (76).

In later years, because of his critics, Friedman had to acknowledge the fact that his reformulation of the quantity theory had "been strongly affected by the Keynesion analysis of liquidity preference" (77). From the above analysis, as Friedman indicates, the fact that "almost every economist will accept the general lines of the preceding analysis on a purely formal and abstract level, although each would doubtless choose to express it differently in detail" (78). However, he goes on to distinguish three main features of the quantity theorist as follows:

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(74) Ibid., p. 11.
(75) Ibid., p. 11.
(76) Stephen Rousseas, **Monetary Theory** (New York: Alfred Knopf, Inc., 1972), p. 183.
(77) Milton Friedman, "The Quatity Theory of Money", in A.A. Walters (ed.), **Money and Banking**, p. 51.
(78) Milton Friedman, "The Quantity Theory of Money - A Restatement", in Milton Friedman (ed.), **Studies in the Quantity Theory of Money**, p. 15.

(i) The quantity theorist accepts the empirical hypothesis that the demand for money is highly stable--more stable than functions such as the consumption function that are offered as alternative relations... The quantity theorist need not, and generally does not, mean that the ... velocity of circulation of money is to be regarded as numarically constant over time... For the stability he expects is the functional relation between the quantity of money demanded and the variables that determine it... The quantity theorist not only regards it as playing a vital role in determining variables that he regards as of great importance for the analysis of the economy as a whole, such as the level of money income or of prices...

(ii) The quantity theorist also holds that there are important factors affecting the supply of money that do not affect the demand for money,,,

(iii) The demand for money is not infinitely elastic (viz., absence of a "liquidity trap") (79).

The Stable Demand Function for Money

The new approach gives great emphasis to the stability of the demand for money function. A function is called stable if the variables of the function explain the unknown variable completely or predicts its direction with some certainly and if the function, at the most, changes slowly over time. A function could be stable in a great number of variables, however, when the economists use the term "a stable money demand function" they mean a function which is stable in a small number of variables. When the demand function for money is stable, money can have a systematic influence on the economy. For this very reason, the policy makers could predict the consequences of monetary measures (80). For that matter, "a stable demand function is useful precisely in order to trace out the effects of changes in supply, which means that it is useful only if supply is affected by at least some factors other than those regarded as affecting demand" (81).

When the authorities print more money-nominal money balances increase; however, what matters to individuals are the real money balances. If the nominal money balances people hold in a particular moment of time is great than what they wish to hold, they will try to dispose of their excess money balances by paying out "a larger sum for the purchase of securities, goods and services, for the repayment of debts, and as gifts than they are receiving from the corresponding sources" (82). Hence, the desire by the public to

(79) Ibid., pp. 15-16.
(80) H. Visser, **The Quantity of Money**, p. 112.
(81) Friedman, "The Quantity Theory of Money - A Restatement", in **Studies in the Quantity Theory of Money**, pp. 16-17.
(82) Friedman, "A Theoritical Framework for Monetary Analysis", in **Milton Friedman's Monetary Framework**, pp. 2-3.

maintain a certain amount of real money balances would render "either a reduction in the real quantity available to hold through prices or an inrease in the real quantity desired through output increases" (83). Thus, the "new approach" has postulated a direction and a certain link between changes in the money supply and changes in prices and output, which has far-reaching implications as far as the role of money for stabilization policies are concerned. The "new approach" believes the money supply will affect only the level of prices in the long run. The change in output in the short run is a transitory phenomenon.

Empirical studies have been undertaken to test the hypothesis of whether we have a stable demand function or not. The result of these findings indicate the existence of a stable demand for money even in countries which had suffered from hyperinflations (85). Moreover, the concept of linear homogeneity of the demand for money was tested by Meltzer and he concluded thet "A doubling of prices and the value of financial assets doubles the demand for nominal balances but leaves the demand for real balances unaffected" (86). In other words, this implies that the demand for real balances is entirely dependent upon the real explanatory variables.

Friedman

Friedman treats the demand for money like his treatment of any other asset. For him, in formulating the demand for money, "... the most fruitful approach is to regard money as one of a sequence of assets, on a par with bonds, equities, houses, consumer durable goods, and the like" (87). However, his ultimate aim is to test the prediction of the hypothesis against empirical evidence by stating that the demand for money is, like consumption, a function not of current measured income but of permanent income, an exponentially weighted average of current and past incomes. Hes was moved to suggest this by the cyclical behavior of velocity. Velocity rose during booms and fell in depressions, yielding a positive relationship between income aend velocity and velocity exhibited a long-run secular fall for the U.S. data from 1870 to 1951 (88). The tires to reconcile these facts by utilizing the concept of permanent income, Y_p.

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(83) Ibid., p. 3.
(84) Milton Friedman, "The Role of Monetary Policy", **The American Economic Review**, Vol. 58, No. 1, March 1968.
(85) Philip Cagan, "The Monetary Dynamics of Hyperinflation", in Milton Friedman (ed.), **Studies in the Quantity Theory of Money**, pp. 25-117.
(86) Allan H. Mertzer, "The Demand for Money: The Evidence from the Time Series", **The Journal of Political Economy**, Vol. 71, June 1963, p. 227.
(87) Milton Friedman, "The Demand for Money: Some Theoretical and Empirical Results", **The Journal of Political Economy**, Vol. 67, August 1959, p. 349.
(88) Velocity has been rising in the U.S. since 1951.

Velocity, he states, is detemined by the demand for money because the demand for money is in real terms and the stock of real balances is something which the public controls. His assertion that velocity is a demand for money phenomenon is more elaborate:

> The nominal stock of money is determined in the first instance by the monetary authorities or institutions... Holders of money cannot alter this amount directly. But they can make the real amount of money anything that in the aggregate they want to ... The real stock of money is determined in the first instance by the holders of money ... Given the level of real income ... income velocity is uniquely determined by the real stock of money. Consequently ... it too is determined by the holders of money (89).

Friedman's empirical analysis to explain money demand behavior leads him to test the following equation to aggregate data:

$$\frac{M}{NP} = \gamma \left(\frac{Y_p}{NP_p}\right) \delta$$

or in logarithmic form, $\ln (M/NP) = \ln\gamma + \delta \ln \frac{Y_p}{NP_p}$

where M = the nominal quantity of money

P = measured price level

N = population

Y_p = permanent nominal income

P_p = permanent price level

γ and δ = behavioral parameters.

This equation expresses the fact that real per capita money balances demanded are a function of real per capita permanent income (90). Hence, the rate of interest and the rate of price changes have been left out from the empirical function as explanatory variables. As friedman states:

> In our experiments, the rate of interest had an effect in the direction to be expected from theoretical considerations but too small to be statistically significant. We have not as yet been able to isolate by correlation techniques any effect of the rate of change of prices, though a historical analysis persuades us that such an effect (91).

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(89) Ibid., pp. 330-331; See also Baldev Raj and Pierre L. Siklos "Some Qualms About The Test of The Institutional Hypothesis of the Long Run Behavior of Velocity", **Economic Inquiry**, Vol. 26, July 1988, p.. 537-545.
(90) Ibid., pp. 335-336.
(91) Ibid., pp. 329.

The result of his empirical studies for the period 1869-1957 shows the permanent income elasticity of demand for money, δ to be 1.8, which is substantially greater than unity-an indication that money balances are considered to be a "luxury" by consumers (92). Hence the demand for real balances will rise faster than Y_p and "real" velocity falls as Y_p rises, which is the secular pattern he observes.

The high income elasticity of demand for money in Friedman's empirical work has been under attack from all sides. As Laidler indicates, "the rate of interest, whatever the actual series that might be used to measure it, has a statistically significant negative effect on the demand for money, however defined ... Friedman's inability to find a close relationship between the demand for money and the ate of interest is a result of the test procedure he followed... As to the permanent income elasticity of demand for money of 1.8, this would appear from subsequent evidence to be partly the result of omitting the rate of interest from the function fitted..." (93).

Meltzer, using tha rate of interest on 20-year bonds for r, found a meaningful negative relationship between the demand for money and the rate of interest (94). Moreover, Brunner and Meltzer have found that the rate of interest plays a significant role in demand for money, however defined. They state his relationship very clearly:

> ... the data suggest that interest rates enter significantly in the velocity equations and in the demand for money equations from which the velocity equations are derived. Including interest rates as an additional variable in Friedman's permanent income model improves the prediction of measured velocity from the model (95).

Furthermore, the results of empirical work undertaken by Chow, Teigen, Laidler and Heller lend further support to the existence of a significant negative relationship between the demand for money and the rate of interest (96).

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(92) Ibid., pp. 328-329.

(93) David Laidler, "The Definition of Money: Theoretic and Empirical Problems", **Journal of Money, Credit and Banking,** Vol. 1, No. 3, August 1969, p. 517.

(94) Allan H. Meltzer, "The Demand for Money: The Evidence from the time Series", **Journal of Political Economy,** Vol. 71, June 1963, pp. 219-246.

(95) Karl Brunner and Allan Meltzer, "Predicting Velocity: Implications for Theory and Policy", **Journal of Finance,** Vol. 18, May 1963, p. 350.

(96) Gregory Chow, "On the Short-Run and Long-Run Demand for Money", **Journal of Political Economy,** Vol. 74, April 1966, pp. 111-113; Ronald Teigen, "Demand and Supply Functions for Money in the United States", **Econometrica,** Vol. 32, October 1964, pp. 477509; David Laidler, "The Rate of Interest and the Demand for Money-Some Empirical Evidence", **Journal of Political Economy,** Vol. 74, December 1966, pp. 545-555; H. R. Heller, "The Demand for Money-The Evidence from the Short-Run Data", **Quarterly Journal of Economics,** Vol. 79, May 1965, pp. 291-303.

Harry Johnson stated that the reason why Friedman omitted the rate interest in his formulation was ideological because "to admit interest rates into the demand function for money is to accept the Keynesian Revolution and Keynes attack on the quantity theory" (97). However, Friedman categorically rejected his crities by stating "I know no empirical student of the demand for money who denies that interest rates affect the real quantity of money demanded, though others have misinterpreted me as so asserting" (98). All he meant was that interest rates "appear to be less important as a determinant of quantity demanded than real per capita income ...; and that the interest elasticity is not very high". In other words, "the basic differences among economists are empirical, not theoretical", as Friedman mildly indicated (99). When this is the case, from the Keynesian point of view, Teigen, rightly so, stated that "there is very little if anything in monetarist theory which is new and different. Rather the two approaches diverge in ways which basically are methodological and operational" (100).

Despite Friedman's affirmation of the effect of the rate of interest on the demand for money, his operational money demand function in empirical studies for the United States is only related to the permanent income, Yp. Thus, his contribution to the field lies in his attempt to define relevant variables to be included "in analyzing the demand for money on an empirical level", (101) and shake Keynesians into reformulating their own paradigms (102).

The Demand for Money in a Fragmented Economy

The economics of most of the third world countries are "fragmented" in the manner that entrepreneurship and people are so much "isolated that they face different effective prices for land, labor, capital, and produced commdities and do not have access to the same tehcnologies" (103). Moreover, financing from outside the

(97) Harry G. Johnson, "A Quantity Theorist's Monetary Histody of the United States", **Economic Journal**, Vol. 75, June 1965, pp. 338-396.
(98) Milton Friedman, "Interest Rates and the Demand for Money", **Journal of Law and Economics**, October 1966, p. 72; reprinted as Chapter 7 in **The Optimum Quantity of Money: And Other Essays** (Chicago: Aldine, 1969), pp. 142-155.
(99) Milton Friedman, "A Theoretical Framework for Monetary Analysis", in Robert J. Gordon (ed.), **Milton Friedman's Monetary Framework**, p. 61.
(100) Ronald L. Teigen, "A Critical Look at Monetarist Economics". Federal Reserve Bank of St. Louis Review, January 1972, pp. 10-25; reprinted in **Readings in Money, National Income, and Stabilization Policy** (Homewood, Ill: Richard D. Irwin, third edition, 1974), pp. 123-147. The quotation is taken from the reprinted version, p. 137.
(101) David E.W. Laidler, **The Demand for Money: Theories and Evidence**, p. 57.
(102) Stephen W. Rousseas, **Monetary Theory**, p. 221.
(103) Ronald I. McKinnon, **Money and Capital in Economic Development** (Washington, D.C.: The Brookings Institution, 1973), p. 5.

individual enterprise is either unknown or extremely limited in the fragmented economy. Firms are unable to issue primary securities and individuals cannot buy them (104). The banking system does not play an important role in intermediation between savers and firms. For these very reasons, we encounter poorly developed markets for investment and for consumer durables, which limit the ability of people to hold their money in alternative forms since they face few "organized" markets for such primary securities as bonds, montgages, or common stock. In this kind of economy, such as Chile, the measured income would have as great an effect on the demand for money as upon the permanent components. Deaver indicates:

> with choices so limited, the additional savings accumulated from transitory income may be kept in the form of cash, assuming no change in the cost of holding money due to changes in the rate of inflation. Short-run rigidity in the investment and consumer durables markets could also lead to a somewhat higher proportion of the transitory component of income being consumed rather than saved (105).

Deaver wanted to test the demand for money hypothesis in Chile where "... money holders may respond and to large changes in the cost of holding money and to substantial changes is expected income as well" (106). For this very reason, he formulated an equation of the following form:

$$\log M/P^1 = b_o + b_1 C^* + b_2 \log y^1 + v$$

where: M/P^1 = real stock of money per capita

C^* = expected rate of change in the cost of living index

y^1 = real per capita national income

$b_1 C^*$ = the elasticity of demand for money in terms of the expected rate of change in prices.

b_2 = income elasticity of demand for money.

His empirical work supports the money-demand hypothesis for Chile (107).

Following Deaver's work on Chile, Diz's study confirms the hypothesis that the demand for per capita monay balances in Argentina, during 1935-1962, is "a stable function of the cost of holding money and real per capita income, and that these two

(104) Raymond W. Goldsmith, **Financial Structure and Development** (Yale University Press, 1969), p. 374.
(105) John V. Deaver, "THe Chilean Inflation and the Demand for Money", in David Meiselman (ed.), **Varieties of Monetary Experience**, p. 32.
(106) Ibid., p. 10.
(107) Ibid., p. 34.

variables alone explain in high fraction of the observed variables of those balances" (108). Cassuto's study on Brazil gives the same conclusion. Cassuto, however, concludes that demand for money in Brazil is explained better when independent variables are the actual rate of inflation, and per capita permanent income (109).

Most of the studies on the demand for money of fragmented economies do not include the rate of interest as one of the explenetory variables, for the simple reason that a legal ceiling is impose on them (110). One study on Nigeria includes the rate of interest as one of the independent variables with no success. Not only the explanatory power of interest rate in nill, furthermore, it has opposite signs (111). The writer comes to the conclusion that "large changes in the interest rates are needed to induce asset holders to change the composition of their portfolios" (112). Since the interest rates are "perverted" and controlled, the rate of inflation could have been a better explanatory variable for the study on Nigeria because "the cost of holding money is the rate at which the value of money is expected to decline due to rising prices" (113).

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(108) Adolfo Cesar Diz, "Money and Prices in Argentina, 1935-1962", in David Meiselman (ed.), **Varieties of Monetary Experience**, p. 971.
(109) Alexander E. Cassuto, "Monetary Stability and Inflation in Brazil", **Economia Internazionale**, Vol. 29, No. 1-2, Feb./March 1976, pp. 161-175.
(110) Maxwell J. Fry, "Manipulating Demand for Money", in Michael Parkin and A.R. Nobay (eds.) **Essays in Modern Economics** (New York: Harper & Row Publishers, Inc., 1973), pp. 371-385.
(111) Simeon Ibi Ajayi, "Some Empirical Evidence on the Demand for Money in Nigeria", **The American Economist**, Vol. 21, Spring 1977, No. 1, pp. 51-54.
(112) Ibid., p. 54.
(113) Deaver, p. 25.