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The Monetary Theories of Milton Friedman and J. M. Keynes: A Comparison

Millicent Moulder Taylor
University of Tennessee

To the Graduate Council:

I am submitting herewith a dissertation written by Millicent Moulder Taylor entitled "The Monetary Theories of Milton Friedman and J. M. Keynes: A Comparison." I have examined the final electronic copy of this dissertation for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy, with a major in Economics.

Charles B. Garrison, Major Professor

We have read this dissertation and recommend its acceptance:

Accepted for the Council:

Carolyn R. Hodges

Vice Provost and Dean of the Graduate School

(Original signatures are on file with official student records.)

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THE MONETARY THEORIES OF MILTON FRIEDMAN AND J. M. KEYNES: A COMPARISON

A Dissertation

Presented for the

Doctor of Philosophy

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Millicent Moulder Taylor

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ABSTRACT

For two decades, Milton Friedman has contended that the monetary theory of John Maynard Keynes is highly special, applicable only to conditions of deep depression. He continues to cite Keynes' dependence on a condition of absolute liquidity preference, commonly called the liquidity trap, as the theoretical basis for Keynes' unemployment "equilibrium." Friedman believes that Keynes' The General Theory was based on this underlying premise, so that its results are correct only in this special circumstance. Therefore, Friedman contends that Keynes regarded monetary policy as ineffective. Additionally, Friedman criticizes all economists in the Keynesian tradition because they adopt a narrow "credit" view of monetary policy while his theory is based on a broad "monetary" view.

This study investigates Friedman's charges in reference to Keynes' The General Theory, and in the process a study is made of Keynes' and Friedman's monetary theories. The result is a presentation of the fundamental differences of the two monetary theories. Additionally, Keynes' monetary policy prescriptions from The General Theory are discussed to investigate further any possible basis for Friedman's criticisms.

The conclusions of the study are: that Friedman is incorrect in his charges that the liquidity trap is the basis for unemployment in The General Theory, that Keynes' monetary theory is very similar to the one which Friedman espouses, and that Keynes' monetary policy view regards changes in the supply of money as a potent tool for maintaining a high level of employment.

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CHAPTER I

INTRODUCTION TO THE PROBLEM

This dissertation examines the divergent monetary theories of Milton Friedman and John Maynard Keynes. The major disagreement in macroeconomics concerns the effectiveness, durability and desirability of monetary and fiscal policy. The basis for this divergence lies beneath the empirical tests and the policy prescriptions, and consists of differences in theoretical structure, including assumptions about the behavior of agents and varying degrees of inclusion of institutional factors.

Friedman has criticized Keynes' monetary theory and Keynes' theory of the determination of real variables (output and employment). In particular, Friedman has made the following three charges (1970, p. 214; 1972, p. 943; 1982, pp. 41-42): (1) the key feature of Keynes' monetary theory is the "special twist" of absolute liquidity preference (the liquidity trap); (2) Keynes' "key proposition" that <u>long-run full employment equilibrium</u> may not exist even if all prices are flexible relies on the existence of absolute liquidity preference; and (3) Keynes' approach of regarding prices as an institutional datum for the purpose of analyzing <u>short-run</u> employment fluctuations also relies on absolute liquidity preference. Friedman has concluded that, due to these three features, Keynes ". . . shunted the car of economic science onto a wrong line . . ." (1982, p. 621).

A. Objectives and Method of Analysis

The chief objective of this study is to address and evaluate Friedman's criticisms of Keynes as summarized in the above three propositions. To address these issues, however, it is necessary to state the objectives in a somewhat different form: (1) To determine whether the liquidity trap is logically implied by Keynes' monetary theory. (2) To compare Keynes' and Friedman's monetary theories with respect to (a) the range of assets in wealth-holders' portfolios affected by changes in the quantity of money and (b) the monetary transmission process--that is, the process by which a change in the quantity of money affects other variables including real variables such as output and employment. (3) To determine whether Keynes believed monetary policy to be ineffective, as Friedman has charged. Monetary policy is defined as changes in the quantity of money brought about by actions of the central bank.

The method of study is empirical, in the sense that the relevant data are the writings of the two economists. In particular, the method involves tracing the implications of the formal theories of Keynes and Friedman to their logical conclusions, without regard to "asides" and peripheral observations, no matter how insightful they may be. For as Friedman (1972, pp. 918, 935) has noted, what an economist says and what his formal theory logically implies may be quite different.

B. The Liquidity Trap

One aspect of the controversy concerns the role of the liquidity trap as a necessary condition for the non-market clearing outcome of

Keynes' The General Theory. Friedman charges that logically the unemployment outcome that Keynes claims to exist cannot do so without the aid of rigidities (1982, p. 42), and in both the short run and the long run, the liquidity trap is the basis for Keynes' theory.

The liquidity trap is a perfectly elastic demand for money at some rate of interest. If the demand for money is perfectly elastic, wealth holders are willing to hold additional money balances that pay no interest rather than trade for any asset with a positive yield. Normally, wealth holders would be induced to hold additional money only if the alternative yields on substitute stores of wealth fell. But in the case of absolute liquidity preference, these individuals will keep additional money even if other yields remain the same. Therefore, any attempt by the central bank to lower interest rates by bidding up prices of bonds or other assets will fail if there is a liquidity trap. These wealth holders will merely store as "wealth" any additional money that the central bank creates. They will not use it to purchase other stores of wealth such as bonds or physical assets thus raising their prices and lowering their yields.

Friedman has asserted that Keynes did not recognize the wealth effect as an equilibrating force (1968, p. 2; 1982, p. 42) when prices are flexible. Thus, even if falling prices do not reduce interest rates, real wealth will increase and spending accordingly will rise until long-run equilibrium at full employment is restored (see Haberler, 1941, and Pigou, 1947).

One might dismiss this criticism of Keynes by Friedman by contending that Keynes was, after all, mainly interested in a short-run

situation in which prices and wages do not move to clear labor and goods markets rather than in a long run in which prices and wages are flexible. But Friedman goes further to state that even short run disequilibrium in Keynes' theory is a result of the liquidity trap, since its existence is "critical" for those propositions that he attributes to The General Theory of prices being given for the short run. The precise way that the liquidity trap ensures rigid prices must be inferred from Friedman's interpretation of Keynes' monetary transmission mechanism. To dismiss these charges does not serve the goal of illuminating the critical differences in monetary theory.

Friedman has elicited some response to his charges, especially from those who defend Keynes' theoretical structure. Patinkin argues that the liquidity trap is "in contrast with Keynes' own statement that

" it did not exist (1974, p. 130), and was only a "theoretical possibility that had not yet been realized" (1976, p. 112). He points out that his own interpretation of Keynes in a disequilibrium setting frees the theory "from any logical dependence on the existence of a 'liquidity trap'" (1974, p. 130). Recently Patinkin stated that " the fact that this work does not assume the existence of a liquidity trap already appears in macroeconomics textbooks" (1983, p. 48).

Other economists have expressed similar sentiments about Friedman's insistence that the liquidity trap is even an issue. Robert E. Hall complains that Friedman and Schwartz's Monetary Trends devotes an inordinate share of the volume to "a view that has no serious adherents among professional economists. Friedman and Schwartz are generals fighting an earlier war (1982, p. 1552). Thomas Mayer

agrees that Friedman and Schwartz are "unconvincing" as they attempt to persuade the reader that ". Keynes took absolute liquidity preference . as the standard case" (1982, p. 1529).

Leijonhufvud (1968, footnote p. 202) finds that "Keynes explicitly rejected the idea that the money-demand function would be perfectly interest-inelastic within any range that we would possibly be interested in." Hahn states that, "Keynes did not build his revolution on the liquidity trap" (1971, p. 59). But, Friedman's question resurfaces: what ultimately explains the existence of unemployment that Keynes talked about in The General Theory (1936, p. 218)? If Keynes based his theory of short-run employment fluctuations on the existence of a liquidity trap, as Friedman has charged, how could it be that Keynes denied that the liquidity trap had ever existed? If not the liquidity trap, the theoretical justification for Keynes' position must be made clear. Friedman would have us accept that Keynes did not see his own error in this matter.

Friedman has held this view for a long time, and he presents it at every opportunity. In 1956, in his "Restatement" paper, Friedman notes:

> the Keynesian underemployment is based primarily on an assertion with the form of [the demand for money]. The demand for money . . is infinitely elastic at a "small" positive interest rate. At this interest rate, which can be expected to prevail under unemployment conditions, changes in the real supply of money, whether produced by changes in prices or in the nominal stock of money, have no effect on anything (1956, p. 17).

In a paper published in 1964, Friedman says that under conditions of unemployment, people would be indifferent to holding money or bonds in Keynes' theory (1969c, p. 70), and in 1966, he says that Keynes considered liquidity preference absolute or "approximately so" (1969d,

p. 141). Friedman considers the liquidity trap the "key novelty" of The General Theory in his 1967 tribute to Henry Simons (1967, p. 7) and similarly in 1968 in his presidential address. In his presentation of his "Theoretical Framework" in 1970 and the "Comments on the Critics" in 1972, he devotes considerable space to and effort in explaining the essence of the General Theory as he interprets it.

> In my interpretation of Keynes, I put great emphasis on a highly elastic liquidity preference calling this his "special twist" and a "key element" in his proposition about long-run equilibrium (1972, p. 928).

His great work in 1982, Monetary Trends with Anna Schwartz, repeats his contentions that it is indeed a liquidity trap which prevents full employment in the long run with flexible wages and prices. He goes further to state that a liquidity trap in the short run is what "allowed" Keynes to assume the existence of "rigid" wages and prices, preventing monetary policy from operating in the short run and justifying the neglect of the effects of wage and price changes (1982, pp. 41-42).

Since Friedman has expended so much time and effort in presenting his case, it certainly bears investigation, especially since other economists do not seem to have considered it worth pursuing. The contention requires more than a flat denial or affirmation. It is a question which requires delving deeply into the monetary theory of Keynes.

The complexity of Keynes' theory is evident. Some of the observations that he makes may be "asides" that clarify or hedge and are not really a part of his formal theory, while others may serve as elucidators or amplifiers. Friedman warns that we must "...distinguish

between the logical implications of a theory and the statements about observable phenomena ." (1974, p. 143). But, he says that Keynes' theory was not describing a "normal" situation but a highly idiosyncratic one based on conditions in the Great Depression (1982, p. 464). An examination of Friedman's interpretation of Keynes will disclose how Friedman sees Keynes as having a special theory tempered by general asides.

There are only two possibilities for resolution of this argument with respect to the long run: (1) Friedman has not interpreted Keynes' theory correctly and it does not depend on the existence of a liquidity trap for long run unemployment equilibrium, or does not claim to have a long run unemployment equilibrium with flexible wages and prices; or (2) Friedman is correct and Keynes' theory must be examined in light of its dependence on the liquidity trap as a basis for long run unemployment equilibrium even with flexible wages and prices. Our interest is mainly the short run since it is the explanantion of short run fluctuations in output and employment with which Keynes was most concerned.

Similarly, there are only two possibilities for resolution of the argument with respect to the short run: (1) Friedman has not interpreted Keynes' theory correctly and it does not depend on the existence of a liquidity trap to explain short-run employment fluctuations; or (2) Friedman is correct and Keynes' approach of taking goods' prices as given to analyze the short-run effects of changes in aggregate demand (1936, chapters 1 - 7) relies on the existence of a liquidity trap. If this study finds that Keynes' theory logically implies (2), it must be the case that Keynes' theory is applicable only

to a very special case, for virtually no economist contends that, as an empirical matter, absolute liquidity preference characterizes an actual economy.

C. The Range of Assets and the Transmission Process

The sucess of monetary policy depends upon the absence of absolute liquidity preference or a highly elastic demand for money. If Friedman is correct that Keynes relied on absolute liquidity preference, then Keynes' monetary transmission mechanism must be shown to demonstrate that monetary policy would be unable to lower the rate of interest. This would be the case even if flexible wages and prices had caused the real money supply to increase. Friedman would be correct in asserting that Keynes considered monetary policy ineffective. The existence of a liquidity trap would prevent an increase in the supply of money from lowering the interest rate and affecting aggregate demand.

The method by which monetary policy may affect real variables differs between Friedman and Keynes. Friedman and Schwartz interpret the major difference between his theory and the "Keynesians" as the range of assets that properly belong in the portfolio (1982, p. 58). Assets are important because they are the forms in which persons store their wealth, and the transmission process impacts the switching or substitution of one asset for another. If, as Friedman and Schwartz believe is proper, all goods and financial instruments qualify equally as assets, then the transmission process affects virtually all prices of goods, services and bonds through substitution (1982, pp. 57-58). New money recipients must choose among these forms according to which offers

the highest "yield." Prices of currently produced goods are thus affected directly by the transmission process, as wealth holders bid up prices in their effort to substitute goods for financial assets with lowered yields.

If the transmission process incorporates a narrow range of assets, then only financial instruments (money and interest-bearing securities) figure into the portfolio substitution process, and a change in the quantity of money impacts only their prices. As wealth holders try to dispose of their excess money by purchasing securities, prices of all remaining financial securities rise and their respective yields fall. This fall in yields, then, encourages borrowing for investment and consumption spending and thus a rise in effective demand.

It is clear that the definition of assets is crucial for a theory of the monetary transmission mechanism. A broad definition puts emphasis on relative price changes, while the narrow definition requires only the prices of financial assets to change instead of the prices of goods or services. The narrow definition acordingly emphasizes the cost of credit as the mechanism whereby money affects aggregate demand.

Friedman interprets the Keynesians as espousing the narrow definition of assets. Our concern in this paper however is with Keynes and not with the Keynesians, so the proposition that Keynes himself took this view will be examined since this view would be an alternative to the broad range of assets or to the liquidity trap. Differences in the range of assets is an important issue for the transmission process in explaining how a change in the quantity of money is realized in different outcomes among the theories. If a narrow range is a hallmark

for Keynes' monetary transmission process, then he limited his portfolio to bonds and money. If not he may have allowed durable goods as well. We do not address here whether or not "Keynesians" have preserved Keynes' monetary theory but endeavor to present the actual monetary theory contained in The General Theory, so that the reader may judge the validity of Friedman's complaints against it.

Friedman and Schwartz take "different assumptions about price" as the central distinction in the different transmission mechanisms (1982, p. 58). They say that Keynes' followers, in rejecting the liquidity trap, admitted flexible interest rates to their theories but retained the fixed price assumption of Keynes. The assumption of fixed prices forces the narrow transmission channel so that changes in the quantity of money affect only bond prices (1982, p. 58).

The legitimacy of this approach is challenged by Friedman and Schwartz who reject the narrow channel and the segregation of the bond and goods markets. They see the rate of interest not as a price but as a "pure number," a ratio with a temporal dimension (1982, p. 527). It relates the "price of services to the value of the source yielding those services" (1963, p. 218). An interest rate is implied in the prices of all goods, though not necessarily explicitly stated as it is for bonds (1982, p. 58).

There is an inverse relationship of bond interest rates to bond prices and the same relationship of the rate of return on goods to the prices of goods. Friedman criticizes the removal of this "rate" from goods' prices and the special treatment of the bond market as the only legitimate vehicle of monetary policy. The isolation of the bond market

from the goods market, implied by the narrow channel, is illegitimate according to Friedman, and he brings this up as a crucial issue, yet Davidson and Tobin, who defend the narrow channel, see no violation of economic logic.

How far may an economist go in segregating markets in macroeconomics? Is it legitimate for one to theorize clearing in the bond market while excess supply exists in the market for goods? Are bond prices and goods prices of the same nature so that we have one "asset" price due to substitution? or may they be treated separately?

Friedman's interpretation of Keynes' theory that the liquidity trap causes short run price rigidity differs from his interpretation of the Keynesians' theories that rigid prices force the narrow transmission channel. Does this mean that he believes that Keynes did not espouse the narrow channel? Or does he believe that Keynes' liquidity trap completely shut off <u>any</u> monetary effects, so that the range of assets became unimportant, the only relevant asset being money?

There are some economists who do not recognize these different transmission processes as significant for explaining different outcomes from a change in the supply of money. Harris, in his <u>Monetary Economics</u> text, finds that " . monetarists and Keynesians adopt broadly similar portfolio models for analyzing the effects of monetary policy" (1981, p. 436). Stein agrees that "Whatever differences there are between monetarists and the neo-Keynesians are not due to the nature of the transmission mechanism" (1976, p. 8). How is it that Stein and Harris, among other economists, do not see this as an issue? Tobin sees Friedman's version of the transmission process as supporting

Keynesian conclusions: "The puzzle is how Friedman could think that his account of the transmission mechanism supports monetarist conclusions" (1974, pp. 88-89). But a typical monetarist response from Brunner and Meltzer concludes on the contrary that "[t]he difference in implications reflects differences in the transmission or adjustment process" (1976, p. 98).

How producers are signalled to increase output is another point of contention. Particularly, do agents respond only to relative price signals or are there other quantity signals which either replace or complement the price signals? This critical issue is cloudy as the terms "aggregate demand" used by Friedman and "effective demand" used by Keynes may be miles apart. Price signals, which hold center stage in eliciting output changes in Friedman's model, seem redundant in producing changes in effective demand for Keynes' model. The actual role of price changes in Keynes' model is unclear. If prices play an insignificant role in Keynes' model, how are changes in demand conveyed to producers?

The implications of the liquidity trap, the relevant range of assets, the monetary transmission process, and the characteristics of the demand for money are important in the theoretical war between Friedman and Keynes, yet their main differences have been underplayed, dismissed or ignored in the literature. Friedman's call for clarification on these issues has not elicited the response it deserves. Since Friedman is undaunted by denials of his charges, this issue deserves an examination of the possible relation of the liquidity trap to Keynes' monetary theory and his theory of output fluctuations.

Friedman's crusade to put Keynes' theory in its proper perspective as a "highly special" theory applicable to "idiosyncratic" conditions has had an effect on current economic thought. If Friedman is correct, his contention should be conclusively proved; if he is incorrect, he should be shown his error. Therefore, it is to the uncovering of the fundamental propositions in the monetary theories of Friedman and Keynes that this dissertation is addressed. Friedman has characterized Keynes as regarding monetary policy as ineffective (1982, p. 48). Yet, The General Theory is replete with descriptions of exactly how changes in the quantity of money may result in output changes. Though Keynes qualifies many of his statements and policy prescriptions, the question of whether Keynes really disclaimed monetary policy, and if so to what degree, is still alive. The issues surrounding Keynes' monetary policy center upon the qualifications he presents and whether he meant for these to be generally applicable or extraordinary.

D. Plan of the Study

To accomplish the task, this study is divided into five remaining chapters. Each chapter uses a similar framework for analyzing the monetary theory of Friedman and Keynes for purposes of comparison. The second chapter examines the monetary theory of Milton Friedman as presented in his series of articles and as summarized in his Monetary Trends work with A. J. Schwartz. Though he has advanced his theory on several levels as it deals with employment, inflation, the monetary transmission mechanism, the consumption function or the demand for money, in no place has he brought together his entire theory so that

the parts form a whole. Although this study focuses primarily on monetary theory, it appeals to Friedman's other theories for clarification of terms and more detailed descriptions of processes or behavior of agents. Friedman's model of a monetary economy is presented as to how money influences economic activity and variables.

The next chapter addresses the criticism leveled by Friedman against the "unemployment" outcome of The General Theory. The charges are listed and analyzed with reference to both short run fluctuations and long run equilibrium. The logic behind these accusations and the critical nature of the charges for market clearing are revealed. The discussion on the narrow range of assets that Friedman attributes to the "Keynesians" is also analyzed.

The fourth chapter interprets and analyzes Keynes' monetary theory as presented in The General Theory. The analysis parallels the one for Friedman above so that the reader may draw comparisons. Keynes' model of monetary transmission is specified also.

Since Friedman says that Keynes considered monetary policy "ineffective," the fifth chapter attempts to refute this allegation by citations from The General Theory which this writer considers evidence to the contrary. Since this section deals with "policy" rather than theory, there is an attempt to reconcile the evidence with Keynes' theory.

Finally, the last chapter will put forth major conclusions reached by this study. The similarities and differences in the theories will be stated, and whatever assumptions required by the theory will be specified. Then, an evaluation of Friedman's contentions will be

offered along with an alternative interpretation of the major conclusions of The General Theory.

CHAPTER II

FRIEDMAN'S MONETARY THEORY

A. The Role of Money

Friedman's theory of how money affects real variables in the short run and the long run depends on his view of individual behavior, price flexibility, and the transmission process of money. Spending decisions by agents are undertaken in view of a utility function which they seek to maximize over time by providing for present and future consumption. This utility function determines the tendency for individuals to "consume" or "save" and the forms in which this consumption and saving take place. If money is one form in which agents hold accumulated savings, then the demand for money would be a subset of this model.

The conditions under which agents alter their money holdings form the basis for monetary theory. Motives for "spending" on assets or trading monetary assets for real assets must be consistent with the demand for money function. Changes in the quantity of money affect real variables through changes in spending.

The transmission process is a spelling out of exactly how output may be affected by changes in monetary aggregates. The outcome of the transmission process depends upon the assumptions made with respect to the demand for money, price flexibility, and the behavior of producers.

Milton Friedman has been widely recognized as an innovator and student of monetary theory. His transmission process incorporates certain assumptions and definitions which are crucial to the outcome of his theory. This chapter will attempt to describe his model of a

monetary economy and to pinpoint those crucial definitions and assumptions that he makes which allow his theory to reach its stated conclusions.

First, Friedman's demand for money function is specified along with his definition of interest rates and how they are determined in the long and short run. Friedman's view of long run equilibrium for the economy is described, and the model that he has envisioned for the long run is specified. In this connection, it is shown how a departure from long run equilibrium results in the economy eventually moving back to its former long run position. This long-run equilibrium path, however, is resumed only after a cyclical change in output. Thus the next step is to examine Friedman's theory of short run fluctuations, especially his view of how money affects spending decisions of agents, prices, and real output via the transmission process. The range of assets that Friedman sees as relevant for his transmission process is specified. Anticipations, perceptions of agents, and price flexibility play major roles in Friedman's model. These roles are described and examined. Friedman's explanations of recession, expansion, short term interest rate movements, and price inflation are included in his monetary transmission mechanism. Finally, the implications of his theory for policy prescriptions are traced.

B. The Demand for Money

If money is primarily a form of <u>wealth</u>, money possesses a yield, has a price, and the demand for money would depend on factors which affect its qualities as an asset. Money's function as the medium of exchange provides the qualities which make it useful as an asset. These

are the "services" that money provides. If money were not the medium of exchange, it would have no use in a portfolio for it would provide no services. Friedman considers this departure from Keynes' division of the function of money into separable motives to be significant. He also sees it as a departure from the earlier quantity theory in which money had but one purpose, facilitating transactions.

> According to the earlier view of money as primarily a medium of exchange . . . it was fairly natural to think of a short link between changes in the stock of money and changes in expenditure and to think of the effects of changes in the stock of money as occuring very promptly. . . according to more recent emphasis, money is something more basic than a medium of transactions; it is something which enables people to separate the act of purchase from the act of sale. From this point of view, the role of money is to serve as a temporary abode of purchasing power. It is this view that is fostered by considering money as an asset or as part of wealth (1969c, p. 74).

> The cash-balances approach . . . leads to emphasis on variables affecting the usefulness of money as an asset: the costs and returns from holding money instead of other assets, the uncertainty of the future, . . . essentially, that is to emphasis on the role of cash in a portfolio. (1982, p. 25)

The temporary abode of purchasing power is the fundamental quality of money and that which permits its use as an asset, even though its nominal yield may be zero. Rather than <u>separated</u> from its role as an asset, as Keynes suggested, it is an integral part of it.

There are two reasons that a person may "hold" money: (1) To maintain a temporary abode of purchasing power. "The separation of the act of sale from the act of purchase is the fundamental productive function of money. It gives rise to the 'transactions' motive stressed in the literature" (1969e, p. 3). (2) To provide a reserve for future emergencies. "This reason corresponds to the 'asset' motive for holding money" (1969e, p. 3). <u>Both</u> reasons depend critically on the character of the economy in which individuals are subject to uncertainty and change.

> Each of these categories of money-holders can be said to demand money partly from "transactions" motives and partly from "speculative" motives, but dollars of money are not distinguished according as they are held for one or the other purpose. Rather, each dollar is . . . regarded as rendering a variety of services, and the holder of money as altering his money holdings until the value to him of the addition to the total flow of services produced by adding a dollar to his money stock is equal to the reduction in the flow of services produced by subtracting a dollar from each of the other forms in which he holds assets (1956, p. 14).

The demand for money depends on those variables which affect the utility of money as an "asset." Since the transactions services of money are an integral part of its yield, then variables affecting its usefulness in transactions would be important for the demand function.

The Yield on Money

Since the nominal yield on money "may be zero," the demand for money is a function of uncertainty. Otherwise,

> . . . no one would hold money instead of an interest-bearing asset if he were certain he would not have to draw on it for a very long time. Yet he may hold money even though there is a sizable possibility that he may not have to draw on it for a very long time. Whether he will do so depends on the return available from assets held for long periods (1982, p. 260).

Since money is an asset in the portfolio (1982, p. 37), the wealth holder calculates the return on holding money in the same way as for other assets. Therefore, just as any other commodity, there is a demand for money whose determinants may be specified (1982, p. 26). The demand and supply of money determine the price of money and, concurrently, the general price level (1982, p. 36).

The yield on money comes from the services it renders, since money's return is not measured by a stated yield but depends on its purchasing power (1982, p. 26). Just as any other asset, money has a rate of return implicit in holding it. This rate is the "value of the

service flow from a unit of money [compared] with the price of money" (1982, pp. 26-27). Therefore, the "rate of return" implicit in holding a unit of money is equal to the value of the service of a unit of money divided by the price of a unit of money. It is this return which wealth holders consider in their decisions to hold money.

The return from holding money is a function of the real quantity of money (M/P) rather than just the actual "pieces of paper" in existence. This real quantity of money corresponds to a certain command over real goods and services. When the price level rises, the real return to a unit of money falls, but the total yield on the stock of money is dependent upon the volume of goods and services, and so unless this volume changes the yield on the stock of money remains constant (1982, p. 17).

> It will simplify matters and entail no essential loss in generality to suppose that money yields its return solely in kind, in the usual form of convenience, security, etc. The magnitude of the return in "real" terms per nominal unit of money clearly depends on the volume of goods that unit corresponds to, or on the general price level . . . (1956, pp. 5-6).
> . . . this demand equation [for money] must be considered independent in any essential way of the nominal units used to measure the money variables (1956, p. 58).
>
> The quantity theory of money takes it for granted first, that what matters to holders of money is the real quantity rather than the nominal quantity they hold and, second, that there is a fairly definite real quantity of money that people wish to hold in any given circumstances (1982, p. 18).

As the stock of money increases, given the existing level of output and the price level, the return from holding an additional unit would be zero since the existing stock is providing all the required services.

Friedman says that monetarists consider the price of money to be 1/P, the inverse of the general price level (1982, p. 26; 1976b, p.

316), which is a direct consequence of the stress placed on money's asset qualities in which changes in the demand for money are a result of a change in money's usefulness as an asset (1976b, p. 316). There is a tendency to confuse the price of money with the rate of interest which is the "price of credit" (1982, p. 26).

Real balances are determined by the nominal money stock and the price level. By spending to affect the price level, holders of money can make the nominal stock equal to any real stock that they desire (1982, pp. 32, 36).

> The stock of money differs from the other two categories [of assets--human capital and goods] because the productive services rendered by money do not depend closely on the number of physical units there are, but primarily on the existence of a stock (1976a, p. 284).

The major return from holding money is the yield from its liquidity--"the non-pecuniary services rendered by money" (1982, p. 260). The major cost of holding money is the income foregone by not holding an interest bearing asset or one which would appreciate in value or yield services (1982, p. 261). Factors affecting the demand for money would be those which affected either the expected return from money (via liquidity) or the expected costs of holding money. The costs of holding money are affected by the returns on alternative stores of wealth, and to some degree, these can provide the same services as money. So, as the "costs" of holding money rise, "there will be a greater incentive to substitute other productive resources for cash" (1969e, p. 14).

Friedman's formal model of the demand for money is as follows: $M/P = f(y, w; R_M^*, R_B^*, R_E^*, g_p^*; u)$, where y = the total wealth

or permanent income of the individual, and where w = the fraction of wealth held in non-human form. These two variables determine the level of desired wealth or the size of the portfolio; thus they would affect the demand for money since money is one of the assets considered. If permanent income increases, the demand for money would increase due to the increased demand for real balances for transactions purposes, but, in principle, there could be a situation in which the demand for money fell with an increase in permanent income if the money is a "necessity like bread" rather than a "luxury like recreation" (1982, p. 38).

But it must be remembered that the demand for money "is adapted not to measured income but to permanent income" (1959, p. 119). Therefore, procyclical changes in velocity related to "measured" income may not reflect changes in velocity when one uses "permanent" income. In Friedman's description of his transmission mechanism, he hypothesizes that demand for money is positively related to the level of output. The demand for money depends on how "large" a portfolio is required to satisfy the "wealth" requirement--thus a positive function of permanent income--but also reflects "how close" one is to achieving it--thus a negative function of the fraction of wealth held in non-human form (1976a, p. 64; 1957, p. 16). When a person has a larger stock of wealth, his savings declines, and so would his demand for money balances since this is "one form" for storing wealth (1982, p. 37).

R_M^* = the expected nominal rate of return on money (+)

R_B^* = the expected nominal rate of return on bonds (-)

R_E^* = the expected nominal rate of return on equities (-)

g_p^* = the expected nominal rate of return on physical assets which includes the rate of price changes plus the acutal nominal yield or cost (-).

The demand for money would vary directly with R_M^* and inversely with other nominal returns since they represent yields on substitutes for money as an asset. The symbol "u" represents whatever other variables affect the utility of money services. These could be conditions of uncertainty or instability which would induce wealth holders to assign an even higher yield to liquidity. Friedman and Schwartz say that this is one aspect of the demand for money that Keynes neglected in his demand function (1982, p. 53).

Friedman's demand for money function seeks to define logically the motives that one may have to hold cash while preserving the feature of money that he considers the most important, the usefulness of money in facilitating transactions.

> On our approach, the average amount of money held per dollar of transactions is itself to be regarded as a resultant of an economic equilibrating process, not as a physical datum. If, for whatever reason, it becomes more expensive to hold money, then it is worth devoting more resources to effecting money transactions in less expensive ways or to reducing the volume of transactions per dollar of final output. In consequence, our ultimate demand function for money in its most general form does not contain as a variable the volume of transactions or of transactions per dollar of final output; it contains rather those basic technical and cost conditions that affect the costs of conserving money, by changing the average amount of money held per dollar of transactions per unit time or by changing the number of dollars of transactions per dollar of final output (1956, p. 12).

The Rate of Interest

Friedman considers a broad range of interest rates, not only those recorded rates on bonds and equities (1982, p. 486, 1963, p. 218).

There are interest rates implicit in owning any asset; these are measured as the ratio of the value of the services that the asset produces to the price of the asset itself (1963, pp. 218, 221). Alternatively, the interest rate of an asset is the "price of a source of services in terms of the service flow" (1976a, p. 285). Therefore, the rate on a bond would be the coupon value in relation to the price of the bond itself.

The interest rate is a "pure number" not measured in the dimension of dollars and independent of the level of prices. If the level of prices doubles, the final rate of interest will be unchanged after agents have accomodated the change (1982, pp. 527, 530).

Whenever the price of the source (the asset itself) rises independently of the price of its services, the yield on the asset has fallen, so one may say that the interest rate on the asset has fallen. In the short run, monetary changes which affect some prices sooner than others will cause a short run change in the interest rate implicit in some assets and explicit in those assets which have recorded rates. Monetary changes affect interest rates through changes in relative prices, but this is a short run phenomenon (1982, p. 482). Any change in the measured interest rate (to be distinguished from changes in the real rate) must be accomplished by relative price changes. Non-monetary induced changes, though, are caused by real changes in supply and demand (1982, p. 584). These changes in the rate of interest persist.

A rise in the demand for "capital" will raise the equilibrium interest rate (1982, pp. 63, 583), and this demand will be met by "higher savings called forth by the higher interest rates" (1982, p.

498). The higher rate may not persist if velocity increases to accomodate the higher level of output, which suggests that Friedman and Schwartz see some monetary influence on the long run rate of interest.

In Friedman's earlier description of the determination of interest rates, money plays no role in real changes, except that of setting a "floor" to the market rate since the costs of holding money as an asset are zero (1976a, p. 316). The nominal rate is determined by the equilibrium between the supply of the services of assets and the demand for them. Savers supply services; firms or borrowers demand them. Savers "sell" these services according to the price of them in relation to the price of the source. Borrowers buy them according to the productivity of them in relation to their price. If the real yield of capital increases, borrowers will demand more services of capital while sellers will supply more only at a higher price (1982, p. 583). Thus the capital market has a mechanism by which supply and demand determine the equilibrium nominal rate of interest.

Monetary disturbances may disturb this mechanism as it distorts relative prices of services and their sources temporarily. In the long run, it is only price changes "arising from other sources" which affect the interest rate permanently (1982, p. 584). Therefore:

> The long-term effect of money on interest rates can therefore be analyzed best by considering the effect of money on prices and then of prices on interest rates (1982, p. 574).
> The effect of monetary change on prices is a major channel through which monetary change affects interest rates (1982, p. 631).

The difference between the nominal rate and the real rate of interest concerns rates of price change. Since interest rates relate

the present to the future, they are necessarily temporal variables. Therefore, if the price level changes over the same period, the real yield is affected by this rate. The real rate is the nominal rate minus the rate of inflation or plus the rate of deflation (1982, p. 491; 1976a, p. 315). Failure of agents to anticipate or allow for inflation or deflation causes the real rate of interest to be higher or lower than expected; the real rate can only be measured ex-post. Therefore, for decisions by agents it is the expected real yield that matters, or the known nominal yield plus the expected rate of price change (1982, p. 491).

C. The Range of Assets

Total wealth, once the level is decided, "must be divided among various forms of assets" (1982, p. 37). Friedman and Schwartz put no restrictions on the form that wealth may take, and they "insist" that a wide range of assets be considered as relevant for storing wealth. Any good which is capable of being stored and yielding "services" would be eligible for the portfolio. Consumer durables and stocks of consumer goods may serve as assets. Houses, automobiles, furniture, food and clothing are mentioned by Friedman and Schwartz as relevant assets.

Every asset has an implicit rate of return which may be represented by the ratio of the price of the services to the price of the asset itself (1982, pp. 26-27). Even though this rate is not quoted on organized markets, it "connects" the price of the services to the price of the source so that it is this "yield" which is important in its value as an asset (1963, p. 221). The marketability of an asset affects the terms on which it may be traded.

"It is necessary to regard households as themselves enterprises holding physical assets which they use to produce services that they consume themselves" (1963, p. 218). Consumption is the purchase of the "service" of an asset, while saving is the purchase of the asset itself, the "source" of the service. Goods could be considered "consumption" if they were the product of some other asset, such as electricity or food (1963, p. 218).

D. Portfolio Balance

Agents maximize the "return" on their wealth by equating the marginal return from each asset (including nominal balances) in their wealth portfolio. Therefore, the return to holding wealth in each form is equal to the return to each other form and to any alternative use, such as consumption, for each individual.

Agents may alter their spending/saving behavior if there is an imbalance in their portfolios. That is, if the returns from holding one type of asset either increase or decrease, the agent will trade assets in the portfolio to restore the balance. If agents are in long run equilibrium, they will recognize any relative price changes as reflecting real changes in returns on various assets they may hold. They trade to maximize returns on their portfolios or to increase wealth without sacrificing consumption.

An individual in equilibrium receives an income or services from his assets which he may consume or with which he may purchase assets or money. Individuals calculate the interest rate implicit in the asset which would discount the sum of the future stream of income from

purchasing one more unit of the asset. This rate measures the marginal return per dollar's worth of the asset. Similarly, they calculate the marginal return from purchasing one more dollar's worth of the "service" that the asset yields. If the marginal return from owning the asset is higher, they will purchase the asset. Otherwise they will purchase the service (1963, p. 220).

> One special problem to which recent work in monetary theory has called attention is whether to hold wealth in money or in other forms. This is merely an extension of the marginal principle--the proportions of different resources held should be such as to equalize the marginal returns in all directions (1976a, p, 285).

Changes in the price of some assets relative to the value of services will cause wealth holders to attempt to convert one form to another. If the price of an asset rises compared to the price of the services it yields, wealth holders will sell the asset and purchase only the services from it. An example is the purchase of a house versus rental of a house (1963, p. 219).

Even though money may be desired as an asset itself in some quantity, persons will exchange other assets for it, not to hold the money permanently, but to profit from "attractive selling opportunities" while searching for "attractive buying opportunities." Money may serve as "a temporary abode of purchasing power," and indeed this is "the major function of money and the basic source of its social utility" (1963, p. 219). Wealth holders consider this yield when holding money versus other assets.

When a portfolio is in equilibrium all marginal yields are equated. A wealth-holder will trade asset A_0 for asset A_1 only if the marginal yield r_0 is greater than the marginal yield r_1. The

rate at which the wealth-holder is able to trade is of course the relative price of the assets.

> Wealth can be held in numerous forms, and the ultimate wealth-owning unit is to be regarded as dividing his wealth among them . . . so as to maximize "utility" . . . subject to whatever restrictions affect the possibility of converting one form of wealth to another . . . . As usual, this implies that he will seek an apportionment of his wealth such that the rate at which he can substitute one form of wealth for another is just equal to the rate at which he is just willing to do so (1956, p. 5).

This analysis requires that the marginal yield on assets falls as more are acquired; otherwise no equilibrium could be established. In equilibrium, $MR_0/MR_1 = P_0/P_1$ for every asset including money.

It is the marginal return on any asset that is important for the wealth holder in trading decisions. The decision to spend an extra dollar must mean that the marginal return from owning the asset or consuming the service is greater than the return from holding the extra dollar in cash.

Assuming that he is able to purchase the service of the asset on the market, or to sell the asset on the market, then he has a choice which is governed by his ability to make the trade (relative prices.) Of course some services of assets are not for sale at any price, so that one would have to own the asset to get the services; some assets are not disposable at any price. These considerations affect the ability to trade, but they do not alter the basis of utility maximization.[1]

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[1] Since existing balances already provide desired services, then there would be no reason to "hold" the new money as an asset. There could be a time period in which they held the new money as a "temporary abode" of purchasing power, but only for the duration of their decision period. Otherwise, the real level of money balances

E. The Transmission Process

As a "preliminary step in sketching a theory of the short run adjustment process" (1972, p. 924), Friedman starts his analysis of a change in money from long run equilibrium in which all expectations are realized and anticipated values are equal to their permanent values.

The precise method of changing the money supply is unimportant in Friedman's model. He describes several ways it could be accomplished: a helicopter drop (or a furnace which consumes money) that occurs with or without distribution effects (1969e), open market operations (1982), government expenditures financed by issuing money (1982), and gold discoveries (1982). The method of introduction is not critical to the outcome since the first round effects are short-lived while the ultimate effects last indefinitely. The new money is soon indistinguishable from the old, and the first use to which it is put has no effect on the outcome of the process (1982, p. 30).

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demanded remains a fairly constant percentage of real income.

Demand for money is affected by expectations of inflation or deflation causing agents to conserve or expand real balances. Either situation imposes "costs" to society since real balances are a productive resource, and there is an optimum level which is most efficient (1969e, p. 17; 1982, p. 492).

Friedman considers the return on other assets as an argument in the demand for money function, but it seems that he admits no alteration in desired real balances for this reason in the transmission process. If wealth holders were induced to hold higher real balances by the short term fall in "interest rates," then they would reduce their spending on other assets. As interest rates begin to fall, they would revise their demand for real balances and consequently would <u>not</u> spend as much on consumption due to the relative price differential: the yield on money would be rising, and the level of real balances would be higher. The fact that interest rates are returned to their long run values requires that wealth holders <u>spend</u> until this is accomplished. If they had modified their demand for real balances, the interest rates would have been permanently lowered, and an equilibrium ($M^s = M^d$) would have been achieved with higher real balances. The constant demand for money in real terms <u>causes</u> the return to long run equilibrium. Similarly, the demand for money specifies that as permanent income rises the demand for real balances will rise; however, the transmission process predicts

An Increase in the Quantity of Money

If the money supply is increased through open market operations, agents are induced by higher bond prices to sell their bonds for cash. Any process, however, by which nominal balances are increased will have the same effect.

Recipients of the new money have several options: purchasing assets, purchasing services, or holding cash. Another possibility is that the recipient of the money will use it to discharge debt, but in this case it is only transferred to another who will attempt to replace his former asset (the debt) with another asset or consumption service. The actual form that the spending takes matters only for the first round. If it is spent for services, then the price of services will be bid up first; if it is spent on goods or assets, then their prices will

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that as the level of output rises temporarily, the demand for money will increase (1982, pp. 18-19).

If interest rates do not affect the demand for money, there can be an income elasticity of changes in money equal to one in the long run. Velocity could be nearly constant. This situation could exist even if money were considered primarily an asset rather than an exchange medium.

A feature of Friedman's theory which distinguishes it from the earlier quantity theory is that money is considered an asset. As explained earlier, it qualifies under the assumption that assets provide some "income" or "services," and the services of money are its liquidity services. Friedman calls this approach a "way station" between the simple quantity theory and the Cambridge cash balances approach (1982, p. 24).

Given that an effect of Friedman's theory is a short run lowering of recorded interest rates, it is required that cash be considered an asset, even if only temporarily, for this to be accomplished. The reason is that savers use the extra cash in the first round primarily to purchase assets or "sources" rather than consumption services. If they replace lower-yielding cash with another asset, it is necessary for cash and other assets to be considered substitutes by the wealth holders. Otherwise, if wealth holders considered cash to be only generalized purchasing power, they would not spend on sources any more than they spend on services, and there would be no method by which the interest rates could be lowered (if a broad range of assets is relevant.) Otherwise, there would be only a price level rise.

be bid up first (1982, p. 30). After the first round of spending, the new money mingles with the old, and its specific effects are not identifiable.

If cash were the only form of wealth and if the individual "finds" excess cash in his portfolio, his equilibrium position described above has been disturbed. At this point,

> . . . he will want to raise his consumption and reduce his cash balances until they are back at the former level. Only at that level is the sacrifice of consuming at a lower rate just balanced by the gain from holding correspondingly higher cash balances (1969e, p. 5).

If assets other than cash exist, the individual will try to replace cash with other existing assets (1982, p. 482; 1963, p. 218), because the ratio of the marginal return from holding money to the price of money is not equal to the marginal return from some other asset to its price. "The first thing people will do is to try to purchase other assets" (1969c, p. 75). There is a profitable trading opportunity.

Persons who have received the new money in the first round either as new money balances or as an increase in income, consider "cash" to be an asset, as above, so they are more likely to adjust their portfolios by replacing the new cash with some other asset with a higher MR/P ratio. It is the purchase of alternative existing assets due to the stimulus of excess cash balances which raises asset prices and lowers their yields.

> The attempt by holders of money to restore or attain a desired balance sheet after an unexpected increase in the quantity of money will tend to raise the prices of assets and reduce interest rates . . . (1982, p. 58).
> . . . holders of cash will try to adjust the portfolios by replacing cash with other assets (including both securities and physical assets.) In the process they will bid up the price of other assets and drive down the rate of interest (1982, p. 482).

The interest rate on physical assets is usually not recorded or stated, so that the change in this rate is an unrecognized effect of the transmission process. The change in the rate on securities, though, will be a noticeable effect of the change in the quantity of money.

The lowering of the rate of interest on a broad range of assets has the effect of raising

> the prices of the sources of the service flows relative to the prices of service flows themselves, which leads to an increase in spending on both the service flows and the production of new sources of service flows (1982, p. 486).

Spending on assets is increased due to the existence of excess cash in the portfolio. The spending rate change is manifested in relative price changes which has two effects: 1) agents modify their spending to take into account the effects of an altered ratio between the prices of assets versus the prices of their services (a change in interest rates); and 2) producers, in their attempt to maximize profit, may increase production of those goods whose prices have risen.

Thus the short run result of an increase in the quantity of money is a short run lowering of all rates of interest (implicit and explicit) due to higher prices for "goods" and other assets; a second effect is an increase in spending for services (consumption) since the price of these has not yet risen.

> . . reported interest rates are only a few of the large set of rates of interest, many implicit and unobservable, that are affected by the changed rate of monetary growth (1982, p. 486).
> . . . monetary disturbances will produce systematic patterns in the reaction of such components of output as construction, other investment, and so on (1982, p. 620).

Whether output will be increased depends upon whether the increase in M is anticipated or unanticipated. This issue is treated later in the chapter.

F. The Adjustment Process

The preceding sections of this chapter have emphasized Friedman's monetary theory and the transmission process by which a change in the quantity of money affects nominal spending in the aggregate economy through a process of asset substitution. In the remainder of the chapter, we analyze Friedman's theory of (a) the short-run division of a change in nominal income between prices and output, (b) the long-run adjustment to a new equilibrium, and (c) the transition between the short-run deviation and the long run equilibrium. The central idea that Friedman uses is the distinction between actual and anticipated magnitudes.

Long Run Equilibrium

Friedman identifies a theoretical long run equilibrium position in the economy. Long run equilibrium is characterized by the situation in which anticipated values are equal to their measured values: the actual rate of growth of prices is equal to the anticipated rate of growth; the actual rate of increase of nominal income is equal to the anticipated increase; and as a consequence, the actual rate of growth of real income is equal to the anticipated permanent growth rate of real income (1982, pp. 59-60). This situation results in agents not being hindered by misperceptions caused by measured values differing from anticipations. In long run equilibrium, all measured changes in output are the result of changes in real (not monetary) conditions of supply or demand. Therefore, agents may fully respond in confidence that what they perceive is reality. This allows them to maximize utility and firms to

maximize profit, making any necessary adjustments without hesitation. The long-run equilibrium

> . . . is not a state which is ever assumed to be attained in practice. It is a logical construct that defines the norm or trend from which the actual world is always deviating but to which it is tending to return or about which it tends to fluctuate (1972, p. 925).

At this equilibrium position, the interest rate is determined by "whatever variables other than money growth affect the interest rate" (1982, p. 490); output is determined by real variables in the economy, that which would be "ground out" by the Walrasian general equilibrium equations (1982, pp. 60, 413); the price level is determined by the equilibrium between the demand for real balances and the supply of nominal balances (1982, pp. 25, 36).

Long run changes in output, employment and the real rate of interest are not caused by monetary factors but by real ones. These real factors include the real supply of resources, the real demand for goods and services based on equalization of the marginal utility-price ratio, technological conditions of production, and institutional factors (1982, p. 413). The long run growth rate of output is "independent of anticipated changes in nominal magnitudes except as they affect real magnitudes [such as] the real interest rate or the real quantity of money" (1982, p. 413).

In this state of long-run equilibrium, individuals are maximizing utility over their lifetime horizon. To accomplish this, they seek to maintain a rate of consumption that corresponds to their estimation of permanent income. Actual measured income may vary, but, in long run equilibrium, agents have allowed for this event by providing for

themselves a stock of wealth which provides "income" and aids in smoothing out consumption (1957, p. 16; 1976a, p. 62). Therefore, this desired stock of wealth is one which ensures the level of permanent income that the agent desires given the disutility of labor in acquiring it and the foregoing of immediate consumption (1957, p. 16). In a broad view, this permanent income may be regarded as a return on the stock of wealth, both for the individual and for society.

In equilibrium, the agent has achieved that stock of wealth which he desires insofar as the return corresponds to the level of permanent income he desires given his personal constraints. Agents build this stock of wealth by saving out of income; consumption is the consumption of the services of the source of wealth. Equilibrium, then, is a situation in which saving is zero (1976a, p. 297).

> If the individual does not have that [equilibrium] stock of wealth, he will move toward it. There will be an equilibrium rate at which he will want to move toward it that will depend on how far he is from his desired wealth and on what his current wealth is (1976a, p. 64).

There is some stock of wealth and some rate of interest which equilibrates the desires of the suppliers of wealth with those of the demanders of wealth. At this equilibrium, aggregate net savings and investment would be zero, and the stock of wealth would be that optimum stock that the economy desired (1976a, pp. 295, 307). But, agents may replenish or diminish their stock as conditions change: their estimation of permanent income may change; or the value of their wealth in relation to permanent income may change; or there may be an opportunity to increase wealth by making a favorable trade without the necessity of foregoing consumption due to a change in the relative

prices of assets. Additionally, the size of the stock of wealth does not affect the "value attached to the flow of services from that stock" (1976a, p. 297).

Friedman's model of individual behavior may be stated as follows: Let U = utility; U(t) = utility at time t. Let G = the disutility of labor; G(t) = disutility at time t. Let C = consumption; C(t) = consumption at time = t. Let W = the stock of desired wealth; W(t) = wealth at time = t. Let ρ = the internal rate of discount which relates wealth to future consumption (the trade-off.) Let r = the interest rate or actual trade ratio for present to future consumption. Then,

$$\text{Max. } U = U[C(t)] + G[C(t)];\ U' > 0,\ G' < 0;$$

$$U(t_0) = \int_0^T U[C(t)]e^{-\rho t}dt$$

$$W(t_0) = \int_0^T C(t)e^{-rt}dt \qquad (1957)$$

A situation that Friedman often describes is one in which the money supply is growing at a rate of 3% per year, output is growing at 3% per year, and prices are stable (only relative price changes occur to reflect real alterations in supply and demand) (1982, pp. 66, 480). Agents expect this situation to continue, for they form their anticipations on the basis of past events. Their anticipations are of the level of prices, nominal income, and real income. (Note that agents, given only two of these variables, may deduce the third.) Since the rate of growth of the money supply cannot be directly observed, agents form no expectations of this variable but observe only its effects. These anticipations or expectations form a part of the information set as agents evaluate their actual position in relation to their desired position. If long run equilibrium exists, agents will make no errors in

their actions. Each decision will serve to increase utility (or profit in the case of firms.)

Assume the long run equilibrium situation sketched above in which agents expect no inflation. (Note: expectations of inflation may be incorporated into a long run equilibrium; in that case agents discount price changes by the expected rate of inflation.) Assume some event occurs which disturbs the composition of portfolios. If the initial disturbance involves an asset other than money, agents will respond by attempting to trade the asset which is in excess supply, or by attempting to acquire the asset that is deficient. This attempt will alter the relative price ratio between that asset and all others, but the price level of output itself will not be changed. An increase in relative price of an asset will encourage producers of that asset to increase production of it, and to decrease production of other assets. Since there has been no increase in aggregate demand, only a change in demand for some goods relative to others, total production will not change if agents are fully informed of relative prices.

Wealth holders will be back in equilibrium when their portfolios have been restored to their former balance, and this will have been accomplished by changes in relative prices and by increased production of some goods and decreased production of others. The level of prices will not have been changed, and nominal incomes will not have risen, and the economy continues in long run equilibrium.

If the change in "wealth" had occurred because of an unanticipated change in the quantity of money that managed to get into the portfolios of wealth holders, the story will be different. Since the economy uses

money to denominate the values of assets, the attempt to trade money for other assets will have the effect, not of changing the relative "price" of money, but of changing prices of all other goods. An unanticipated change in the quantity of money will throw agents out of long run equilibrium since the price level will change as demand increases or decreases for other assets when wealth holders attempt to restore portfolio balance.

Even though the stock of assets is unchanged at this point, there will be a change in relative price of existing assets as agents trade assets. Output rates are altered due to perceived changes in relative prices. Since no real determinants of the output rate have changed, the long run position of the economy is the same rate of growth of output, but the transition may involve significant departures. "The ripples produced by a monetary action may therefore take a rather long time to reach the whole range of assets" (1969b, p. 256).

Short-Run Adjustment

For Friedman, a key question is the process of adjustment to a discrepancy between the nominal quantity of money demanded and the nominal quantity supplied" (1970, p. 225). Assume that the discrepancy arises from a change in the supply of money; Friedman states that "The key insight of the quantity theory approach is that such a discrepancy will be manifested primarily in attempted spending, thence in the rate of change in nominal income" (1970, p. 225). This manifestation was described above in Friedman's transmission mechanism. In general form,

$$(1)\quad g_Y \equiv \frac{d \log Y}{dt} = f\left[\left(\frac{dY}{dt}\right)^*,\ \frac{dM^s}{dt},\ \frac{dM^d}{dt},\ M^s,\ M^d\right]$$

where M^s = money supplied, M^d = money demanded, Y = nominal income, and an asterisk attached to a variable denotes the anticipated value of that variable. To illustrate, a particular version of (1) would be:

$$(2)\quad g_Y = g_Y^* + \gamma(g_{M^s} - g_{M^d}) + \Phi(\log M^s - \log M^d).$$

One of the features of Friedman's model is that agents build into their information sets anticipations of rates of growth of the price level as well as of income (nominal or real). In this manner they attempt to separate monetary events which do not indicate a change in output rates from real events upon which they should act if prices perform their task of transmitting information. As rates of price change increase or decrease over time, agents build in these expectations to alter their behavior. They come to "expect" inflation. They also incorporate real variables (such as the rate of change in real income) into their decision process.

Prices change because of alterations in spending behavior that occur because of changes in the available returns from some form of wealth or from consumption of services given anticipations of inflation. Considering that agents are continually in the process of revising expectations as they spend, the rate of change of prices will be a positive function of the rapidity that they revise their expectations to conform with actual rates of change.

Therefore:

$$(3)\quad g_P \equiv \frac{d \log P}{dt} = \left(\frac{d \log P}{dt}\right)^* + \alpha\left[\frac{d \log Y}{dt} - \left(\frac{d \log Y}{dt}\right)^*\right]$$

$$+ \beta\,[\log y - (\log y)^*]$$

where Y* = expected nominal income, P* = expected level of prices, and y = the real level of output.

Note if log y = (log y)*, the expected level of real income will be equal to the actual level, and if

$$\frac{d \log Y}{dt} = \frac{d \log Y^*}{dt}$$

then the expected rate of growth of prices is equal to the actual rate of growth of prices. That is, inflation or deflation is fully anticipated.

The rate of growth in real income may be altered whenever actual nominal income and prices are not equal to their long run anticipated values. In this case, optimizing agents alter "real" output in response to perceived profit opportunities. Therefore, the change in the rate of growth of real income becomes a function of the difference between expected nominal and real income and their measured values.

$$(4) \quad g_y = \frac{d \log y}{dt} = \frac{d \log y^*}{dt} + (1 - \alpha) \frac{d \log Y}{dt} - \frac{d \log Y^*}{dt}$$

$$-\beta [\log y - (\log y)^*].$$

The divergence between expected nominal income and its measured value is reflected in some part by output changes and in some part by price changes. The value of α determines the relationship. If one sums equations (3) and (4), the result is

$$(5) \quad \frac{d \log P}{dt} + \frac{d \log y}{dt} = \frac{d \log Y}{dt} = \frac{d \log P^*}{dt} + \frac{d \log y^*}{dt}$$

If prices fully reflect any changes in nominal income, then $\alpha = 1$ and $\beta = \infty$, and real output grows at its long term growth rate. If prices are rigid, then $\alpha = 0$, $\beta = 0$, and all of the change in nominal income is in output.

The first case Friedman calls the extreme quantity theory

assumption that prices bear all adjustment; the second case he calls the extreme Keynesian assumption that quantity is the only variable that adjusts. Friedman's own theory of nominal income makes neither of these assumptions. His assumption is that the anticipated values are revised over time to conform with observed values, so that the difference between them is continually diminished. Anticipations are revised such that the larger the discrepancy, the faster revisions of anticipations of that variable are adjusted (1982, p. 65).

In Friedman's adaptive expectations model, the expected rate of change in the price level at a point in time is some function of all past rates of change up to that point.

$$(6)\quad \frac{d \log P^*}{dt} = \int_0^T f[\log P(t)dt] \quad \text{and} \quad \frac{d \log Y^*}{dt} = \int_0^T f[\log Y(t)dt]$$

The rate of change of prices is determined by nominal income, real income and the anticipated values of each, plus the expected rate of price change. The rate of change in real income is determined by nominal and real income and the anticipated values, plus the expected growth rate of real income. Real income then is co-determined by "real" factors and by expectations in the short run, providing a feedback to agents who reform long run anticipations and alter current spending behavior. "The problem is to assure, at long run equilibrium, these two values do not conflict" (1982, p. 66).

An Illustration: An Increase in M

Assume that the economy starts from a position where $g_p = 0$, $g_y = 3\%$, $g_M = 3\%$, and $g_Y = 3\%$ (g_p = rate of growth in the price level, g_Y = rate of growth of nominal income, g_y = rate of growth of

real income, g_M = the rate of growth in the money supply). Since in long run equilibrium, all anticipations are realized, then $g_p^* = 0$, $g_y^* = 3\%$, and $g_Y^* = 3\%$ (g_p^* = expected growth of prices, g_y^* = the expected growth of real income, g_Y^* = the expected growth of nominal income). Let there be a change in the rate of money growth so that $g_M = 8\%$, while $g_M^* = 3\%$.

First, Friedman asks what the long-run equilibrium solution will be. After full adjustment, nominal income will be rising at 8 percent per year. Since the real determinants of output have not been affected, prices will be rising at 5 percent per year and real output at the rate of 3 percent per year.[2] But the long-run equilibrium outcome will be one in which all anticipations are realized. If the increase in g_{M^s} is unanticipated then g_{M^d} would not immediately adjust in equation (2) causing a discrepancy between g_Y and g_Y^*. Now, this discrepancy will be resolved by a change in g_p (equation 3) and g_Y (equation 4), and will continue until all actual measured values are equal to their long run anticipated values.

An unanticipated change in the money supply is manifested in an altered demand for particular products. The seller of a particular product has no way of knowing whether this increase is an increase relative to the demand for other products; if it were, he would be

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[2] Friedman notes that, while g_y should be at its long-run rate of growth, the equilibrium level of output will not be unaffected by the monetary change. If real output is measured so as to include the "non-pecuniary services of money," y will be lower after the monetary change because (1) the higher cost of holding real balances will lead producers to substitute other resources for money, thereby lowering efficiency, and (2) the flow of non-pecuniary services from money will be lower (1970, p. 230).

correct in expanding output of the product. If he were certain that the demand was merely a reflection of a change in "general nominal demand," he would correctly respond by adjusting price. At the outset of the adjustment process, the seller has no way of knowing the correct response so output changes are to be expected when there is a change in nominal demand (1982, p. 415).

The short run is an adjustment toward a new nominal level of income but away from the long run permanent growth trend of real income and level of real interest rates. The "misperceptions" of producers and workers are caused by changes in the rate of growth of money, and fools these agents into thinking that the price changes are due to a real change in demand for their products or services.

In Friedman's analysis, he assumes that prices are "flexible." He considers a price to be flexible "in the sense that it can and does change promptly to changes in demand and supply and that there are no institutional obstacles to its changing . ." (1972, p. 925).

However, Friedman and Schwartz do not assume "perfectly" flexible prices (1982, p. 58). If prices were perfectly flexible, then there could occur no cyclical reaction to a change in nominal demand--all the adjustment would be in prices and none in output. Friedman and Schwartz maintain that a change in money is reflected in both P and y (1982, p. 57).

Therefore, if there is a change in supply or demand, prices will reflect some of the adjustment and will respond promptly, although in the early stages, much or most of the adjustment will be in output (1968, p. 8; 1976a, p. 216; 1982, pp. 403, 414, 489, 498). Since there

is a "rate" of price change, it follows that agents act on the information that the price signal provides before the full adjustment has taken place. Particularly, producers will adjust rates of output at early signs of a price change to avoid losses or to capture a profit opportunity. It is this early reaction based on price misperceptions which permits short-run output reactions to monetary stimuli.

In Friedman's short run analysis, the initial state is one of full-equilibrium market-clearing. Thus, the reaction by producers is due to a misperception. If they had known that monetary changes were responsible for the change in prices (even if in some brief interval there would have been a temporary relative price difference) they would not have altered output levels (1976a, p. 223, 1982, p. 415). Prices are bid up as agents attempt to purchase a quantity of goods and services which carry one nominal value with "spending" that carries a higher nominal value. Price or quantity or some combination of the two must adjust to clear the market. Agents will alter quantity supplied only as a result of a perceived change in relative price.

If agents had been in long-run equilibrium before, then some rise in the price level must occur in response to an increase in nominal spending. A monetary-induced change will change the price level if it is accompanied by a higher rate of spending (dollars per time period) causing g_Y to exceed g_{Y*}. The economy always accomodates changes in nominal demand by some combination of a rise in P or in the real quantity of goods. No increase in real supply is possible without some perceived change in price, since producers were at an optimum level of output previously. Whatever price is the outcome of the process will "clear" the market.

Prices are flexible in both directions. They fall if there is a decline in nominal spending, causing either through a price change, a quantity change, or some combination of both. The lowered price clears the market.

Adjustment in the Goods and Labor Markets

Friedman's analysis starts from long run equilibrium in which all markets clear. The money market relates the supply and demand for money and the equilibrating variable which is the price level. The market for existing assets is related only to the price of existing assets, but the market for new goods must be related to output prices, the nominal wage rate, and the real wage. Assume that M^s is exogenous.

P = the general price level.

P_A = the price of existing assets.

y = the quantity of newly-produced goods.

N = the level of employment.

r = the composite of the rates of interest.

u = uncertainty factor.

W = the money wage; W/P = the real wage.

Let M^s increase as a result of open market operations:

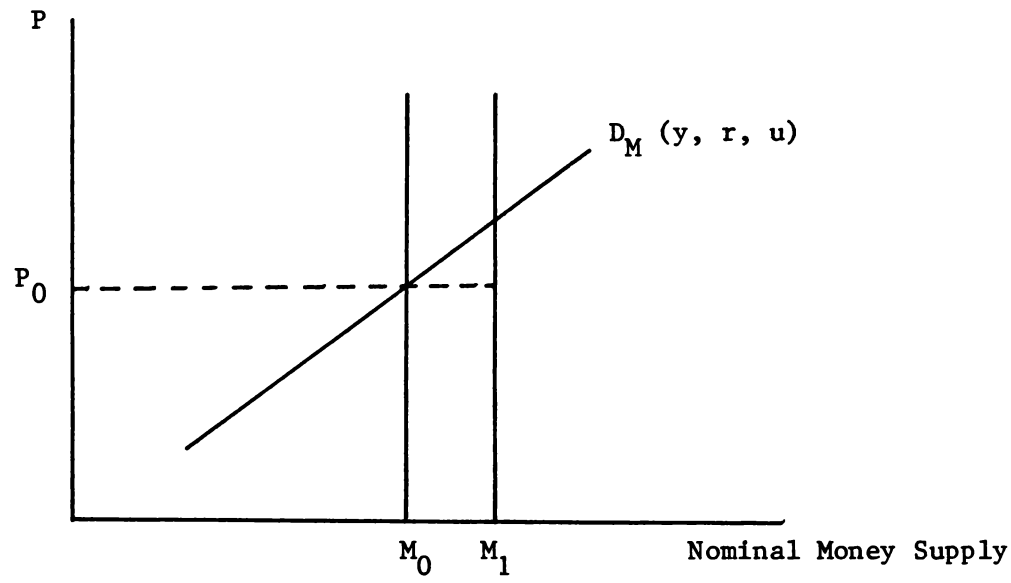


Figure 2.1. Friedman's market for nominal money balances.

1. Figure 2.1 shows that, in the long run, the price level is the variable that equates the nominal demand for money with nominal balances (1982, p. 36). However, since the price level is changed only as a result of spending which takes place through other markets, it does not move immediately to restore equilibrium in this market. Therefore, as the level of nominal money balances increases from M_0 to M_1, at P_0, there is an excess supply of nominal (and real) money balances $(M_0 - M_1)$.

2. In figure 2.2, demand for existing assets rises to D_1 since there is an excess supply of real balances, and money and existing assets are substitutes. There is a fixed stock of existing assets so that the price rises in this market from P^A_0 to P^A_1 causing the yield on existing assets to fall.

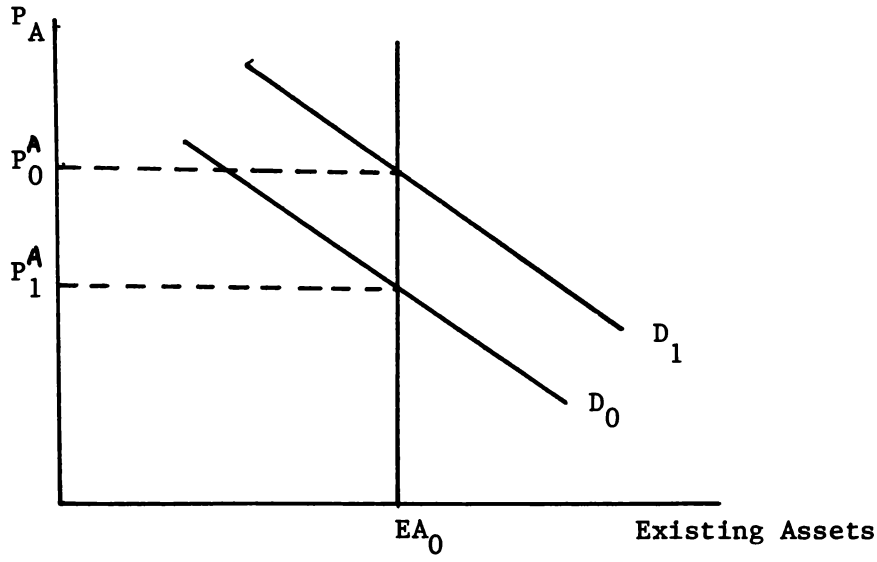


Figure 2.2. Friedman's existing asset market.

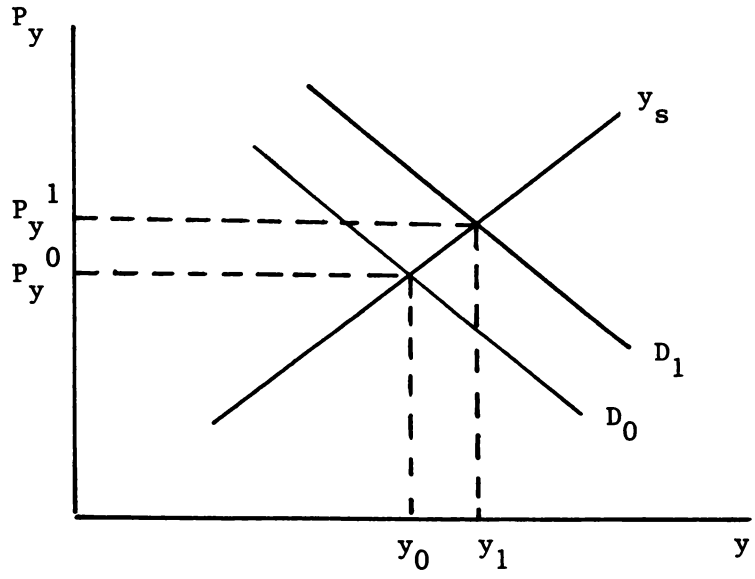


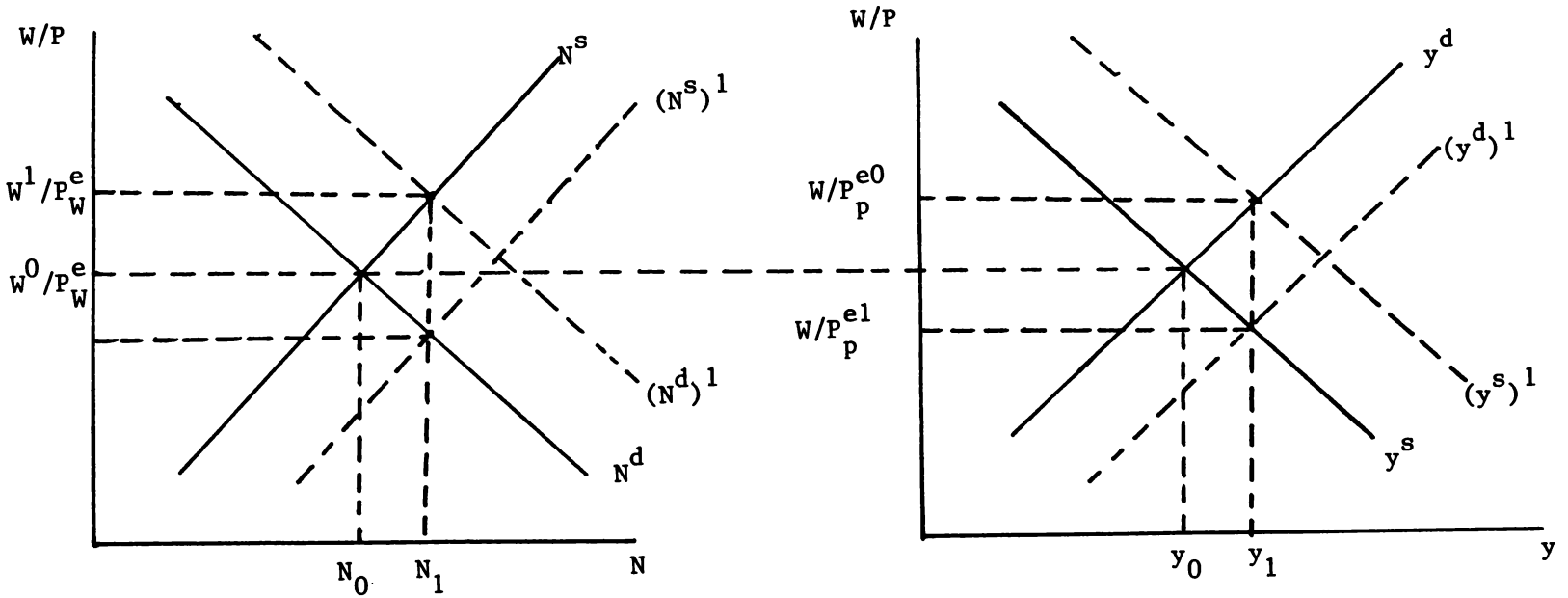
Figure 2.3. Friedman's market for new output.

3. As shown in figure 2.3, the process of substitution of assets in the portfolio causes the demand for new assets to rise and thus the price of new assets to increase. In nominal terms, producers see an increased demand for their products from D_0 to D_1. This causes P_y to rise to P_{y1} and producers to increase output of new goods from y_0 to y_1.

4. At this point, (see figure 2.4) output has increased, prices of assets are raised and yields are lowered. Producers have increased output because they saw a fall in the real wage rate from $W/P^e_{p\ 0}$ to $W/P^e_{p\ 1}$ due to prices of their output rising, and therefore they perceive a rise in the supply of labor.

5. Workers, however, supply more labor because they see a rise in the real wage rate due to a perceived increase in the demand for labor. Workers see their wage as rising from W^0/P^e_W to W^1/P^e_W. They see their nominal wage rising but do not notice that all prices are rising.

In the Friedman scenario considered here, the actual real wage rate does not change at all. All prices and wages are rising in the economy, price misperceptions occur on the part of both workers and employers, and a short run cyclical expansion of output and employment occur. Workers eventually realize that they are providing more labor for the same real wage, and prodcucers eventually realize their profits are down because the real wage rate has not fallen. And, money holders realize that with the price rise, the level of real balances now puts them in equilibrium. So, producers and workers will revert to their old levels of supply, and an automatic cyclical contraction of y and N will



Friedman's labor market as perceived by workers and firms

Friedman's goods market as perceived by workers and firms

Figure 2.4. Friedman's labor and goods markets. The effects of an increase in nominal money balances.

$(N^s)^1$ = supply of labor as perceived by producers

$(N^d)^1$ = demand for labor as perceived by workers

$(y^d)^1$ = demand for output as perceived by producers

$(y^s)^1$ = supply of output (demand for labor) as perceived by workers

occur. Interest rates will be restored since the price of the services has caught up with the price of the sources. At the culmination: $W/P^{e}_{w} = w^*$; $g_Y = g_Y^* = 8\%$; $g_y = g_y^* = 3\%$; and $g_p = g_p^* = 5\%$. Therefore, the short-run fluctuation is linked to long-run equilibrium.

A Decrease in the Quantity of Money

Assume now that, again starting from full equilibrium where $g_p = g_p^*$, $g_Y = g_Y^*$, and $g_y = g_y^*$, the monetary authority reduces the rate of growth of the money supply. The "initial deficiency" in the quantity of money will cause individuals who have been induced to trade money for other assets (government bonds) or who have otherwise suffered a decline in their money balances to try to restore that level of real balances which equates MR/P for their portfolios. The transaction raised the marginal return for a unit of money so that now it is higher than for any other asset.

This group of affected wealth holders will attempt to sell more goods and services than they are purchasing. On the whole, however, they cannot succeed: "One man's expenditures are another man's receipts" (1982, p. 18). The aggregate attempt to do so will lead to reduced spending on assets and to falling prices of these assets (or a fall in the rate of their price change) as agents attempt to trade them for higher money balances (see figure 2.5). In terms of equation (2), a discrepancy is introduced into the second term in parentheses, and the decline in g_{Ms} reduces g_Y. This occurs because the fall in the rate of change of prices of existing assets will discourage spending on newly

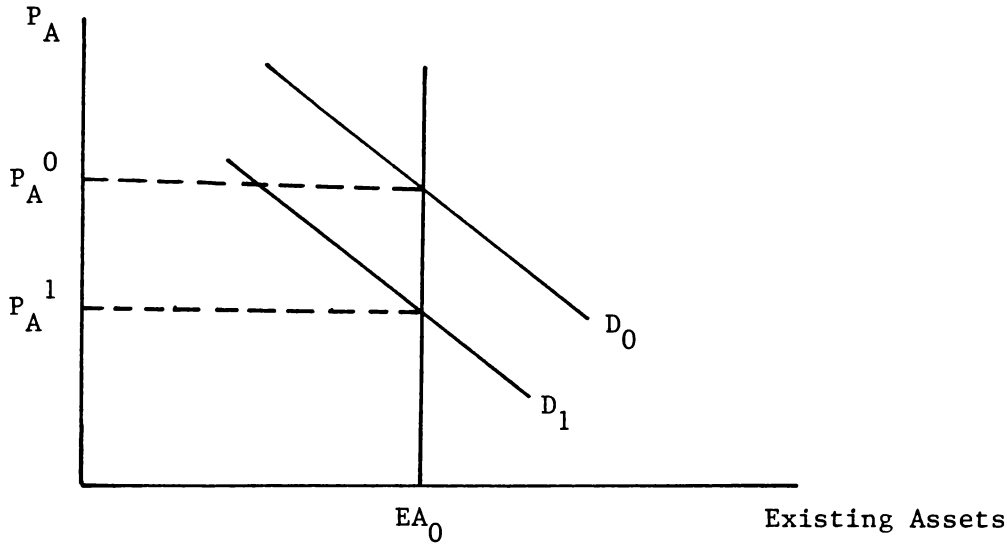


Figure 2.5 Friedman's existing asset market. Response to a decline in nominal money balances.

produced assets. Given Friedman's assumption that output prices are flexible, producers of assets will notice that the rate of change in prices of goods they are producing is falling.

Now assume that the decline in g_{Ms} is unanticipated. Producers therefore perceive that the real wage rate in terms of the goods they are producing is rising. Accordingly, $\alpha < 1$ in equations (3) and (4), and both g_Y and g_P will decline.

The decline in g_P will reduce the demand for labor and cause the nominal wage rate to be lower than it otherwise would have been. On the labor supply side, workers see the rate of change in the nominal wage rate falling. This fall occurs because the supply of workers at the former nominal wage rate is greater than the demand. Workers, though, do not realize that the transmission process is causing the rate of

change of prices of all goods and services to fall, and they perceive that the fall in the rate of change of the nominal wage is identical to a fall in the real wage rate. Therefore, they will supply a smaller quantity of labor at each actual real wage rate (see figure 2.6) (1976a, p. 223; 1972, p. 930).

Even though the actual real wage rate may have been constant over the cycle, workers and firms have reduced their demand for and supply of labor in the interim, both perceiving a movement in the real wage rate due to misperceptions caused by changes in the rate of change in prices. Agents' anticipations had been that the former rate of price change would continue.

Firms who reduced output in response to a fall in the rate of change of prices did so because they perceived that the price of their

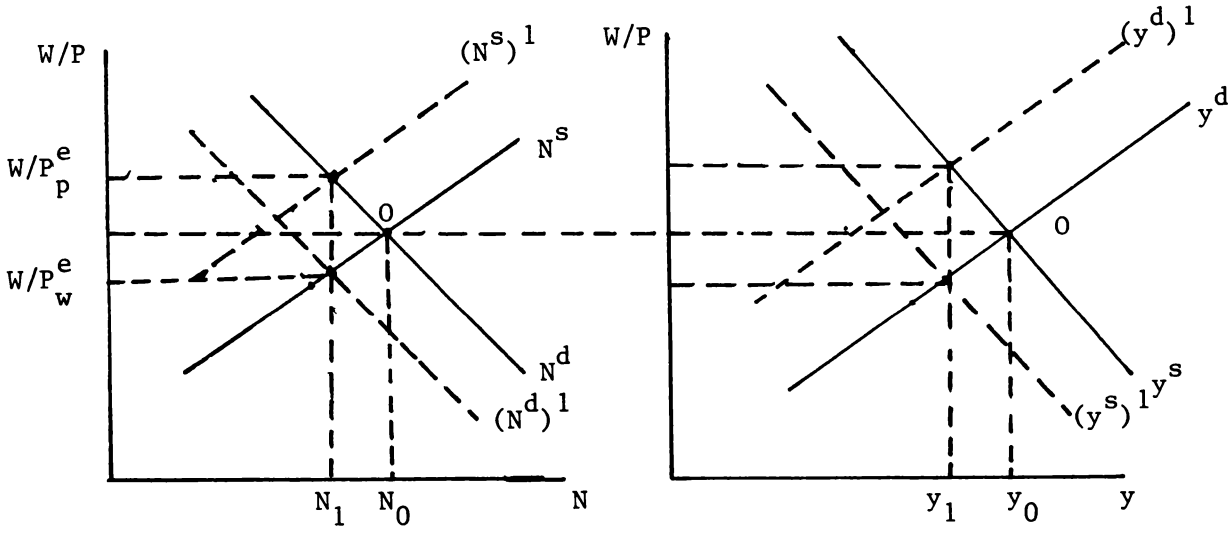


Figure 2.6 Friedman's market for labor and goods. The effect of a decrease in nominal money balances.

product had fallen relative to the prices of inputs, including labor services (see figure 2.6). Price signals were necessary to cause a cutback in output, or recession. A falling level of prices is not necessary for recession, but it is necessary that agents' expectations are not realized. A recession is caused by the rate of actual price change being lower than the expected rate of price change.

If all agents had had full information that the rates of all prices would change eventually, or, in other words, if they had anticipated the rate of change in prices, the recession would not have occurred. Firms would have lowered the rate of change in the nominal wage to the extent that the real wage would have remained constant at the previous level of output, since no changes in real magnitudes had occurred. Workers would have adjusted their supply of labor to conform with the new rate of change in prices, thus supplying the same quantity of labor as before, since the actual and perceived real wage would have remained constant.

If a decrease in money caused output to fall, the recession in output is not permanent. As the rate of change in prices of assets are lowered through the transmission process, the effect spreads to all other prices in turn. Since the rate of spending on assets has fallen, the relative prices of assets are lower than that for consumption services. This imbalance discourages spending for consumption which by the same process lowers the prices of these goods and services. The lowered level of output causes the demand for real balances to fall and the marginal return on a unit of money to be lowered. Additionally, real balances are restored on the supply side through the effect of a

falling price level which raises the price of money. At the new equilibrium MR/P for money is equal to that for other assets (1982, pp. 18-19).

At this point, agents have adjusted their price expectations to the different rate of price change. They are then prepared to adjust their output decisions to reflect their real long run optimal position. Producers will realize that there will be a higher profit from the former level of output. Workers will realize that their real wage has found its former level. When anticipations adjust, there are no more barriers to the optimum production level. In terms of figure 2.6, the labor and goods markets return to point 0. In terms of growth rates, g_p^* and g_Y^* adjust downward so that $g_p = g_p^*$, $g_Y = g_Y^*$, and $g_y = g_y^*$, and long-run equilibrium is restored.

Price Misperceptions

An unanticipated increase in the supply of money induces an increase in spending on existing assets causing their prices to rise. Individuals then react by increasing spending on new assets, and then on new output in general. The result is an increase in nominal demand (Y). Due to price misperceptions, producers react by increasing output and increasing the demand for labor. The resulting rise in the nominal wage rate induces workers to increase the quantity of labor supplied. Firms seek to increase production of those goods whose prices have risen, but they do not recognize that all other prices have risen.

Therefore the sets of information are different to the two groups. Firms that produce goods whose demand has fallen relative to other

demands are unaware of the situation, since, to them, the prices of what they sell have not changed. Therefore, a misperception on the part of firms of the behavior of prices is necessary for any cyclical increase in output to occur.

An Anticipated Increase in the Quantity of Money

If agents were aware that the supply of money were being increased, they would expect inflation. But this expectation of inflation does not interfere with their tendency to equate marginal returns in their portfolios. If agents expect inflation and they received new money just equal percentage-wise to the increase in the price level, their long run best interest would be to hold the new money rather than spend it (1982, p. 413; 1969e, p. 10). But, in the interim between the distribution of the new money and the full rise in the price level, there is an opportunity for some agents to profit by trading the cash for assets with higher yields. If inflation is fully expected, prices may rise before any actual spending changes.

Even if the recipients of the new money expect a one time price rise due to the new money, they will spend their new balances to capitalize on the short run profit opportunity. As they attempt to spend on goods and services, though, sellers of the goods and services also expect a one time price rise, and, to protect their profits, they will sell only at prices that reflect the expected price rise. Thus, if the quantity of money is fully anticipated, suppliers of output and labor will not be subject to price misperceptions and there will be no increase in output and employment (1977, p. 464).

> At an anticipated 20 percent per year inflation, ... would have some real effects by altering desired cash balances, for example, but . . . . . it need not change the natural rate of unemployment (1977, p. 464).

In this case, there is no opportunity for a change in the real rate of interest, since if the prices of services and their sources rise by the same percentage, the ratio will remain constant (1982, pp. 527-530). This process will occur rapidly due to the expectations adjustment so that there will be no perceptible change in the interest rate, and real balances will remain constant, while prices will reflect fully the change in the nominal stock of money (1982, p. 483). "In our example, prices rise, though markets are continuously cleared, because everybody knows that they will" (1969e, p. 10).

Return to Long-Run Equilibrium

When a monetary-induced expansion has taken place and prices of assets have risen, agents see a relative price difference between them and their services due to the lowered interest rates. During the adjustment process of getting rid of excess balances, they switch spending to consumption services thus driving up their prices. As producers increase output in response to the rise in the prices of assets, demand for real balances increases. At the same time, the rising price level is reducing the real supply of money.

> The initial excess of nominal balances will therefore tend to be eliminated . . . by either a reduction in the real quantity available to hold through price rises, or an increase in the real quantity desired through output increases (1982, pp. 18-19).

Since nominal income changes only when there is a "discrepancy between the nominal quantity of money demanded and the nominal quantity

supplied" (1982, p. 62), then, when this discrepancy is eliminated, agents are back in long run equilibrium. The adjustment will bring the interest rate "back to its initial position," since the prices of the sources and services are back in alignment (1982, p. 490), and "[r]eal balances and the real supply of and demand for loanable funds would be at their initial level" (1982, p. 488).

Producers or sellers who increased output in expectation of higher profits due to higher relative prices, find that all other prices have adjusted and that the increased output level is not the profit maximizing level. They find they had confused a general increase in nominal demand with an increase for their particular product (1982, p. 415).

At the culmination of this process, the marginal returns in the portfolio again are equalized, since with the higher price level, wealth holders desire a larger stock of nominal balances to maintain their stock of real balances. The MR/P ratio of money will be temporarily higher than for other assets, and individuals who had traded money for other assets will increase their nominal balances after the price level rises.

> If, as we have argued, demand for money is related to permanent income, the liquidity preference curve . . . will initially shift to the right in lesser proportion than the rise in . . . nominal income, though ultimately it will have to shift in full proportion (1982, pp. 488-489).
> The impact [lower rates of interest] and the intermediate [higher nominal income] effects together would, by themselves, ultimately produce a return to the initial rate of interest (1982, p. 487).

However, the adjustment process takes a long time, and involves relative price changes in the meanwhile.

> A swing produced by monetary disturbance can . . be expected to take a considerable time . . . and to display a consistent pattern of reaction of both nominal and real magnitudes (1982, P. 260).

The deviation from the long run trend in output growth is manifested as a cyclical recession or expansion, and in Friedman's "personal judgment,"

> . . the initial effects of a higher and unanticipated rate of inflation last for something like two to five years . . . a full adjustment takes , say, a couple of decades (1968, p. 11).

The higher or lower rate of output, though significant in strength and duration, was not permanent since it occurred due to a misperception on the part of producers. These misperceptions will be corrected in the course of the full adjustment:

> The transition between the short-run adjustment process and long-run equilibrium is produced by a revision in anticipated values in response to measured values in such a way that . . . a single disturbance sets up discrepancies that are in the course of time eliminated. (1982, p. 64)
> Discrepancies between the rates of price and output change and their permanent values . produce revisions in the anticipated values that . . . after a cyclical reaction process, eliminate the discrepancies between measured and permanent values. . . . . [We assume] an anticipated value is revised at a rate proportional to the discrepancy between actual and anticipated values (1982, p. 65).

Thus the increase in output will automatically be reversed as employers discover that the real wage has not fallen and workers discover that the real wage has not risen.

Effects on the Nominal Rate of Interest

Friedman and Schwartz see real and nominal interest rates lowered in the short run as prices of the sources are bid up relative to the prices of the services. Nominal rates will be lowered for a time until the "effects" of the new money begin to reverse themselves. This should occur "in something less than a year" (1968, p. 6). The real portion of

the interest rate will revert to its permanent value in the course of the long run adjustment process since wealth holders will attempt to equate marginal returns in their portfolios.

> The key feature of this process is that it tends to raise the prices of sources . . relative to the prices of the services themselves . . . . But these reactions in their turn tend to raise the prices of services relative to the prices of sources, this is, to undo the initial effects on interest rates (1969b, pp. 255-256).

There may be a lasting effect on the nominal rate if wealth holders permanently incorporate inflation anticipations. There would be a "price anticipation" premium on the real rate of interest which would make the nominal rate and real rates unequal (1982, pp. 490-491). There could theoretically be effects on the real rate itself due to anticipation of inflation, since this would cause savers to economize on cash balances and prefer other forms of wealth which may be less "productive." But, Friedman and Schwartz "conclude that the real rate [can be] regarded as unaffected by <u>anticipated inflation</u>" (1982, p. 494).

Once anticipations catch up with the new price level, real rates of interest will depend only on changes in real conditions in the economy mentioned above. The prices of services will be in the same proportion to the prices of the sources as before.

CHAPTER III

FRIEDMAN'S INTERPRETATION AND CRITICISM OF THE UNEMPLOYMENT OUTCOME OF THE GENERAL THEORY

A. Friedman's Interpretation of The General Theory

Friedman criticizes Keynes' unemployment "equilibrium" in The General Theory as "explained by rigidities or imperfections, not as the natural outcome of a fully operative market process" (1968, p. 3). Keynes, according to Friedman, is guilty of incorporating a liquidity trap to prevent full employment in the long run and to insure rigid prices in the short run. Additionally, Keynes failed to recognize the wealth effect which would have assured the existence of a full employment equilibrium even in the event of a liquidity trap.

According to Friedman, a fully operative market process would work to eliminate deviations from equilibrium by changes in the price level. Unemployment is a characteristic of a short run departure from long run equilibrium which tends to be corrected by market forces. If involuntary unemployment existed, unemployed workers would have a tendency to "offer their labor services at a slightly lower real wage ." (1976a, p. 214). Friedman asks, "How is this force contained?" (1976a, p. 214). Institutional factors may be responsible for "delaying the adjustment," but cannot be responsible for "enforcing a long run stable equilibrium position at less than full employment" (1976a, p. 215).

In Friedman's interpretation of Keynes' theory, he identifies three propositions on which he says Keynes relied:

> 1. As a purely theoretical matter, a long run equilibrium position characterized by "full employment" of resources need not exist, even if all prices are flexible.

2. As an empirical matter, prices can be regarded as rigid--an institutional datum--for short-run economic fluctuations; that is, the distinction between real and nominal magnitudes that is at the heart of the quantity theory is not important for such fluctuations.
3. The demand for money has a particular empirical form --corresponding to absolute liquidity preference--that makes velocity highly unstable much of the time, so that . . . changes in the quantity of money produce offsetting changes in V. This proposition is critical for the other two . . . . Absolute liquidity preference at an interest rate approaching zero is a necessary though not a sufficient condition for proposition 1. Absolute liquidity preference at the "conventional" interest rate explains why Keynes regarded the quantity equation . . as largely useless for policy or for predicting short-run fluctuations in nominal and real income (identical by proposition 2) (1982, pp. 41-42).

The Liquidity Trap

It seems that Friedman's interpretation of The General Theory places the blame for a level of output at which there is unemployment on the existence of a liquidity trap at the existing level of r and Y. The liquidity trap enforces a long-run unemployment equilibrium even if all prices are flexible.

Keynes described the demand for money as separable into various "motives." Demand for money from the speculative motive in real terms is a decreasing function of the rate of interest. If there is an increase in the supply of money, wealth owners will hold it as an asset only if the rate of interest falls. In order for the rate of interest to be lowered, recipients of the new money balances must "bid up" prices of assets and securities and thus lower their yields. Therefore the rate of interest (or price of bonds) which equates the purchases and sales of bonds or assets will be the new equilibrium rate of interest. Wealth owners are holding more cash, and the rate of interest is lowered.

The liquidity trap is a perfectly elastic demand for money balances, in which persons would rather "hold" additions to the money stock rather than purchase an interest bearing asset at such a low rate of interest. It is characterized by a perfectly elastic range in the demand for money "curve." Normally, as the rate of interest falls, wealth holders will desire more cash to hold for future profit opportunities. If a liquidity trap exists, the demand for money becomes infinite at some low rate of interest. In this case, all wealth owners desire liquidity at that rate because they believe that the future rate of interest will be higher. An increase in the supply of money would have no effect on the prices and yields of bonds and other assets because the wealth holders would not spend it to purchase bonds or other assets, thus prices would not rise and the yields would not fall. Wealth holders are waiting for the prices of assets to fall (yields to increase) and are holding "liquid" assets (money) in the interim. Wealth holders are willing to sell an infinite quantity of bonds, but are willing to buy none at this low rate.

If there were a liquidity trap, the LM curve would have a flat portion where the demand for money is perfectly elastic (see figure 3.1). Therefore, shifts in the LM curve (from LM_0 to LM_1) due to an increase in the quantity of money would not lower the interest rate or affect nominal income. The LM curve represents the loci at which r and Y are in equilibrium in the assets market. Since $r = r_0$ represents the lowest market rate that can exist, then an increase in the quantity of money would be nugatory. Real income (y) (or nominal income) could not be raised by increases in the money supply since the interest rate

would not fall in response to an increase in the quantity of money. Additionally, a fall in the price level which would increase the supply of real balances would have no effect either since it also must operate through a shift in the LM curve. The level of output y_0 may not be changed by any monetary means if there exists a liquidity trap.

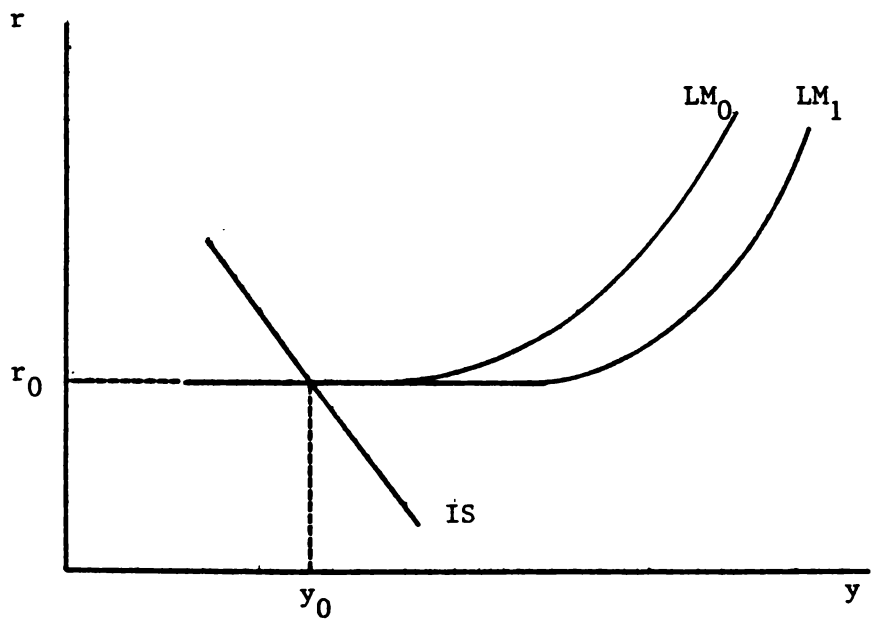


Figure 3.1. An IS-LM representation of the Liquidity Trap.

B. The Long Run with Flexible Wages and Prices

If wages and prices were perfectly flexible, as Friedman and others believe is necessary for a long run view, the price level would adjust to restore that level of real balances which would provide full employment. However, a falling price level would be deprived of its beneficial effects in the case of absolute liquidity preference.

Friedman maintains that the liquidity trap is Keynes' ultimate barrier to full employment.

> If liquidity preference were absolute, or nearly so,--as Keynes believed likely in times of heavy unemployment--interest rates cannot be lowered by monetary measures. If investment and consumption are little affected by interest rates, . . . lower interest rates, even if they could be achieved, would do little good (1968, p. 2).
>
> Time and time again when Keynes must face up to precisely what it is that prevents a full-employment equilibrium, his final line of defense is absolute liquidity preference (1972, p. 942). I do not see how anyone can . . . come to any other conclusion than that his 'special twist' was highly elastic liquidity preference and that 'this was a key element in Keynes' proposition' about the possibility that there might not be a full-employment equilibrium even with flexible prices (1972, p. 942).

Friedman and Friedman and Schwartz have charged that the existence of a liquidity trap is "necessary" and a "key element" for long run unemployment equilibrium if all prices are flexible.

If all prices are flexible, then any output level requiring less than full employment can never be stable because as long as at least one person is involuntarily unemployed, it would be in his best interest to offer his labor services at a lower "price" thereby putting additional downward pressure on the general price level. Keynes' model, according to Friedman, recognizes this automatic adjustment, but relies on an extraneous force (the liquidity trap) to prevent it from operating.

Using an IS-LM framework to describe the automatic adjustment process in figure 3.2, let y = real output, Y = nominal income, M = nominal money balances, N = the level of employment, P = the level of prices, r = the rate of interest. Now, assume the economy is in full-employment equilibrium at $y = y_f$, with employment $N_0 = N_f$. The nominal money supply is M_0, the price level P_0, and the interest rate r_0. Let some decline in aggregate demand resulting in a decline

in spending so that the IS curve shifts to the left, causing the new equilibrium level of output to be y_1.

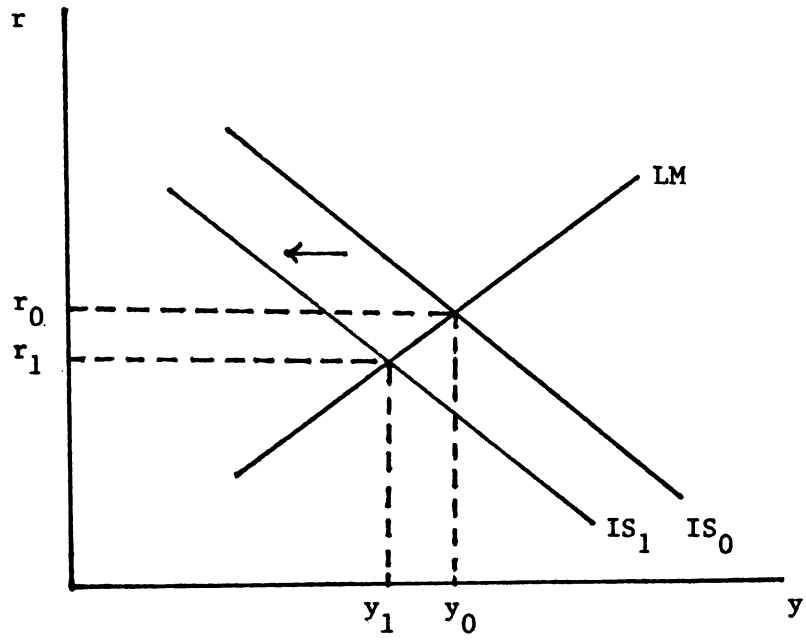


Figure 3.2. An IS-LM representation of a decline in demand.

In figure 3.3, the output and labor market for the firm is shown. Firms have a production function $y = f(N)$ such that $F'(N) = MPN < 0$, where the quantity of labor demanded is a function only of the marginal product of labor. If prices are flexible, then P is bid down to P_1 to maintain sales. Therefore, the demand for labor will fall to $D_1 = MPN*P_1$ and employment will fall to N_1.

This situation is unstable. Unemployed workers will immediately bid the nominal wage to W_2 to secure employment. Because of pure competition in the labor market, the equilibrium wage rate for all workers will fall from W_0 to W_2. Firms will rehire the workers at

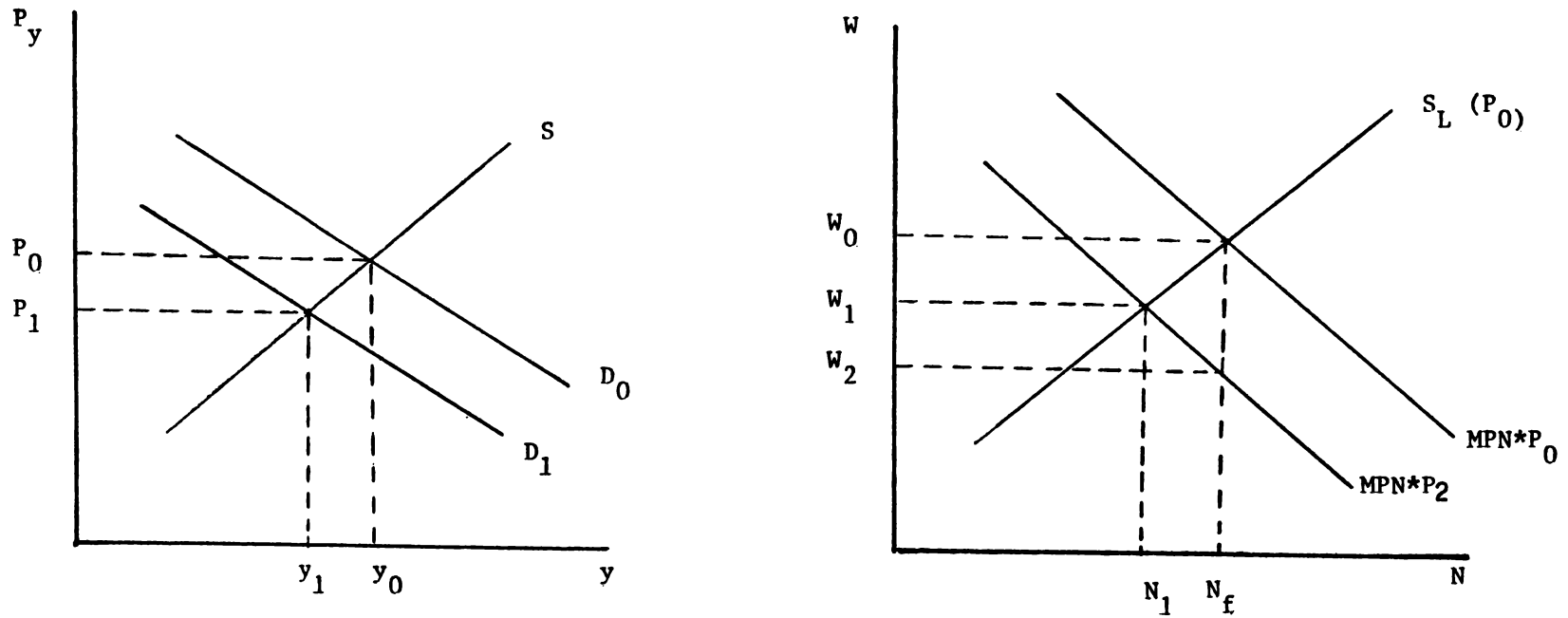


Figure 3.3. Adjustment of the output market and labor market to a decline in demand.

W_2 because at this lower wage, the marginal product of the worker is equal to the wage rate at the same level of employment. But, aggregate spending is lower since the total wage income has fallen ($W_2 * N_0$) so if the prices of goods and services fall enough to bring about a price level of P_2, then the market will clear. Real output is restored to its former level y_f, employment is at N_f, but prices and wages have fallen to P_2 and W_2. Through the lowered price level, the LM curve will shift to the right tp $LM_1(P_2)$ in figure 3.4, and spending will be restored in real terms.

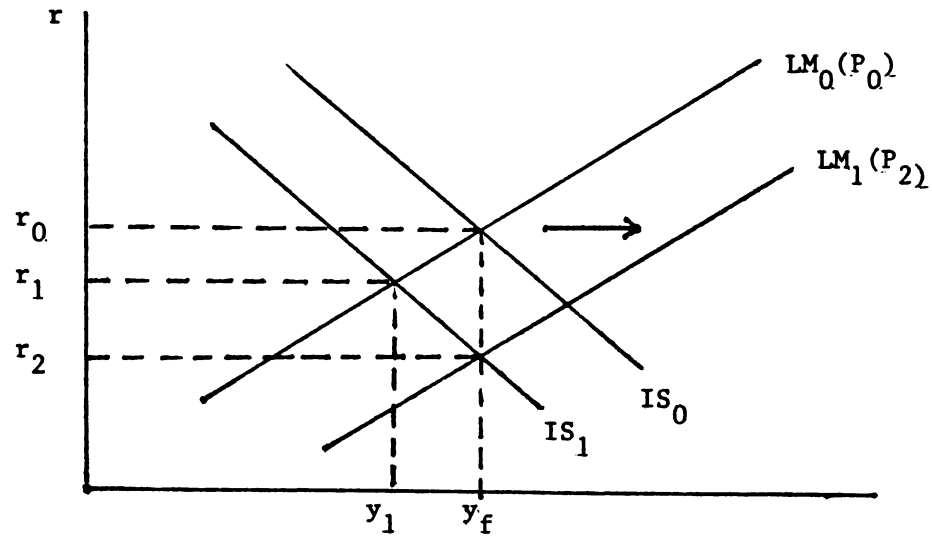


Figure 3.4. Return to full employment via an increase in real balances through falling prices.

The real quantity of money balances has increased at the lower price level. At the same time that the product market is finding its new equilibrium level of output, changes in the real money supply are operating to lower interest rates and increase investment spending,

which hastens the return to full employment. At M_0/P_0, the LM curve is at LM_0. But, the fall in P shifts the LM curve to LM_1 which corresponds to M_0/P_2 (see figure 3.4). If this were the only effect of lowered prices, it would be capable of restoring full employment at (Y_f, r_2), even if the IS curve did not shift back to IS_0, due to the pressure on wages, but remained at IS_1. In figure 3.5, the supply of labor curve shifts to the right to reflect the lowered price level. Therefore, the labor market is also at full employment equilibrium.

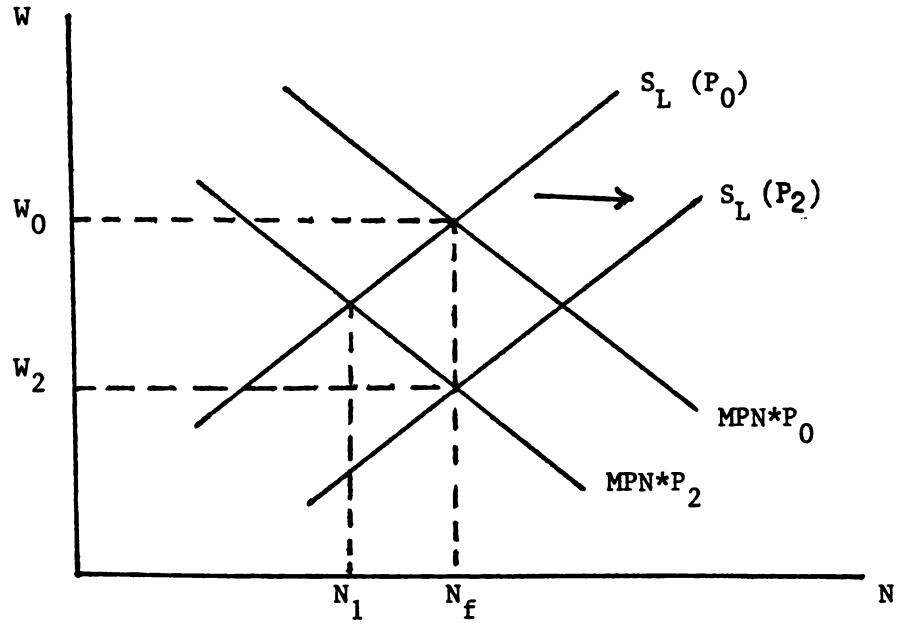


Figure 3.5. Restoration of full employment in the labor market due to the effect of falling prices.

As long as there continues to be pressure on prices to fall due to the existence of unemployment, the LM curve will shift to the right until full employment is restored at a lower rate of interest.

If, however, a liquidity trap exists, the interest rate will not be lowered and output cannot be increased by falling wages and prices augmenting the real supply of money. Thus Friedman contends that the liquidity trap is critical for Keynes' proposition (1).

Friedman and Schwartz discredit totally proposition (1) from a theoretical standpoint, stating that this proposition "has been demonstrated to be false" (1982, p. 42). They point out that "Keynes's error consisted of neglecting the role of wealth in the consumption function (1982, p. 42). Keynes "recognized in his asides that wealth has an effect on consumption," but failed to incorporate this mechanism in his formal theory (1982, p. 45). Friedman considers the wealth effect theoretically pervasive:

> There always exists, with a fixed nominal quantity of money, a rate of price decline sufficiently great to reconcile at full employment the desires of producing enterprises to invest and of wealth holders to save, no matter how stubborn both are (1976a, p. 320).

The wealth effect would operate to offset the power of the liquidity trap to prevent full employment since it affects the IS curve only.

The wealth effect derives from the lowered price level and operates on the value of "savings" held in the form of fixed money assets. Holders of this wealth experience an increase in the real value of this wealth as the price level falls. Of course, fixed money assets are two sided--for every debtor there is a creditor. But, it has been theorized that if the debtor is the government, then this debt may be imperfectly acknowledged by the citizens whose liability it is. Therefore, a fall in the price level would increase the wealth of debt holders but would not increase the perceived liablility of the taxpayers

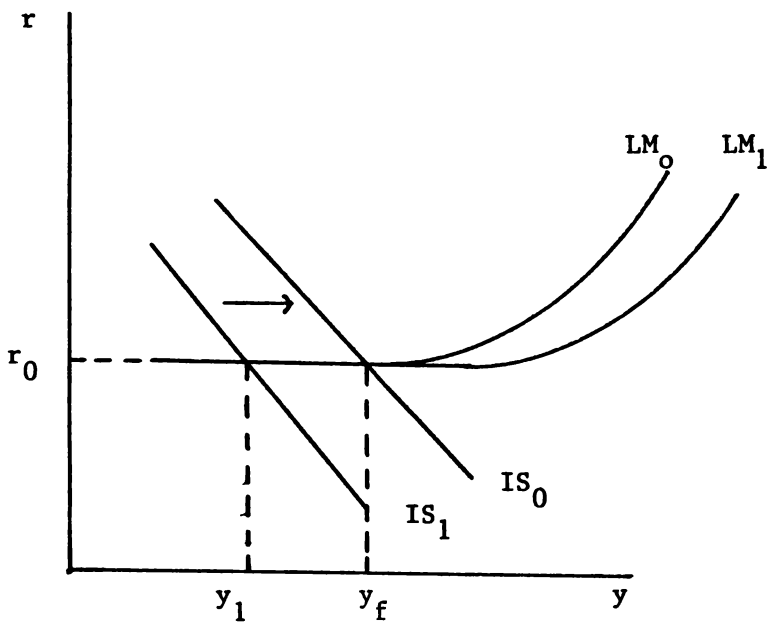
who are responsible for the debt. In the case of currency, or outside money, the holder generally recognizes no liability whatsoever.

Wealth changes operate on the willingness to spend and save. If wealth holders realize an increase in their wealth, they will spend more from a given level of current income, thus raising the aggregate level of spending. Therefore, when the price level falls, the IS curve will shift to the right, since with the increased wealth, less saving would occur at each value of y, and the product market would be in equilibrium at combinations of greater values of r and y. If no other effects were forthcoming from the fall in prices (no change in the LM curve) given the wealth effect on spending, prices would eventually fall enough to restore equilibrium through shifting the IS curve.

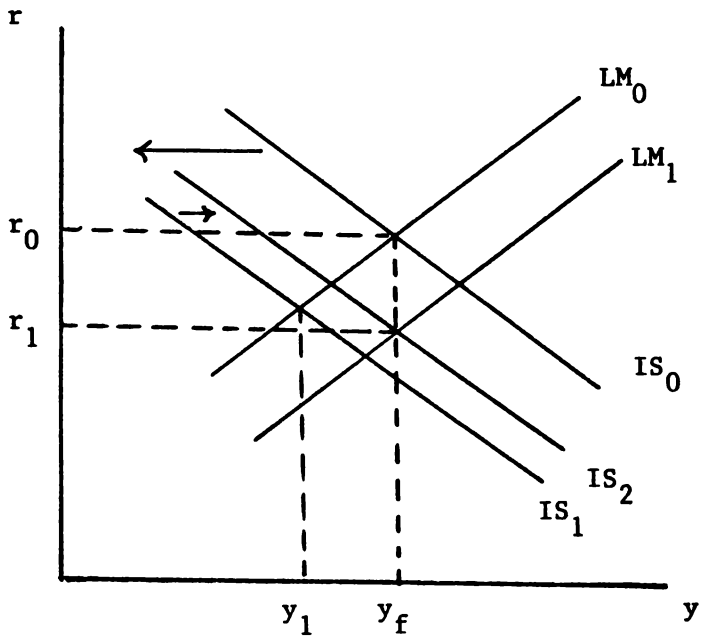
Through the wealth effect of falling prices, the IS curve will shift back to IS_0 to restore equilibrium at full employment. At full employment, the rate of interest which prevails would equate the desires of savers and investors. As shown in figure 3.6, any level less than Y_f will result in <u>pressure</u> on prices to fall further.

Thus there are two forces operating to restore full employment in the long run, but they both depend on the fall in the wage and price level. If one mechanism fails, there is another to back it up. If Keynes did neglect the role of a desired level of wealth, an important effect of falling prices would be that households would spend more and save less thus shifting the IS curve to the right. This effect would take place even if a liquidity trap existed because it does not depend on a fall in the interest rate.

In the long run, all expectations are realized so that the



Wealth effect with a liquidity trap



Wealth effect in the absence of a liquidity trap

Figure 3.6. The Wealth Effect of falling prices.

equilibrium interest rate is the expected rate of interest. At a very low rate, the return gained from holding other assets would not be enough to compensate for the additional risk involved. Therefore, liquidity preference becomes absolute. Friedman says that Keynes believed that this minimum rate set a "floor" to the market rate when the equilibrium rate would have to be lower to clear the market at full employment (1982, p. 55).

Friedman and Schwartz see a "fallacy" in this argument since they say that the existence of money would force these two rates to be the same. The equilibrium rate would be adjusted through a flexible price level so as to introduce a floor to the equilibrium rate making it identical to the market rate. This is another way to look at the "wealth effect" that Keynes missed in his theory, even though in his "asides" he recognized that it existed (1982, p. 55).

Even with a liquidity trap, the market rate could be the equilibrium rate if the price level fell enough so that consumption were stimulated to the extent that full employment were restored. Therefore, this is Keynes' fatal "error." Even though he acknowledged its existence, he failed to realize its key role in long run adjustment. No unemployment equilibrium is possible with flexible wages and prices. Thus proposition (1) has been demonstrated to be "false," and even some of Keynes' most noted disciples have acknowledged this fact.[1]

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[1] James Tobin stated that, "[he[did not establish an underemployment equilibrium" (1975, p. 201). Also, Don Patinkin feels that Keynes only demonstrated a short run disequilibrium, not an unemployment equilibrium (1965, p. 337). But, Patinkin thinks too much attention has been paid to this question since the focus on "equilibrium" has caused an undue emphasis on rigid money wages or a liquidity trap. Patinkin himself considers Keynes' theory in view of a disequilibrium setting.

C. Short Run Price Rigidity

Friedman and Schwartz analyze short run price rigidity in the General Theory as having the necessary condition of the liquidity trap. Existence of a perfectly elastic demand for money is the root cause of short run price rigidity.

Keynes, they say, "assumed" rigid wages because there was a "lack of concordance between observed phenomena and the implications of a literal application of Marshall's assumption to aggregate magnitudes" (1982, p. 47). Therefore, Keynes reversed the roles that Marshall had assigned to price and quantity variables: quantity adjusts quickly while price adjusts slowly "at least downward" (1982, p. 46). The "idiosyncratic" period between World War I and the writing of the General Theory influenced Keynes to abandon his former quantity theory leanings and fit a new theory to the empirical observances (1982, p. 621). But, say Friedman and Schwartz, he carried it to the "extreme, all adjustment in quantity, none in price" (1982, p. 48).

Friedman and Schwartz say that Keynes "rationalized" his assumption of wage rigidity on two levels: on the surface, he relied on institutional variables such as trade unions and money illusion; at a deeper level, he relied on proposition (1)--there could be no equilibrium price level if there were no equilibrium. Wage rigidity, they say, was crucial to Keynes' model to "fix the price level" and lend stability to the system (1982, p. 47).

It was Keynes' "erroneous interpretation" of the Great Depression which led him to regard monetary policy as "ineffective in stemming a decline" (1982, p. 48) Due to his assumption about prices, the quantity

theory equation could be rewritten as: M/P = ky, where M = nominal money balances, P = the price level, k = the inverse of velocity (the demand for real balances), y = real income. If the quantity of money were increased, and if P is assumed constant, then all adjustment would have to take place on the right side of the equation. Even at this point, say Friedman and Schwartz, Keynes' theory could be consistent with a monetary interpretation of changes in output. But at this point he introduces absolute liquidity preference.

If elastic liquidity preference exists, adjustment would take place mostly through changes in k. The demand for money would be highly elastic so as to absorb the almost the entire change in the money supply. In Keynes' "most extreme, and we are tempted to say purest" form of his theory (1982, p. 48), all changes are in k; liquidity preference is absolute; there are no possible effects on y.

Keynes' rationale for this position, according to Friedman and Schwartz, is the demand for money function he specifies in which the speculative demand is highly sensitive to changes in the rate of interest. Since the interest rate is a "price"--the price of credit (1982, pp. 26, 48), then by assumption this price is "slow to adjust". The variable that must adjust is "the real quantity of money people desire to hold" (1982, p. 48).[2] An infinitesimal change in the

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[2] In another discussion of the relation between the liquidity trap and rigid prices, Friedman and Schwartz say that in the event of a change in the quantity of money "Keynes supposes that the whole of the adjustment will be in k. And this result can also be regarded as a direct consequence of his assumption about the relative speed of adjustment of price and quantity." (1982, p. 48) In this case there is a reversal of the previous causation. Since the adjustment in k is the liquidity trap, Friedman and Schwartz are saying that sticky prices cause a liquidity trap (or that if Keynes' model is to have sticky prices, it must logically have absolute liquidity preference.)

interest rate would cause an infinite change in the quantity of money demanded.

Friedman and Schwartz's conclusions from this analysis are that absolute liquidity preference and rigid prices (including interest rates) go hand in hand. Otherwise, a change in the quantity of money would affect interest rates. A change in interest rates implies that there has been a change in the price of assets (or in their returns), and this would mean that a change in the quantity of money affected prices. Keynes' theory did not admit this possibility according to Friedman and Schwartz. With absolute liquidity preference, nothing is affected by a change in the supply of money except a change in the demand for real balances in the same proportion. Changes in the supply of money do not affect prices of assets, interest rates, the level of output, or the price level of output. Therefore, a theory that incorporates rigid prices must have some theoretical cause--in Keynes' theory it was absolute liquidity preference.

As Friedman and Schwartz point out, this is really not the same thing as asserting that prices and wages are "constant." It only means that Keynes' theory provided for no effects on prices or wages as a result of a change in the quantity of money (1982, p. 49). There are "forces" which determine the wage level, but these are not part of the "theory in question," but are affected by forces "abstracted from in the theory," and a result of "ad hoc relations" (1982, p. 49). It was not enough for Keynes to admit that wage and price changes occur; they were not a direct consequence of his monetary theory, so his formal theory "has nothing to say about what determines the absolute price or wage level " (1982, p. 50).

Friedman says Keynes theorized that the interest rate could not be changed by any monetary means in the short run because at "low" interest rates a liquidity trap would exist, but at higher rates there would be an "unstable" demand for money in which velocity would change to offset any change in the money supply by the banking authority (1972, p. 908). This unstable demand for money would be caused by speculators who would move quickly to offset any change in banking policy. These speculators have expectations that the "conventional" interest rate will persist in the future, thus they will frustrate any attempt of the monetary authority to affect the rate of interest by buying and selling bonds.

If the central bank tried to increase the money supply and lower the rate of interest by purchasing bonds, these speculators would sell an infinite supply of bonds at the going price. Wealth holders who would have been induced to sell at the higher prices find that these speculators flooded the market thus driving down the price to the former level. The slightest rise in the price of bonds would encourage them to sell their bonds and effectively frustrate the attempt of the monetary authority to raise bond prices.

A similar situation would exist when the monetary authority attempted to lower bond prices and raise yields. These same speculators would buy an infinite quantity of bonds at the slightest lowering of bond prices, in order to profit when the price rose again. If these speculators exist, then the monetary authority is blocked in its efforts to lower <u>or raise</u> the rate of interest. Its actions merely change the quantity of money balances held by these speculators (1982, pp. 53-54).

A feature of this phenomenon is that nominal income becomes

independent of the quantity of money. If nominal income increases (for some reason other than a monetary inducement) which requires an increase in transactions balances, then holders of these speculative balances will provide them at no increase in interest rates. Conversely, these speculators will absorb all excess balances made available by a fall in nominal income, even if the rate of interest does not fall.

> The conclusion is that in circumstances of absolute liquidity preference, income can change without a change in M or in interest rates and M can change without a change in income or in interest rates. The holders of money are in metastable equilibrium, like a tumbler on its side on a flat surface; they will be satisfied with whatever the amount of money happens to be (1982, p. 54).

Friedman and Schwartz conclude that Keynes saw absolute liquidity preference at the conventional rate of interest in the short run, so that money changes are unimportant in explaining changes in prices, output, or rates of interest. They say that Keynes did qualify this assertion by applying it only to conditions of unemployment, and that at high levels of employment the demand for money is "unstable." At full employment, they say, he conceded that increases in the supply of money would affect prices, and in fact it would only affect prices. This qualification, though, is unimportant, since Keynes paid only "lip service" to the possibility that it could happen, so it would do his theory no injustice to neglect it (1982, p. 49).

Implications of the Liquidity Trap

Friedman and Schwartz see a difference between a long run and a short run liquidity trap which they say that Keynes and his followers "tended to merge" (1982, p. 55). As a consequence, the important effects of the expected interest rates in the demand for money were

omitted. The theoretical distinction between the long and short run liquidity traps is necessary to point out consequences of long run or short run liquidity preference. The long run liquidity trap is caused by the expected rate of interest R* being so low that "the extra return from holding non-money assets would only just compensate for the extra risks involved" (1982, p. 54). This long run liquidity trap involves the risk factors of investing long term rather than activity by speculators. The liquidity trap in the long run may occur only at an interest rate approaching zero, while in the short run it may occur at the "conventional" rate due to the activity of speculators.

Friedman's Interpretation of Keynes' Demand for Money

Keynes' system "emphasized the relation between nominal income and investment or autonomous expenditures rather than the relation between nominal income and the stock of money" (1982, p. 41). Therefore his monetary theory was more of an appendage to his basic income-expenditure approach. Even though Keynes recognized a spectrum of interest rates, his "interest rate" corresponded to that on long term government securities. This was a result of Keynes' definition of "money" as any short term liquid asset, cash and deposits, so that any distinction made between money and bonds in Keynes' model would be misleading (1982, p. 52).

Keynes' liquidity preference function (demand for money) specifies the quantity of nominal balances demanded as a function of "the" rate of interest. Friedman and Schwartz note several problems with it. First, the demand function should be specified as a function of the difference

between the rate of interest and the rate paid on "money," but due to the "simplification" Keynes made above, they say, this was not necessary. Second, Keynes failed to distinguish between nominal and real money balances in his demand function. Again, this is due to his assumption that "prices could be taken as rigid" and that nominal and real income were identical (1982, p. 481).

Friedman and Schwartz specify a formalized version of Keynes' demand for money function. It is separable into two components, the transactions demand and the speculative demand, and each depend on different variables (1982, p. 52).

$M/P = M_1/P + M_2/P = k_1y + f(R - R^*, R^*)$, where k_1 = velocity of transactions and R = the current rate of interest, R* = the expected rate of interest, y = real output, M_1 = money held for the transactions motive, M_2 = money held for the speculative motive, M = the supply of nominal balances, and P = the price level. In practice, Keynes and his followers have treated the demand for money as a function of current interest rates, even though they considered the effect of expectations in developing the demand for speculative balances. This omission was due to their concentration on the short run (1982, p. 53).

D. The Keynesians: the Narrow Range of Assets

Criticism of the "Keynesians"

It is not surprising that hardly an economist today accepts Keynes's conclusion about the strictly passive character of k, or the accompanying conclusion that . money does not matter" (1982, p. 49). Even so, Keynesian economists are identifiable by their tendencies to

adopt Keynes' assumptions about the relative speed of adjustment of price and quantity (1982, p. 49). If they reject absolute liquidity preference, then they must offer some other explanation of sticky prices.

Friedman and Schwartz see a "more subtle difference between the approach of economists in the Keynesian tradition and the approach we have adopted" (1982, p. 57), and that difference concerns the effects of the range of assets considered for the transmission process. The transmission mechanism by which changes in the quantity of money operate to change real variables such as output, employment and the rate of interest, forms the basis for monetary theory. Any differences that are apparent in monetary theories must find their origin in the transmission process.

Friedman and Meiselman distinguish between two views of the transmission process, one of which focuses on "credit" effects and the other on "monetary" effects. The "credit" view concentrates "on a narrow and well-defined range of capital assets and a correspondingly narrow range of associated expenditures" (1963, p. 217). The yields from these assets can be summarized by "a" rate of interest, which becomes the focus of the analysis to the exclusion of other effects.

The "credit" view recognizes that investment expenditures are financed generally by debts and equities, and there is a close link between the prices and yields on these assets and the Keynesian income-expenditure explanation of movements in output. Since investment spending is sensitive to changes in the rate of interest, as monetary policy affects "the" rate of interest, it allows for increases in

investment spending. Income is affected as the multiplier operates on changes in investment. Therefore, for those who adopt this "credit" view, "the important thing about money is how it affects this class of expenditures" (1963, p. 217).

The "monetary" view on the other hand is a "much different, and broader view" (1963, p. 218). Adopting this perspective, households possess a stock of "capital" which provides services that they consume. So, at any time, the whole stock of unconsumed goods, including physical capital which they may hold in the form of claims on enterprises, real estate, personal consumer durables (including clothes and food), and human capital, represents the range of assets considered for the monetary view. There is an interest rate implicit in all "assets" which measures the yield or services provided by the good, so monetary policy affects the prices and yields of all goods.

Friedman and Meiselman argue that the "monetary" view is "more useful" than the credit view. They maintain that it has been empirically demonstrated that changes in money affect more than interest rates on a narrow class of financial assets. Money affects "a much broader range of assets" and therefore the rates implicit in them (1963, pp. 221-222). Friedman and Schwartz contend that the broader range of assets is theoretically necessary for tracing changes in the quantity of money. The narrow channel (corresponding to the credit view) does not take into account the full impact that changes in money have on expenditures for goods, their prices, and on implicit rates of interest, so that they "<u>insist</u> that a far wider range of assets and interest rates <u>must</u> be taken into account" (1982, p. 58).

Friedman and Schwartz pinpoint the major difference in monetary theory as dependent upon the range of assets considered for the portfolio (1982, p. 58). They contend that the narrow range adopted by the Keynesians provides the underpinning for a model in which the price level cannot be affected by monetary policy. If the range of assets is "extremely narrow," then the only "price" that is affected by changes in the quantity of money would be the prices of those particular assets in the savers' portfolios and their accompanying rates of interest. Therefore, "r" can vary in response to monetary changes, but prices of other existing assets (such as real estate and durables) and of current output will not be affected and thus can remain stable. Monetary changes would have no direct link to the general price level. Those economists who adopt the "credit" view of the transmission process can assume away effects of changes in the quantity of money on the price level in their theories. These economists, then, see money as affecting only "the" rate of interest which is the "market rate on a fairly narrow class of financial liabilities" (1982, p. 57), whose effect depends on the interest elasticity of investment expenditure. Therefore, they can theorize that changes in money affect spending on current output indirectly and sometimes weakly.

E. Conclusions about Keynes' Monetary Theory

Friedman and Schwartz contend that it is the empirical data which have discredited Keynes' theory, and of course the data were unavailable to him at the time (1982, pp. 621-622). Others have "expressed" the view that Keynes' theory is highly special, but they have not been able

to document it with evidence as fully as Friedman and Schwartz feel they have been able to do (p. 622).

Friedman attributes the liquidity trap to Keynes as an explanation of the cause of rigid prices while he attributes the narrow range of assets to the Keynesians as their rationale for the same phenomenon. The result is that price level changes, which are critical for the automatic adjustment that Friedman sees as operational, do not occur. In the case of the Keynesians, monetary policy has "more significance" (1982, p. 49), but he sees Keynes as considering expansionary monetary policy as "ineffective in stemming a decline" (1982, p. 48).

By rejecting the liquidity trap, the Keynesians had to find some other way to explain price rigidity, so they focused on the narrow transmission channel. The fact that they allow prices to change is of no consequence, since their formal theories have no mechanism by which prices are affected by changes in aggregate demand.

If Keynes did adopt the liquidity trap as an explanation of unemployment equilibrium, then he had no monetary transmission mechanism. Money would not matter at all. Keynes' range of assets would reduce to only one--that being money. The LM curve would be perfectly flat in the range of absolute liquidity preference: the demand for money would be infinite; the demand for bonds would be zero.

Friedman and Schwartz do not classify Keynes as embracing a narrow range of assets as they do the Keynesians. In fact, they say Keynes saw no distinction among any assets "whether these be bonds, equities or physical assets" because he assumed the price level to be rigid (1982, p. 54), and if prices were rigid, the rates of return on these assets

would be "fixed" for the short run. Therefore, whether or not a person might hold these assets is immaterial--the liquidity trap completely negates the transmission mechanism and renders the definition of "assets" unimportant. Money remains the only asset relevant to Keynes' monetary theory.

Sticky wages and prices "forced the transmission process to go through an extremely narrow channel" for the Keynesians, while flexible prices allow Friedman and Schwartz to consider a broad range (1982, p. 58). Therefore, if Keynes' monetary theory encompassed a liquidity trap which rendered prices rigid, then he could not also have a "broad" range of assets, which would require flexible prices.

The conclusion is that Keynes considered monetary policy ineffective and that "money does not matter." Though Friedman qualifies his statement with the condition of "in times of heavy unemployment" (1968, p. 2), he also states that in Keynes' theory, no monetary-induced price changes occur until full employment (1982, p. 623). This would imply that monetary policy is never effective in restoring full employment if it was instituted at a time of unemployment.

The implication of Friedman's criticism is that, without the liquidity trap, Keynes would have been forced to adopt a flexible price model where changes in the supply of money affect prices of assets, both existing and newly-produced, and therefore rates of interest. As pointed out earlier, Friedman's definition of a "flexible" price is one that responds promptly to changes in supply or demand (1972, p. 925). Since Friedman's own model incorporates this mechanism, the liquidity trap is the barrier to Keynes' admission that his own model is a

"version" of the quantity theory with highly "special assumptions." The only cause for short-run output fluctuations then would be misperceptions of agents as they adjust to price signals. In particular, there would be no justification for Keynes' model of short-run fluctuations to be characterized by price stickiness if liquidity preference were not absolute. (A possible justification would be the "narrow range of assets," but recall that Keynes himself did not appeal to this justification; only his followers, the "Keynesians" took this approach.) If Friedman can discredit the Keynes' theory by showing its dependence on the liquidity trap for sticky prices, he has built a case against a theory in which unemployment may exist unaided by rigidities or not "fully operative" market processes. Thus there is no barrier to full employment in the long run, since flexible prices would constantly work to restore full employment by one or the other mechanism.

CHAPTER IV

KEYNES' MONETARY THEORY

A. The Role of Money

In The General Theory, Keynes considered money to have a key role in economic decisions of agents (1936, p. 32). One of his major criticisms of the classical school was that no account of money was allowed in their theories of employment and determination of output even though they purported to be concerned with a monetary economy (1936, pp. 19-20, 189). Indeed, Keynes presents a theory of money and its influence on employment, interest rates, output, and prices. Keynes' monetary theory is bound to his theory of the macro economy so closely that he states that it is illegitimate to try to separate monetary economics from the study of how output is determined as a whole, so we "require the complete theory of a Monetary Economy" (1936, p. 293).

To spell out Keynes' monetary transmission mechanism, two preliminary tasks must be accomplished. First, the rationale behind the behavior of agents must be specified to conform with principles of maximization: the purpose of holding money or purchasing assets, and the inducements to alter the composition of the portfolio; the range of assets that an individual may hold for the purpose of storing wealth; the demand for money as a possible asset in the portfolio, especially the role of other variables such as interest rates, prices, and real income in determining the demand for money.

Second, it is necessary to describe a long run position for the economy, the "equilibrium." The stability of long run equilibrium is

important for monetary theory and policy implications, and it serves as a basis for describing short run fluctuations or deviations. How the interest rate, the level of output and employment, and the price level are determined at a long run equilibrium, and what effect the level of money balances has upon this state, give insight into features of his theory that may differ from other monetary theories. It is the differences in monetary theory that we are interested in, and if conditions of long run equilibrium are different, the desirability and effectiveness of monetary policy is at stake.

Keynes' transmission mechanism specifies how a change in the supply of money may affect real variables in the short run. The mechanism is subject to the assumptions and conditions of individual behavior specified in the long run model. The specific path that adjustment follows in the short run depends on the range of assets, the demand for money, and the consumption function. The short run adjustment and its duration is critical for the difference in outcome of monetary theory.

This chapter will examine Keynes' monetary theory with reference to Friedman's criticisms. It will specify Keynes' range of assets, his demand for money and possible conditions of the long run state of the economy. Then, it will describe the short run adjustment to a change in the quantity of money, and what impact the change has on real and nominal variables--the level of output and employment, interest rates, and prices--and whether this impact may carry over into the long run.

B. The Range of Assets

Friedman and Schwartz have contended that a major difference between their approach and that of Keynesians is in the transmission mechanism that is assumed to connect a change in the quantity of money with a change in total nominal income (= total spending)" (1982, p. 57). In particular,

> The difference between us and the Keynesians [the followers of Keynes] is less in the nature of the process than in the range of assets considered. The Keynesians tend to concentrate on a narrow range of marketable assets and recorded interest rates. We insist that a far wider range of assets and interest rates must be taken into account--such assets as durable and semi-durable consumer goods, structures, and other real property. As a result, we regard the market rates stressed by the Keynesians as only a small part of the total spectrum of rates that are relevant (1982, p. 58).

The adoption of the narrow range of assets means that Keynesians can reject absolute liquidity preference and allow interest rates on a narrow range of assets to be flexible, while simultaneously continuing to regard price of other assets (houses, automobiles, furniture, clothes, etc.) as an institutional datum. Thus the Keynesians felt free to develop a short-run theory in which output prices and wages are not flexible. Friedman, on the other hand, has been led to interpret the transmission process in terms of relative price adjustment over a broad range of assets.

Observe that Friedman has criticized only Keynes' followers (and not Keynes himself) on the issue of the range of assets. Indeed, to my

knowledge, Friedman has not discussed Keynes' views on this issue. But, is it not possible that Keynes himself relied on a transmission mechanism impinging on a narrow range of assets (rather than on absolute liquidity preference) to justify his short-run theory of sticky wages and prices? This is the issue addressed in this section.

A desire for wealth is the motivation behind saving for the individual. "Wealth" is merely the "potentiality for consuming an unspecified article at an unspecified time" (1936, p. 211), and the ultimate goal of all economic activity is consumption (1936, p. 104) which is the "only raison d'etre of employment" (1936, p. 211). So the act of saving is important for portfolio theory because saving is the act of building the portfolio itself. It may not be the saver's desire to achieve some rational predetermined goal, but saving could be more of a psychological tendency (1936, pp. 107-108), and "this is where the trouble arises" (1936, p. 211). If there has been an increase in individual wealth, then saving has occurred since ". . . when an individual saves he increases his own wealth" (1936, p. 83).

What motivates the wealth-owner to choose one asset over another in which to store his wealth is its relative yield or return compared to that for other assets. Keynes says that some believe a wealth-owner desires "a capital-asset as such, whereas what he really desires is its prospective yield" (1936, p. 212). The potential owner of an asset calculates the difference between the expected present value of the yield provided by the asset in the form of a stream of returns and the current replacement cost of that asset to arrive at the marginal efficiency of that asset (MEC) (1936, p. 135). The wealth holder will

choose that asset having the highest marginal efficiency, whether it is newly produced or an already existing asset.

The task at hand is not to determine the inducements to make new investments but to determine the inducements to trade assets within a portfolio the size of which is given. Once the level of savings is established, a person must make his or her portfolio choice. Keynes says that "it is in respect to the stock of accumulated savings that the individual can exercise his choice between liquidity and illiquidity" (1936, p. 194).

> But this decision having been made [of how much to consume or save], there is a further decision which awaits him, namely in what <u>form</u> he will hold his command over future consumption which he has reserved, whether out of his current income or from previous savings. Does he want to hold it in the form of immediate, liquid command (i.e., money or its equivalent)? Or is he prepared to part with immediate command for a specified or indefinite period, leaving it to future market conditions to determine on what terms he can, if necessary, convert deferred command over specific goods into immediate command over goods in general? (1936, p. 166).

A person has a choice as to the degree of liquidity he will accept in his wealth holding. Money is of course the ultimate in liquidity, but other assets rival money in their liquidity premiums (bonds and government securities). This liquidity premium will be a factor in the demand for specific forms of wealth. The choice, though, is for the entire range of assets Keynes considered--cash, debts and capital goods (1936, p. 81).

Keynes identified many non-financial "goods" that wealth owners may store in their portfolios. If his purpose for mentioning these goods was merely to establish their unsuitability for storing wealth,

then a narrow-range interpretation could be correct. Another possibility is that Keynes gave lip service to the ability of certain goods to serve as assets but did not incorporate them into his formal theory. Keynes' transmission process must directly impact the prices of those assets he considers for the transmission process for them legitimately to be in his range of assets.

This section will establish that Keynes' range of assets was broad and that his transmission process operates on the relative prices of assets as related to portfolio decisions by individuals. Capital goods comprise a broad category whose limits are subject to discussion, but as long as one is consistent in his limits, any reasonable distinction will suffice (1936, p. 61).

Keynes identifies three attributes that assets possess in different degrees:

> (i) Some assets produce a yield or output q . . . by assisting some process of production or supplying services to a consumer.
>
> (ii) Most assets, except money, suffer some wastage or involve some cost through the mere passage of time . . . ; i.e., they involve a carrying cost c measured in terms of themselves.
>
> .
>
> (iii) . . . . The amount . . . which they are willing to pay for the potential convenience or security given by this power of disposal . . . we shall call its liquidity premium l.
>
> It follows that the total return expected from the ownership of an asset over a period is equal to its yield minus its carrying cost plus its liquidity premium, i.e., q - c + l (1936, pp. 225-226).

There is an additional yield that Keynes recognized, and that is the "appreciation premium" which is the expected appreciation of the asset in terms of the standard of value (1936, pp. 224, 227). Keynes denotes this component of an asset's yield by "a."

According to this definition of assets, it is clear that any good,

financial instrument or cash possesses some of these attributes in varying degrees. Consumer durables would qualify since they supply services to a consumer. Capital goods used in production would assist the process of production. It is not necessary for goods to possess a high liquidity premium to be considered an asset for the purpose of storing wealth, and it is not necessary that the yields be measurable in terms of output, for they could just as easily be subjective yields in terms of particular consumer goods. If the yield on some good were negative, that is $a + q - c + l < 0$, that good would not be an "asset" for that particular person. This could be the case for some non-durables whose combined yield from the other factors was less than the carrying-cost. Since services cannot be owned or stored, they would not qualify. The particular definition was not of great importance to Keynes, who agreed to "any reasonable line" (1936, p. 61).

Keynes also attributes a "scarcity premium" to assets which represents the ability of these goods to offer services which have a higher present value than their current replacement cost or "supply price" (1936, p. 213). As the production of these assets increases, the scarcity premium falls, thus dragging down the total return from the asset.

> Since the value of a house depends on its utility, every house which is built serves to diminish the prospective rents obtainable from further house-building and therefore lessens the attraction of further similar investment unless the rate of interest is falling <u>pari passu</u> (1936, p. 130).

Yields on Assets

The yields on assets as described above result from the interaction of the scarcity premium and the yields already identified. Maximization of utility operates to equate all "net" yields (having adjusted for risk) on the assets involved in the portfolio. Trading among assets will occur until no further trades can be made for profit. If agents see an opportunity for profit, they will trade, affecting asset prices, until all prices of assets will be such that that they are in the same relation to their yields as before (1936, p. 227). Even though there may be a difference in stated yields, the real yields on these assets (measured as above with implicit premiums accounted for) will be equalized due to the differences in liquidity, scarcity, appreciation potential and carrying costs.

Keynes' example addresses the yields on physical assets and money. His use of money and physical goods is to demonstrate that though money and financial instruments are clearly substitutes, it is less obvious that money and goods are just as substitutable. In fact, the wealth-holder will seek a "balancing of advantages" in holding cash versus other assets (1936, p. 174). Keynes uses the following notation:

a_1 = expected appreciation of houses (assume > 0)
q_1 = yield from owning houses (assume > 0)
c_1 = carrying cost of owning houses (assume = 0)
l_1 = liquidity premium of houses (assume = 0)

a_2 = expected appreciation of wheat (assume > 0)
q_2 = yield from owning wheat (assume = 0)
c_2 = carrying cost of owning wheat (assume > 0)
l_2 = liquidity premium of wheat (assume = 0)

a_3 = expected appreciation of money (assume = 0)
q_3 = yield from holding money (assume = 0)
c_3 = carrying cost of holding money (assume = 0)
l_3 = liquidity premium of money (assume > 0)

> Thus in equilibrium the demand-prices of houses and wheat in terms of money will be such that there is nothing to choose in the way of advantage between the alternatives;--i.e., $a_1 + q_1$, $a_2 - c_2$, and l_3 will be equal. The choice of a standard will make no difference to the result (1936, pp. 227-228). With this notation it is easy to see that the demand of wealth-owners will be directed to houses, wheat or to money according as $a_1 + q_1$ or $a_2 - c_2$ or l_3 is greatest (1936, p. 227).

Equalization of yields implies that wealth holders substitute various forms of assets in the portfolio to gain the best yield available. The yields that are affected represent those on assets which would be in a saver's portfolio. The fact that their yields are impacted in this manner means that they must be included in the range of assets. Therefore, the range must be broad enough to include such goods as houses, wheat or money.

Keynes addresses the problem of liquidity by calculating the liquidity premium into the real yield which the wealth owner considers when making his choice. A corporate bond, therefore, may have a lower stated yield than a comparable physical asset; however, its implicit liquidity yield may be very high. "The owners of wealth will then weigh the lack of 'liquidity' of differenct capital equipments . as a medium in which to hold wealth against the best available actuarial estimate of their prospective yields allowing for risk" (1936, p. 240).

Physical assets may not have the appeal of financial securities as long term stores of wealth due to carrying costs and low liquidity premiums.

> In the case of a commodity other than money, a modest stock of it may offer some convenience to users of the commodity. But even though a larger stock might have some attractions as representing a store of stable wealth, this would be offset by its carrying costs in the shape of storage, wastage, etc. (1936, p. 233).

But, even so, the yield is calculated on the total return (a + q -

c + 1). If the price of debts were bid up by the central bank, lowering the yield, then the return on the physical commodity which was previously equal to the return on short term debt would appear more attractive to wealth-owners since carrying costs are already calculated into the yield on the asset. Equalization of yields on all assets, including goods and financial assets, is proof that Keynes' range of assets was broad and not limited to a narrow range of financial securities. If yields are equalized on assets, financial securities and money, then relative prices must change through subsititution among assets, and this must be the mechanism that restores equilibrium.

Keynes points to the existence of organized markets as enhancing the liquidity premiums of certain assets, especially debts and equities (See Appendix C). Without the organized markets, those who desired a high degree of liquidity would have no choice except to hold money. "For in the absence of an organised market, liquidity preference due to the precautionary motive would be greatly increased; whereas the existence of an organised market gives an opportunity for wide fluctuations in liquidity-preference due to the speculative motive" (1936, pp. 170-171). This market in effect releases precautionary balances into the speculative pool. Given the existence of these organized markets and a degree of uncertainty, then "anyone who differs from the predominant opinion . may have a good reason for keeping liquid resources in order to profit (1936, p. 169).

Keynes recognizes that organized commodity markets, spot and future, may enhance liquidity premiums of certain "stocks of commodities" (1936, pp. 223-224). Therefore, holding these commodities

as assets must be on a par with holding debts or other securities. It is interesting to question whether a non-traded item such as a refrigerator could be considered a potential asset for the portfolio. Assets of this type for which there are no markets still yield "services," even though their liquidity premiums would be zero. But Keynes did not require assets to possess positive liquidity premiums. An asset is characterized by the fact that it has a yield which is the composite of the factors listed above. Goods that yield "services to consumers" are assets, and thus their yields stand in equality with all others. If the present value of the refrigerator fell below its selling price, it would be traded and another asset purchased. Even though the nominal yield on money is "nil" (1936, p. 226), it still competes with other assets because of the liquidity service that it provides (1936, p. 231).

Keynes mentions no psychological aversion to long term debt, but he does point out that

> there is a risk of loss being incurred in purchasing a long term debt, . . [therefore] The actuarial profit or mathematical expectation of gain calculated in accordance with the existing probabilities . . . must be sufficient to compensate for the risk of disappointment (1936, p. 169).

The "mass psychology" aspect of expectations of future rates of interest operate to affect current rates of interest. The person who believes that long term rates <u>will</u> be higher in the future will keep cash in order to profit from his expectation. The one who believes it will be lower in the future will borrow "for short periods in order to purchase debts of longer term" (1936, p. 170). This speculative substitution should bring the prices of debts of varying maturities into

line with each other according to their risks. If inflation were expected by wealth holders, they would choose real assets over financial assets such as bonds or money.

> A third source of risk might be added, namely, a possible adverse change on the value of the monetary standard which renders a money-loan to this extent less secure than a real asset; though all or most of this should already be reflected, and therefore absorbed, in the price of durable real assets (1936, p. 144).

It is possible that prices of short term debts could be bid up so far that no one believed that prices of long term debts could fall enough to cover the risk differential. In this case, the central bank could only affect prices of short term debts. "The short-term rate of interest is easily controlled by the monetary authority But the long-term rate may be more recalcitrant. ." (1936, p. 202-203).

With yields being equalized in equilibrium, it is necesssary that a process of asset substitution exists, so that wealth holders trade until prices and yields are equalized. This requires a broad range of assets for the transmission process and the prices of assets such as durable goods to be affected by changes in the prices of other assets.

The Marginal Efficiency of Capital

Aggregate investment is the addition to the physical capital stock after allowing for depreciation--the purchase of <u>new</u> capital-assets (1936, p. 75). Therefore, an individual "invests" when he adds to his stock of physical assets by purchasing a newly produced asset. These purchases will be made only if the return from doing so exceeds the return from any other activity. If the return available from new assets falls below the rate of interest (or any other alternative return), no

further investment will occur (1936, p. 236). Since the return from purchasing new assets varies inversely with the price of the asset, then low prices of new assets relative to other existing assets encourage investment. So, "there is no sense in building up an enterprise at a cost greater than at which an existing one can be purchased (1936, p. 151).

Entrepreneurs who "invest" do so after calculating the marginal efficiency of the asset they purchase. The marginal efficiency is the difference between the present value of the expected yield and the "supply price" of the asset in question--the cost of purchasing it. This calculation gives the return on investment which is compared to other returns available. Therefore, a wealth holder or entrepreneur will purchase a new asset only if its marginal efficiency is greater than the rate of interest.

> . . . the marginal efficiency of capital is here defined in terms of the expectation of yield and of the current supply price of the capital asset. It depends on the rate of return expected to be obtainable on money if it were invested in a newly produced asset (1936, p. 136).

Keynes reasons that ". for every durable commodity we have a rate of interest in terms of itself ." (1936, p. 223). This rate of interest corresponds to the marginal efficiency of the asset. Therefore, it may be that it is the greatest of the own rates of interest that the marginal efficiency must attain if it is to be newly-produced ." (1936, p. 223).

The wealth holders seek out the greatest returns available when deciding in what form to store their wealth. There would be no incentive for a wealth holder to purchase new units of capital assets

unless their yields were greater than any currently available asset. If the marginal efficiency of a new asset is greater than the rate of interest, the investment purchase will be made. Since the marginal efficiency is based on expectations of yield, it will change as expectations do. But, it is its relation to the rate of interest which determines the volume of investment.

> For the stimulus to output depends on the marginal efficiency of capital rising relatively to the rate of interest (1936, p. 142).

When investment in new assets takes place, the marginal efficiency of all assets of that type falls. The fall in the marginal efficiency occurs for two reasons: one is that the prospective yield due to the scarcity premium falls; another is that the supply price of the asset will rise, due to "pressure on the facilities for producing that type of capital" (1936, p. 136). These events take place simultaneously although "the second of these factors being usually more important in the short run, but the longer the period in view the more does the first factor take its place" (1936, p. 136).

This result is certain enough so that schedules for individual assets can be established relating the marginal efficiency to the quantity of new investment in that asset. For the economy as a whole, it is possible to construct a schedule of the relation of the rate of investment to the marginal efficiency of capital in general. As the rate of investment increases, the marginal efficiency of capital in general falls (1936, p. 136). Another consequence of the rise in the rate of investment is the increase of prices associated with the increase in output due to the rise in the wage-unit and increasing marginal cost (1936, p. 249).

Keynes warns that ". . . whilst a decline in the rate of interest may be expected, cet. par., to increase the volume of investment, this will not happen if the schedule of the marginal efficiency of capital is falling more rapidly than the rate of interest . . ." (1936, p. 173).

Investment is undertaken by entrepreneurs who expect profits from the activity. They are the purchasers of the new capital. Their main concern is the marginal efficiency of the capital assets they seek to purchase, or in other words the expected profitability of the investment in relation to its price. A ready alternative that could be gotten from an existing asset or debt is given by the prevailing rate of interest. These entrepreneurs are free to purchase existing assets as well as new assets, so they will only purchase the new assets so long as no existing asset offers a better return. "The schedule of the marginal efficiency of investment may be said to govern the terms of which loanable funds are demanded for the purpose of new investment" (1936, p. 165).

C. The Demand for Money

Money may be held as a store of wealth, since "cash" is one of the possibilities of the assets that Keynes saw. It is possible to hold cash for spending and to keep cash as an asset. Liquidity preference is a function of the rate of interest, income, the price level and expectations of interest rates and the price level.

Keynes saw three distinct motives for holding money which underlie the individual's demand for money. The demand for money is a "single decision, though the composite result of different motives" (1936, p. 195). The holders of cash may not segregate their demands into "three

watertight compartments" since one may serve as a contingent reserve for another (1936, p. 195).

The transactions motive, consisting of "income" and "business" transactions balances, and the precautionary motive are affected by the "cheapness and reliability of methods of obtaining cash" and the "relative cost of holding cash,"--the opportunity cost of holding cash. But except in the case of "large changes in the cost of holding cash," it is a "minor factor" in the demand for money for these motives. The largest effect on these components of demand for money is a result of the "general activity of the economic system and of the level of money income" (1936, p. 196). Therefore as the level of income increases, the demand for money increases.

The speculative motive has at its basis "the object of securing profit from knowing better than the market what the future will bring forth" (1936, p. 170). The only reason for holding speculative cash balances is for the purpose of increasing returns by purchasing an asset later than immediately, especially if a person "believes that future rates of interest will be above the rates assumed by the market" (1936, p. 170). This is a valid reason for keeping cash, and the "necessary condition is the existence of uncertainty as to the future rate of interest" (1936, p. 168). Otherwise, with a positive rate of interest, "it must always be more advantageous to purchase a debt rather than to hold cash as a store of wealth" (1936, p. 169).

This speculative demand for money is highly sensitive to the rate of interest.

> As a rule, . . . the schedule of liquidity preference relating the quantity of money to the rate of interest is given by a smooth

curve which shows the rate of interest falling as the quantity of money is increased (1936, p. 171).

Since, "experience indicates that the aggregate demand for money to satisfy the speculative-motive usually shows a continuous response to gradual changes in the rate of interest as given by the prices of bonds and debts of various maturities" (1936, p. 197), the speculative motive is the component of the demand for money which is "particularly important in transmitting a change in the quantity of money" (1936, p. 196).

Therefore, if the rate of interest falls, the demand for money due to the speculative motive would be increased. The change in "r" determines the change in M_2, given that expectations of the future are constant (1936, pp. 199-200). The speculative pool is a residual whose size is dependent upon "the degree of its [the current rate of interest] divergence from what is considered a fairly safe level of r" (1936, p. 201).

The demand for money is also a function of the price level (or the wage-unit as Keynes describes it), indicating that demand is for real rather than nominal balances. If the price level is raised through the rise in the "wage-unit," the demand for nominal balances increases (1936, pp. 173, 249). Keynes' assumption early in The General Theory of a constant wage-unit when he described liquidity preference did not require him to specify this component of demand, but it is brought out in later discussions.

The demand for money as an asset depends on the prices of other assets which could serve as substitute stores of wealth. Not only does

it depend on their current prices, but it is also sensitive to the expectation of price changes in the future. The demand for money, or the liquidity preference schedule, may shift due to changed expectations concerning the future policy of the central bank (1936, pp. 202-203). If this were the case, the rate of interest at which persons would be content to hold a certain level of speculative balances could change "without any market transactions being necessary" (1936, p. 198). Expectations of changes in the value of money in the future reduce the liquidity premium of money and therefore the demand for money (1936, pp. 231, 238, 241), since "money itself rapidly loses the attribute of 'liquidity' if its future supply is expected to undergo sharp changes" (1936, footnote, p. 241).

The equilibrium rate of interest on money is determined by the supply of money and liquidity preference (1936, p. 167). If any of the determinants of the demand for money change, it will change the equilibrium rate of interest without the necessity of the supply of money having to be altered.

Keynes' demand for money is actually the same demand as for other assets, since money is a part of the portfolio. However, since money also facilitates transactions, variables affecting this component of demand must be included. Therefore, Keynes' demand for money function is $M^d = M^d(Y, r, P, P^*, r^*)$, where Y = the level of nominal income (+), r = the complex of interest rates on debts and other assets (-), P = the level of prices (+), P* = the expected future general price level (the value of money) (-) (1936, pp. 142, 237), and r* = the expected future rate of interest (+) (1936, pp. 142, 198).

The shape of the demand function is a declining function of the rate of interest given the levels of the other variables. However, at rates considered "unsafe" (1936, p. 203) or at rates so low that they cannot cover the costs associated with risk (1936, p. 202), or the expenses of lending (1936, p. 208), liquidity preference may become absolute--demand will be infinite, "M_2 may tend to increase almost without limit in response to a reduction of r below a certain figure" (1936, p. 203).

Since the rate of interest is "psychological" and "conventional," this minimum rate may not "be rooted in secure knowledge," so that it "will not be always unduly resistant to a modest measure of persistence and consistency of purpose by the monetary authority" (1936, p. 204).

The speculative demand for money is the cornerstone of Keynes' transmission process for money. Through this demand, wealth owners allow for changes in their portfolios. The speculative balance is the "fund" which finances trading. It grows as the rate of interest falls and shrinks as it rises, thus allowing changes in yields to spur asset trading and to finance higher output levels. If persons held no speculative balances, purchases of assets would be possible only at the expense of other expenditures, and yield differences would be immediately erased as assets were traded for other assets allowing no changes in output. There would be no possiblility of lowering the rate of interest for any length of time and therefore no stimulus to investment expenditure.

D. Long Run Equilibrium

Recall that Friedman characterizes Keynes' basic challenge to the quantity theory as being summarized in three propositions, one of which is that a long-run full employment equilibrium need not exist even if all prices are flexible. Further, in Friedman's view, this proposition depends on absolute liquidity preference. In this section we examine the long-run implications of Keynes' model in the light of Friedman's criticism.

The long run position of the economy that Keynes describes as "equilibrium" is one in which there is no automatic tendency to change. Keynes says that there may be a "cyclical movement around this equilibrium position," when the marginal efficiency of capital rises and falls above zero (1936, p. 218), but the economy tends to return to this state of affairs, thus giving it the status of "equilibrium." Unlike Friedman's long run position in which all anticipations are realized, Keynes sees a possibility of the existence of unemployment in the long run, as an equilibrium state (1936, pp. 242-243). If there were unemployment, quantities demanded and supplied would not be equated: there would be excess supply of labor and an excess (potential) supply of goods. Workers would not be on their notional demand curves. As Keynes criticized the classical school, if one is able to assume that conditions always exist which "force" the return to full employment in the long run, theory may only describe the laws that "govern the application and rewards of the commmunity's productive resources," so that the "volume of output depends solely on the assumed constant level of employment in conjunction with the current equipment and technique" (1936, pp. 243-244).

> . . . even in the long period the volume of employment is not necessarily full but is capable of varying, and . . . to every banking policy there corresponds a different level of long-period level of employment; so that there are a number of positions of long-period equilibrium corresponding to different conceivable interest policies on the part of the monetary authority (1936, p. 191).

Keynes identified three possible long run equilibrium positions: 1) that in which the level of capital (and rate of investment) is constrained by an equilibrium interest rate too high for full employment, and one in which the level of wages and prices do not fall to lower this rate sufficiently for full employment; 2) that in which due to perfectly flexible wages and prices there is full employment and the rate of interest is equal to the real yield on capital; and 3) that in which liquidity preference has become absolute at some level of interest so that even if wages and prices are flexible and do raise the real quantity of money, the rate of interest low enough for full employment cannot be achieved. The first case is the normal one; the second two are extreme.

Even though Keynes identifies cases 2) and 3) as "limiting" and "extreme" (1936, pp. 207, 191), Friedman bases his criticism on the third one while not recognizing that 1) and 2) also exist, so it is necessary to examine all cases of long run equilibrium in Keynes' theory to judge whether Friedman has been faithful to The General Theory.

Long Run Unemployment Equilibrium

The yield on money though is not self-adjusting for several reasons: "money" is not produced in response to its price rising as other assets are; no ready substitute exists for the "exchange value" of

money; when money is produced, its liquidity premium does not fall nearly so rapidly as the return on other assets falls (1936, pp. 229, 233); even though the real quantity of money may be increased by perfectly flexible wages, this process has such a harmful effect on stability and expectations, it should not be counted on to restore full employment (1936, p. 269).

> Thus with other commodities left to themselves, "natural forces," i.e. the ordinary forces of the market, would tend to bring their rate of interest down until the emergence of full employment . . . Thus in the absence of money . . . the rate of interest would only reach equilibrium when there is full employment (1936, p. 235).

This unemployment "equilibrium" is the result of a long term interest rate on money that does not respond to changes in conditions of aggregate demand. Rather than the interest rate adjusting in the long run, it is output and employment that do. Keynes says, the position of equilibrium, under conditions of <u>laissez faire</u>, will be one in which employment is low enough and the standard of life sufficiently miserable enough to bring savings to zero" (1936, p. 217). The stock of capital must be constrained to that level where the marginal efficiency of capital is equal to the rate of interest on money. Once this level is reached, new investment expenditure would become zero, hence savings must also equal zero.

In the long run, other economists see no difficulty in the flexibility of prices and wages causing a return to full employment due to the increase in the real quantity of money which will reduce the rate of interest. Keynes agreed with this proposition in principle: the fall in the wage level could restore real balances thereby reducing the rate of interest. In fact, if wages were perfectly flexible so that they

changed immediately with every change in aggregate demand, full employment may be a more frequent long term position.

> . . . though in the extreme case where money-wages were assumed to fall without limit in face of involuntary unemployment . . . there will . . . be only two possible long-period positions--full employment and the level of employment corresponding to the rate of interest at which liquidity preference becomes absolute (1936, p. 191).

Even a fixed quantity of money could not prevent the rate of interest from falling and from increasing the level of output. Therefore if wages and prices were "perfectly" flexible, the quantity of money would be "nugatory" in the long run (1936, p. 191). Keynes, however, does not limit his long period analysis to one characterized by perfectly flexible wages and prices, but considers the case in which there is no tendency for prices to fall without limit, but to settle in at a level which assures some measure of satisfaction with the status quo.

In fact, an economy in which wages and prices were perfectly flexible would be an "extreme case" in which no stability of values would be possible and in which fluctuations in output would be so great as to make futile all expectations and planning (1936, p. 269). If the long period equilibrium were at full employment, it would be marred by an instability of values as the interim periods were characterized by great swings in prices (1936, p. 253).

As it is, the rate of interest is not responsive to excess supply of labor, that is, wages and prices are not sufficiently "flexible," so

> . . . it may fluctuate for decades about a level which is chronically too high for full employment;--particularly if it is the prevailing opinion that the rate of interest is self-adjusting . (1936, p. 204).

This situation of long run equilibrium, like Friedman's, occurs without interference by a monetary authority or central bank. While in Friedman's model there is no need for this interference, in Keynes' description of long run equilibrium, there is no automatic return to full employment. There is a monetary constraint, and wages and prices do not move to bring adjustment. Even though this "mean position" is "established by laws of necessity" and is descriptive of the present and past states, "it is not a principle which cannot be changed" (1936, p. 254).

Absolute Liquidity Preference

As discussed earlier, Keynes saw a minimum interest rate acceptable to wealth holders, for both psychological and practical reasons, below which liquidity preference would be absolute. This would be another possible long run position.

In this case, output below the full-employment level could not be increased by any method which depended on lowering the rate of interest. If the propensity to consume were "given," no possible increases in output would be possible, even if we rely on falling wages and prices to reduce the demand for money. Wages would have to fall to "zero," but even this would be futile since the rate of interest is the critical variable, "given" the propensity to consume (1936, p. 191). Similarly, if the central bank attempted to lower the rate of interest by increasing the money supply, the same situation would occur. No lowering of the rate of interest, and no raising of effective demand would be possible through this means. In this case, purely monetary measures are indeed ineffective in stimulating output (1936, p. 233).

As a position of long run equilibrium, however, Keynes considered the liquidity trap unlikely. Although Keynes perceived that it might be "important in the future" (1936, p. 207), he saw no examples of it hitherto; he did recognize that it could have existed in the past, [1] unknown to observers, since central banks have been unwilling to "deal boldly in debts of long term." If they had been willing, there would have been a test of absolute liquidity preference. Banks could have purchased long term debt at constant prices, and there would have been an unlimited supply of such debt. Not only that, but the public authority would have found that they could have borrowed "on an unlimited scale at a nominal rate of interest" (1936, p. 207).

The minimum rate of interest acceptable to wealth holders must exceed: "(1) the cost of bringing borrowers and lenders together, (2) income and sur-taxes and (3) the allowance which the lender requires to cover his risk and uncertainty If the remaining net yield is "infinitesimal," then "time-honoured methods may prove unavailing" (1936, p. 309). However, Keynes sees this as a possible limit to monetary management in the long run.

Keynes was describing a situation that could occur in "highly abnormal" circumstances (1936, p. 207). Long run unemployment is normal and must be caused by "normal" interactions, including the failure of prices to adjust even in the long run.

Full Employment under Perfectly Flexible Wages and Prices

If prices and wages responded "perfectly" to every change in aggregate demand and if no liquidity trap existed, then the real

[1] Later in the discussion, however, Keynes acknowledges a "flattening out" of liquidity preference in the U. S. during the Great Depression.

quantity of money would be that which would restore the interest rate to the full employment level. Keynes said that the classical school "assumed" certain "natural forces which caused the market rate to satisfy one or the other of the above conditions" (1936, pp. 243-244).

The quantity of money could be changed by falling wages and prices which would restore the level of real balances necessary to maintain that rate of interest necessary for full employment.

> If money-wages were to fall without limit whenever there was a tendency for less than full employment . . . . there would be no resting-place below full employment until either the rate of interest was incapable of falling further or wages were zero" (1936, pp. 303-304).

> But if the quantity of money is virtually fixed, it is evident that its quantity in terms of wage-units can be indefinitely increased by a sufficient reduction in money-wages; and that its quantity in proportion to incomes generally can be largely increased . . . . We can, therefore, theoretically produce precisely the same effects on the rate of interest by reducing wages, that we can produce by increasing the quantity of money whilst leaving the level of wages unchanged (1936, p. 266).

> . . . the Classical Theory has been accustomed to rest the supposedly self-adjusting character of the economic system on the fluidity of money-wages; . . . A reduction in money-wages is quite capable in certain circumstances of affording a stimulus to output, as the classical theory supposes (1936, p. 257).

Though this case is an "extreme" (1936, p. 191), nevertheless it is possible, and Keynes did recognize it as one long run outcome. He prefers though not to concentrate on those remote possibilities but to recognize the real world facts which mitigate pure theory, and temper the outcome. The fact is that money wages do not fall without limit whenever there is a change in demand, but they tend to fall less than the decrease in demand due to worker resistance (1936, p. 303). So, the characterization of this case as extreme is "well founded in facts" (1936, p. 303).

Nevertheless, if we confine our attention to Friedman's precise criticism of Keynes' long-run analysis (that absolute liquidity preference is essential for the failure of long-run full employment equilibrium to exist even if all prices are flexible), we must conclude that Friedman is correct. But, we conclude here that the analysis of a long-run equilibrium in which all prices are flexible is not an issue that was part of Keynes' "basic challenge" to the reigning theory. Rather, as noted above, Keynes considered flexible prices to be an "extreme" case, and he considered the long-run analysis to be tangential to his main concern:

> Now "in the long run" this [quantity theory of money] is probably true. . . . . But this long run is a misleading guide to current affairs. In the long run we are all dead. Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again (1924, p. 88).

Thus we turn to Keynes' theory of short-run fluctuations of economic activity and in particular to the role of money in such short-run analysis.

E. Keynes' Short Run Analysis

Price Behavior

The price level of output is a function of costs and of the scale of output in Keynes' short run analysis (1936, p. 294). Prices change as one or the other of these determinants change. There is no direct "jump" from increases in the supply of money to increases in the price level bypassing the effects of output changes. Indeed, it is this argument that Keynes makes throughout The General Theory. It is only through either a change in marginal costs (measured in money) due to a

change in the real level of output or a "pure" price rise due to a change in the wage-unit that prices can change. Thus, Keynes apparently has a model in which prices rise only as a result of a higher output level. Prices then are "sticky" in the sense that there exist forces which inhibit a prompt response of output prices to a change in demand.[2] Keynes' approach with respect to price behavior differs from that of Friedman, who regards output prices as responding promptly to a change in demand. This implies that in Keynes' approach employers and workers are willing to supply more output in the event of an increase in demand, even in the absence of a price signal.

Keynes contends that output prices will tend to rise as output rises for the following reasons:

1. "Since resources are not homogeneous, there will be diminishing, and not constant, returns as employment gradually increases" (1936, p. 296). That is, the marginal product of labor will diminish and, if the real wage equals marginal product, it will be necessary for the real wage to fall. Output prices must rise to accomplish the real wage decline.

2. "Since resources are not interchangeable, some commodities will reach a condition of inelastic supply whilst there are still unemployed resources available for the production of other commodities" (1936, p. 296). In this situation, the economy will encounter

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[2] Keynes complains that it is a "great fault" of the quantity theorists that they do not distinguish between a rise in prices due to the rise in the wage-unit (caused by "bottlenecks") from a rise in prices due to an increase in output (caused by increasing marginal cost) (1936, p. 209).

"bottlenecks" at high levels of output even though there is not yet "full" employment.

3. "The wage-unit will tend to rise before full employment is reached" (1936, p. 296). Workers are more successful at getting wage increases during expansions, and so the nominal wage rate will rise.

In a later article (1939), Keynes eliminated the first reason for rising prices. In that article, he concluded that the real wage was best regarded as constant during short-run fluctuations of output. Thus there is no necessity for a real wage reduction during expansion to be achieved by a rise in prices. However, the other two causes of rising prices remain.

Thus as output rises, prices also rise. As more and more "bottlenecks" are encountered because of the nature of an interdependent economy, price rises account for a larger share of the increase in effective demand (1936, p. 301). The limit is a situation of true inflation at full employment in which the simple quantity theory of money becomes operational (1936, p. 303). Changes in the price level depend on whether a change in effective demand operates more on increasing employment or in increasing the "wage-unit."

There is an "extreme complexity" in the relationship between the quantity of money and the price level.[3] If velocity is constant, then effective demand will change in exact proportion to the change in the quantity of money. If prices change in full proportion to changes in

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[3] In the long run, ". . . stability or instability of prices will depend on the strength of the upward trend of the wage-unit . . . compared with the rate of increase in the efficiency of the productive system" (1936, p. 309).

effective demand, then output and employment are constant. These are the assumptions of the quantity theorists which Keynes seeks to deny (1936, pp. 208-209).

The response of effective demand to changes in the quantity of money (e_d) is a function of liquidity preference and the variables specified in the demand for money. The response of money wages to changes in effective demand is e_w, and the response of employment and output to changes in effective demand are e_e and e_o. The latter two are determined by the physical elasticity of supply.

An approximation to the way in which money affects prices (denoted by e) is as follows:

$$e = e_d(1 - e_e e_o + e_e e_o e_w).$$

If $e_e e_o = 1$, there are constant output returns to increases in employment; if $e_w = 1$, money wages change in full proportion to changes in effective demand (1936, pp. 304-305). Keynes points out that this is only a demonstration of the complexity involved in trying to pinpoint the determination of prices, since several elasticities are involved. But, it can be seen that the price level at any given time depends on the degree of capacity utilization, the demand for money, and the readiness with which money wages change in accordance with the change in effective demand. [4]

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[4] The long run price level may be proportional to the quantity of money if liquidity preference has stayed fairly constant. This, however, is more an historical than a theoretical question (1936, p. 306). The trend has been upward, but that is easy to understand since ". when money is relatively abundant, the wage-unit rises; and when money is relatively scarce, some means is found to increase the effective quantity of money" (1936, p. 307).

Historically, the stability of liquidity preference and increases in productivity have provided a "fair measure of stability of prices" (1936, p. 308). In the long run, nominal income (Keynes' price level) is a function of liquidity preference and the quantity of money.

The Transmission Process

Open market operations involve the purchase or sale of short term government securities in the open market by the central bank. If securities are purchased, the result of this process will be that prices of short term government securities are bid up, and the yields on these securities, being the fixed coupon rate divided by the price, fall. There is a fall in the yield on short term securities and an increase in money balances which wealth holders have voluntarily have received in exchange for the securities, due to the higher prices.

Keynes' analysis, as documented above, involves a broad range of assets in portfolio decisions. Therefore, his analysis implies that wealth holders will now try to convert these new money balances into higher yielding assets, including consumer durables, since yield is what they desire. The question may arise as to why money is not kept as an asset. Money in this and all cases is primarily a medium of exchange, since the services that money provides come in the form of liquidity services (1936, p. 231). When the quantity of money increases, the yield per unit of money falls somewhat (but not as much as for other assets, 1936, pp. 229, 233), so that wealth owners desire to trade it for more profitable investments. At the same time the open market operation has caused the yield on government securities to fall (because of its price increase) so that yields on other assets are greater (1936, pp. 200-201).

Part of the increased money will be stored as M_2 (speculative) balances due to the lowered rates of interest yielded by assets which are alternatives to holding money. Money's yield has also been lowered,

and at the completion of the entire process, all yields on assets will stand in the same relation to each other as before. Spending on investment in new capital goods has been increased due to the relative price differential seen by wealth holders. The opportunity cost of new investment is lower in terms of alternatives and in terms of borrowing funds to accomplish it. The prevailing rate of interest has been lowered since the prices of debts have risen. Though Keynes uses the term "interest rate" in different contexts, he defines it in his "general discussions" as "the complex of various rates of interest current for different periods of time, i. e., for debts of different maturities" (1936, footnote, p. 167).

The other way for new money to be introduced into the economy is through direct government expenditures. In this case, nominal income would increase directly as a consequence of the increase in money, since the new money "accrues as someone's income" (1936, p. 200). As recipients of the new money spend it, they will choose to consume part and save part so that

> some portion of the money will seek an outlet in buying securities or other assets until r has fallen so as to bring about an increase in the magnitude of M_2 and at the same time to stimulate a rise in Y to such an extent that the new money is absorbed in M_1 and M_2 (1936, p. 200).

Given the level of government spending and of taxes, the change in M is the change in spending in the first round of the monetary action, and these recipients will allocate some of spending for consumption and some for "saving." The part that is saved causes the prices of securities and other existing assets to be driven up, since the quantity of these are fixed. The lowered yield on assets and securities causes

interest rates in general to be lower than if government bonds had been issued and investment to be stimulated as above. Equilibrium is restored when all yields are in equilibrium and real yields are equalized.

> Thus incomes and such prices [of alternative stores of wealth] necessarily change until the aggregate of the amounts of money which individuals choose to hold at the new level of incomes and prices thus brought about has come to equality with the amount of money created by the banking system (1936, pp. 84-85).

The desire to spend on assets comes in this case from the psychological desire to save, so that some portion of income will be devoted to spending on assets whose prices are driven up. If this were not the case the effects of money would not operate through relative prices. In the first case, the desire was that of persons already holding wealth to maximize returns on their savings.

A Model of Market Transmission

Keynes' channel by which open market operations affect spending and real variables provides for transmission of effects from one market to another. It is clear that Keynes separates markets according to special characteristics. For example, he speaks of prices of existing assets and the supply-price of newly produced assets (1936, pp. 142, 235, 248), and since he distinguishes between the prices of these categories of goods they must be separate. These markets are separate yet related in that the interest rate established in one market is an argument in the demand function for the other market. The market for consumer goods (non-durables and services) is yet another market. Producers and demanders of durable goods face a different set of

decisions than the participants in the consumer goods markets. As Keynes outlines these differences, it is clear that his model separates these markets.

Assumptions that are made in developing Keynes' model are as follows: Individuals demand current consumption and future consumption. Future consumption is provided for by saving, and savers attempt to maximize yields on their assets.

The demand for a particular asset has the following arguments:

P_s = the price of substitute assets

y = real income

q = the physical yield (either production or consumer services) of the asset.

a = the appreciation premium

l = the liquidity premium

c = the carrying cost

k = the rate of investment

K = the stock of capital-assets

s = the scarcity premium; s = s(K)

The rate of investment is given by k = dK/dt. The scarcity premium is negatively related to K. We may take demand for the asset to depend on

$D^A = D^A(P_s, y, s(K), r_A)$ where $r_A = (a + q + l - c)$.

The process begins by an open market operation in which the monetary authority purchases bonds for cash.

Since the central bank does not engage in purchasing or selling real capital assets or private securities, the first round effects would be on the rates of return on government securities, as shown in figure 4.1, the effect on other assets coming later, as the sellers of bonds trade their excess money for other assets.

> One reason for supposing that there is a special connection arises from the fact that . . the banking system and the monetary authority are dealers in debts and not in assets or consumables. (p. 205)

The next step in the process is that wealth holders will recognize the existence of other profit opportunities--that is, there are other assets whose prices have not been affected. They will increase demand for these assets (D^A_0 to D^A_1) and attempt to purchase more of these assets and in doing so drive up their prices (see figure 4.2). These assets are "existing" assets, but since wealth owners care only

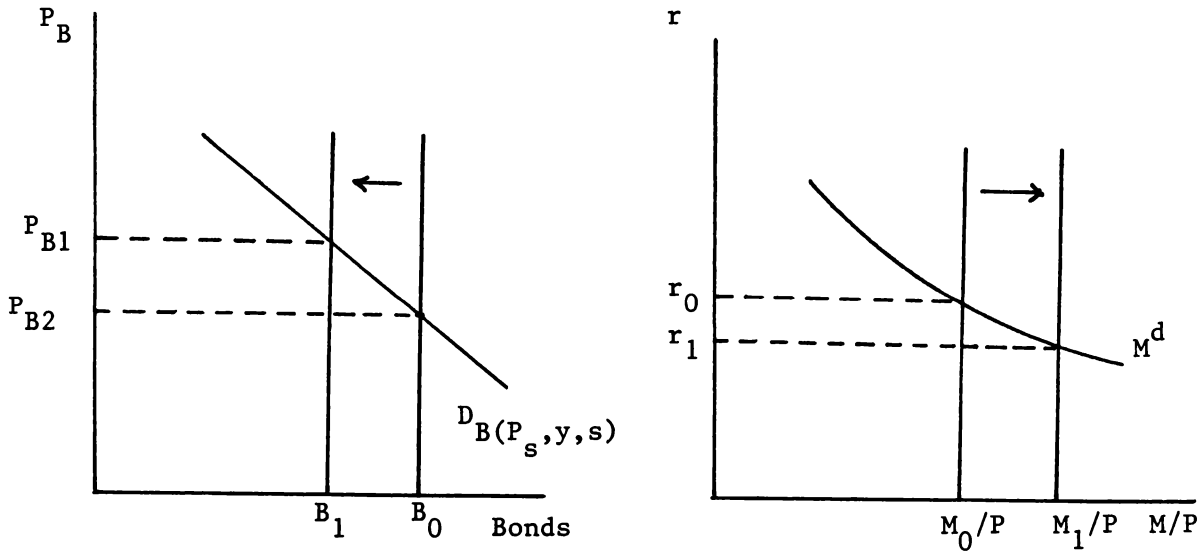

Figure 4.1. Keynes' markets for government bonds and money.

about the yield on the asset and not the form, this is irrelevant. When they drive up the prices of these assets from P^A_0 to P^A_1, they have driven down their yields simultaneously.

Once all other assets have higher prices and lowered yields, it becomes profitable to purchase (or order) new capital goods--either consumer durables or production capital. The prices of these goods are still a bargain to potential investors or wealth holders. So, the increase in the prices of existing assets raises the demand for newly produced assets. Up to this point, Keynes' analysis bears a strong resemblance to that of Friedman. However, at this point, the two approaches depart. For we shall now argue that under certain conditions (which Keynes considered to be quite common), the increase in demand for newly produced assets will cause the output of these assets to be increased but will do so without the necessity of an increase in their prices or in the nominal wage-rates of workers employed in their production.

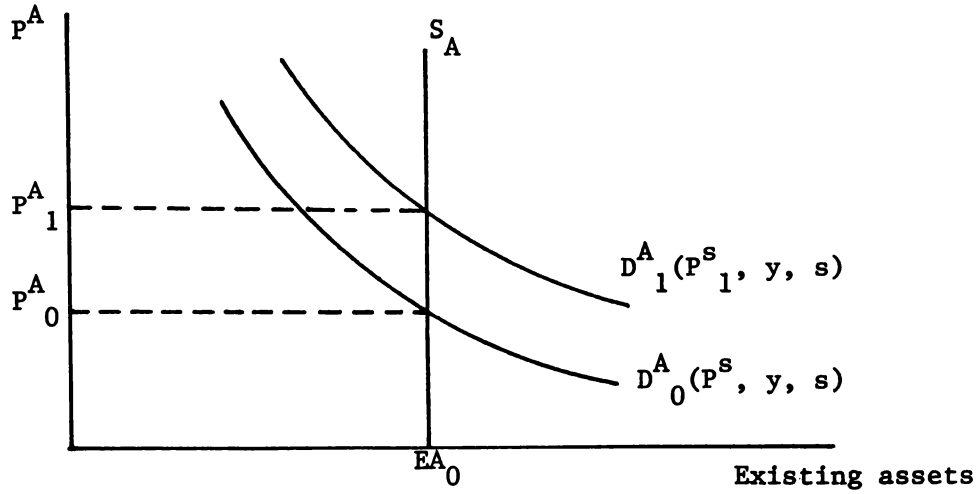

Figure 4.2. Keynes' market for existing assets.

Excess Supply

Keynes in The General Theory attempted to build a model of an economy characterized by excess supply of goods and labor. The existence of excess supply is due to deficient demand for goods, so that a gap will occur between a community's actual and potential production. In particular, producers set levels of production according to effective demand but not exceeding that level where the real wage falls below the marginal disutility of labor (1936, p. 26). Effective demand is determined by the amount expected to be spent on consumption at that level of employment plus the amount expected to be spent on investment purchases by the community (1936, pp. 25, 29). Therefore, given the propensity to consume, effective demand is a function of expected investment expenditure (1936, p. 27). Expected investment expenditure is determined by the expectation of the "yield" on the purchase of a new capital asset compared to its supply price. If this yield is greater than the highest rate of return from alternative uses, it will be undertaken (1936, p. 137). There is, then, an inverse relationship of these highest yields to the volume of investment, and since the level of output is determined by the level of investment when the propensity to consume is given, the long run level of output is determined by the schedule of "greatest yields" (1936, p. 136).

Employment is uniquely associated with the level of output at any time given the state of art of industry (1936, p. 246). The level of output is in equilibrium when employers have no incentive to change it in order to profit further from the aggregate demand proceeds being greater than the aggregate supply price (costs) (1936, pp. 25, 27).

Following the line of reasoning, then, employment is also a function of the schedule of "greatest yields."

To illustrate Keynes' idea of excess supply, we present a model of an economy consisting of households and firms. The households attempt to maximize utility, which is given by:

$U = U(N, c^{d'}, A/P + \Delta a)$, subject to

$+ w^*N + A/P = C^{d'} + \Delta a$, where $\partial U/\partial N < 0$, $\partial U/\partial C^{d'} > 0$, $\partial U/\partial(A/P + \Delta a) > 0$.

The firm attempts to maximize real profits which are given by

$\pi = y - w^*N^{d'}$, subject to $y = F(N)$, $F' > 0$, $F'' < 0$.

Where N = quantity of labor

$C^{d'}$ = effective demand for consumption goods and services.

A = nominal value of assets

P = price level

a = A/P, the real value of assets

π = the real value of profits

w = W/P, the real wage rate

$N^{d'}$ = effective demand for labor

N^s = notional supply of labor

N^d = notional demand for labor

$y^{d'} = c^{d'} + i$ = effective demand for output

y^d = notional demand for output

y^s = notional supply of output

y = real value of current output

In this model, N^s is the quantity of labor supplied by households if they are constrained only by the real wage and their time endowments. The actual level of employment, N, is determined by the level of output firms can sell so that

$$N^{d'} = N^{d'}(y) \text{ for } dF/dN \geq w.$$

That is, firms hire just that amount of labor necessary to produce the amount of output they can sell, y (figure 4.3). In turn, y is determined by the effective demand for goods $y^{d'}$, so that $y = y^{d'}$. Observe that, at $N = N^{d'} < N^s$, excess supply of labor exists; at w_1, $N < N^s$, or, as Keynes stated it, ". . . the existing real equivalent of these wages exceeds the marginal disutility of the existing employment . . ." (1936, p. 14). With respect to the behavior of firms, Keynes specified in The General Theory that $F'' < 0$ and that

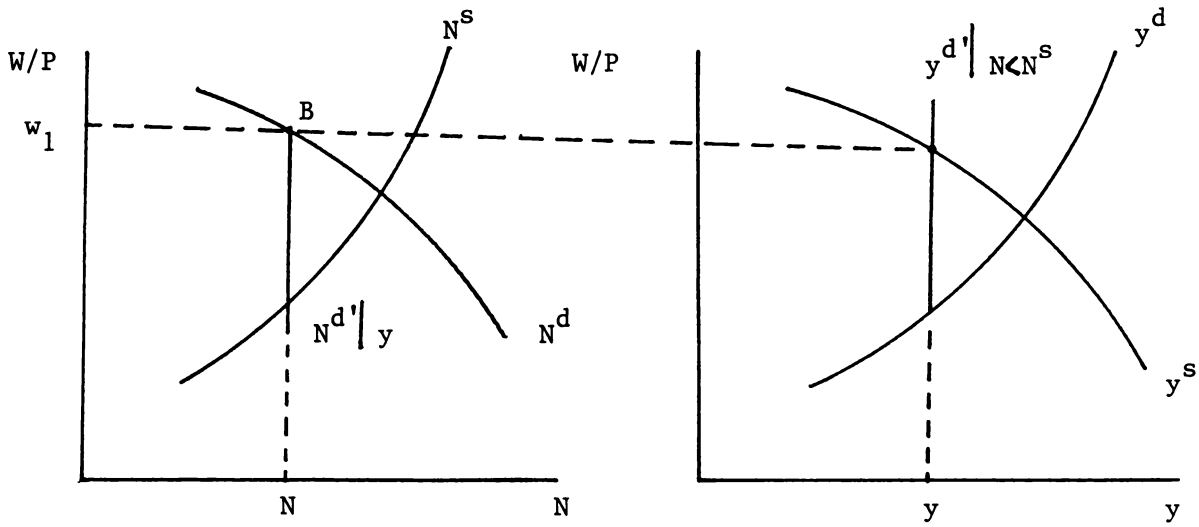

Figure 4.3. Keynes' labor and goods markets demonstrating excess supply caused by a dual constraint.

$w = \partial y/\partial N$, so that the notional demand for labor (N^d) and the notional supply of goods are negatively sloped.

Keynes attributes the above situation to deficient demand for both investment and consumption goods. Deficient demand in the investment goods market comes about because of the competition that existing assets provide for the purchase of newly produced capital goods. As long as there is an existing asset with a higher return, savers will choose that asset over newly produced assets.

Now assume that the central bank increases the quantity of money from M_1 to M_2 through open-market operations. This action, according to Keynes' transmission process, will increase the demand for existing assets (figure 4.4), shifting the demand curve for these assets from $D^A(M_1)$ to $D^A(M_2)$. The increase in the prices for existing assets allows new investment to be made, since it is only in this situation that savers will be willing to order a new capital good rather than purchase an existing asset.

> Now those assets of which the normal supply-price is less than the demand-price will be newly produced; and these will be those assets of which the marginal efficiency would be greater . . . than the rate of interest . . . (1936, p. 228).
> No further increase in the rate of investment is possible when the greatest amongst the own-rates of own-interest of all available assets is equal to the greatest amongst the marginal efficiencies of all assets . . . (1936, p. 236).

When the price of existing assets increases, the demand curve for newly-produced assets shifts from $D(P^A_1)$ to $D(P^A_2)$. Investment increases from k_1 to k_2, and the increase in output increases the effective demand for labor, shifting the $N^{d'}$ curve in figure 4.3.

Workers will be willing to supply more labor at the existing (or even a lower) real wage rate. Therefore, they do not require the

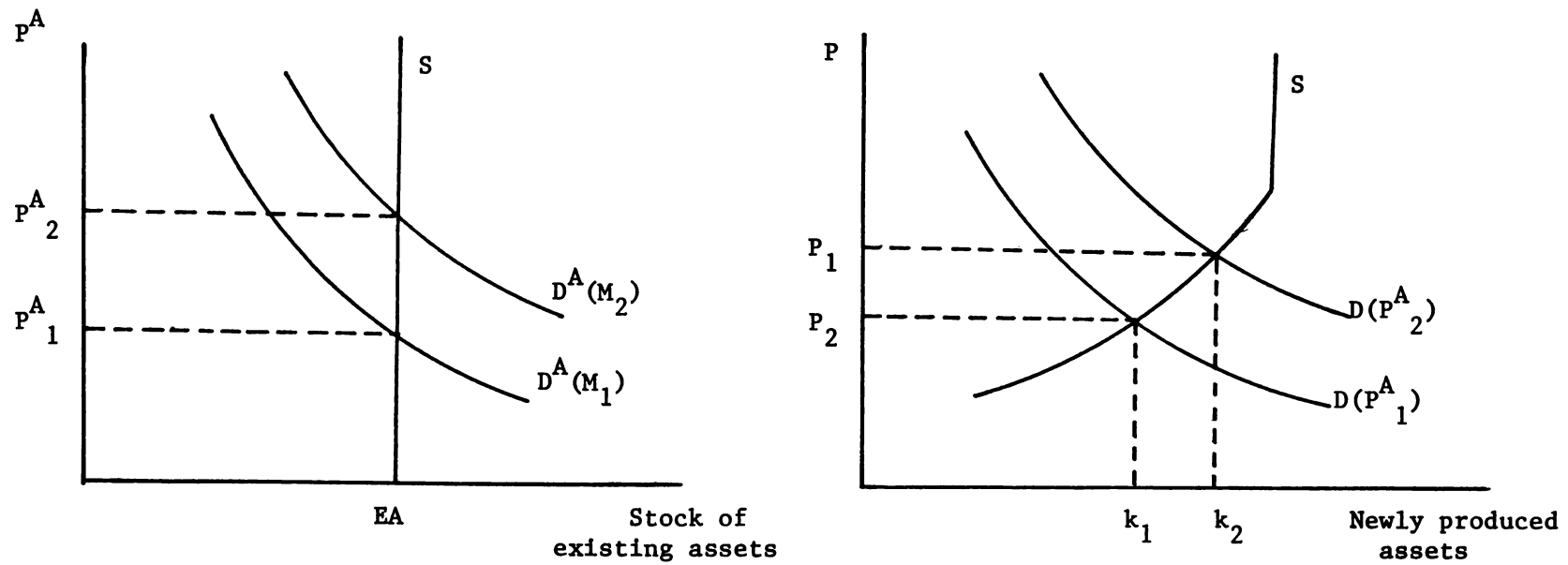

Figure 4.4. Effects of an increase in the quantity of money on the market for newly produced assets and existing assets.

inducement of a higher nominal wage rate, and there will be no pressure for W, the nominal wage rate, to rise. In The General Theory, Keynes contended that the marignal product of labor ($\partial y/\partial N$) would fall as output rose, that $w = \partial y/\partial N$, and that therefore the real wage would have to fall. Keynes apparently was arguing that the real wage would fall as a result of the increase in output (1936, p. 10). Workers would not resist

> . . . reductions of real wages, which are associated with increases in aggregate employment and leave relative money wages unchanged, unless the reduction proceeds so far as to threaten a reduction of the real wage below the marginal disutility of the existing volume of employment (1936, pp. 14-15).

Thus, whereas workers would resist ". . . reductions of money-wages, which are seldom if ever of an all-round character . . . " (1936, p. 14), they allow their real wage rate to fall as output prices tend to rise.

But a question emerges: If firms were located on their N^d and y^s curves (figures 4.3 and 4.4) prior to the increase in demand, how could firms be characterized as having excess supply? Keynes' evident desire to build excess supply in the market for output into his model was obscured by his incorporating the classical view of diminishing $\partial y/\partial N$ and the requirement that $w = \partial y/\partial N$ into the analysis. In a later article (1939), he altered this portion of his analysis to allow for a constant w during short-run fluctuations and a constant $\partial y/\partial N$ over a significant range of output fluctuations.

The effects of these alterations are shown in figures 4.5, 4.6, and 4.7. In figure 4.5, the monetary stimulus which raises P^A shifts the demand curve along a horizontal supply curve, so that there is no

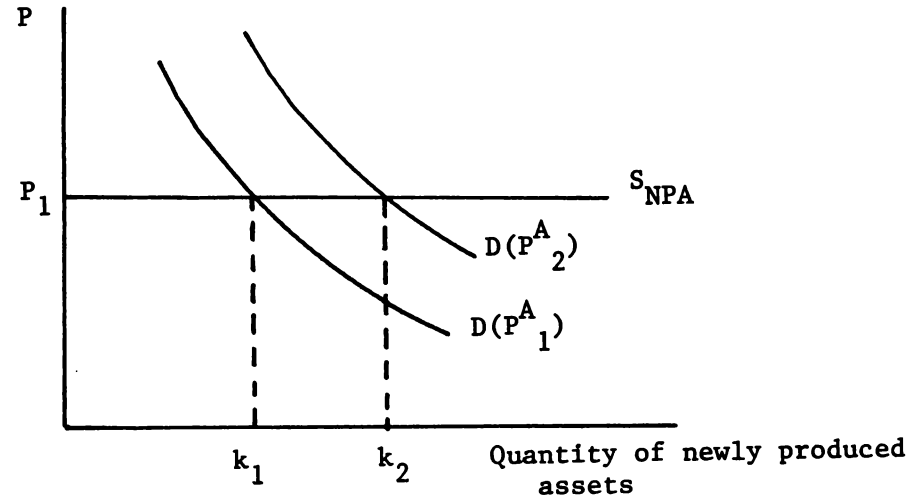

Figure 4.5. Effects of an increase in demand when there is excess supply in Keynes' market for new assets.

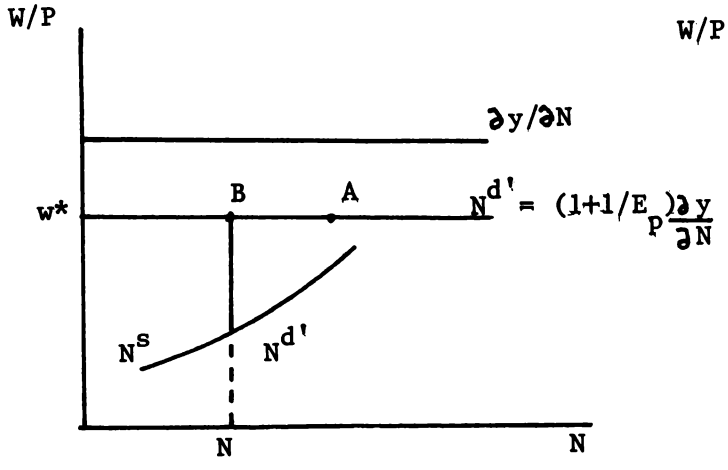

Figure 4.6. Excess supply in Keynes' labor market with constant MPL.

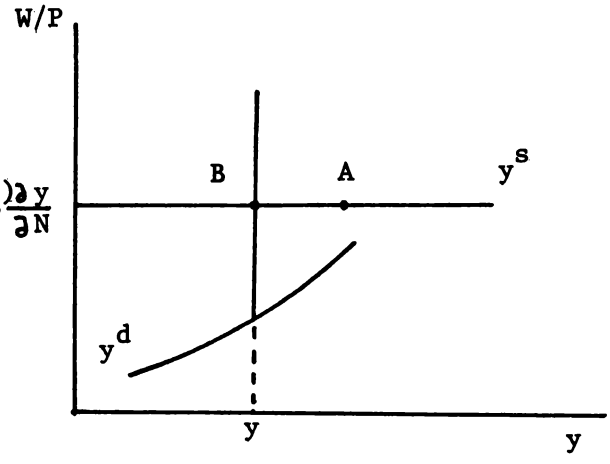

Figure 4.7. Excess supply in Keynes' goods market with constant marginal cost.

upward pressure on price. That is, so long as the producer of durable goods can purchase inputs (including labor services) at constant prices, his marginal cost curve will be horizontal. And, as noted above, workers will be willing to supply more labor at a constant nominal wage rate, W, due to excess supply in the labor market.

Figure 4.6 follows Keynes (1939, p. 46) by introducing imperfect competition into the model. In this case, for the individual firm, price will exceed marginal cost. If marginal cost is constant as above, the firm can increase output at a constant price. But even with a constant price, real profits will rise because of the difference between the price and the marginal cost. In terms of the demand for labor, the firm will hire additional labor so long as $w \leq (1 + 1/e_p)\partial y/\partial N$, where e_p is the price elasticity of demand for output. Thus excess supply of goods clearly exists at point B in figure 4.7. An increase in demand, which moves the firm to the output level of some point such as A, can be achieved without the inducement of a lower real wage rate.

As the economy approaches the level of fully employed resources, marginal cost is no longer constant.

> A point must surely come, long before plant and labour are fully employed, when less efficient plant and labour have to be brought into commission . . . (1939, p. 44).

But the statistical phenomenon of the stability of labor's share of the national product, and therefore a possible constant real wage over the business cycle, might be explained by the degree of imperfection of competition diminishing as output neared its capacity level in terms of labor and existing plant. Therefore, the notional demand for labor would approach the marginal product of labor as the economy became more

competitive due to a higher ratio of actual to capacity output (1939, p. 49). It just may be, theorizes Keynes, that the "change in the degree of the imperfection of the market is such as to offset the combined effect of changes in marginal costs and of changes in the prices of materials brought in from outside the system relatively to money wages" (1939, p. 49).

A way that this mechanism could operate to keep the real wage constant is that as output is increased from y_0 to y_1 and the effective demand for labor shifts from $N^{d'}_0$ to $N^{d'}_1$, the notional demand for labor curve would shift up to $(1 + 1/e^1_p)\partial y/\partial N$ in figure 4.8, as the price elasticity of demand has increased due to more competitive conditions. While output has risen from y_0 to y_1, the real wage has remained at w*. Another increase in output would shift the effective demand for labor to $N^{d'}_2$, and further raise e_p shifting the notional demand for labor to $(1 + 1/e^2_p)\partial y/\partial N$, until finally at y_f (full employment of resources) the effective demand for labor curve would cross the supply of labor curve where the notional demand for labor equals the supply of labor so that both workers and firms would have eliminated their excess supply. Only under purely competitive conditions would e_p be equal to infinity, so $(1 + 1/e_p)\partial y/\partial N = \partial y/\partial N$. It is not necessary for the level of full employment to dictate purely competitive conditions, although Keynes saw competition <u>improving</u> as the ratio of actual to capacity output rose and <u>declining</u> as the ratio fell. Keynes only stipulated that full employment would be a situation of diminishing marginal product of resources. At less than full employment, the resulting demand for labor

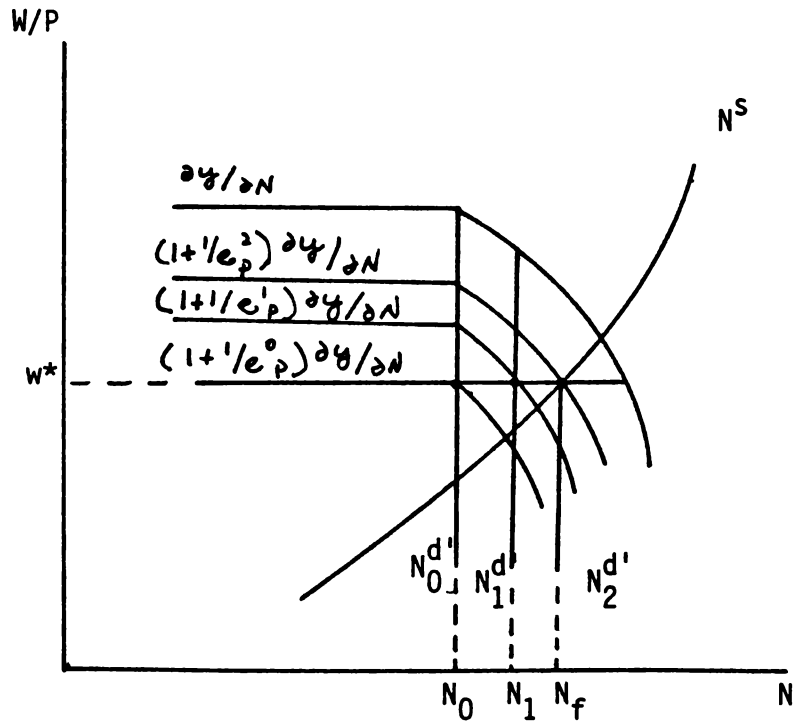

Figure 4.8 Keynes' goods market with imperfect competition improving as the economy nears capacity providing a constant real wage rate.

is perfectly elastic over the business cycle at w*. While diminishing returns are present, the demand for labor curve is a result of a combination of competitive conditions at high levels of output and of a constant marginal product of labor at low levels of output.

In this analysis, Keynes has retained his hypothesis that the real wage is always equal to the firm's demand for labor [either the marginal product of labor, when $e_p = \infty$, or $(1 + 1/e_p)\partial y/\partial N$] so that the worker may have an excess supply of labor. But, in The General Theory, the firm faces a declining marginal product of labor and there is pure competition, the firm will not be in a position of excess supply, bu would be maximizing profits. The later development of the 1939 paper of a constant real wage, allows for firms to be in a sub-optimal position also. In this last case, made explicit by the 1939 article, Keynes shows a situation of excess supply of goods, and the demand for labor is horizontal over some range. Firms would like to move to y_f, but are constrained by the level of effective demand. Since the necessity of a declining real wage has been dispensed with, "the good effect of an expansionist investment policy on employment . . . [can be] due to the stimulant which it [gives] to effective demand" (1939, p. 40), and "we can advance farther on the road towards full employment than . . . previously supposed without seriously affecting real hourly wages or the rate of profits per unit of output" (1939, p. 41).

Further Effects of the Transmission Process

At this point, there has been an increase in output and employment in the market for newly produced assets. During the expansion, the real

wage has remained constant, but labor income (w x N) has risen since $N_1 > N_0$. The increase in real income then produces further increases in real income through the multiplier effect, as workers increase their demand for consumption goods ($c^{d'}$) and additional assets (Δ a). The additional increase in effective demand raises firms' demand for labor, which, if the economy is still at less than full employment, results in yet another round of increased real income and increased effective demand. The extent of the increase in real income that comes from the primary increase in the production of new "assets" may be determined by the investment multiplier "k" (1936, pp. 114-116). "Thus their effort to consume a part of their increased incomes will stimulate output until the new level . . . of incomes provide a margin of saving sufficient to correspond to the increased investment" (1936, p. 117).

The market for consumption goods is stimulated by an increase in the level of output economy-wide.

> . . . increased employment for investment must necessarily stimulate the industries producing for consumption and thus lead to a total increase of employment which is a multiple of the primary employment required by the investment itself (1936, p. 118).

The multiplier works to increase income for all markets, since there was excess supply at the outset (1936, p. 248).

Full Employment in the Market for Investment Goods.

Assume again that the monetary authority purchases bonds in the open market and, in doing so, raises the market price of these bonds and drives down their yields. Recipients of the new money, who have voluntarily traded their bonds for cash, now look for more profitable

investments for their wealth since the yield on short term government bonds has fallen. The demand for other existing assets increases. Since the supply in this market is inelastic, prices of existing (traded) assets increase. Consequently, the demand for newly produced assets of all types increases, since they are now a "bargain" to the investor: their MEC has risen relative to the rate of interest.

But now assume full employment in the market for newly produced goods; producers will require a price increase in order to expand production of these goods. However, this price increase will be such as to discourage increased purchases of these newly produced assets. In fact, if there is no excess capacity, the supply curve for these newly produced assets will be vertical above full employment (see figure 4.4), causing price to rise the full extent of the increase in demand (1936, pp. 118-119). At this point, the price rise of the newly produced assets will reduce the MEC of those assets so that in relation to the rate of interest, the previous equilibrium position is restored. The rate of investment will not rise, thus causing no increase in output and no effect on the market for consumption goods through the MPC and the multiplier.

Behavior of Producers of Capital Goods

A further complication exists with respect to newly produced asset markets. The constraint on clearing in these markets depends not only on coordination with the labor market but also on the price level established for existing assets. This price level is a determinant of demand in the market for newly produced goods.

Prices in the newly produced goods markets rise only as as a result of output increases not in response to demand changes, even if there remains some unemployment in these industries:

> . . . the wage-unit itself will tend to rise as employment improves, and the increase in output will be accompanied by a rise of prices (in terms of the wage-unit) owing to increasing cost in the short period (1936, p. 249).
> Thus instead of constant prices in conditions of unemployment, and of prices rising in proportion to the quantity of money in full employment, we have in fact a condition of prices rising gradually as employment increases (1936, p. 296).
> This [rising prices] is not a process that will have only begun when full employment has been attained;--it will have been making steady progress all the time that expenditure was increasing (1936, p. 290).
> . . . supply price will increase as output from a given equipment is increased. Thus increasing output will be associated with rising prices. . . (1936, p. 300).

Therefore prices respond to an increase in the output of the good due to increases in the wage-unit, bottlenecks, and increasing short run costs. Producers of the goods do not need an "up front" price signal to increase production; they are willing to expand production at the market price.

Prices of existing assets have risen, but prices of newly produced goods rise only after output has begun to increase. Therefore, a consequence of the transmission process is that eventually there will be an increase in the price level. This increase is a consequence and not a precondition of the increase in output. Output increases take place without price increases. If price signals were required, then these investors would have had to recalculate the marginal efficiency of the asset at the new price before purchasing it. So, if the increase in demand for investment goods results in an increase in output at constant

prices due to the existence of excess supply, then what signals do producers see to increase production and employment?

Producers of capital goods sell their products to the investors in the model. They rely on their estimates of effective demand when deciding the scale of their operations, and in particular, they get signals from the behavior of investors, who are their customers.

> . . . in the case of durable goods, the producer's short-term expectations are based on the current long-term expectations of the investor . . . (1936, p. 51).
> Thus the behaviour of each individual firm in deciding its daily output will be determined by its short-term expectations as to the cost of output . . . and as to the sale-proceeds of this output; . . . in the case of additions to capital equipment . . . these short-term expectations will depend on the long-term expectations of other parties (1936, p. 47).
> [Keynes is agreeing with Mr. Hawtrey's point that] . . . input and employment are influenced by the accumulation of stocks before prices have fallen . . . . For the accumulation of unsold stocks (or decline in forward orders) is precisely the kind of event which is most likely to cause input to differ from what the mere statistics of the sale-proceeds would indicate . . . (1936, p. 51, footnote 1).
> . . . I prefer . . . to emphasize the total change of effective demand which reflects the increase or decrease of unsold stocks. . . . Moreover, in the case of fixed capital, the increase or decrease in unused capacity corresponds to the increase or decrease in unsold stocks in its effect on decisions to produce . . . (1936, p. 76).

Thus producers are induced to change output by a myriad of signals, and price need not be one of them. Since there is excess supply in this market for newly produced assets, producers would be willing to increase output at the going price if they perceived that the output could be sold. The increase in effective demand brought about by the rise in prices of existing assets causes purchasers to increase orders and producers to increase production without prices in this market having to change.

If wages fell "without limit" whenever there was unemployment, and if prices of newly-produced assets also fell, the market would clear. As long as there were workers willing to supply labor at a nominal wage low enough to make production possible, excess supply of labor would not develop in the market for newly produced assets. But, in reality,

> . . . a contraction of effective demand below the critical level [full employment] will reduce its amounts measured in cost units; whereas an expansion of effective demand beyond this level will not, in general, have the effect of increasing its amount in terms of cost units. This result follows from the assumption that the factors of production, and in particular workers, are disposed to resist a reduction in their money-rewards, and there is no corresponding motive to resist an increase (1936, p. 303).

The cost unit that Keynes has referred to is the weighted average of all costs entering into the production process. So, as above, if demand falls "measured in cost units," then demand has fallen more than costs, so that the producer would have to maintain prices for his output. The condition that Keynes calls "true inflation" is one in which any increase in effective demand results in an increase in the cost unit fully proportional to the increase in effective demand, thus allowing no margin for output increases.

The producer will cut his employment before he cuts his prices. This is especially true when we consider that the "amount of employment, both in each individual firm and industry and in the aggregate, depends on the amount of the proceeds which the entrepreneurs expect to receive from the corresponding output" (1936, p. 24). The entrepreneurs realize the gap between the supply price of their output and the expected proceeds from the expenditure of consumers or investors. Unless there is an expectation of increased expenditure on investment goods, neither

the producers of consumption goods nor the producers of investment goods will increase output (1936, p. 30). Since employers construct their labor demand according to the nature of supply and demand in other industries, and "as to the amount of effective demand" (1936, p. 259), then this area is out of their control.

When producers cut output, a necessary consequence is that the marginal disutility of labor falls below the real wage. Unfortunately, there is "as a rule, no means of securing a simultaneous and equal money-wage reduction in all industries," and "a movement by employers to revise money wage bargains downward will be much more strongly resisted . . ." (1936, p. 264).

> . . . the workers, though unconciously, are instinctively more reasonable economists than the classical school, inasmuch as they resist reductions of money-wages, which are seldom or never of an all-round character, even though the existing real equivalent of these wages exceeds the marginal disutility of the existing employment . . . (1936, p. 14).

Therefore, Keynes sees an assymetry. If the economy were at full employment and demand rises, only prices would be affected. But, if the economy is at full employment and demand falls, output and employment are affected, and money-wages and prices will tend to fall only after output and employment have declined. The reason lies in the inability of workers to "insist on being offered work on a scale involving a real wage which is not greater than the marginal disutility of that amount of employment" (1936, p. 291).

If this were not the case, the classical economists would have been correct in their assumption of continuous full employment at a wage equal to the marginal disutility of labor. Only if the real wage is greater than the marginal disutility of labor will it be possible to

increase employment by "increasing expenditure in terms of money" (1936, p. 284).

The producers of consumption goods realize that they would not profit by increasing output, since there would be some part of the resulting increased income that was saved, and not spent on consumption goods. "Hence employers would make a loss if the whole of increased employment were to be devoted to satisfying the increased demand for immediate consumption" (p. 27). Producers of goods watch not only their own markets but other markets for signals as to the most profitable course of action. Since these producers have expectations as to what total demand will be and realize that prices will not fall in areas they cannot control, they are not in a position to lower price to gain a greater share of the market. Lowering prices on their output would reduce their total revenues and cause them to suffer losses on each unit of output they produced. They have no choice but to reduce output.

If there is a decrease in the quantity of money causing a fall in spending, producers will not lower prices unless they could be assured that 1) lower prices on the goods they sell would induce their workers to lower their wages, and their suppliers to lower prices; 2) other firms would follow by lowering their prices so that there would be a general price decline; 3) this general price decline would lead to a lower interest rate through a reduction in the demand for money; and 4) the lower rate of interest would induce new investment purchases and fill in the gap between consumption expenditure and total output in monetary terms.

A Decrease in the Supply of Money

It may now be shown how a decline in the nominal money supply from a position of full employment results in a fall in output and employment at the same real wage rate, with money wages and prices remaining "sticky." A decrease in the supply of money caused by open-market sales of securities by the central bank will produce the following sequence of events: 1) it will lower the price and raise the yield of short term government securities; 2) it will raise yields on all alternative forms of wealth since an excess demand for money emerges causing wealth holders to sell assets which have low yields, driving down the prices of assets; 3) it will discourage investment in new assets due to the lower prices on existing assets and thus cause a reduction in effective demand in these durable goods industries; 4) the effects of reduced demand in the investment goods market will not result in a lowering of prices due to the reluctance of producers described above, and due to the resistance of workers to lower money wages, output and employment in these industries are affected primarily rather than prices; 5) lower output in these industries impacts real incomes and profits and through the multiplier lowers effective demand and thus income in the consumption goods market; 5) producers in the consumption goods market also will be reluctant to lower prices since prices of those goods and labor which figure into their production decisions have not fallen.

So, a fall in the quantity of money will have effects the reverse of those for an increase in the money supply. The price decline of existing assets is immediate (1936, p. 142); however, prices of newly produced assets and goods do not follow. These markets have an

additional constraint of the attachment of an employment market. If a constant marginal product of labor exists, and if prices fall in these markets, money wages would have to fall simultaneously.

In figure 4.9, if we start at point A where $y = y_f$ and assume a decline in the money supply as a result of an open market operation, demand in the market for newly produced goods is affected through the transmission process. The decrease in the money supply raises the interest rate on bonds as bond prices fall when the central bank sells a larger quantity on the open market. The return on other assets is lower than the return on these bonds and money, so wealth holders will sell other existing assets driving down their prices; therefore P_A falls. Since investors compare prices of newly produced assets with the prices of existing assets, the prices of new assets will now be higher than for any other and they will substitute existing assets for new ones causing a fall in the demand for new assets. Lowered demand for new assets causes y^d to fall to $y^{d'}$, and the corresponding demand for labor to fall to $N^{d'}$. Since there were diminishing returns at y_f and N_f (1939, p. 44), one might expect that a rise in the real wage would be necessary if Keynes' assumption that the real wage corresponded to the demand for labor. But, if Keynes' later assumption of imperfect competition at less than full employment is taken into account, it turns out that the rise in the productivity of labor is offset by the deterioration of competitive conditions in just that measure to produce a constant real wage rate.

In figure 4.9, when effective demand for output falls to $y^{d'}_1$ and the effective demand for labor falls to $N^{d'}_1$, the real wage

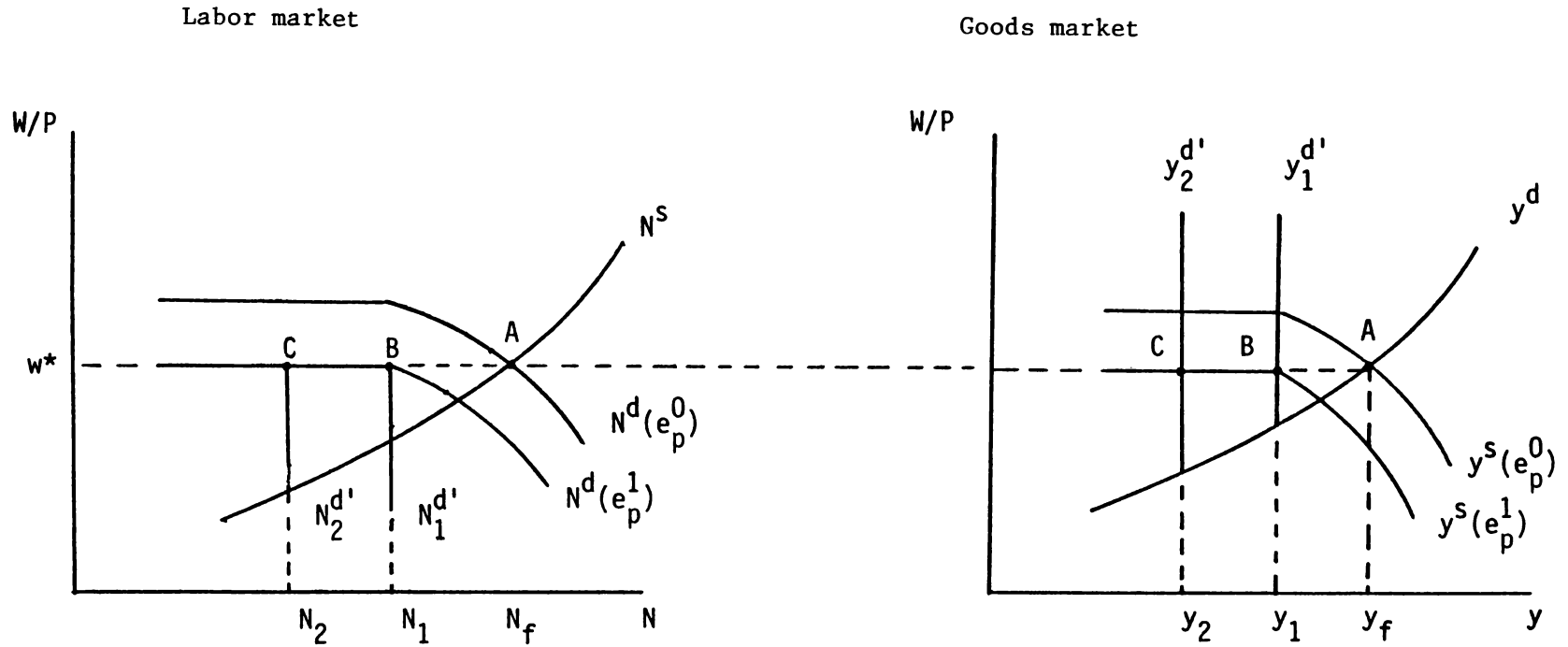

Figure 4.9. The effects of a decrease in the quantity of money in Keynes' model.

remains at w* because e_p falls just enough to offset the increase in $\partial y/\partial N$ caused by the decrease in output. Thus the decline in output to y_1 is matched by a shift downward and to the left of the notional supply of output from $y^s(e^0_p)$ to $y^s(e^1_p)$ reflecting the lower elasticity of demand caused by a lower level of competition, and the labor market moves from A to B.

Similarly, as the decline in effective demand for goods shifts the effective demand for labor to $N^{d'}$, employment declines from N_f to N_1. But the fall in e_p shifts the notional demand curve for labor downward to $N^d(e^1_p)$, and w remains at w* as the labor market moves from A to B. As demand declines further, $y^{d'}$ shifts to $y^{d'}_2$ along the horizontal segment of $y^s(e^1_p)$, and the output market moves from B to C. In the case of the labor market, the further decline int he effective demand for labor shifts the $N^{d'}$ curve along the horiontal segment of $N^d(e^1_p)$ from B to C. There is excess supply of goods since firms would prefer to be at A, where profits are maximized; there is excess supply of labor, since workers would if unconstrained supply more labor at w*, (N_f), giving labor a larger real income.

Limits to the Transmission Process

The transmission process will be self-limiting as a new equilibrium is reached between the marginal efficiency of capital and the rate of interest. ". . . the rate of investment will be pushed to the point . . . where the marginal efficiency of capital in general is equal to the market rate of interest" (1936, pp. 136-137). Consider again an increase in demand. As investment in newly produced assets

takes place, the marginal efficiency of capital in general falls. The scarcity premium will not rise as output increases since other assets will be produced whose output is in competition with the output from the asset. The scarcity premium will fall. Relative to other assets, the supply price of a newly produced asset will rise since the increase in output will raise prices in that industry. The actual physical output or "services" from the asset will not be affected by changes in its supply, but its "yield" which is the total of all the other yields will fall. However, increases in the price level from increases in output tend to offset this decline somewhat as investors revalue the stream of prospective yields against the supply price of the asset (1936, pp. 141-142).

The increase in the price level will reduce the impact of the initial increase in money by increasing demand for nominal balances, and ". . . the effect of this on liquidity preference will be to increase the quantity of money necessary to maintain a given rate of interest" (1936, p. 173).

Therefore, unless the rate of money growth continues, the interest rate will rise. Eventually the decline in the MEC and the rise of the interest rate will be such as to restore the purchase of new assets to the former level, since the advantage of the higher rate of investment will have vanished. Prices of assets and rates of return will again stand in such a relation to each other that there is no gain in trading further. This period of time "measured in years, is not very large" (1936, p. 251).

There can be two outcomes to this process. One is that full

employment (in investment goods market) is achieved before the rates of return come into equilibrium; then the rise in prices would accelerate the realignment of the rates of return. Another is that the rates of return come into equilibrium before full employment.

Prices of newly produced assets may not fully adjust to prices of existing assets, with the result that long term rates of interest may not fully adjust to changes in the short term rates. This non-adjustment is a result of the conditions that cause excess supply in the market for newly produced goods. As the rate of investment increases, the fall in the scarcity premium reduces the yield on all assets of that type and lowers demand for those assets. Prices on existing assets respond immediately, but prices on newly produced assets do not fall rapidly due to their labor market constraint. Therefore, a situation of excess supply will reestablish itself in the market for investment goods.

CHAPTER V

KEYNES' VIEWS ON MONETARY POLICY

Keynes' theory has been widely characterized as promoting fiscal measures over monetary measures, and of particular interest in this study is Friedman's position that Keynes did not favor monetary policy.

As documented in the introduction to this paper, Friedman has long held the view that Keynes considered monetary policy "ineffective in stemming a decline" (1982, p. 42). Not only is monetary policy ineffective, "money has no effect on anything"--neither prices nor output (1956, P. 17).

Friedman believes that Keynes was led astray from his earlier support of the quantity theory by the experience of the Great Depression. (1982, pp. 47, 621; 1967, p. 87) He wrongly interpreted this period to have demonstrated the impotence of monetary measures, whereas in Friedman's interpretation, having access to more sophisticated data, the Great Depression was lengthened and made more severe by an incorrect application of monetary policy.

Keynes carried his interpretation to the "extreme" and built a theory to fit the facts as he saw them (1982, p. 48). The resulting theory is "highly specific," applicable only to conditions of deep depression (1982, p. 464).

As a result of Keynes' convictions, he favored fiscal measures in combatting unemployment, since monetary policy was of no use (1967, p. 87). However, in the preceeding chapter it was made clear that Keynes did recognize the potency of changes in the money supply. While this

process has been recognized by interpreters of Keynes, it has been given second billing to the warnings and qualifications that Keynes did make concerning the limits to monetary policy. This paper will not argue that Keynes advocated a wholesale dependence on monetary policy to the exclusion of other measures or that he considered monetary policy the answer to unemployment. It will present evidence that Keynes did not consider monetary policy ineffective and that, under most normal circumstances, it is useful and potent.

This chapter will provide support and clarification that Keynes' views on monetary policy can be summarized as follows:

1. Monetary measures should be the first choice of policy makers, since monetary restrictions are capable alone of keeping the economy at a less than full employment level of output.

2. Keynes' theoretical framework implies that monetary policy is effective and he believed that in practice the magnitude of its effects was sufficiently large that it should be implemented in real world circumstances in such a manner as to promote confidence in the system and a stability in prices.

3. There may be extreme circumstances in which monetary measures do not result in increases in output. In these cases, monetary policy should not be abandoned but supplemented by other measures designed to restore confidence in and a balance to the economic system.

4. Monetary policy should precede and complement any other type of economic policy. A monetary policy that is effective will erase the need for other policies which may be more difficult to implement.

A. The Importance of Monetary Policy in The General Theory

One of Keynes' major criticisms of Marshall and other classical economists was that their theories took no account of the influence of money on real variables in the economy (1936, pp. 183-184, 189). He also criticized the false division of the study of economics into the Theory of Value and Distribution and the Theory of Money. Money, he argued, was an integral part of the determination of output as a whole, so that a better division would be the study of individual decision making when output was fixed, as one branch, and the determination of output and employment as a whole which requires "the complete theory of a Monetary Economy" (1936, p. 293).

Keynes isolated three variables in the economy through which any change in output must occur. If one of these variables is not changed, then there can be no change in output. These are the rate of interest, the marginal efficiency of capital and the propensity to consume (1936, p. 245). A necessary (but not sufficient[1]) condition for a change in output is a change in one of these variables.

> If, without any change in these factors, the entrepreneur were to increase employment as a whole, their proceeds will necessarily fall short of their supply-price (1936, p. 261).

Keynes advocates isolating those determinants which are responsible for output changes, and among those concentrating on the ones that a government is capable of affecting (1936, p. 247). The rate of interest is one of those variables important for changes in output and one over which the monetary authority has great influence.

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[1] The change is not sufficient unless all other variables remain the same; interactions among variables may cause a reduced effect. See pages 173 and 184 in Keynes, 1936.

This is the case since interest rates are determined by monetary factors and not real ones (given the level of real income) (1936, pp. 165, 174, 183-184, 213). The rate of interest can be influenced in the right direction and the failure to do so results in output that is below a full employment level.

> The rate of interest is not self-adjusting at a level best suited to the social advantage but constantly tends to rise too high, so that a wise Government is concerned to curb it . . . (p. 351).

Since the rate of interest on money is one form of yield that a wealth holder may earn, he always has the option of purchasing debts rather than purchasing a capital asset. Therefore the marginal efficiency of capital must be greater than the rate of interest the wealth holder could obtain by loaning his money.

> . . . there is always an alternative to the ownership of real capital-assets, namely the ownership of money and debts; so that the prospective yield with which the producers of new investment have to be content cannot fall below the standard set by the current rate of interest (1936, p. 212).
> . . . the rate of interest on money plays a peculiar part in setting a limit to the level of employment, since it sets a standard to which the marginal efficiency of a capital-asset must attain if it is to be newly-produced (1936, p. 222).

Since the marginal efficiency of assets falls as their stock increases,

> a point will come when it no longer pays to produce them, unless the rate of interest falls pari passu. When there is no asset of which the marginal efficiency reaches the rate of interest, the further production of capital assets comes to a standstill (1936, p. 228).

Keynes assumed a zero elasticity of production and substitution for money (1936, pp. 230-231). Money has no substitutes in transactions and cannot be "produced" to accomodate the desires of wealth holders. This unique combination of attributes serves to restrict the self-adjusting nature of the economy:

> The money-rate of interest holds back investment in the production of those other commodities without being capable of stimulating investment for the production of money . . . (1936, p. 235).

The classical economists supposed that a rise in the rate of interest due to an increase in the demand for capital assets would not affect the level of output. The rise in the rate of interest would call forth additional saving to restore full employment equilibrium (1936, p. 274). But, if saving is determined by the scale of investment, which is determined by the rate of interest, which in turn is a result of liquidity preference and the supply of money, then the interest rate on money cannot be determined by the real "yield" on capital and the supply of "wealth." Then

> a rise in the rate of interest will diminish investment; hence a rise in the rate of interest must have the effect of reducing incomes to the level at which saving is decreased in the same measure as investment (1936, pp. 110-111).

Therefore, a stimulus to output would depend on the "marginal efficiency of capital rising relatively to the rate of interest" (1936, p. 142). Investment, a critical component of aggregate demand, "is prompted by a low rate of interest . . . . Thus it is to our best advantage to reduce the rate of interest to that point relatively to the marginal efficiency of capital at which there is full employment" (1936, p. 375).

Keynes admonishes that

> The remedy for the boom is not a higher rate of interest but a lower rate of interest!" (1936, p. 322).
> The boom which is destined to end in a slump is caused . . . by the combination of a rate of interest . . . too high for full employment with a misguided state of expectation" (1936, p. 322).

Therefore,

> The only relief [from unemployment]--apart from changes in the

> marginal efficiency of capital--can come (so long as the propensity to consume is unchanged) from an increase in the quantity of money . . ." (1936, p. 234).
> Thus, apart altogether from progress and an increasing population, a gradually increasing stock of money has proved imperative (1936, p. 340, footnote).

In Keynes' model, the rate of interest important for investment and thus output is the rate of interest on money. However, this rate is highly "psychological" since it depends on the interaction between the supply of money and liquidity preference for the community (1936, p. 202). The only method by which the rate of interest can be altered is by changing this equilibrium rate by either changing the supply of money or by influencing liquidity preference. The psychological incentives to liquidity may be difficult to influence (1936, p. 309), so a more reliable method would be to change the supply of money.

As noted earlier in this paper, the rate of interest is affected by a change in the prices of assets relative to their returns. When the price of bonds rises, the effective interest rate falls. Monetary policy affects rates of interest by changing the price of the asset. So whether one considers monetary policy as operating through interest rates "directly" or through the prices of assets "indirectly," the results of monetary policy are the same. Interest rates can only change (as a result of monetary policy) through changes in changes in asset prices. In Keynes' model, it was shown that a change in the prevailing interest rate is necessary to restore equilibrium in the money market, and in that sense interest rates might be considered to have a more direct influence on the money market. But the decision to invest because the rate of interest has fallen is equivalent to the decision to invest because the prices of new assets are "relatively" lower than

existing ones. In both cases, the wealth holder must decide on a set of alternatives, and in both cases the opportunity cost of investing is precisely the return that could be had either by holding money, by purchasing an alternative store of wealth, by increasing consumption,or by not borrowing. Therefore no attention need be paid to whether monetary policy operates through interest rates or through asset prices if the range of assets is broad.

There are two methods by which the real supply of money may be increased. One method is the overt increase in nominal balances by the central banking authority which Keynes described in his transmission process. The other occurs as a result of falling wages and prices. In the second instance, the real money supply is increased so that real balances become sufficiently abundant in terms of the wage-unit "to restore a level of full employment" (1936, p. 253).

The second method depends upon the flexibility and responsiveness of prices and wages to changes in employment and output levels. This flexibility, while desirable isofar as it propels the system back to full employment, results in fluctuations of the price level which detract from a stability of values. Every change in aggregate demand would set up great movements in the price level which would find "no resting-place below full employment" except at that point where liquidity preference became absolute (1936, pp. 303-304).

Therefore, a much more beneficial policy would be a program of monetary management which would avoid great swings in the price level and would promote stability and confidence (1936, pp. 270-271). Stable prices are desirable since they remove many of the harmful effects that

expectations have on the level of output (1936, p. 88). Even though "analytically" they come to the same thing, Keynes advocated replacing the "laissez faire" monetary policy of flexbile wages with one that was intended to bring about the same results but avoiding the consequences of price instability (1936, p. 267-268).

B. Monetary Policy Implementation

Keynes denied the simple quantity theory of money on the grounds that it ignored the effect of interest rates on the demand for speculative balances (1936, p. 196). For, otherwise, he said, output could be "assumed" to always be at full employment levels and prices would always change in proportion to changes in the quantity of money. This denial of the simple quantity theory does not constitute a denial of monetary policy. Rather, it is a recognition that monetary policy operates on interest rates rather than on output prices in the short run, and that the major thrust of monetary policy is the effect it produces on interest rates (1936, p. 200-201).

Keynes' theory of how monetary policy affects the interest rate is described in Chapter IV. The effect of monetary policy on <u>prices</u> comes as a result of the change in output. As described in that chapter, if the economy were at full employment, the simple quantity theory would hold (1936, p. 209). Otherwise, a change in money balances <u>usually</u> has an effect on output through changes in the rate of interest.

Accomodative monetary policy prevents the rate of interest from rising too high. If the demand for real balances rises as output

increases and if money has no substitutes and cannot be produced, an otherwise dynamic and healthy economy would be constrained by insufficient real balances to maintain the rate of interest which would result in full employment (1936, pp. 234-236).

A remedy for this situation is the production of money in just that quantity which would maintain real balances:

> . . . whereas if money could be grown like a crop or manufactured like a motor-car, depressions would be avoided or mitigated because, if the price of other assets was tending to fall in terms of money, more labour would be diverted into the production of money; . . . (1936, pp. 230-231).
> Unemployment develops . . . because people want the moon;--men cannot be employed when the object of their desire (i.e., money) is something which cannot be readily produced and the demand for which cannot be readily choked off. There is no remedy but to persuade the public that green cheese is practically the same thing and to have a green cheese factory (i.e., a central bank) under public control (1936, p. 235).

Keynes described the normal or usual result of changes in the quantity of money as a change in output. It is helpful to consider the transmission process in its "stages" of operation. In the first stage, rates of return on short-term government securities are lowered by a bidding up of their prices by the banking authority.

> . . . in normal circumstances the banking system is in fact always able to purchase (or sell) bonds in exchange for cash by bidding the price of bonds up (or down) in the market by a modest amount; and the larger the quantity of cash which they seek to create (or cancel) by purchasing (or selling) bonds and debts, the greater must be the fall (or rise) in the rate of interest (1936, p. 197).

The second stage would come when individuals choose not to hold the new cash after the bond purchase but to spend it on other "existing" assets, thus raising their prices and lowering their yields. In this stage, ". . . some portion of the money will seek an outlet in buying securities or other assets until $\underline{r}$ has fallen . . ." (1936, p. 200).

This r would correspond to the rates (implicit or explicit) on substitute assets, so that at the completion of this "stage," all rates of return have been lowered, including the interest rate on money. The last stage occurs when investment in new capital assets increases as a result of the lowering of the interest rates. New investment expenditures cause output to rise. At the same time, liquidity preference rises due to a lowering of the rate of interest and a rise in the level of income. The excess money balances now find a home in the portfolios of wealth holders, and equilibrium is once again restored.

> Thus each increase in the quantity of money must raise the price of bonds sufficiently to exceed the expectation of some "bull" and so influence him to sell his bond for cash . . . (1936, p. 171).
> The primary effect of a change in the quantity of money on the quantity of effective demand is through its influence on the rate of interest (1936, p. 298).
> There will be a determinate amount of increase in the quantity of effective demand which, after taking everything into account, will correspond to and be in equilibrium with, the increase in the quantity of money (1936, p. 299).
> . . . the grant of bank credit will set up three tendencies--(1) for output to increase, . . . (1936, p. 83).
> Moreover, except in conditions of full employment, there will be an increase in real income . . . (1936, p. 82).
> . . . employment, incomes and prices cannot help moving in such a way that in the new situation, someone does choose to hold the additional money (1936, p. 83).
> Thus incomes and such prices [of assets] necessarily change until the aggregate of the amounts of money which individuals choose to hold at the new level of incomes and prices thus brought about has come to equality with the amount of money created by the banking system (1936, p. 84).
> A change in M can be assumed to operate by changing r, and a change in r will lead to a new equilibrium partly by changing M_2 and partly by changing Y . . . (1936, p. 200-201).
> . . . the terms on which the monetary authority will change the quantity of money enters as a real determinant into the economic scheme (1936, p. 191).

> . . . if the quantity of money beyond what is required in the active circulation is in excess of this proportion of the national income, there will be a tendency sooner or later for the rate of interest to fall to the neighborhood of this minimum. The falling rate of interest will then, cet. par., increase effective demand . . . (1936, p. 306-307).

Therefore, the classical theory is wrong when it claims that the interest rate is self-adjusting without "grandmotherly care" (1936, p. 177).

C. Monetary Policy Under Extreme Conditions

Unusual circumstances may exist in which reliance solely upon monetary policy may be disappointing. One example might be a situation in which there had been a "collapse" of the marginal efficiency of capital, so that investors would expect little or no returns from investment. If these expectations are held universally, lowering the rate of interest would be of little benefit. Confidence in future returns from investments would be low; therefore, any "practicable" reduction in the rate of interest would not be enough to stimulate new investment (1936, p. 316). This condition could exist at "reasonable" levels of interest rates, so it is not a liquidity trap.

There could be a situation in which the rate of interest on all assets had been driven so low that savers uniformly expect that it cannot be maintained at such a low level. Therefore, in hopes of getting a higher profit by waiting, they will hold cash or some other extremely liquid asset in order to purchase assets at a later time. This is the liquidity trap. Since savers do not want to commit their wealth to an illiquid, low-yielding investment to which they will be tied for long periods, they will hold cash as a store of wealth for the interim. Therefore, at these low rates, liquidity preference is perfectly elastic, and the monetary authority has reached a limit below which the interest rate may not be pushed.

If open market operations were conducted in conditions of a liquidity trap, rates on short term government securities would fall. However, recipients of the new cash would not immediately try to convert it into other assets but would hold it until rates rose again. Thus, the substitution effect, upon which successful monetary policy depends, would not occur. The interpretation presented by Friedman that speculators would prevent a rise in the rate of interest is not apparent from Keynes' discussion of activity by speculators (see Appendix C.) If this discussion is the source of Friedman's views, it seems that it serves only to document the preferences of investors for short term, highly liquid assets.

Keynes introduced the possibility of a liquidity trap as a limit to monetary policy in extreme cases. He never discusses it as a normal case, but only under highly unusual circumstances. It is a warning to those who would rely on manipulating the money supply as a remedy to unemployment under any circumstances. These statements are an expected adjunct to the policies of one who encourages and even mandates the use of monetary policy as a matter of course. Keynes, who was a student of money, foresaw the dangers of placing so potent a tool into the hands of those who were not duly warned. To those who sought a simple answer for the problems of unemployment:

> The object of our analysis is, not to provide a machine, or method of blind manipulation, which will furnish an infallible answer, but to provide ourselves with an organised and orderly method of thinking out particular problems . . . (1936, p. 297).

One danger in "formalising a system" is that we lose track of "the necessary reserves and qualifications and adjustments which we shall have to make later on" (1936, p. 297).

A major topic in Keynes' qualifications is the effect of expectations on the behavior of agents. Expectations affect the rate of interest by shifting liquidity preference and by changing the elasticity of demand for money, so that in one instance monetary policy works satisfactorily, while in other seemingly identical circumstances the result is not intended.

Keynes warned against large changes in the money supply which may cause uncertainty and therefore increase liquidity preference (1936, p. 172). Also, expectations are "catching," so that a small change in the rate of interest may cause a "mass movement into cash" (1936, p. 172).

> Thus a monetary policy which strikes public opinion as being experimental in character or easily liable to change may fail in its objective of greatly reducing the long-term rate of interest, because M_2 may tend to increase almost without limit in response to a reduction of $\underline{r}$ below a certain figure. The same policy, on the other hand, may prove easily successful if it appeals to public opinion as being reasonable and practicable and in the public interest, rooted in strong conviction, and promoted by an authority unlikely to be superseded (1936, p. 203).

Changes in the quantity of money may increase output, and that sets up changes in other variables which tend to negate the increase in money. If the increase in output causes prices to rise substantially (due to inelastic supply), liquidity preference will rise. For independent reasons, the MEC may be falling, or the MPC may be falling (1936, p. 173). It is not that monetary policy does not work, it is that one must consider "complicating factors" and their "possible interaction" when "thinking out particular problems" (1936, p. 297).

Monetary policy directly affects rates on short term government securities, but depends on substitution effects to change rates on long term debts and other assets (1936, p. 207). A "slip" may occur,

diminishing these effects because of response time or reluctance on the part of agents due to expectations. Liquidity preference may be absolute, or it may be zero. Keynes described the liquidity trap as a "limiting case" of which he knew no examples, but he does provide examples of a "flattening out" of liquidity preferences in both directions. He cites two cases, one in Europe and another in the United States, but he refers to these situations as "very abnormal circumstances" (1936, p. 207).

An additional problem with the rate of interest being driven to a very low level is that it may not be enough to cover the real costs of risk and uncertainty associated with the asset. This cost is magnified as the term of the ownership of the asset is increased (1936, p. 202). Therefore, savers will not choose to hold their wealth in forms that provide a negative return (1936, p. 219).

While high interest rates retard output and employment by limiting profitable investment, very low rates are equally dangerous for other reasons. Very low interest rates afford no room for manipulation of the money supply, since there is a minimum rate that will be acceptable to wealth holders for the reasons cited above. This minimum rate has proved the "most stable and the least easily shifted" (1936, p. 309). Therefore, "a long-term interest rate of (say) 2 per cent. leaves more to fear than to hope . . ." (1936, p. 202).

These possibilities force Keynes to qualify his statements on monetary policy. However, it must be noted that he never abandons monetary prescriptions but advocates combining them with other methods in circumstances that require "more." A complete breakdown of the

system, situations in which "confidence" is gone, or a level of output very far below average are situations in which monetary measures may need some help. "Merely" (meaning only) monetary measures may be inadequate.

> If a tolerable level of employment requires a rate of interest much below the average rates, . . . it is most doubtful whether it can be achieved by merely manipulating the quantity of money (1936, p. 309).
> . . . the collapse in the marginal efficiency of capital may be so complete that no practicable reduction in the rate of interest will be enough.
> . . . . . .
> This is the aspect of the slump . . . which the economists who have put their faith in a "purely monetary" remedy have underestimated (1936, p. 316).

A real problem with dependence on monetary policy alone is that fluctuations in the marginal efficiency of capital may be so great that changes in the money supply cannot keep the pace (1936, p. 320). The volatility of expectations, rather than the impotence of money, is the cause of this problem (1936, pp. 164, 219-220, 315, 319). Some of the problems of rendering monetary policy more effective can be solved if monetary measures are combined with other policies.

D. Monetary Policy Combined with Fiscal Policy

In spite of the qualifications he presents, Keynes does advocate reliance on monetary policy in normal times, and in this case monetary measures are crucial to the ongoing stability of output levels and price levels. But, "it seems unlikely that the influence of banking policy on the rate of interest will be sufficient by itself to determine an optimum rate of investment" (1936, p. 378).

To mitigate some of the complicating factors, Keynes proposes

redistribution measures to enhance the effectiveness of monetary policy:

> If the rentier is less prone to spend than the entrepreneur, the gradual withdrawal of real income from the former will mean that full employment will be reached with a smaller increase in the quantity of money and a smaller reduction in the rate of interest (1936, p. 290).
> [If the boom has proceeded to the point where the economy is saturated with capital goods (MEC = 0), then] The remedy would lie in various measures designed to increase the propensity to consume by the redistribution of incomes or otherwise; so that a given level of employment would require a smaller amount of investment to support it (1936, p. 324).

These redistributions are necessary only when monetary measures to increase investment have failed because of the above-mentioned factors. The major tool to be used on investment is monetary policy. But where investment is "unplanned and uncontrolled" (1936, p. 324), then "there is no means of securing a higher level of employment except by increasing consumption" (1936, p. 325).

Keynes says the "under-consumption" theorists have laid "a little too much emphasis on increased consumption at a time when there is still much social advantage to be obtained from increased investment" (1936, p. 325). So, to cover the event that the return from capital is secularly declining, Keynes advises that the "wisest course is to advance on both fronts at once" (1936, p. 325). "There is room, therefore, for both policies to operate together . . ." (1936, p. 325).

CHAPTER VI

CONCLUSIONS

A. Major Differences in the Monetary Theories of Friedman and Keynes

As a result of this investigation, some apparent conclusions may be stated. While it is useful to examine the monetary theory of an economist, it is more revealing to compare his theory with another on specific points. This chapter will make a comparison of Friedman and Keynes, especially in light of Friedman's criticisms.

Friedman's model is characterized by a situation of agents adjusting to a change in the nominal supply of money, nominal income, and the level of prices. If price anticipations are less than perfectly accurate, agents will alter spending in real terms until the discrepancies are eliminated. There are two ways the discprepancies are resolved: 1) agents adjust their anticipations to the new nominal values and readjust their spending; and 2) prices will move so as to restore real values to their original levels. These occur simultaneously since they are interdependent.

In the interim period, however, a change in the rate of spending causes a change in the rate of growth of prices. Because producers do not anticipate this change, they mistakenly perceive it as a relative price signal, and they alter their output levels to adjust to a new situation. If there had been an unexpected rise in prices, producers would perceive that the real wage had fallen and that they could profitably increase output. If there had been an unexpected fall in the

rate of change in prices, producers would see this as a price decrease, relative to their costs and other prices in the economy. In this case they would decrease the level of output. Of course, there had really been no relative price change at all. All prices in the economy had risen or fallen in concert, and because the producers were not aware of this, they mistakenly changed the level of output from the profit maximizing level.

A similar story applies to workers in the economy. They offer more labor when their nominal wage is higher than the expected nominal wage, and conversely they offer less labor when their nominal wage is lower than expected. However, they overestimate their real wage in the first case and underestimate it in the second since they do not realize that all other prices in the economy had been moving together. They were fooled by unanticipated inflation or disinflation.

Therefore, if all agents had been informed of the exact movement of the price level, monetary changes could not have influenced the level of output and employment. There is no reason for agents to depart from that level of profit-maximizing output or utility-maximizing employment, so they must have done so as a result of an error in their calculations.

The previous state of long-run equilibrium requires that agents receive a price signal to alter their level of output or labor supplied. The initial result of increased spending is to raise prices, and as a result of the price increase output levels will be increased. This must be so since output cannot be increased if the economy is at its "natural" level of full employment without some price signal to agents.

If there is no "excess supply," agents are constrained by their marginal costs (for producers) and the marginal disutility of labor (for workers), and they must have an increase in price relative to their costs to raise output. If both voluntarily alter employment in the same direction, then the only explanation is that they must have perceived a change in the real wage, and since they require the real wage to move in opposite directions, then at least one or both must have made an error as to the exact nature of the real wage. Friedman explains this by appealing to different sets of information available to workers and firms. Money affects output levels only if there are misperceptions and confusion of agents as to what is or is not a change in relative prices.

Friedman says that his model incorporates flexible prices but not "perfectly" flexible prices. Perfectly flexible prices would prevail whenever agents fully anticipated changes in the price level (1976a, p. 223; 1982, p. 415). In this case, monetary changes would be fully reflected in the price level and agents would not misperceive price level changes to be relative price changes. If prices are not perfectly flexible, it must be due to an information deficiency in the economy. In Friedman's theory, all prices, including the price of existing assets, the price of newly produced goods, and the money wage rate of labor, are flexible in the sense that they respond promptly to changes in the demand and supply. As prices begin to rise due to an increase in spending, agents take the rise in their price to be a real increase in demand for their "service," so they alter their production or supply of labor. This error in calculation results in less than perfectly

flexible prices; in this case output responds along with price, and delays the full adjustment in the price level. Therefore, it is misperceptions which cause prices to be less than perfectly flexible.

Friedman has observed that, in the early stages of an expansion, much or most of the increase in spending will take the forms of an increase in output rather than an increase in prices. Observations such as this should not obscure the direction of causation in his model: it is the increase in the rate of change in prices of output and of the money wage rate of labor that cause output and employment to rise in the event of a monetary stimulus. Similarly, in the event of a monetary restriction, the decrease in spending will cause a decrease in the rate of change of prices and nominal wages, and this in turn causes output and employment to fall. In particular, the important point is the direction of causation, the observation that the decrease in the rate of change of prices may be small relative to the decline in output notwithstanding. More accurately, it is the price signal combined with price misperceptions that explains why monetary events cause cyclical fluctuations in Friedman's theory.

Keynes' model takes an entirely different focus. The existence of money is responsible for an economy operating at less than full employment, but recession is not caused because agents are fooled by unanticipated disinflation. The distinction between relative price signals and changes in the general price level is not crucial to Keynes' analysis because misinterpretations of price "signals" are not important for causing non-optimal changes in output, and in conditions of excess supply, price signals are not necessary. Keynes did recognize that at

full employment a price misperception might occur as Friedman's model predicts (1936, p. 290). But this would be a very temporary state of affairs. Producers would not continue at a too-high output level for any significant length of time; the producers in Keynes' model are aware of their costs and the true relative price.

At less than full employment, below which Keynes considers that the economy is perpetually fluctuating, agents have no problem sorting out the relative price change from the general one. In fact, the change in the supply of money operates on relative prices of assets by offering a real opportunity for profit, which agents quickly seize. Agents build into their calculations the expectation of price level changes, and so are not fooled by increases or decreases in the rate of inflation. But, the economy works well as long as upward changes are indicated; agents are always willing to increase the price of the goods or services they sell. The problem arises when effective demand is not sufficient to maintain full employment. Keynes' agents will not readily reduce their prices to maintain that rate of interest which will provide the level of effective demand that corresponds to full employment.

Are Keynes' agents fooled by the decline in spending, thinking that their relative price has fallen? Keynes would say that his agents are much more aware. They realize that demand has fallen economy-wide; and they may realize that if all agents lowered their prices simultaneously, full employment could be restored. But they also realize that their own individual action will not substantially affect the whole economy. If one worker were to lower his wage, his fellow workers may not follow--certainly his creditors will not lower their

demands from him. If one producer were to lower his price, he does not expect that his workers will agree to lower wages and his suppliers to lower prices. Therefore, any lowering of wages and prices would be seen by the agents as individually harmful, and they perceive this because they make calculations of the effect of their actions in reference to what others will do to arrive at the final optimal course of action.

Therefore, due to the interdependence of decisions, and the existence of a monetary economy in which nominal values assume the center stage because of fixed money obligations, and due to the reluctance of agents to suffer relative declines in income, the economy may become "constrained" by the failure of the price level to decline adequately to maintain full employment. Because of this coordination problem, the economy is always prevented from moving toward full employment because of agents' reluctance to lower own price; the same mechanism operates well when demand exceeds supply, and a price rise is called for--agents are always ready to raise price. Therefore, an unemployment situation is always on the horizon, since the economy is flexible only in one direction.

Monetary policy is effective even if agents anticipate it. If agents will not lower nominal prices to increase real balances and lower the rate of interest, then let nominal prices remain stable and raise the quantity of money to accomplish the same result! Even if, as in The General Theory, workers are aware that their real hourly rewards may be falling, the real wage exceeds the marginal disutility of labor as long as there exists involuntary unemployment. So, workers are concerned with their "balance sheet" and their relative position in

terms of income and are reluctant to suffer nominal losses. Monetary policy has but one purpose: to reduce the rate of interest to allow "spending" for investment goods to increase and thereby to raise effective demand.

A rise in effective demand does not have to operate through price signals if there is excess supply. Firms and workers both desire an increase in employment, for both benefit. If firms believe that an increase in output can be sold they will be willing to increase production at the same price, since labor will not demand a higher money wage if there is excess supply in that market; also their other costs will not increase immediately if there is a condition of excess supply throughout the economy. Further, if the productivity of labor is at least constant in the short run, there is no reason at all to raise prices even after production is underway until finally some "bottlenecks" are encountered which raise costs of production.

Price changes occur in the existing asset market and the money market since these supplies are fixed, and those prices adjust immediately. However, in the market for new goods which have the additional constraint of labor market clearing, prices do not adjust due to the coordination problem described above. Therefore, sticky prices may exist, due to excess supply in the case of an expansion and due to the reluctance of agents to unilaterally lower price in the case of a contraction. Sticky prices in the market for new goods occur without the necessity of a liquidity trap. In fact, monetary policy affects output levels without the necessity of affecting prices of new goods. The crucial element is the existence of excess supply. If Keynes'

economy were at full employment, it would behave as Friedman's does in the event of a monetary stimulus.

Since Keynes espouses a broad range of assets with relative price signals in the existing asset market, it is also not true that Keynes relied on a narrow range of assets as Friedman attributes to the Keynesians. In fact, it is not necessary to use any such assumption once it is realized that the existence of excess supply may explain movements in output caused by changes in the quantity of money without the necessity of agents being deceived by price level changes. It is also not necessary that agents receive a price signal to tempt them to increase output. Additional features of this explanation are (with the amendments of the 1939 paper) that the real wage may remain constant throughout the cycle, that firms and workers are allowed to know the true level of the real wage, and that it is not necessary to explain away quantity responses before changes in prices have occurred.

At the very basis of the theories is the definition of equilibrium, and this seems to be the point from which most of the differences emanate. Friedman's definition of equilibrium is that "all anticipations are realized." Under this requirement, it is clear that Keynes' definition of an equilibrium state does not qualify. Whereas Keynes would maintain that there are any number of equilibrium positions, Friedman admits only one.

Friedman concludes that the long run equilibrium is a hypothetical state, but that it is important since it is one toward which the system is constantly moving. Even though it may never actually exist, that is not relevant since the concept it delivers of the workings of the

automatic adjustment process are revealing. The level of output may be on either side of this "natural" level, but there are "forces" which left alone will move the level of output toward long run equilibrium. The natural equilibrium level may not be at "full employment" in the strict sense of a definition, however it will be at its "natural" full employment level at which agents choose to be if they have all the information that they need to make a decision.

Keynes' equilibrium is one about which the actual level fluctuates, but this state is not hypothetical but actual. It is the normal state of employment and output. It does not have to be at less than full employment, but it is more often than not. While less-than-full employment may be an equilibrium state, over-full employment is not. The state of equilibrium is one that exists because of the nature of a monetary economy that stalls adjustment due to the existence of money as a store of wealth and the problems with coordinating price level changes to restore demand in real terms. It is not subject to full automatic adjustments even in the long run.

Keynes recognized that Friedman's brand of equilibrium occupied the foreground in the classical school, and in fact, was responsible for their preoccupation with the long run and their lack of concern for pressing short run problems. But this too was one of Keynes' objectives in attacking the foundations of economics: long run equilibrium is a hypothetical state that should be of little concern to economists.

The Rate of Interest

Friedman theorizes that the rate of interest on money equilibrates the desires of savers to forego consumption with the desires of

borrowers who seek to borrow for investment or consumption. In the short run the interest rate may be affected by monetary influences as it temporarily disturbs relative price ratios, but the long run position of the interest rate is equal to the real yield on capital at the "natural" level of full employment.

Keynes differs substantially from this position. The interest rate is the result of the demand for money and the supply of money. Investment affects the interest rate only through the effect that it has on output and prices. Increases in output and prices raise the demand for money which tends to have upward influence on the rate of interest. An increased demand for investment (increase in the MEC) would raise interest rates indirectly through the above channel, whereas in Friedman's model, the rate of interest would be bid up directly as the equilibrating variable.

The rate of interest is affected by changes in the supply of money by changing the prices of assets in both Friedman's and Keynes' models. The influence of the interest rate on the money market though is more direct in Keynes' model as equilibrium in the money market is restored through changes in the rate of interest. In Friedman's model, the ultimate determinant of equilibrium in the money market is the price level. Both agree that an interest rate is not limited to debts, and both have a similar idea about what an interest rate represents--the price of the asset relative to the price of the "return" it yields. It is lowered or raised in the same manner also, as the prices of sources are bid up relative to the prices of services.

The Transmission Process and Short-Run Fluctuations

The transmission process envisioned by Friedman and Keynes are broadly similar. An increase in the rate of growth of the money supply through open market operations sets up a substitution process as savers adjust their portfolios to reflect the changed bond prices and yields. In doing so, they drive up prices of existing assets. Even the "range" of assets is broadly similar, though Friedman conceptually may go further than Keynes in this area; but, Keynes maintained that his main concern did not lie with what was called consumption and what was called investment (or saving). It is the case that Keynes recognized that durable goods and even stocks of commodities could serve as assets in a portfolio, in fact anything yielding services of any type.

As the transmission process continues, there are some notable differences. In Keynes' model, wealth holders increase the quantity of money demanded as the interest rate falls. Therefore, there is a limit to spending occurring before interest rates are bid back up to their original level. Further, transmission to demand for consumption goods is not accomplished directly through relative price inducements but through the stimulus of higher income. That is, Keynes' consumption function is an important part of the process. An increase in the output of newly-produced durable goods (assets) requires firms to increase employment. The representative household now will be able to work more hours than previously was the case, so that real labor income will rise. This relaxation of the household's income constraint wil permit a higher level of consumption spending. Eventually, though, output prices will rise, and the demand for money will increase due to real output and price rises, causing a higher equilibrium rate of interest.

Friedman's model has a different outcome, not because of different assumptions about "price" but because of different assumptions about the demand for money. In Friedman's description of the transmission process, wealth-holders continue to spend the "excess" balances until their real balances are at their former level; of course this is only possible if the lowering of the interest rate had no influence on the demand for real balances. Otherwise, like Keynes' wealth-holders, they would have been satisfied with a higher level of real balances at some point in the process. The demand for money in Friedman's model is based on permanent values, and agents may for a time not realize that their permanent income has not risen and will temporarily alter the demand for money. As other anticipations adjust, though, the demand for money will return to its former level causing a return to the level of real spending that existed previously. In Keynes' model, interest rates and real income do affect the demand for real balances, while in Friedman's model they may affect demand during the adjustment process, but when agents "realize" their error, they readjust the demand for money to the long run values of income and the interest rate, and thus force a return to this level of output.

Keynes' transmission process continues after the rate of interest is lowered as the multiplier effect from the increase in investment operates on the market for consumer goods, whereas in Friedman's model the effects of money are finished when agents have fully incorporated the new price level into their calculations. In Keynes model, after the initial stimulus, the market for "money" is equilibrated via the rate of interest, but its effects on output are still operating. In Friedman's

model, as soon as the money market is equilibrated by the price level, the effects are gone. However, in Friedman's model it takes considerable time for anticipations to adjust, whereas in Keynes' model, the interest rate moves quickly to restore equilibrium in the money market. Price rises in Keynes' model are an undesirable but inevitable occurrence. To mitigate the effects of rising prices on the rate of interest, an ongoing program of monetary management must occur.

The Demand for Money

The demand for money in both Friedman's and Keynes' formal specifications is very similar. Both specify real income, rates of return, the price level, and unspecified variables affecting the liquidity of money. While Friedman specifies uncertainty as a variable in his demand function, Keynes considers uncertainty a "given" since without it there would be no demand for money as an asset. Both consider money an asset, and both consider the "exchange" (Keynes, 1936, p. 231) services to be the principal function of money and the "source of its utility" (Friedman and Meiselman, 1963, p. 221).

Even though Keynes separates his demand function and Friedman does not, Friedman admits to this separation in the basic motives. But, he says that wealth holders do not earmark dollars for one or the other purpose. Keynes says precisely the same thing. Therefore, this is not a difference.

The Capital Market

Friedman does not recognize Keynes' scarcity premium which accrues to capital because it is scarce and desirable and not readily produced. As capital becomes more abundant in Keynes' model, the scarcity premium falls and therefore the inducements to produce it fall. The yield from capital falls as more is produced.

In Friedman's model, he denies that the yield on capital falls as more is produced. The stock of capital has a special relation to the yield of capital, so that if the yield changes, the stock is adjusted to obtain the desired yield (1976a, pp. 299-309). In this way, the yield on capital does not depend on the stock in existence but on the demand for the services of the capital equipment and the physical output of the stock.

B. Validity of Friedman's Criticisms

The Liquidity Trap

From the foregoing chapters it is clear that Keynes did recognize the possibility of a liquidity trap, but that it was not the cause of unemployment in the long run nor of price rigidity in the short run. As demonstrated earlier, output prices are sticky due to excess supply and the existence of a monetary economy in which agents are concerned with nominal values. Unemployment is caused in the short run by the failure of prices and wages to fall. Long run unemployment, in Keynes' model, is the result of the failure of prices and wages to be perfectly "flexible" even in the long run. Perhaps Keynes did not produce the kind of long run equilibrium acceptable to pure theorists, and perhaps

Keynes was not overly concerned with the rigor of pure theory, but he considered that the long run, if it had to be interpreted as a "pure" state of perfectly flexible prices, was not very useful to solve economic problems. He maintained that the interest rate could remain too high for decades, and certainly that was his cause of "long-run" unemployment rather than the other hypothetical "extreme" situation--the liquidity trap. If Friedman must criticize Keynes for dependence on a liquidity trap, he should clarify by saying that Keynes saw two hypothetical long run situations if prices are flexible: one the liquidity trap, the other full employment, neither of which were issues that economists should be overly concerned with since they were not "usual."

The short run liquidity trap that Friedman described was a possible result of Keynes' discussions about speculators (see Appendix C). But, it did not impact the transmission mechanism and was unrelated to money's role in the economy. In fact, Keynes claims that there is no obstacle to changing prices on short term debt that is "liquid."

Wealth Effect and Saving

Friedman himself acknowledges that absolute liquidity preference would exist at interest rates "approaching zero," (1976a, p. 316), but he sees this as never occurring, even theoretically, due to the wealth effect. Friedman's individuals "save" to attain a desired balance sheet. Keynes' individuals save for many reasons: to enjoy future consumption or to build up a great fortune or just for the pure pleasure of not spending (pp. 107-108). In Friedman's model there is a limit or

a "desired" balance sheet. In Keynes' model there is not some predetermined stock of wealth. Saving still occurs even if assets grow in real terms due to falling prices. Therefore, in Friedman's model, the "wealth" effect will be operational, but in Keynes' model, there may be no desired balance sheet and no point at which "saving" stops altogether. Keynes does mention, however, the wealth effect on consumption (1936, pp. 57, 84, 92-95, 319), and he does concede that the propensity to consume will change as wealth increases, but he never considers that the propensity to consume would be equal to one when wealth reaches some level as Friedman does.

Even if one assumes that Keynes incorporates changes in the propensity to consume in certain circumstances of increases in wealth in his theory of adjustment to changes in demand, the next question is: would a falling price level be up to the task of reaching this state of wealth? Since Keynes considered perfectly flexible wages and prices that fell without limit to be "extreme," it is doubtful that it could achieve this level of wealth if the same mechanism could not even restore the money supply to the level needed to lower the interest rate sufficiently. Prices would have to fall even further to achieve the "wealth" effect since wealth is less important as a determinant of consumption but the money supply is the major determinant in the rate of interest. There is the additional consideration that the percent of wealth affected in this manner would be small.

According to Friedman, the wealth effect is always operational, even if a liquidity trap restrains a fall in the interest rate. Keynes considered the liquidity trap a "limiting" factor and would have not

have considered that in this improbable circumstance the wealth effect could have much influence either. Though Friedman sees that the "wealth" effect of falling prices encourages "spending," Keynes saw the opposite tendency associated with a falling wage and price level. In this case, the individual would want to "wait out the decline," usually by holding money or some highly liquid asset, inducing "saving" rather than spending. Only when all expectations were that the "bottom" had been reached, would there be any impetus to spending (1936, pp. 263-265).

C. An Alternative Explanation of Unemployment in the General Theory

Some explanation must be offered as to why there is unemployment when there is an obvious route to full employment through price level changes. The explanation must lie in the failure of prices to move adequately. Friedman sees a relative price signal mechanism characterized by price misperceptions as the only way that changes in the quantity of money can operate to induce output changes since the economy always starts from a position of "natural" full employment. Friedman's interpretation of the absence of this mechanism in Keynes' theory is the liquidity trap which prevents relative price changes from inducing output changes. He says that once Keynes' followers recognized that the liquidity trap could not be justified empirically they relied on a narrow range of assets to restrict the price changes only to those assets recorded in financial markets, so that their mechanism had to operate through interest rates, and thus some element of short-run price

rigidity for goods could be theorized. Friedman sees the only other plausible model as his theory in which money affects a broad range of assets through substitution in all markets, and therefore assures that the level of output changes only in response to price changes because of the existence of price misperceptions.

Friedman does not recognize a fourth possibility: that there may be market clearing in the market for existing assets and money but excess supply in the market for newly produced consumer and investment goods. This fourth model would allow relative price changes in the market for existing assets (and therefore interest rate changes), and would intensify the effectiveness of changes in the supply of money, since money in this model would assume a greater position than a medium of exchange--it would form the barrier to market clearing and the the best weapon against unemployment.

In this model then, prices are flexible in the market for existing assets but sticky in the output market and in the labor market. The model allows for price increases (decreases) in the market for existing assets to increase (decrease) the demand for newly-produced assets. If, for example, a decrease in demand occurs under conditions of full employment, output prices and nominal wage rates will be sticky due to the coordination problem in a monetary economy. Accordingly, the decrease in spending will cause output and employment, rather than prices, to fall. Neither a narrow range of assets nor a liquidity trap are necessary to explain why prices are not flexible in the short run.

In this fourth model, if the economy is in recession and experiences an <u>increase</u> in spending, there will be no pressure for

output prices and nominal wages to increase because excess supply exists. Firms and workers will be willing to expand output and employment at the existing price level and the level of nominal wages, and at the existing real wage rate. In particular, price misperceptions are not necessary to explain why short-run (cyclical) fluctuations in output and employment occur. It is the contention of this study that this fourth model best describes the output and employment theories of Keynes.

BIBLIOGRAPHY

BIBLIOGRAPHY

Barro, R. J. and H. I. Grossman. "A General Disequilibrium Model of Income and Employment," American Economic Review, Vol. 61, pp. 82-93, March 1971.

Davidson, Paul. Money and the Real World. London: Macmillan, 1978.

_____. "Reviving Keynes's Revolution." Journal of Post-Keynesian Economics, Vol. 6, No. 4, pp. 561-575, 1984.

Friedman, Milton. "The Quantity Theory of Money--A Restatement." In Studies in the Quantity Theory of Money, edited by M. Friedman. Chicago: University of Chicago Press, 1956.

_____. A Theory of the Consumption Function, National Bureau of Economic Reasearch, No. 63. Princeton, N. J.: Princeton University Press, 1957.

_____. "The Monetary Theory and Policy of Henry Simons." Journal of Law and Economics, Vol. 10, pp. 1-13, October, 1967.

_____. "The Role of Monetary Policy." American Economic Review, Vol. 58, pp. 1-17, March 1968.

_____. "The Demand for Money: Some Theoretical and Empirical Results," pp. 111-140. In The Optimum Quantity of Money and Other Essays, by Friedman, M. Chicago: Aldine, 1969a.

_____. "The Lag in the Effect of Monetary Policy," pp. 237-260. In Friedman (1969a). 1969b.

_____. "Post War Trends in Monetary Theory and Policy," pp. 69-80. In Friedman (1969a). 1969c.

_____. "Interest Rates and the Demand for Money," pp. 141-155. In Friedman (1969a). 1969d.

_____. "The Optimum Quantity of Money," pp. 1-50. In Friedman (1969a). 1969e.

_____. "A Theoretical Framework for Monetary Analysis." Journal of Political Economy, Vol. 78, pp. 193-238, April/May, 1970.

_____. "Comments on the Critics." Journal of Political Economy, Vol. 80, pp. 906-950, September/October, 1972.

_____. Price Theory. Chicago: Aldine, 1976a.

_____. "Comments on Tobin and Buiter," pp. 310-317. In Stein (1976). 1976b.

_____. "Nobel Lecture: Inflation and Unemployment." Journal of Political Economy, Vol. 85, pp. 451-472, 1977.

Friedman, Milton and David Meiselman. "The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States," in Stabilization Policies, ed. Commission on Money and Credit. Englewood Cliffs, NJ: Prentice-Hall, 1963.

Friedman, Milton and Anna J. Schwartz. Monetary Trends in the United States and the United Kingdom: 1875 - 1975. Chicago: University of Chicago Press, 1982.

Garrison, Charles B. "Involuntary Unemployment in Keynes' Model," unpublished. The University of Tennessee, Knoxville, Tennessee, 1985.

Gordon, R. J. Milton Friedman's Monetary Framework. Chicago: University of Chicago Press, 1974.

Haberler, Gottfried. Prosperity and Depression. Geneva: League of Nations, 1941.

Hahn, F. H. "Professor Friedman's Views on Money," Economica, Vol 38, No. 149, 1971.

Hall, Robert E. "Monetary Trends in the United States and the United Kingdom: A Review from the Perspective of New Developments in Monetary Economics," Journal of Political Economy, Vol XX, pp. 1552-1556, Dec. 1982.

Harris, Laurence. Monetary Theory. New York: McGraw Hill, 1981.

Jensen, Hans. "J. M. Keynes as a Marshallian," Journal of Economic Issues, Vol. 17, pp. 67-94, March 1983.

Keynes, J. M. Monetary Reform. New York: Harcourt, Brace, 1924.

_____. The General Theory of Employment, Interest and Money. New York: Harcourt, Brace, 1936.

_____. "Relative Movements of Real Wages and Output," Economic Journal, pp. 34-51, 1939.

Leijonhufvud, Axel. Keynesian Economics and the Economics of Keynes. New York: Oxford University Press, 1968.

Mayer, Thomas. "Monetary Trends in the United States and the United Kingdom: A Review Article," Journal of Political Economy, Vol XX, pp. 1528-1539, Dec., 1982.

Okun, Arthur M. Prices and Quantities: A Macroeconomic Analysis. Washington: The Brookings Institution, 1981.

Patinkin, Don. "Friedman on the Quantity Theory," in Gordon, op. cit., pp. 111-131, 1974.

Patinkin, Don. Keynes' Monetary Thought. Durham: Duke University Press, 1976.

Patinkin, Don. "New Perspectives or Old Pitfalls? Some Comments on Allan Meltzer's Interpretation of the General Theory," Journal of Economic Literature, pp. 47-51, March, 1983.

Pigou, A. C. "Economic Progress in a Stable Environment," Economica, Vol. 14, pp. 180-188, 1947.

Stein, Jerome. Monetarism. Amsterdam: North Holland, 1976.

Tobin, James. "Liquidity Preference as Behaviour Toward Risk," Review of Economic Studies, Vol 25, pp. 65-86, 1958.

Tobin, James. "Friedman's Theoretical Framework," in Gordon, op. cit., pp. 77-89, 1974.

APPENDIXES

APPENDIX A

KEYNES ON INVESTMENT BY FIRMS

Keynes did not consider cases of "firms" making these decisions to invest based on alternative returns to various assets. Firms are a form of productive activity for their owners by producing that good which is its business. A firm will expand to the limit of its ability to secure financing to increase production of its own goods. Firms cannot be speculators in asset markets since they have no "income" which could either be consumed or saved. Income accrues only to the owners of the firm who are individuals. The desire for quick returns is not characteristic of the behavior of investment by firms.

Whether or not firms make this decision to invest based on the relative prices and yields of alternative assets, as certainly individuals do, is important given the volume of investment purchases undertaken by firms in the economy. If, as argued above, firms are single-mindedly directed to increasing their own business, then any profitable opportunity to increase the scale of production would result in increased profits for their stockholders. A profitable opportunity would arise when the marginal efficiency of capital exceeded the rate of interest. But, given this assumption about the behavior of firms, they would already have exploited such opportunities to the maximum extent subject to the financial constraint imposed by the prevailing rate of interest and the debt to equity ratio of the firm. It is only through the relaxing of this constraint and the simultaneous lowering of the

rate of interest that will allow firms to increase the rate of investment. Once this is accomplished, then firms hold no reservations or expectations as individuals do. They are not portfolio holders, but they are "held" by their stockholders.

The transmission process associated with an open-market stimulus would affect firms in the following way: the prices of government securities and existing assets are driven up by the transmission process described above; since common stock is one of the assets in savers' portfolios, its price will be driven up also. The reason is that savers will purchase more of the existing shares of common stock because its earnings to price ratio (its yield) is high compared to government bonds. But, when the price of the stock rises, the total equity held by stockholders will have risen in value since there are the same number of shares with higher market prices. This increase in equity lowers the debt to equity ratio for the firm and effectively relaxes the existing financial constraint. Now the firm may borrow or issue new shares of stock to raise funds for expansion, both methods raising the debt to equity ratio. Borrowing would seem to be the preferred method since the "cost" of funds is now cheaper due to the general lowering of all alternative "yields." An additional inducement, and an important one, is that the marginal efficiency of capital has risen relative to the interest rate for the firm as well as for the individual investor, for at this point, the supply price of newly-produced assets has not risen. This makes it easier for the firm to invest in new capital, at the same time that the individual investor finds it profitable to purchase new capital goods as a store of wealth.

Keynes recognizes the relationship between the price of shares and investment by firms.

> . . . a high quotation for existing equities involves an increase in the marginal efficiency of the corresponding type of capital and therefore has the same effect (since investment depends on a comparison between the marginal efficiency of capital and the rate of interest) as a fall in the rate of interest (1936, footnote, p. 151).

It is interesting to note that firms are not "unconstrained" in their activities. Individuals are constrained by their wealth and their rate of saving out of income, while firms are constrained by their debt to equity ratios. Firms whose debt to equity ratios are high must pay a high rate of interest to borrow, due to the high risk which lenders assign the the borrower, and potential purchasers of new issues investigate the debt position of firms. Therefore, the transmission process is critical for this situation, especially if there is an economy-wide problem that firms are illiquid. Firms will have a mandate to invest in new capital equipment due to the transmission process. This investment will take place not due to portfolio management within firms, but due to the special nature of firms as organizations of production in which persons hold ownership and from which they demand a return. Although there are cases of firms purchasing other firms, this is not a situation of portfolio management but a substitution on the supply side. If firms behaved as individuals by saving and holding a portfolio of assets not related to their business, including equities of other firms, they would find themselves in the strange situation of competing with their owners for the available returns and of providing funds for their competitors in the form of loans and equities.

APPENDIX B

FRIEDMAN'S VIEWS ON THE EFFECTS OF A CHANGE IN MONEY ON FIRMS

Firms store money as a productive tool--meeting payrolls, purchasing supplies, and the like; therefore, the cost of holding money to accomplish these things (which is the opportunity cost of holding interest bearing assets) is "highly relevant" to the business enterprise (1982, p. 41). Another important set of variables is whatever affects the "productivity of money balances," though Friedman and Schwartz do not specify, important ones would be the rate of inflation and the ease of obtaining short term loans.

The demand for money will vary from firm to firm according to the scale of the enterprise, but this scale is a "variable that an enterprise can determine to maximize returns, since it can acquire additional capital through the capital market" (1982, p. 41). The only constraint that the firm would be under is the real return on capital as related to the real return demanded by suppliers of wealth. If the return on capital were greater than the rate of interest, the firm would acquire more of it, "demanding" a greater level of capital, and therefore driving up the equilibrium rate of interest. In the same manner, if the return on capital fell, the firm would sell capital, thus driving down the rate of interest. In this way, the real rate of return on capital is always equated to the rate of interest.

If a firm made wise decisions about purchasing the most productive capital whose rate was at least equal to the rate of interest, it would

be able to expand to any size, provided the economy possessed adequate capacity to produce this productive capital. There is no financial constraint on the ability of firms to invest.

What effect does the short term lowering of interest rates have on "investment" by firms? In Friedman's model, if firms "invest" whenever the interest rate is lowered by purely monetary means, they borrow to purchase capital goods to expand their scale of production. When they attempt to purchase these assets, the suppliers demand a higher price for them since the former rate of output was equilibrium. A higher price for the asset means that the expected return on the asset will have fallen. In fact, if prices of assets move up uniformly, no new investment will be possible merely because interest rates are lowered. The transmission process equates returns on assets, real ones as well as financial ones, so that there is no advantage to the firm in "investing."

The lowering of interest rates cannot have an effect on investment unless suppliers of these goods are willing to sell them at the same prices. If the transmission process affects output by affecting the willingness of suppliers to increase production due to a higher price, then unless firms miscalculate the price of the assets they are purchasing, some other explanation must be offered as to why there is an increase in investment by firms.

APPENDIX C

KEYNES' VIEWS ON NEW INVESTMENT

Organized markets

Since a person may purchase existing assets or purchase new ones with his savings, a new asset will not be produced unless the aggregate level of savings rises. Otherwise, only transfers of wealth will take place. Therefore, saving must be equal to current new investment. (pp. 81-82) It follows that unless it is attractive to purchase new wealth, therefore ordering its production, there will only be a reshuffling of portfolios. This situation will not lead to an increase in the rate of investment and will do nothing to increase output. Insofar as wealth owners choose existing assets over newly produced ones, investment in new capital assets is correspondingly reduced.

Wealth owners' preferences are guided by their desires for yield from an investment. Part of this yield, as described above, is the liquidity premium. Keynes saw this desire for liquidity as operating to reduce the market transferrence mechanism from the market for existing assets to the market for newly produced assets. The organized markets, which facilitate transfers of existing assets among traders and which facilitate the issuing of new securities, operate from both sides to promote and at the same time discourage investment in new capital.

> With the separation between ownership and management which prevails to-day and with the development of organised investment markets, a new factor of great importance has entered in, which sometimes facilitates investments but sometimes adds greatly to the instability of the system (1936, p. 150).

The problem is caused by the fact that an investor has more choices than previously. He may either purchase a new capital asset to employ in producing goods, or he may purchase an existing asset in an organized market. He will do so according to which form of investment carries the higher expected return. If he chooses to purchase an existing asset on an organized market, and if his purchase does not perform as expected, he has the option of selling or trading for another. On the other hand, if he chooses a capital asset that is not traded, he is generally committed to the investment for a longer period. Therefore, the existence of organized markets lends a great deal of liquidity to the purchase of some assets, and in doing so, elevates their yields.

> But the daily revaluation of the Stock Exchange, though they are primarily made to facilitate transfers of old investments between one individual and another, inevitably exert a decisive influence on the rate of current investment. For there is no sense in building up a new enterprise at a cost greater than that at which a similar existing enterprise can be purchased . . . (1936, p. 151).

Some problems with encouraging long term investment are solved by the existence of organized markets:

> For if there exist organized investment markets . . . an investor can legitimately encourage himself with the idea that the only risk he runs is that of a genuine change in the news over the near future . . . which is unlikely to be very large (1936, pp. 152-153).
> Thus investment becomes reasonably "safe" for the individual investor over short periods . . . . Investments which are "fixed" for the community are thus made "liquid" for the individual (1936, p. 153).

Keynes details a host of reasons that investment may be curtailed by the existence of these organized markets. The markets become a game for speculators who play desiring quick profits. The game turns

investment into a speculative exercise in which the players attempt to outguess each other rather than making decisions with regard to long term returns on their investment purchases. Since the "investors" are not well-acquainted with the businesses they are "purchasing," the day to day fluctuations guide their trading which are generally unrelated to the long term potential of the firm. These short term investors shun assets which represent long term committments that will not turn a quick profit. The long term investors are discouraged from borrowing to purchase capital assets since there exists an alternative way to earn quicker returns at a much lower risk due to the high liquidity premium (1936, pp. 154-156).

Keynes sees a "dilemma" which plagues modern organized investment markets:

> If individual purchases of investments were rendered illiquid, this might seriously impede new investment so long as alternative ways in which to hold his savings are available to the individual. This is the dilemma. So long as it is open to the individual to employ his wealth in hoarding or lending money, the alternative of purchasing actual capital assets cannot be rendered sufficiently attractive (especially to the man who does not manage the capital assets and knows very little about them), except by organizing markets wherein those assets can be easily realised for money (1936, p. 160).

The transferrence from the market for existing assets to the market for new assets is thus somewhat strained by the high liquidity premiums that attach to traded assets, especially to already-produced assets. The transmission process operates on a structure of yields, which is altered by bidding up the prices of existing assets. The fixed supply of existing assets forces the entire change to be borne in their prices. Prices of newly produced assets rise only as their production

increases due to the existence of bottlenecks in the production process (1936, p. 300). When wealth holders regard this situation, they will see that aside from the increased liquidity premium of already existing traded assets there is an additional appreciation premium from their purchase. Therefore, the demand for newly produced assets must always "lag behind" the demand for existing assets.

The price of new capital assets is governed by the conditions of supply. New capital assets which are traded in organized markets would command a higher price due to their liquidity premiums. But the suppliers of these assets make no distinction as to whether they are producing traded assets or not. At prices higher than equilibrium, suppliers would be willing to supply more new assets. But the demand for assets at this price is limited to the ones that are traded. Therefore the incentive of high prices on traded assets keeps suppliers of these assets in a condition of excess supply. The transmission process provides the only method by which effective demand can increase in the market for newly produced goods. The only method by which demand for newly-produced goods (traded as well as non-traded) can increase is through the increase in the price of substitute goods and a fall in the cost of acquiring these goods.

Keynes recognized this interdependence between markets, and the importance of whether goods are traded or non-traded. Traded goods always command higher prices, and since they set the standard for all newly produced goods, the inevitable result is excess supply in the market for newly produced goods due to an equilibrium price that is too high.

> For there is no sense in building up a new enterprise at a cost greater than an existing enterprise can be purchased; whilst there is an inducement to spend on a new project what may seem an extravagant sum, if it can be floated off on the Stock Exchange at an immediate profit. Thus, certain classes of investment are governed by the average expectation of those who deal on the Stock Exchange as revealed in the price of shares, rather than by the genuine expectations of the professional entrepreneur (1936, p. 151) (emphasis added).

What did Keynes propose to do about this matter?

> The only radical cure . . . would be to allow the individual no choice between consuming his income and ordering the production of the specific capital-asset which . . . impresses him as most promising . . . .
> . . . that would avoid the disastrous, cumulative and far-reaching repercussions of its being open to him . . . to spend his income neither on one nor the other (p. 161).

Long Term Rates of Interest

Another limit to new investment may be that the transferrence between markets is limited in that long term rates of interest may respond imperfectly to changes in short term rates. Keynes says that the central bank is always able to alter the price on short term securities through its open market operations (1936, p. 197). In this case, the long term rates will have to follow from the substitution process. Since the rate of interest on short term securities is given by the inverse of the price of these securities and the rate on long term securities is given by the price on them, then whenever the price of short term securities is bid up by the central bank, then savers will search for better yields in the asset markets. After all short term yields are affected in this manner, savers should then turn to long term bonds as a substitute investment.

As savers purchase more long term debt, they bid up prices on this debt and lower its yield. Keynes sees a problem with this transmission process.

> If the monetary authority were prepared to deal . . . in debts of all maturities, and . . . of varying risk, the relationship between the complex rates of interest and the quantity of money would be direct (1936, p. 205).
> The monetary authority often tends to concentrate upon short-term debts and to leave the price of long-term debts to be influenced by belated and imperfect reactions from the price of short-term debts. . . (1936, p. 206).
> Where these qualifications operate, the directness of the relation between the rate of interest and thequantity of money is correspondingly modified (1936, p. 206).
> Where . . . open market operations have been limited to the purchase of very short-dated securities, the effect may . . . have but little reaction on the much more important long-term rates of interest (p. 197).

The long term rates are critical for investment in new capital goods. Since the nature of investment in new capital must involve a delayed return, changes in long term rates can determine the profitability of an investment. These are the rates which matter for calculating the marginal efficiency of capital and are an argument in the demand function for new capital assets.

VITA

Millicent Moulder Taylor was born in Longview, Texas on November 6, 1945. She lived in Nashville, Tennessee and attended public schools there. She entered Vanderbilt University in 1963 and received a Bachelor of Arts degree in January 1966, with a major in Economics.

After being employed as a systems analyst in Nashville for several years, she moved with her family to Morristown, Tennessee in 1977, and entered the graduate school at the University of Tennessee in September 1979. She received the Master of Arts Degree in June 1982.

Mrs. Taylor taught economics at Tusculum College in Greeneville, Tennessee while completing the requirements for the Ph.D. in Economics. The degree was awarded in December 1985.

At the present time she is employed as an economist with the Central Intelligence Agency in Washington.